

Revision 3
Comprehensive Basewide Range Assessment Report
Former Fort Ord, California
Draft Final



Prepared for:

U.S. Department of the Army
Fort Ord Base Realignment and Closure
4463 Gigling Road, Room 101
Seaside, CA 93955-7302

Prepared by:

U.S. Army Corps of Engineers
1325 J Street
Sacramento, California 95814

With Technical Support from:

JBW Federal
Fort Ord BRAC Technical Support
Building 4463 Gigling Road
Seaside, CA 93955

September 2026

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ACRONYMS

AR	administrative record
Army	United States Department of the Army
bgs	below ground surface
BLM	Bureau of Land Management
BRA	Basewide Range Assessment
BRAC	Base Realignment and Closure
BRAWP	Basewide Range Assessment Work Plan
COCs	chemicals of concern
CSM	conceptual site model
cy	cubic yards
DMM	Discarded Military Munitions
DTSC	California Department of Toxic Substances Control
DU	decision unit
EG	East Garrison
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ERA	Ecological Risk Assessment
ESCA	Environmental Services Cooperative Agreement
FORA	Fort Ord Reuse Authority
FOSET	Finding of Suitability for Early Transfer
FS	Feasibility Study
GIS	Geographic Information System
GPS	Global Positioning System
HA	Historical Area
HGV	Health Guidance Value
HLA	Harding Lawson Associates
HMP	Habitat Management Plan
HMX	cyclotetramethylene tetranitramine
HTW	Hazardous and Toxic Waste
IA ROD	Interim Action Record of Decision
ID	identification
KEMRON	KEMRON Environmental Services, Inc.
MACTEC	MACTEC Engineering and Consulting, Inc.
MD	munitions debris
MEC	munitions and explosives of concern
mg/kg	milligrams per kilogram
MOUT	Military Operations in Urban Terrain
MR(s)	munitions response(s)
MRA	munitions response area
MRS	munitions response site
OEHHA	Office of Environmental Health Hazard Assessment
PAHs	Polynuclear aromatic hydrocarbons
PA/SI	Preliminary Assessment/Site Inspection
QAPP	Quality Assurance Project Plan
RAO	Remedial Action Objectives
RDX	cyclotrimethylene trinitramine

RI	Remedial Investigation
ROD	Record of Decision
RSL	regional screening level
SAP	Sampling and Analysis Plan
SAW	semi-automatic weapon
SI	Site Inspection
SL	Screening Level
SOP	Standard Operating Procedure
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbons
UCL	upper confidence level
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
WGBA	Watkins Gate Burn Area

EXECUTIVE SUMMARY

This report presents an update of the comprehensive results of the Basewide Range Assessment (BRA) investigation activities conducted through August 2026 at the former Fort Ord military complex in Monterey County, California. The BRA is being conducted to evaluate the potential presence of chemicals of concern (COCs) at known or suspected small arms ranges, multi-use ranges, and military munitions training areas within the former Fort Ord military complex. The report was first issued as Revision 0 in 2005 and later updated as Revision 1 in 2009. The *2012 Comprehensive BRA Report* Revision 2 included updates for activities conducted between 2009 and 2011. This report includes updates for activities conducted since 2012 mainly associated with Site 39. This report summarizes the status of investigations for known or suspected small arms and multi-use training ranges, identified as historical areas (HAs) in the report. The objectives of the BRA investigation activities described in this report are to identify which HAs can be eliminated from consideration for potential remediation related COCs, and to identify HAs that require additional investigation for potential chemical contamination or should be considered for remediation/habitat mapping related to COCs. The main body of the text includes background information on the BRA process and summarizes the results of the BRA evaluation. Summary information for each remaining HA and newly identified HAs are included in Appendix A of this report. Only HAs with new information since the *2012 Comprehensive BRA Report* are included in this Revision 3.

The BRA process involved five steps: 1) A review of historical documents including historical training maps, historical aerial photographs, range control records, and military munitions response activity reports, 2) site reconnaissance and mapping, 3) limited soil sampling for screening purposes, 4) site characterization, and 5) remediation/habitat mapping. The first three steps are part of the site assessment phase and the final two steps are part of the remedial phase (see PLATE 1.2).

Since the 2012 revision, the Army has implemented changes in the sampling approach for metals and explosives at former ranges at Fort Ord. These changes are described in individual work plans (for HA-23D and areas within Site 39) and the *Final, Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix B, Soil Sampling, Basewide Range Assessment* (KEMRON 2016a). This report summarizes these changes and the results of completed sampling through October 2020.

The *Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites* (KEMRON 2019a) was prepared since the 2012 revision. Most HAs with elevated lead concentrations were re-evaluated under a new lead screening level for residential use based on a change in health guidance value developed by the State of California. In 2018 the California Department of Toxic Substances Control (DTSC) promulgated the "Toxicity Criteria Rule" that established a new toxicity criterion for lead. Sites HA-18D and 23D are within areas designated for future development that could include residential use, and a change in lead cleanup level is currently being discussed between the Army, DTSC, and the U.S. Environmental Protection Agency (EPA). Details are further discussed in Section 2.

This report expands on the *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2* (Shaw 2012). Below is a summary of the HAs with new information since the 2012 report.

- Incorporates the results of the remedial actions completed in Site 39 habitat reserve areas, as described in the *Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014b).
- Incorporates the results of the lead re-evaluation conducted as a result of a change in California health guidance value for blood-lead levels. The 2019 *Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California* report identified HA-18D and HA-23D for further evaluation for lead in soil under future residential use (KEMRON 2019a).
- Describes additional BRA evaluations conducted in munitions response work units where munitions and explosives of concern (MEC) remedial action and associated vegetation removal made the areas accessible to conduct BRA evaluation. Several of the units are within the Impact Area (HA-118), and BRA evaluations are conducted following munitions responses, as described in *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California* (Army 2009a). Additional HA numbers have been assigned to these units. To date, two future soil remediation areas have been identified (within HA-211 and HA-215).
- Describes additional BRA evaluation conducted in a portion of Bureau of Land Management (BLM) Area B (HA-219), north of the Impact Area, following munitions responses. One area remains to be evaluated.

Additionally, the following updates since the 2022 draft Revision 3 are incorporated in this document:

- BRA evaluation of Unit 5 within the Impact Area was completed in 2023 as documented in *Site Evaluation Results, Basewide Range Assessment Investigation, Unit 5* (KEMRON, 2023). The unit is listed as HA-223.
- EPA issued the revised regional screening level (RSL) of 200 mg/kg for lead in residential soil in *EPA Office of Land and Emergency Management Directive SUBJECT: Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities*, dated October 16, 2025 (EPA, 2025).

The following additional information provides follow-up to some HAs, but does not result in a change to the BRA evaluation or recommendations:

- No Action Approval Memoranda were approved in 2009 to plug-in several HAs (HA-79, -92, -98, -100, -121, and -183) to the *No Action Plug-In Record of Decision, Fort Ord California* (Army 1995). Revision 2 had recommended no further BRA action for these HAs.
- For the Site 3 Beach Trainfire Ranges, the final Record of Decision (ROD) (Army, 2005) required no further remedial action with ecological monitoring. The ecological monitoring program was completed in 2016 (Chenega 2016).
- BRA evaluation is complete for areas included in the Environmental Services Cooperative Agreement (ESCA) which include several formerly evaluated HAs. There are follow-up actions for HA-18D and HA-23D only.
- The development and habitat area boundaries have been revised based on East Garrison and Parker Flats Land Use Modification Assessment (Zander 2002) and the Revised Attachment A – Habitat Management Plan (HMP) map (March 2006). The BRA program has retained the HA boundaries to preserve HA- specific evaluations and recommendations.

Sixteen munitions remediation units/areas have been evaluated under the BRA process since Revision 2

and have been identified as new HAs.

In this revision, an updated site report is provided in Appendix A for HAs that have had an updated status since 2012. In the *2012 Comprehensive BRA Report*, six HAs were identified as “remediation ongoing” and 12 HAs as “reconnaissance/sampling pending vegetation clearance and/or munitions removal.” All 6 HAs (HA-34, -37, -38, -72, -203, and -205) deemed as “remediation ongoing” were deemed for “No further BRA action” based on HA specific work. HA-203 and -205 were deemed for “No further BRA action” based on completed actions in other HAs located within. Of the 12 HAs, seven HAs (HA-30, -41, -42, -70, -73, -153, and -204) have reached “No further BRA action”, five of which fall into unit- wide BRA evaluations that were deemed for “No further BRA action”. The remaining five of the 12 HAs (HA-27, -31, -31A, -32, and -118) require further BRA actions. Six HAs (HA-18D, -23D, -158, -202, -203, and -205) have status updates due to items such as updated lead levels and ESCA remediation program updates. Four newly established HAs (HA-211, -215, -219, and HA-223) are deemed for further evaluation and eleven HAs (HA-207, -208, -209, -210, -212, -213, -214, -216, -217, -221, and -222) were deemed for “No further BRA action” based upon recent evaluations and investigations.

1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) prepared this report on the Basewide Range Assessment (BRA) investigation with technical support from Chenega Tri Services. This report documents the status of sites identified for investigation for the presence of potential chemicals of concern (COCs) at known or suspected small arms ranges, multi-use ranges, and military munitions training areas within the former Fort Ord military complex (Plate 1.1, Table 1.1) in Monterey County, California. The sites, known as historical areas (HAs), were identified for investigation as part of the Basewide Range Assessment Work Plan (BRAWP) and previous investigations performed as part of the Basewide Remedial Investigation/Feasibility Study (RI/FS) process. The 2012 report, issued as Revision 2, was comprehensive for all identified sites, including those where remediation for COCs had been completed. This report, Revision 3, provides an updated status for HAs where new information is available, and for additional HAs identified since the 2012 version. These additional HAs comprise munitions response work units where munitions and explosives of concern (MEC) remedial action and associated vegetation removal made the areas accessible to conduct BRA evaluation. These unit-based HAs typically include previously evaluated HAs.

Under the BRA, an evaluation of each of the identified HAs were initiated to ascertain whether potential chemical contaminants could be present in sufficient amounts to warrant remediation, and if remediation was warranted based on available information, to determine the area within an HA where remediation should be recommended.

This report expands on the *Final Comprehensive BRA Report, Former Fort Ord, California, Revision 2* (Shaw 2012). This Comprehensive BRA includes results of site characterization, reconnaissance, and/or site investigations. Only HAs with new information since the *2012 Comprehensive BRA Report* are included in this Revision 3. Summaries for each of these HAs are included in Appendix A.

The process used to complete the BRA was described in detail in the *Draft BRA and Investigation Process Technical Memorandum* (HLA 2000) and is summarized in the flow chart presented as PLATE 1.2. This report presents a summary of the evaluation process and provides appropriate recommendations for each HA related to potential COCs. Activities at some of the HAs identified in the BRA have not been completed because MEC removal activities are ongoing or pending, limiting access to the site. The BRA Comprehensive Report will be updated in the future, as necessary, when additional work is completed at HAs included in this report, or if additional HAs are identified. This report only identifies HAs with new data since the previous *2012 Comprehensive BRA Report* (Shaw 2012). Information on closed HAs or HAs with no further evaluations recommended in 2012 or prior can be found in the *2012 Comprehensive BRA Report* (Revision 2) (Shaw 2012).

1.1 Summary of Basewide Range Assessment Process

The BRA consists of two phases, the site assessment phase, and the remedial phase (PLATE 1.2). The site assessment phase consists of data review, site reconnaissance and mapping, and limited soil sampling. The remedial phase consists of the remedial investigation including site characterization, feasibility study, and remedial actions.

1.1.1 Site Assessment Phase

The site assessment phase is divided into three parts:

- Literature Review;
- Reconnaissance and Mapping; and
- SI Sampling.

If evidence of the potential for COCs in soil at a range or training area was identified during literature review, site reconnaissance is conducted. The results of the site reconnaissance are evaluated to determine whether sampling is required to further characterize a training site or range. If no evidence of small arms use or other chemical contamination is identified during the site reconnaissance, no further investigation is recommended. If the results of the site reconnaissance and literature review indicate the potential for chemical contamination, but significant spent ammunition concentration are not present, SI soil samples will be collected. Site-specific soil sampling plans are developed prior to sampling. The results of the literature review, site reconnaissance and limited soil sampling are evaluated to determine if the area should be evaluated as a remedial investigation site (Harding ESE/IT Corporation, 2001).

The process followed for completing each phase is described in more detail in Section 4. Table 1.1 presents a list of all the HAs identified to date at the former Fort Ord.

1.1.2 Remedial Phase

The remedial phase is also broken into several parts as follows:

- Site Characterization;
- Risk Evaluation;
- Remediation/Habitat Mapping;
- Preparation of Technical Memorandum or Remediation Work Plans;
- Remediation.
- Final Risk Evaluation; and
- Remediation Confirmation Reports.

This report summarizes the results of the site characterization activities, remediation mapping, and remediation completed through October 2020. The ecological risk assessment is presented in the Basewide RI/FS (HLA 1995) and the *Final Ecological Risk Assessment for Site 39 Ranges, Habitat Areas, Impact Area, Former Fort Ord, California, Revision 1* (Site 39 Ecological Risk Assessment [ERA]; MACTEC/Shaw 2007). This report does not address the preparation of remediation work plans or confirmation reports.

1.2 Report Organization

The Comprehensive BRA Report is organized as follows:

Section 1.0 – Introduction. This section provides information on the BRA process and the organization of the report.

Section 2.0 – Background. This section presents a description of the investigations completed prior to establishing the BRA process, Conceptual Site Models, and summarizes the methodology used to complete each phase of work. It also provides a summary of the soil collection methods and analytical methods used during SI and site characterization sampling.

Section 3.0 – Basewide Range Assessment Results. This section summarizes the results of the initial BRA and subsequent assessments.

Section 4.0 – References. This section provides a list of references to pertinent documents cited in the report.

Appendix A – Site Reports. Each site report presents background information, reconnaissance results, sampling results, and mapping results, as appropriate. A section is included for each HA, and can be updated in the future by replacing the section, if additional information becomes available. Each HA is separated by a tab to identify the individual HAs. Only HAs with new data since the previous *2012 Comprehensive BRA Report* (Shaw 2012) are included in this Revision 3. Additional information on the closed and “No further BRA action” HAs completed prior to 2012 can be found in the previous *Comprehensive BRA Report* (Shaw 2012).

Appendix B – Responses to Comments. Responses to comments received on the 2022 draft Revision 3 are provided.

2.0 BACKGROUND

2.1 Military Munitions History at Fort Ord

Fort Ord served as a training and staging facility for infantry troops from its opening in 1917 until its closure in 1993. Since 1917, portions of Fort Ord were used by infantry units for maneuvers, target ranges, and other purposes. Military munitions were fired into, fired upon, or used on the facility in the form of artillery and mortar projectiles, rockets guided missiles, rifle and hand grenades, land mines, bombs, demolition materials, and small arms (HLA 2000). To date, review of existing data has identified three primary areas where military munitions and small arms were used at designated ranges, the Beach Ranges, the Impact Area, and the East Garrison Ranges. In addition, several areas outside of the designated range areas have been identified as known or suspected munitions response sites.

2.2 Previous Investigations

Each of the three primary areas and other areas outside of the designated range areas have undergone some level of investigation. The investigations are summarized below for each group.

2.2.1 Previous Investigations of the Impact Area

The Impact Area was identified as Site 39, the Multi-Range Area (MRA) as part of the Basewide RI/FS completed in 1993 and 1994 (HLA 1995). This area was also identified as the MRA on historical training maps. The MRA, Site 39 was subsequently renamed the Impact Area because of changes to military munitions terminology implemented by the Army. Site 39 and the Multi-Range Area are referred to as the Impact Area in this report.

Several investigations of the Impact Area (HA-18D through HA-76 and HA-110 through HA-118) occurred prior to the development of the Basewide Range Assessment Program in 2001. Investigation included the Basewide RI/FS, several pilot studies, and additional characterization and remediation of areas within the Impact Area where reuse was modified from habitat reserve to development. Areas identified for habitat reserve are restricted from future development. Development could include commercial or residential development. These areas are identified in the Fort Ord Reuse Plan (FORA 1997) and *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California* (HMP) (USACE 1997). The development area boundaries have been further revised; *East Garrison and Parker Flats Land Use Modification Assessment* (Zander 2002) and the Revised Attachment A – HMP map (March 2006) present the revised boundaries of the development areas and habitat reserve areas.

Evaluation of chemical contamination related to military munitions use within the Impact Area was first conducted as part of the Basewide RI/FS (HLA 1995). The area was investigated for chemical contamination related to small arms ammunition use and larger military munitions. Investigation of chemical contamination (metals, explosive compounds, and total petroleum hydrocarbons) related to military munitions was conducted at military munitions targets within specific ranges inside the limits of the Impact Area. The results of the investigation indicated that explosive compounds and metals are generally present in surface soil (0 to 12 inches below ground surface [bgs]) and are present primarily in ranges that show evidence of heavy use, such as demolished targets and visible explosive waste (munitions debris) and unexploded ordnance. The occurrence of explosive compounds in the subsurface

soil was sporadic, and concentrations were generally below reporting limits. When levels of explosives were elevated there was an accompanying elevation in metals. Areas of the Impact Area were also investigated for the presence of hydrocarbons related to the use of flammable substances in training operations. Ranges investigated for hydrocarbons include Range 40A (HA-40) and Range 33 (HA-33). A ROD for Site 39 was signed in 1997 (Army 1997a). The selected remedial action for soil associated with spent small arms ammunition contamination was excavation of soil containing greater than 10 percent spent small arms ammunition and soil containing greater than 1,860 mg/kg lead. This action was based on the reuse of the areas as a habitat reserve. The selected remedial action for areas with elevated explosives and beryllium concentrations was excavation of soil containing the explosive cyclotrimethylene trinitramine (RDX) at concentrations above 0.5 mg/kg and beryllium concentrations above 2.8 mg/kg. Remedial actions were also identified for soils where hydrocarbons were detected at greater than 500 mg/kg.

A pilot study was conducted in 1998 to refine the approach for characterization of small arms ranges, the predominant type of range within the Impact Area. The primary objective of the pilot study was to establish a quantitative correlation between the visual mapping of spent small arms ammunition on the surface of the small arms ranges versus the concentration of lead and other metals associated with spent ammunition (HLA 1999a). The results of the pilot study indicated that lead in soil samples collected in areas of greater than 10 percent spent small arms ammunition generally exceeded the ROD specified health-based level of concern for habitat reuse of 1,860 milligrams per kilogram (mg/kg) (Army 1997a). Samples collected from areas with 1 to 10 percent spent ammunition had lead concentrations that generally exceeded 1,000 mg/kg and some samples were greater than 1,860 mg/kg. The results of the pilot study also indicated that mapping spent small arms ammunition concentrations in the inland ranges was difficult due to the thick brush present in most of the ranges. The results of this study were used to modify the site mapping program to emphasize mapping of range features such as targets, firing lines, and areas of 10 percent spent ammunition, where visible. The mapping of these features and development of conceptual models for the different types of ranges present, were used to better refine sampling programs for these ranges.

Additional characterization was conducted in the residential (non-habitat) and mixed-use areas of the Impact Area under the *Draft Final Additional Soil Characterization – Site 39, Work Plan, Former Fort Ord, California* (HLA 1999a). This characterization included performing a literature review to identify other areas of potential small arms ammunition use within the Impact Area and outside the Impact Area, site reconnaissance and mapping, soil sampling, and evaluation of the data. These data were then used to make recommendations for remedial actions within the non-habitat areas of the Impact Area. Remedial actions at portions of Ranges 21, 24, 25, and 26 were completed in 1999 based on the results of the characterization activities completed at Site 39. Remediation at portions of Ranges 18 and 19 was completed in 2002.

2.2.2 Previous Investigations of the East Garrison

Site 39A (East Garrison Ranges) is located in the northeastern portion of the former Fort Ord, on the southwestern side of the East Garrison Area (Plate 1.1). Three small-bore shooting ranges (EG-1, EG-2, and EG-3; which are HA-86, 87, and 88, respectively), a skeet range (HA-89), and three former target bunkers (HA-77) compose Site 39A. At the time of the investigation, the land including the East Garrison Ranges was primarily vegetated dune sand and the surface topography at Site 39A generally sloped toward the north.

Site characterization was conducted in 1994 and 1995 according to the *Draft Work Plan, Site Characterization, Site 39A – East Garrison Ranges, Fort Ord, California* (HLA 1994). The investigation included visual surveys and test pit excavations to estimate the surface and subsurface distribution of spent ammunition and clay pigeons (skeet). In addition, soil samples were collected and analyzed for metals and/or polynuclear aromatic hydrocarbons (PAHs) (considered representative of COCs present in clay pigeons). The results of the site characterization were presented in the *Draft Final Site Characterization, Site 39A – East Garrison Ranges, Fort Ord, California* (HLA 1997).

The results of the site characterization indicated that remediation was necessary at Ranges EG-1, EG-2, and EG-3 and at the skeet range (HA-86 through HA-89). Cleanup of these areas was performed under the Interim Action Record of Decision (IA ROD) process (Army 1994). Excavation activities were performed in November and December 1997 and in July 1998. A summary of the site characterization and the interim action is presented in the *Interim Action Confirmation Report, Site 39A-East Garrison Ranges, Former Fort Ord, California* (HLA 1998).

The literature review identified several 1930s ranges that were adjacent to the previously investigated Site 39A ranges (HA-76, HA-77, HA-79, HA-80, and HA-85). These additional areas are considered part of Site 39A. Based on the evaluation process, no further BRA action was recommended for these HAs in Revision 1.

2.2.3 Previous Investigations of the Beach Trainfire Ranges

The Beach Trainfire Ranges (previously identified as RI/FS Site 3) extend approximately 3.2 miles along the coastline of Monterey Bay and form a portion of the western boundary of Fort Ord. Seventeen ranges (identified as HA-1 through HA-17) were present within Site 3. The site is bordered to the south by the cities of Seaside and Sand City, to the north by the city of Marina, to the west by Monterey Bay, and to the east by Beach Range Road and Highway 1 (Plate 1.1). Site 3 occupies a total area of about 780 acres. Site 3 was used for small arms train fire beginning in the 1940s. Trainees fired small-caliber, hand-held weapons from firing lines in the eastern portion of the site toward targets spaced at varying intervals to the west.

An interim ROD was signed for Site 3 in 1997 (Army 1997b). The Army performed the remedial action at the small arms firing ranges at Site 3 from April 1997 through November 1998. The remedial action addressed the removal of spent ammunition from areas with greater than 10 percent coverage and residual lead from soil at concentrations above the health-based cleanup level of 1,860 mg/kg. *The Remedial Action Confirmation Report, Site 3 Remedial Action, Basewide Remediation Sites, Former Fort Ord, California* (IT 1999) describes the remedial action completed at Site 3, the former Beach Trainfire

Ranges, at the former Fort Ord, California. Additional investigation at Site 3 is not required as stated in the 2005 Track 1 ROD (Army 2005).

2.2.4 Previous Investigations of Other Military Munitions Training Areas

During the literature review conducted as part of the Basewide Range Assessment (BRA) Preliminary Assessment/Site Inspection (PA/SI), reports and data from the munitions and explosives of concern (MEC) investigations at Fort Ord were reviewed to identify areas at Fort Ord that require investigation for the presence of COCs related to small arms and military munitions use and training. The literature review indicated that reconnaissance was required at many of the Munitions Response sites (MRSs) (Plate 1.1), and SI sampling was recommended for seven sites (Harding ESE/IT Corporation 2002). Reconnaissance activities have been completed at most of the identified MRS, SI sampling has been conducted at several MRS HAs, and site characterization conducted at three MRS HAs, with no further BRA action recommended in Revision 2.

2.3 Conceptual Site Models

This section presents conceptual site models (CSMs) for the types of ranges and areas that were investigated under the Basewide Range Assessment program. The models were developed as a tool to be used in the sampling approach. The CSMs are described below.

2.3.1 Long Distance Range without Berms or Backstops

This type of range generally consists of a firing line, several rows of targets generally 50 to 100 meters apart and does not contain a backstop or berm. Example ranges of this type within the Impact Area include Range 18 (HA-18H) and Range 19 (HA-19H). Based on mapping at these ranges, the greatest concentrations of spent ammunition are found around the targets both in front of and behind the targets, along slopes that face the firing line, and along erosional features such as gullies along roads. Results of chemical analysis of soil samples collected at these ranges indicate that the highest concentrations of metals are generally found near the targets and along areas with slopes facing the firing line. Lead concentrations above 1,860 mg/kg have also been found between the target lines and along the firing lines. Results from the Basewide RI/FS indicate leaching to subsurface soil and groundwater is not significant.

2.3.2 Short Distance Range with Berms or Backstops

This type of range generally consists of a firing line, one or two rows of targets, and a berm or backstop a short distance behind the last row of targets. Example ranges of this type within the Impact Area include Range 27A (HA-27A). Based on mapping completed as part of the additional soil investigation at Site 39 and the Site 39 Pilot Study, the greatest concentrations of spent ammunition are found at the berm. Elevated concentrations of metals, including lead, are also sometimes near the firing point and at the target line and a short distance behind the berm. Visual observations of spent ammunition indicate concentrations are generally less than 1 percent between the firing line and the targets and behind the berm. Results of chemical analysis of soil samples at these sites indicate that the highest concentrations of metals in soil are found at the berm and drop off an order of magnitude or more within 50 feet of the berm. Results from the Basewide RI/FS indicate leaching of metals to subsurface soil and groundwater is not significant. Based on review of the remediation at Ranges 25 and 46, the depth of contamination within the berm may extend to as much as 10 feet below the top of the berm.

2.3.3 Multi-Use Ranges

Multi-use ranges are areas that were intentionally constructed and/or were used for training of personnel in the use of military munitions and small arms ammunition. Multi-use ranges generally consist of a firing line, firing points, and the target area. Established firing lines are not present on all ranges, especially those designated as squad attack ranges. Depending on the historical use of the firing range, it may contain munitions debris (expended or inert remnants of military munitions), munitions and explosives of concern (MEC) and small arms ammunitions. Examples of this type of range include Range 34 (HA-34). Results of the RI/FS investigation at the Impact Area (Site 39) indicated that the majority of detections and the highest concentrations of explosive compounds were in surface soil (the top 12 inches). Where present, concentrations of explosive compounds in subsurface soil appear to decrease approximately one order of magnitude or greater within 5 feet of the surface. Metals concentrations above background levels were generally located in areas where explosive compounds were detected, indicating that they may be related to the presence of explosive compounds. Results from the Basewide RI/FS indicate that migration of contamination to deep soil or groundwater is not expected.

2.3.4 Hand Grenade Ranges

Hand grenade training areas usually consist of throwing bays or trenches, observation bays, and targets. According to the *2014 Department of the Army Range Safety Pamphlet* (Army 2014a), targets are a minimum of 25 meters from the throwing bays. Throwing bays should be separated by 20 meters unless they are separated by another physical barrier such as an earthen berm or concrete. Examples of this type of range include HA-36 and HA-53.

The primary explosives used in the fragmentation hand grenades are RDX and TNT (2,4,6-trinitrotoluene). Cadmium is present in some fuses used with the fragmentation hand grenades. Results from the Basewide RI/FS indicate that migration of contamination to deep soil or groundwater is not expected.

2.3.5 Military Munitions Training Outside the Impact Area

Training sites are areas identified on training maps that were not specifically identified as a range. These sites typically served as maneuver, instruction, and bivouac areas and may contain live and/or expended small-arms and live and/or expended pyrotechnics. Training sites include HA-133 through HA-157. These areas were evaluated as part of the BRA. Literature review, reconnaissance, and SI sampling have been completed as part of the assessment.

Leaching of chemicals to subsurface soil and groundwater are not expected to be significant pathways based on results of previous investigations at Fort Ord.

2.4 Basewide Range Assessment Methods

This section describes the methods that were used for evaluating sites as part of the BRA program. This includes the methods used for conducting the literature review, field methods used during reconnaissance, sampling process design, and sample collection methods and analytical methods used during SI and site characterization.

2.4.1 Literature Review

A review of existing literature was the first step in evaluating areas at Fort Ord for the presence of ranges and other training areas that could contain COCs related to military munitions use and training. Review of data related to small arms ammunition use and review of information related to military munitions was completed as part of the literature review. The literature review included evaluation of standard operating procedures (SOPs) for ranges, dud records, munitions response contractors after-action reports, historical maps, aerial photographs, and interview records. Selected data from the review was stored in the project Geographic Information System (GIS). SOPs describing the procedures used for adding data to the project GIS are presented in the BRAWP (Harding ESE/IT, 2001).

The data were reviewed to search for evidence of previous training areas and ranges, disturbed areas, vegetation patterns, man-made structures, range fans, targets, trenches, bunkers, discovery of live small arms during MEC sampling or removal activities, and density and type of MEC items discovered during removal actions. If evidence of the potential for COCs in soil at a range or training area was identified, site reconnaissance was conducted. Literature reviews were conducted for 190 historical areas as part of the BRA. The remaining sites were previously investigated and identified for reconnaissance or sampling at the beginning of the BRA program.

2.4.2 Reconnaissance

Site reconnaissance and mapping procedures are described in detail in the BRAWP. An overview of the procedures used is presented below. Aerial photography is available for all of the former Fort Ord and was, in general, used as a base map for each area that required reconnaissance. Information that was added to the reconnaissance base map included range fan designations from historical training maps and specified training areas, information from reported military munitions incidents, topography, and current roads and buildings.

Prior to beginning the site reconnaissance, longitude and latitude data for key features of the base map such as training area boundaries, disturbed vegetation areas, and historical roads were loaded into the global positioning system (GPS) unit. These points, known as way points, were then visited in order to establish that the area investigated corresponds to the area identified on the base map. Site reconnaissance was conducted by a minimum two-person team composed of a military munitions specialist and a second team member trained in military munitions recognition.

During site reconnaissance activities the GPS-mapped features included, but were not limited to, the following:

- Areas of 10 percent spent ammunition;
- Any targets identified;
- Firing lines;
- Range fan markers;
- Survey bench marks;
- Areas of stained soil that could indicate petroleum hydrocarbon or bulk explosive contamination;
- MEC and munitions debris;
- Path walked during site visit; and

- Other features that may aide in the development of a sampling plan for a particular range.

In addition to mapping using the GPS, notes were taken describing the following site characteristics:

- Vegetation density and type;
- General description of topography;
- Soil type; and
- Buildings and other structures present.

Photographs were taken to document features present at a range and the layout of the range. Per this BRA, reconnaissance is planned for two sites (HA-30 and -32). Reconnaissance would be performed as part of BRA evaluations that will be conducted in additional munitions response work units following munitions responses. Soil sampling may be recommended based on the results of the reconnaissance. If soil sampling is required, a site-specific soil sampling plan will be developed prior to sampling.

2.4.3 Site Inspection and Site Characterization Sampling

Previously, site inspection sampling was performed in accordance with the *Draft Final Basewide Range Assessment Work Plan and Contractor Quality Control Plan for Small Arms and Multi-Use Ranges* (HLA 2001) and characterization sampling was performed in accordance with the *Draft Final Sampling and Analysis Plan (SAP), Characterization of Small Arms and Multi-Use Ranges* (MACTEC/Shaw 2003a). In the effort to streamline soil sampling procedures, the *Quality Assurance Project Plan (QAPP), Former Fort Ord, California Volume I, Appendix B, Soil Sampling, Basewide Range Assessment* was developed in 2016 to be the main reference of future soil sampling and analysis within Site 39 (KEMRON 2016a). Part of the streamlined BRA process was to focus on relevant COCs based on past uses and investigations. As specified in the 2016 QAPP, lead and explosives were the COCs for the remaining investigations (KEMRON 2016a). Similar to the 2003 SAP, a site-specific plan would be prepared for each sampling event which specifies the sampling scenario to be used for the particular activity. Soil sample locations were based on identifying locations that meet potential “worst case scenario” criteria; that is locations that most likely exhibit elevated concentrations of COCs.

2.4.3.1 Soil Sampling Methods

Soil sampling methods were updated based on the QAPP, *Former Fort Ord, California Volume I, Appendix B, Soil Sampling, Basewide Range Assessment* (KEMRON 2016a) and are summarized below. For summaries of sampling methods previously used for COCs other than lead and explosives, please see Revision 2 (Shaw 2012).

Metals (Lead) & Explosives

Soil samples were collected by excavating small test pits. The test pits were dug by hand using a shovel. The samples were collected from the surface, 1 foot and 2 feet below the surface using a stainless steel scoop, shovel, or spoon. For metals analysis, the unsieved sample was placed into a plastic Zip-loc™ bag for transfer to a central area for drying, sieving, and final packaging. The shovel used to dig the trench was decontaminated between each test pit. The shovel or spoon used to collect the sample was decontaminated between each sample. After collection of the soil samples, each sampling location was backfilled with the soil pile that was placed on plastic. Soil excavated last (from the bottom of the pit) was on top of the pile and was backfilled first. Surface soil was on the bottom of the pile and was backfilled last, in an effort to minimize site disturbance.

Each of the Zip-loc™ bags containing raw sample material was brought to a central sample processing station for drying, sieving, and packaging for shipment. Samples were processed in batches with each range consisting of one batch. Samples within each batch were processed with the samples least likely to be contaminated (those from the areas with no fragments, or less than greater than 10 percent spent ammunition areas) processed first. Samples submitted for metals analysis were dried prior to sieving. If samples were not processed in a batch, with the least contaminated samples processed first, the sieve was decontaminated between each sample.

Each bag of raw sample was passed through a No. 10 stainless-steel sieve into a stainless-steel bowl. The material in the bowl was placed into a labeled clean Zip-loc™ bag for transport to the laboratory, for later analysis. If homogenization of the sample other than sieving was necessary, the entire contents of the sample were placed into a stainless-steel bowl, thoroughly mixed using a stainless-steel utensil, and placed into the sampling container for transport to the laboratory.

After arrival at the central sample processing location, the samples were prepared for shipment to the laboratory for analysis. If the samples were shipped to the laboratory, they were stored as required in the designated sample storage area. Further processing details is specified in the KEMRON 2016a Report.

2.4.3.2 Analytical Methods

Soil samples were analyzed for lead at an offsite laboratory using EPA Method 6010C (Preparation Method 3050B modified). Soil samples for explosives were analyzed using EPA Method 8330B (Preparation Method 8330B). Quality control criteria corresponding to the test methods described above were applied to the soil samples in accordance with the directives provided in the *Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix B, Soil Sampling, Basewide Range Assessment* (KEMRON 2016a). Equipment rinsate blanks and source water blanks were also collected as specified in the Fort Ord QAPP (KEMRON 2016a).

2.4.3.3 Soil Sampling Approach

Previously, four different sampling approaches were used during the SI and site characterization work, detailed in the SAP (MACTEC/Shaw 2003a). The approaches outlined in the 2003 SAP included biased, modified transect, step-out and random grid sampling. All samples collected as part of the SI phase were biased samples collected at locations where the highest concentrations of COCs would be anticipated based on available reconnaissance and literature review data. For summaries of sampling approaches previously implemented in HAs, please see Revision 2 (Shaw 2012).

As mentioned above, a more streamlined soil sampling approach has been used as specified in the 2016 QAPP (KEMRON 2016a). Sampling locations would represent the portions of each unit, most likely to exhibit elevated COCs. If concentrations of lead and/or explosives exceed the remediation goals, step-down samples (vertical) and step-out (horizontal) will be collected. Based on the conditions of the HA, sampling methods were modified to be used based on the following goals (KEMRON 2016a):

- **Initial Characterization:** Discrete (Biased) Samples
- **Detailed Characterization:** Incremental Sampling Method and Seven-Point Incremental Sampling
- **Confirmation Sampling:** Discrete Samples

A description of the 2016 methods is provided below. Sites sampled since the *2012 Comprehensive BRA* are listed under each sampling method.

Discrete (Biased) Sampling

Biased sampling was selected as a sampling method for sites that typically do not appear to have been heavily used but show evidence of targets or other range features that could indicate localized potential accumulations of metals. Sample locations represent the areas most likely to contain elevated concentrations of metals. These locations include areas that displayed visual evidence of spent ammunition, targets, berms, or other features as described for each of the sampling areas below. In some cases, biased samples were collected at locations where high concentrations of analytes were expected on the basis of visual evidence in order to identify the maximum concentrations. At each location, samples were collected from the surface (0-0.5 feet), and from depths of 0.5-1 foot and 1.5-2 feet. Samples from the 0.5-1 foot and 1.5-2 foot depths were not analyzed unless the surface sample at that location exceeded the screening threshold, then samples from the 0.5-1 foot depth at the location were analyzed. If analysis of the 0.5-1 foot samples indicated concentrations in excess of decision criteria, then the 1.5-2 feet sample was also analyzed. Biased sampling was conducted for explosives (HMX [cyclotetramethylene tetranitramine], RDX, and TNT) analysis and conducted for metals analysis based on the locations of targets, bullet accumulations, and geographical features. Biased sampling was also used as a method for confirmation sampling after remedial actions. Confirmation samples were collected without taking the 1ft/2ft samples as stated above. The sites at which biased sampling was conducted since Revision 2 include the following:

- HA-34 – Machine Gun Assault Course/Close Combat Course;
- HA-37 – Night Firing Record Range;
- HA-38 – Zero Range/Submachine Gun Shotgun

Seven-Point Incremental Sampling

The seven-point incremental sampling provides a statistically representative sample for the sample location. The seven increment samples are collected from a small area, approximately 4 feet in diameter, and are combined to form a single incremental sample. Samples would be collected from 0-0.5 feet bgs), 0.5-1 foot bgs, and 1.5-2 feet bgs. If concentrations of COCs are found to exceed the decision criteria, appropriate step-down samples (vertical) and step-out (horizontal) samples were collected.

Seven-point incremental sampling was performed on the following sites:

- HA-202 – Watkins Gate Burn Area North
- HA- 207 – Units 1/2/3
- HA-210 – Units 5A/9
- HA-211 – Units 7/10/33
- HA-212 – Unit 23
- HA-213 – Unit 25
- HA-214 – Unit 28
- HA-215 – Unit 31

Step out Sampling

As necessary, the step-out sampling approach was used to characterize an area surrounding a target or other apparent high-density impact feature. Step-out sampling provides sample data to evaluate the lateral extent of potential contamination associated with the target or other range feature. Step-out samples were collected in four cardinal directions from the original sample. The distance from the original samples depended on findings in the field and surrounding topography. Samples were generally collected from points along each step-out transect at distances of 10 to 30 feet from the original sample point. At each of the selected locations, samples were collected at the surface (0-0.5 feet) and at depths of 0.5-1 foot and 1.5-2 feet. Samples from the 0.5-1 foot and 1.5-2 foot depths were not analyzed unless the surface sample at that location exceeded the screening threshold criteria, then samples from the 1-foot depth at the location were analyzed. If analysis of the 1-foot samples indicated concentrations in excess of remediation criteria, then the 2-foot sample was also analyzed. Depending on the initial sample results, the step-out sampling technique was utilized for both discrete and composite/incremental samples. The sites at which step-out sampling was employed include the following:

- HA-208 – Unit 4
- HA-209 – Units 11/12

2.4.4 Remediation/Habitat Mapping

Methods for habitat mapping for possible remediation areas were identified in the *Draft Final Work Plan, Remediation Areas and Habitat Mapping, Impact Area, Former Fort Ord, California (Shaw, 2004)*. The plan describes the procedures and requirements for mapping activities that were conducted within the habitat area of the Impact Area to delineate possible remediation areas. Mapping addressed visual observations, especially accumulations of spent small arms ammunition, concentration of COCs, and visual classification of habitat quality, diversity, and distribution; as well as consideration of access and other logistical issues associated with remediation.

This data was evaluated in the context of the need to balance the remediation requirements for the protection of human and ecological receptors, and the need to preserve valuable habitat. The mapping process was designed to generate the spatial data required for an assessment of the remediation requirements based on a balance between human health risk, ecological risk, and the benefits of preserving valuable high-quality habitat. The mapping is the last step in the investigation phase and provides the information needed by the Army and the regulators to assess remediation requirements.

2.5 Additional Work Completed at Fort Ord

Since the *2012 Comprehensive BRA*, there have been the following changes to the BRA process:

- As discussed in Section 2.4.3.3, in 2016 a revised sampling QAPP was developed to streamline the process for future soil sampling and analysis within Site 39, specified in the *2016 QAPP, Former Fort Ord, California, Volume 1, Appendix Soil Sampling Basewide Range Assessment* (KEMRON 2016a). When soil sampling is warranted, sampling locations were chosen to represent portions of each Unit most likely to exhibit elevated COCs (lead and explosives).
- Lead levels were re-evaluated based upon a revised health guidance value (HGV) established in 2007 by the Office of Environmental Health Hazard Assessment (OEHHA). In 2011 California DTSC updated the LeadSpread model that had been used in the human health risk assessment at Fort Ord. The lower HGV for lead in blood and the revised LeadSpread model were identified as having the potential to affect the protectiveness of human health at the hazardous and toxic waste (HTW) sites with lead detected in soil. In response, the 3rd Five Year Review (Army 2012b) recommended to evaluate the effect of these changes on the protectiveness of the human health-based cleanup levels. In 2018 DTSC promulgated the “Toxicity Criteria Rule” that established a new toxicity criterion for lead. The *Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites* (KEMRON 2019a) was prepared to provide an evaluation for 17 lead-impacted HTW sites at Fort Ord. These sites included 14 Interim Action sites and 3 sites (Site 3, Site 31 and Site 39). These HTW sites were re-evaluated for protectiveness with the new screening levels of 80 mg/kg and 320 mg/kg for residential and industrial use, respectively (KEMRON 2019a). In order to evaluate the identified HTW sites, the in-place post-remediation confirmation soil sample results were compiled, and the lead concentrations were compared to the conservative screening level of 80 mg/kg established for residential use. For some sites, the 95 percent upper confidence limit (UCL) values of the post-remediation confirmation soil sample results were calculated and compared to the default screening level (KEMRON 2019a). Based on the evaluation:
 - The Interim Action sites are protective for residential use scenarios; Site 31 is protective as long as land use restrictions remain in effect; and Site 3 is protective.
 - Cleanup in the Site 39 habitat areas has been conducted to meet ecological cleanup levels, and the remedy is protective.
 - All development areas of Site 39, with the exception of HA-18D and 23D, are below the 80 mg/kg screening level and are protective of future site users. Based on the initial screening criteria, a remediation goal will be developed based on the new lead toxicity value for HA-18D and -23D and the future residential use scenario.

Further information on the additional lead evaluation is provided in the HA write-ups included in Appendix A.

- EPA issued the revised RSL of 200 mg/kg for lead in residential soil in *EPA Office of Land and Emergency Management Directive SUBJECT: Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities*, dated October 16, 2025 (EPA, 2025).

A summary of the HAs with new information since the *2012 Comprehensive BRA Report* is as follows:

- HA-34, -37, -38: The *2014 Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014b) documents the remedial action completed at the Site 39 Inland Ranges through 2013 in HAs designated as habitat reserve and identified for soil remediation in the Site 39 ROD Amendment (Army 2009a). The remediation approach reduced the removal of very high-quality habitat and aided in post-remediation habitat restoration efforts by leaving “islands” of very high-quality habitat within the remediation areas to establish a vegetative base for re-growth. Remedial action was completed based on the contaminants of concern at each HA. Approximately 150,000 cubic yards of soil were excavated from an area of approximately 64 acres (Gilbane 2014b). Further details can be found in the *2014 Final Remedial Action Completion Report, Site 39 Inland Range Habitat Reserve* (Gilbane 2014b).
- HA-18D, -23D: The *2019 Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California* documents the revised lead evaluation as a result of a change in California guidance value for blood-levels as described above. Based on the evaluation, HA-18D and HA-23D, which are within areas designated for future development that could include residential use, had levels exceeding the updated human health-based screening level of 80 mg/kg for residential sites (KEMRON 2019a). The Army is currently working with DTSC and EPA to develop and memorialize an appropriate site-specific lead remediation goal in a future decision document.
- HA-118, 207, -208, -209, -210, -211, -212, -213, -214, -215, -216, -217, -218, -221, -222, -223: Additional BRA evaluations were conducted in these units within the Impact Area (HA-118), following munitions responses, as described in the *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California* (Army 2009a). The units were grouped and additional HA numbers have been assigned to the units. Based on these evaluations, additional soil remediation areas have been identified within HA-211 and -215.
- HA-219: Additional BRA evaluations were conducted in a portion of BLM Area B (HA-219), north of the Impact Area, following munitions responses (KEMRON, 2019d). In Subarea B-3 Unit A, BRA evaluation is pending completion of the munitions response.

The following additional information provides follow-up to some HAs, but does not result in changes to the 2012 BRA evaluation or recommendations:

- No Action Approval Memoranda were approved in 2009 to plug-in several HAs (HA-79, -92, -98, -100, -121, and -183) to the *No Action Plug-In Record of Decision, Fort Ord California* (Army 1995). U.S. EPA provided concurrence in July 2009 (EPA 2009). Revision 2 had recommended no further BRA action for these HAs:
 - *Approval Memorandum Proposed No Action Site HA-79 – 22 Caliber Small Arms Range* (Army 2009b)
 - *Approval Memorandum Proposed No Action Site HA-92 – Old Demolition Training Area* (Army 2009c)
 - *Approval Memorandum Proposed No Action Site HA-98 – Leary Hill Region* (Army 2009d)

- *Approval Memorandum Proposed No Action Site HA-100 – Demolition Training Area* (Army 2009e)
 - *Approval Memorandum Proposed No Action Site Ha-121 – Rifle Grenade Range* (Army 2009f)
 - *Approval Memorandum Proposed No Action Site HA-183 – Shoulder Launched Projectile Area* (Army 2009g)
- For HA-80 and HA-85, the site reports in the 2012 BRA (Revision 2) recommended remediation/habitat mapping, while the Site Status table reflected an updated status of no further BRA action based on the Interim Action ROD. The remediation was completed through the Interim Action Sites ROD process and U.S. EPA concurred with the confirmation report in 2006 (EPA 2006).
 - *Interim Action Confirmation Report, IA Area 39A HA-80 and HA-85* (MACTEC 2006)
- Site 3 Beach Trainfire Ranges. The final ROD signed in 2005 required no further remedial action with ecological monitoring. The ecological monitoring was completed in 2016 as described in *Final 2016 Annual Biological Monitoring Report, Fort Ord Dunes State Park, Former Fort Ord, California* (Chenega 2016). Additionally, the 4th Five-Year Review (Army 2017a) found that the remedy at Site 3 was protective of human health and the environment. Since Site 3 is complete, no units or ranges within Site 3 are provided in Appendix A.
- Approximately 3,300 acres of the former Fort Ord were transferred in 2009 to Fort Ord Reuse Authority to complete munitions responses under Environmental Services Cooperative Agreement (ESCA). The property transfer was facilitated by *Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET5)* (Army 2007). The FOSET5 identified the following BRA sites as being present on the properties: a portion of Site 8 (evaluated as HA-92), portions of Site 39, and Site 39B. All non-MEC related environmental remediation activities at Site 8 and Site 39B had been completed (Army 2007). All munitions response remedial actions were subsequently determined to be complete for areas included in the ESCA, as described in *Site-Wide Remedial Action Completion Report, FORA Environmental Services Cooperative Agreement (ESCA) Remediation Program, Former Fort Ord, Monterey County, California* (FORA 2020). CERCLA warranty has been issued with no future contamination-related activity required, with the exception of HA-18D and HA-23D.
 - HA-35A and HA-158: The FOSET5 noted no further action under BRA. The Military Operations in Urban Terrain (MOUT) facility was to continue to be used for law enforcement training (like-use), and no further investigation for munitions constituents is required. Further, as described in the ESCA Group 3 MRA ROD, no further BRA action is required for the ESCA Group 3 MRAs (Army 2014b).
 - HA-161 Site 39B: The FOSET5 noted no further action under BRA. Subsequently, based on a continued evaluation under the BRA program, additional Interim Action excavation was proposed for HA-161 at Site 39B due to metals contamination at the location. This work was conducted in 2010. As described in the ESCA Group 2 MRA ROD, the soil

remedial action taken at Site 39B is protective of residential use (Army 2015). The 2012 BRA (Revision 2) had recommended no further BRA action.

- o The FOSET5 described that soil remedial actions had been conducted in HAs within Site 39 Development areas within the City of Seaside ESCA property. Subsequent lead re-evaluation has identified the need to further evaluate the cleanup goal for HA-18D and HA-23D. Residential use restriction remains in place for the areas of HA-18D and HA-23D.
- o The FOSET5 described the status of several Site 39 HAs within the ESCA Interim Action Ranges Munitions Response Area (newly labeled as HA-218). At the time, HA-43 and HA-44 were being further evaluated. Soil remedial action at these HAs were subsequently completed under the Site 39 ROD Amendment (Army 2009a). The 2012 BRA (Revision 2) recommended no further BRA action for these HAs. As described in the ESCA Interim Action Ranges MRA ROD, soil remedial actions have been completed by the Army at the Site 39 Inland Ranges at the ESCA Interim Action Ranges MRA (Army 2016). No further BRA evaluation is required.
- o No soil contamination was observed during FORA's MEC remedial investigation activities under the ESCA as described in the *Final, Group 4, Remedial Investigation/Feasibility Study, Volume 1: Remedial Investigation, Future East Garrison Munitions Response Area, Former Fort Ord, Monterey County, California* (FORA 2017). The munitions response RODs for the ESCA MRAs (which selected land use controls as the remedy) affirmed no further action for evaluation of soil contamination within those ESCA properties.

3.0 BASEWIDE RANGE ASSESSMENT RESULTS

This report serves as a comprehensive summary update in the Fort Ord BRA Program since the previous *Comprehensive BRA Report* in 2012. The status and recommendation for only the newly identified HAs and previous HAs that have new information are included in this BRA program update. 16 new HAs have been identified since the previous BRA and 19 previous HAs have been updated since the 2012 *Comprehensive BRA Report* with new information. Refer to Table 3.1 for the list of the HAs and their status since 2012. PLATE 3.1 displays the units, corresponding HAs, and their BRA status. Information about HAs completed prior to 2012 can be found in the 2012 *Comprehensive BRA Report* (Shaw 2012).

3.1 Work Completed Since 2012 Comprehensive BRA Report Revision 2

Since the Comprehensive BRA Report Revision 2, additional work has been completed including HA characterization and investigation following associated MEC cleanup. The following are major documents presenting HA specific results related to the BRA.

- *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4, 11, and 12, Former Fort Ord, California* (Gilbane 2014a)
- *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014b)
- *Final Technical Memorandum Basewide Range Assessment Investigation, Unit 6, Former Fort Ord, California* (Gilbane 2015b)
- *Historical Area (HA) 23D Sampling Results, Former Fort Ord, California* (KEMRON 2016b)
- *Final Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 23, Former Fort Ord, Monterey County, California* (KEMRON 2018a)
- *Final Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 5A and 9, Former Fort Ord, California* (KEMRON 2018b)
- *Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey* (KEMRON 2019a)
- *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase 1, Former Fort Ord, Monterey County California* (KEMRON 2019b)
- *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 25 and 28, Former Fort Ord, California* (KEMRON 2019c)
- *Site Evaluation Results, Basewide Range Assessment Investigation, BLM Area B – Sub-Areas B-2A and B-3, Units A, B, B-2A, B-3E, B-3W, and C, Former Fort Ord, Monterey County, California* (KEMRON 2019d)
- *Final Sampling Results Technical Memorandum Basewide Range Assessment Investigation, Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South* (KEMRON 2020a)
- *Site Evaluation Results, Basewide Range Assessment Investigation, Unit 5* (KEMRON, 2023)

3.2 HA Status Summary

This section presents the summary results of the BRA. The first step in this BRA process was to identify sites that did not require additional evaluation from the *2012 Comprehensive BRA Report*. Sites where remediation was complete were eliminated from further consideration in this BRA. Further information on previously completed sites can be found in the *2012 Comprehensive BRA Report*. Table 3.1 presents a summary of the results including a brief description of the HA, the status of the assessment, and the recommendations for each HA. Section 3.2.1 describes previous HAs that have an updated recommendation and Section 3.2.2 describes previous HAs that have a status change. Based on the *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California* (Army 2009a), additional BRA evaluations have been conducted in munitions response units and new HA numbers were assigned to the unit-wide evaluations. Section 3.2.3 describes new HAs that require further evaluation and Section 3.2.4 describes new HAs that are deemed for “No further BRA action.” Further details of the assessment for individual HAs are provided in Appendix A.

3.2.1 HAs with Updated Recommendations

The *2012 Comprehensive BRA Report* identified six HAs (HA-34, -37, -38, -72, -203, and -205) as “remediation ongoing” and 12 HAs (HA-27, -30, -31, -31A, -32, -41, -42, -70, -73, -118, -153, and -204) as “reconnaissance/sampling pending vegetation clearance and/or munitions removal.”

All 6 HAs (HA-34, -37, -38, -72, -203, and -205) deemed as “remediation ongoing” were deemed for “No further BRA action.” It is important to note that HA-72 was mislabeled in the *2012 Comprehensive BRA Report* and was corrected and evaluated in conjunction with HA-34.

HA-203 and -205 had ongoing remediation based on other HAs falling within their boundaries. Remediation was ongoing in HA-34 within HA-203 (Eucalyptus Fire Area), which has been completed per this BRA. Per this BRA, “No further BRA action” is required in HA-158 (the MOUT facility) which also falls within HA-203. For HA-205 (Units 15/21), *2012 Comprehensive BRA Report* recommended no further BRA action except in HA-37 and HA-38 where remediation was required. Remediation in HA-37 and HA-38 have been completed, and the recommendation for HA-205 has been updated to “No further BRA action”.

Of the twelve HAs with a recommendation of “reconnaissance/sampling pending vegetation and/or munitions removal” relating to the unit-wide BRA evaluation, seven HAs (HA-30, -41, -42, -70, -73, -153, and -204) are deemed for “No further BRA action.” Evaluation of HA-30 was completed as part of the evaluation of unit-wide BRA evaluation for HA-223 (Unit 5). Three of the seven HAs were deemed for “No Further Action” in the *2012 Comprehensive BRA Report* based on range specific cleanup actions and now are deemed for “No further BRA action” based on the falling within unit-wide BRA evaluations:

- HA-30 – evaluation had been completed as part of the BRA evaluations of HA-218 and HA-212; evaluation of the area within Unit 5 was completed in 2023 (HA-223)
- HA-41 – based on HA-204 (Unit 19) and HA-222 (Unit 18)
- HA-42 – based on HA-222 (Unit 18) and HA-217 (Ranges 43-48 South)
- HA-73 – based on HA-42, HA-217 (Ranges 43-48 South) and HA-222 (Unit 18)

The *2012 Comprehensive BRA Report* noted one HA (HA-70) as complete reconnaissance and

recommended additional review of MEC removal data. HA-70 is deemed for “No further BRA action” per this BRA based on completed unit-wide BRA evaluations for HA-209 (Unit 11) and HA-213 (Unit 25).

For HA-153 (MRS-27U), the *2012 Comprehensive BRA Report* recommended reconnaissance for evaluation for spent small arms ammunition related to possible training for firing tank mounted .30 caliber and/or .50 caliber machine guns and therefore recommended “Reconnaissance after MEC removal”. The “after MEC removal” was likely an error since MEC removal was never contemplated for MRS-27U. The munitions response evaluation concluded that the area of HA-153 was not a target area for the suspected tank-mounted .30 caliber and/or .50 caliber machine guns (Track 1 Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California [Army 2012a]). Therefore, no additional BRA investigation is warranted for HA-153. Please see Appendix A for further information on HA-153.

For HA-204 (Units 14/19), the *2012 Comprehensive BRA Report* documented completed remedial actions in several HAs within HA-204 and recommended “No Further BRA Action” outside existing HAs (HA-39, -40, and -40A). Additionally, reconnaissance was recommended for small arms use after MEC removal at HA-41. Per this BRA, remedial actions in HA-39/40/40A are complete and reconnaissance was conducted in Unit 19 which includes the downrange areas of HA-41.

The remaining five of the twelve of the HAs (HA-27, -31, -31A, -32, and -118) are deemed for further BRA actions and/or evaluations:

- HA-27: BRA evaluations were completed as part of the BRA evaluations of HA-211. Limited remediation of soils is recommended in a portion of Range 27 within Unit 33 (HA-211).
- HA-31: HA-31 evaluations are part of other unit-wide evaluations. BRA evaluation was complete in HA-209 (Units 11 and 12). Further BRA evaluations are required for the area based on HA-215 (Unit 31).
- HA-31A: HA-31A evaluations are part of other unit-wide evaluations. BRA evaluation was complete in HA-210 (Units 5A and 9). Further BRA evaluations are required for the area based on HA-215 (Unit 31).
- HA-32: Further BRA evaluations is required.

HA-118 encompasses the larger Impact Area and therefore categorized as “Other” in Table 3.1 since it includes many other HAs. HA-118 discussed further in Section 3.2.2.

Refer to Table 3.1 for further information on the renaming and regroupings of the HAs mentioned above.

3.2.2 HAs with Status Change

Since the *2012 Comprehensive BRA Report*, there are six HAs (HA-18D, -23D, -158, -202, -203, and -205) that have been updated due to a status change. HA-18D and HA-23D both were deemed for “No further BRA action” in the *2012 Comprehensive BRA Report*. As mentioned in above Section 2.5, HA-18D and HA-23D were identified as potentially requiring further remedial action pending future discussions by Army, DTSC and EPA regarding the revised lead levels. HA-18D and HA-23D status has changed to “Further remedial actions might be warranted.”

HA-158 (originally referred to as the MOUT site) was noted as an active site in 2012. The MOUT facility was transferred in 2009 as part of the ESCA for “like-use” (law enforcement training). No further BRA evaluation is required. The status for HA-158 has been changed to “No further BRA action.”

HA-202 (Watkins Gate Burn Area [WGBA]) was recommended for “No further BRA action” in the *2012 Comprehensive BRA Report* based on the evaluation of the burned areas of the site. In 2013, unburned portions to the north and south were added to the WGBA (became available for BRA reconnaissance after munitions responses) and were evaluated. Based on the evaluation, the expanded HA-202 is recommended for “No further BRA action.”

In the *2012 Comprehensive BRA Report*, HA-203 was recommended for “Further SI Sampling” around one location in HA-34 due to elevated lead levels. Additional soil sampling was conducted at the time of HA-34 site characterization and “No further BRA action” was recommended at the HA-34 location, thus “No further BRA action” is recommended for HA-203.

HA-205 was recommended for “No further BRA action” except on HA-37 and HA-38 where remediation is required” in the *2012 BRA Report*. Additional soil sampling and remedial actions were completed in both HA-37 and HA-38 and “No further BRA action” was recommended, thus “No further BRA action” is recommended for HA-205.

3.2.3 HAs Requiring Further Evaluation

HAs requiring further evaluation was determined in areas where the BRA evaluation has not been fully completed, or remediation has been recommended. Three HAs were identified to require further evaluation. Limited remediation for elevated lead is recommended for two HAs (HA-211 and HA-215). Further BRA action is also recommended in the densely vegetated areas of HA-215 and in a sub-area of HA-219.

3.2.4 HAs with No Further BRA Action

HAs requiring “No further BRA action” was determined based upon sites where no evidence of small arms use or other chemical contamination is identified during the reconnaissance, sampling determined that lead and explosives were below screening levels defined in the Site 39 ROD Amendment, or remedial actions have been completed. Thirteen HAs (HA-207, -208, -209, -210, -212, -213, -214, -216, -217, -218, -221, -222, and HA-223) were deemed for “No further BRA action” based upon recent evaluations and investigations.

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TABLES

Table 1.1 Historical Areas Site List			
Reference Number	Range/Site Number	Range/Site Name (s)	Historical Area Grouping
HA 1	1	25 Meter Zero	Beach Trainfire Ranges
HA 2	2	25 Meter Zero	Beach Trainfire Ranges
HA 3	3	25 Meter Zero	Beach Trainfire Ranges
HA 4	4	25/75 Meter Zero	Beach Trainfire Ranges
HA 5	5	Field Fire	Beach Trainfire Ranges
HA 6	6	Field Fire	Beach Trainfire Ranges
HA 7	7	25 Meter Zero & AR	Beach Trainfire Ranges
HA 8	8	Known Distance	Beach Trainfire Ranges
HA 9	9	25 Meters Zero & AR	Beach Trainfire Ranges
HA 10	10	Pistol	Beach Trainfire Ranges
HA 11	11	25 Meter, Quick Kill	Beach Trainfire Ranges
HA 12	12	25 Meter	Beach Trainfire Ranges
HA 13	13	Pistol	Beach Trainfire Ranges
HA 14	14	25 Meter Zero	Beach Trainfire Ranges
HA 15	15	Field Fire	Beach Trainfire Ranges
HA 16	16	Field Fire	Beach Trainfire Ranges
HA 17	17	25 Meter Zero	Beach Trainfire Ranges
HA 18D	18	Record Firing Range	Impact Area
HA 18H	18	Record Firing Range	Impact Area
HA 19D	19	Record Firing Range	Impact Area
HA 19H	19	Record Firing Range	Impact Area
HA 20D	20	Unknown, Available	Impact Area
HA 20H	20	Unknown, Available	Impact Area
HA 21D	21	10m Machine Gun/25m Rifle Range	Impact Area
HA 21H	21	10m Machine Gun/25m Rifle Range	Impact Area
HA 22D	22	0.50 cal Machine Gun Range	Impact Area
HA 22H	22	0.50 cal Machine Gun Range	Impact Area
HA 23D	23	Squad Attack Range, Rifle Squad Tactical Range, Trainfire II Range Complex	Impact Area
HA 23H	23	Squad Attack Range, Rifle Squad Tactical Range, Trainfire II Range Complex	Impact Area
HA 23M	23M	Dragon Tracking Range (Nonfiring Range)	Impact Area
HA 24D	24	Sniper Range, Table VII Range, Table VIII Range	Impact Area
HA 24H	24	Sniper Range, Table VII Range, Table VIII Range	Impact Area
HA 25D	25	Offensive Overhead Firing Course, Table VII Range, Table VIII Range, Range 41	Impact Area
HA 25H	25	Offensive Overhead Firing Course, Table VII Range, Table VIII Range, Range 41	Impact Area
HA 26D	26	Machine Gun Transition, Machine Gun Field Fire, Machine gun, Table II, Austin Antitank Range	Impact Area
HA 26H	26	Machine Gun Transition, Machine Gun Field Fire, Machine gun, Table II, Austin Antitank Range	Impact Area
HA 27	27	Fire Movement Course, SAW Table I IV, Close Combat Course	Impact Area
HA 27A	27A	10m Machine Gun/25m Rifle Range	Impact Area
HA 28	28	Technique of Fire Range, Rifle Squad Tactical Range, Automatic Rifle and ARTEP Range	Impact Area
HA 29	29	Machine Gun Assault Range, Squad Battle Drill and Assault Range, 10m Machine Gun, 25 m Zero, M 3 Machine Gun	Impact Area
HA 30	30/30A	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP	Impact Area
HA 31	31	Platoon Attack Course, Demolition Range	Impact Area
HA 31A	NA	STT Range 23	Impact Area
HA 32	32	Wild Cat Ridge Day/Nigh Combat Course, Attack Helicopter and UH 1 Door Gunnery, Live Fire Exercise, Day/Night Combat	Impact Area
HA 33	33	Demolitions Range	Impact Area
HA 34	34	Machine Gun Assault Range, Close Combat Couse, Mortar Range	Impact Area
HA 35A	35A	Combat Pistol Range	Impact Area
HA 35	35	Mout Complex	Impact Area
HA 36A	36A	EOD	Impact Area
HA 36	36	Fragmentation Hand Grenade	Impact Area
HA 37	37	25m Night Record Fire, Quick Kill and Night Fire, Rifle Grenade Range, Old Bazooka Range	Impact Area
HA 38	38	Zero Range, 25 M 2 Submachine Gun Shotgun	Impact Area
HA 39	39	Bench Rest Rifle Range	Impact Area
HA 40	40/40A	Infiltration Course, 10m and 25m Machine gun and rifle range/Field Flame Expendiency Training	Impact Area
HA 41	41	Sub Caliber Moving Target/Mortar	Impact Area
HA 42	42	Mortar Range (Long Range)	Impact Area
HA 43	43	Platoon Size Live Fire Course, Mortar Range	Impact Area
HA 44	44	Antitank Weapons Range	Impact Area

Table 1.1 Historical Areas Site List			
Reference Number	Range/Site Number	Range/Site Name (s)	Historical Area Grouping
HA 45	45	Grenade Launcher Range	Impact Area
HA 46D	46	Pistol Range, MP/CID Qualification Couse, Night Record Fire, 10m MG	Impact Area
HA 46H	46	Pistol Range, MP/CID Qualification Couse, Night Record Fire, 10m MG	Impact Area
HA 47	47	M79 Grenade Launcher	Impact Area
HA 48D	48	14.5mm Artillery and Mortar Subcaliber Range, Light Antitank Weapons Range, Sniper Training	Impact Area
HA 48H	48	14.5mm Artillery and Mortar Subcaliber Range, Light Antitank Weapons Range, Sniper Training	Impact Area
HA 49	NA	MG 30 cal	Impact Area
HA 50	NA	Bobby Traps	Impact Area
HA 51	NA	30 cal AA Practice	Impact Area
HA 52	NA	Dummy Grenade	Impact Area
HA 53	NA	Live Hand Grenade	Impact Area
HA 54	NA	Mortar Range No. 2	Impact Area
HA 55	NA	Carbine Tranisition Course, Rocket Launcher Course	Impact Area
HA 56	NA	Rifle Transition Course, Combat in Cities No. 1	Impact Area
HA 57	NA	Close Combat Course No. 1	Impact Area
HA 58	NA	MG Table 2, Weapons Demonstration Range	Impact Area
HA 59	NA	M 1 Table IX	Impact Area
HA 60	NA	Squad Problems Range	Impact Area
HA 61	NA	A. R. Table VII Range, A. R. Table VII Range	Impact Area
HA 62	NA	Machine Gun Transition	Impact Area
HA 63	NA	Small Arms Firing Course, Rifle Night Firing	Impact Area
HA 64	NA	Rifle Night Firing	Impact Area
HA 65	NA	Carbine Table X	Impact Area
HA 66	NA	Carbine Table XI	Impact Area
HA 67	NA	Wild Cate Ridge Training Area	Impact Area
HA 68	NA	Sub Mach Gun DSMTD	Impact Area
HA 69	NA	Barloy Canyon Sub MG Range	Impact Area
HA 70	NA	Small Arms Firing Course	Impact Area
HA 71	NA	Impossible Ridge Training Area	Impact Area
HA 72	NA	Close Combat Course No. 2	Impact Area
HA 73	NA	Grant Close Combat Course	Impact Area
HA 74	NA	Infiltration Course, Hoffman Infiltration Course	Impact Area
HA 75	NA	Mock Up Village, Combat in Cities	Impact Area
HA 76	NA	Company Problems	Impact Area
HA 77	NA	East Garrison Known Distance Range	East Garrison Ranges
HA 78	NA	East Garrison 1942 Small Arms Range	East Garrison Ranges
HA 79	NA	East Garrison 22 Caliber Range	East Garrison Ranges
HA 80	NA	East Garrison Landscape Target Range	East Garrison Ranges
HA 81	NA	East Grrison 1000 Inch Machine Gun Range	East Garrison Ranges
HA 82	NA	East Garrison Pistol Range	East Garrison Ranges
HA 83	NA	East Garrison Pistol Range	East Garrison Ranges
HA 84	NA	East Garrison Pistol Range	East Garrison Ranges
HA 85	NA	East Garrison Rifle Range	East Garrison Ranges
HA 86	NA	Range EG 1/Part of Site 39A	East Garrison Ranges
HA 87	NA	Range EG 2/Part of Site 39A	East Garrison Ranges
HA 88	NA	Range EG 3/Part of Site 39A	East Garrison Ranges
HA 89	NA	East Garrison Skeet Range/Part of Site 39A	East Garrison Ranges
HA 90	MRS 1 -	Flame Thrower Range	Military Munitions Training Areas
HA 91	MRS 2 -	Pete's Pond	Military Munitions Training Areas
HA 92	MRS 3 -	Old Demolition Training Area, Range 49	Military Munitions Training Areas
HA 93	MRS 4A -	CBR Training Area	Military Munitions Training Areas
HA 94	MRS 4B -	CBR Training Area	Military Munitions Training Areas
HA 95	MRS 5 -	South of East Garrison	Military Munitions Training Areas
HA 96	MRS 6 -	Booby Traps and Land Mines	Military Munitions Training Areas
HA 97	MRS 9 -	MBA Training Area	Military Munitions Training Areas
HA 98	MRS 10A	Leary Hill Region	Military Munitions Training Areas
HA 99	MRS 10B	Elliot Hill Region	Military Munitions Training Areas
HA 100	MRS 11 -	Demolition Training Area	Military Munitions Training Areas
HA 101	MRS 12 -	Picnic Canyon	Military Munitions Training Areas
HA 102	MRS 13A	Practice Mortar Range	Military Munitions Training Areas
HA 103	MRS 13B	Practice Mortar Range	Military Munitions Training Areas
HA 104	MRS 13C	CSU Footprint Wedge	Military Munitions Training Areas
HA 105	MRS 14A	Lookout Ridge 2	Military Munitions Training Areas
HA 106	MRS 14B	Pilarcitos Canyon	Military Munitions Training Areas
HA 107	MRS 14C	Site 14SE	Military Munitions Training Areas
HA 108	MRS 14D	Site 14 West	Military Munitions Training Areas
HA 109	MRS 14E	Site 14 East	Military Munitions Training Areas
HA 110	MRS 15DRO.1A	Del Rey Oaks, E29a	Military Munitions Training Areas
HA 111	MRS 15DRO.2A	Del Rey Oaks, E29b.1	Military Munitions Training Areas
HA 112	MRS 15SEA.1	Seaside 1, E24	Military Munitions Training Areas
HA 113	MRS 15SEA.2	Seaside 2, E34	Military Munitions Training Areas

Table 1.1 Historical Areas Site List			
Reference Number	Range/Site Number	Range/Site Name (s)	Historical Area Grouping
HA 114	MRS 15SEA.3	Seaside 3, E23.1	Military Munitions Training Areas
HA 115	MRS 15SEA.4	Seaside 4, E23.2	Military Munitions Training Areas
HA 116	MRS 15MOCO.1	Monterey County 1, E29b.3	Military Munitions Training Areas
HA 117	MRS 15MOCO.2	Monterey County 2, E21b.3	Military Munitions Training Areas
HA 118	MRS 15 BLM	BLM	Military Munitions Training Areas
HA 119	MRS 16 -	2.36 inch Moving Target Rocket Range	Military Munitions Training Areas
HA 120	MRS 17 -	Anti Tank Practice Mine Area	Military Munitions Training Areas
HA 121	MRS 19 -	Rifle Grenade Range	Military Munitions Training Areas
HA 122	MRS 20 -	Recoilles Rifle Training Range	Military Munitions Training Areas
HA 123	MRS 21 -	Mudhen Lake	Military Munitions Training Areas
HA 124	MRS 22 -	Beach Ranges/Trainfire Ranges	Military Munitions Training Areas
HA 125	MRS 23 -	Engineering Training Area, Demolition Area	Military Munitions Training Areas
HA 126	MRS 24A	Practice Rifle Grenade	Military Munitions Training Areas
HA 127	MRS 24B	Practice Hand Grenade Range	Military Munitions Training Areas
HA 128	MRS 24C	Live Hand Grenade Range	Military Munitions Training Areas
HA 129	MRS 24D	Bobby Traps	Military Munitions Training Areas
HA 130	MRS 24E	Practice Rifle Grenade Range	Military Munitions Training Areas
HA 131	MRS 25 -	Firing Point; within 14D Footprint (Range P 5)	Military Munitions Training Areas
HA 132	MRS 26 -	Hiltop within 14D Footprint (Range P 5)	Military Munitions Training Areas
HA 133	MRS 27A	Training Site 1	Military Munitions Training Areas
HA 134	MRS 27B	Training Site 2	Military Munitions Training Areas
HA 135	MRS 27C	Training Site 3	Military Munitions Training Areas
HA 136	MRS 27D	Training Site 4	Military Munitions Training Areas
HA 137	MRS 27E	Training Site 5	Military Munitions Training Areas
HA 138	MRS 27F	Training Site 6	Military Munitions Training Areas
HA 139	MRS 27G	Training Site 7	Military Munitions Training Areas
HA 140	MRS 27H	Training Site 8	Military Munitions Training Areas
HA 141	MRS 27I-	Training Site 9	Military Munitions Training Areas
HA 142	MRS 27J-	Training Site 10	Military Munitions Training Areas
HA 143	MRS 27K	Training Site 11	Military Munitions Training Areas
HA 144	MRS 27L	Training Site 12	Military Munitions Training Areas
HA 145	MRS 27M	Training Site 13	Military Munitions Training Areas
HA 146	MRS 27N	Training Site 14	Military Munitions Training Areas
HA 147	MRS 27O	Training Site 15	Military Munitions Training Areas
HA 148	MRS 27P	Training Site 16	Military Munitions Training Areas
HA 149	MRS 27Q	Training Site 17	Military Munitions Training Areas
HA 150	MRS 27R	Training Site 18	Military Munitions Training Areas
HA 151	MRS 27S	Training Site 19	Military Munitions Training Areas
HA 152	MRS 27T	Training Site 20	Military Munitions Training Areas
HA 153	MRS 27U	Training Site 21	Military Munitions Training Areas
HA 154	MRS 27V	Training Site 22	Military Munitions Training Areas
HA 155	MRS 27W	Training Site 23	Military Munitions Training Areas
HA 156	MRS 27X	Training Site 24	Military Munitions Training Areas
HA 157	MRS 27Y	Training Site 25	Military Munitions Training Areas
HA 158	MRS 28 -	MOU Site	Military Munitions Training Areas
HA 159	MRS 29 -	Laguna Seca Bus Turn Around	Military Munitions Training Areas
HA 160	MRS 30 -	Laguna Seca Turn 11	Military Munitions Training Areas
HA 161	MRS 31 -	CSU Footprint	Military Munitions Training Areas
HA 161A	MRS 7 -	Part of CSU Footprint	Military Munitions Training Areas
HA 161B	MRS 18 -	Part of CSU Footprint (100 LB Bomb)	Military Munitions Training Areas
HA 161C	MRS 8 -	Part of CSU Footprint	Military Munitions Training Areas
HA 161D	MRS 4C -	Part of CSU Footprint	Military Munitions Training Areas
HA 162	MRS 32A	Oil Well Road I	Military Munitions Training Areas
HA 163	MRS 32B	Oil Well Road II	Military Munitions Training Areas
HA 164	MRS 32C	Oil Well Road III	Military Munitions Training Areas
HA 165	MRS 33 -	OE Cache	Military Munitions Training Areas
HA 166	MRS 34 -	Fitzsche Army Airfiled	Military Munitions Training Areas
HA 167	MRS 35 -	Former Range Control	Military Munitions Training Areas
HA 168	MRS 37 -	Parker Flats Practice Mortar Range	Military Munitions Training Areas
HA 169	MRS 39 -	Mine and Booby Trap Area	Military Munitions Training Areas
HA 170	MRS 40 -	Parker Flats Gas House	Military Munitions Training Areas
HA 171	MRS 41 -	Powder Magazine in Combat Range 3	Military Munitions Training Areas
HA 172	MRS 42 -	Demolition Area Rifle Grenade Area	Military Munitions Training Areas
HA 173	MRS 43 -	South Boundary Area	Military Munitions Training Areas
HA 174	MRS 44 -	MPC Habitat Preserve and EDC	Military Munitions Training Areas
HA 175	MRS 45 -	Tactical Training Area TTA	Military Munitions Training Areas
HA 176	MRS 46 -	York School	Military Munitions Training Areas
HA 177	MRS 47 -	Wolf Hill	Military Munitions Training Areas
HA 178	MRS 48 -	Former Dummy Grenade	Military Munitions Training Areas
HA 179	MRS 49 -	Former Rifle Grenade Range	Military Munitions Training Areas
HA 180	MRS 50 -	Artillery Hill	Military Munitions Training Areas
HA 181	MRS 51 -	Rifle Grenade and Projectile Target Area	Military Munitions Training Areas
HA 182	MRS 52 -	Rifle Grenade and Projectile Target Area	Military Munitions Training Areas
HA 183	MRS 53 -	Shoulder Launched Projectile Area	Military Munitions Training Areas
HA 184	MRS 54 -	Canyon Target Area	Military Munitions Training Areas

Table 1.1 Historical Areas Site List

Reference Number	Range/Site Number	Range/Site Name (s)	Historical Area Grouping
HA 185	MRS 55 -	Parker Flats	Military Munitions Training Areas
HA 186	MRS 56 -	Hayrake Area	Military Munitions Training Areas
HA 187	MRS 57 -	Unnamed, coordinates only	Military Munitions Training Areas
HA 188	MRS 58 -	Unnamed, coordinates only	Military Munitions Training Areas
HA 189	MRS 59 -	Unnamed	Military Munitions Training Areas
HA 190	MRS 60 -	Unnamed, coordinates only	Military Munitions Training Areas
HA 191	MRS 61 -	Grenade Range	Military Munitions Training Areas
HA 192	MRS 62 -	Laguna Seca Open Spaces	Military Munitions Training Areas
HA 193	MRS 63 -	Canyon Training Area	Military Munitions Training Areas
HA 194	MRS 64 -	Unnamed	Military Munitions Training Areas
HA 195	MRS 65 -	Unnamed	Military Munitions Training Areas
HA 196	MRS 66 -	Signal Corps Small Arms	Military Munitions Training Areas
HA 197	MRS 67 -	Unnamed	Military Munitions Training Areas
HA 198	MRS 68 -	Unnamed	Military Munitions Training Areas
HA 199	MRS 69 -	Unnamed	Military Munitions Training Areas
HA 200	MRS 70 -	Unnamed	Military Munitions Training Areas
HA 201	NA	Closed Combat Range	Military Munitions Training Areas
HA 202	NA	Watkins Gate Burn Area	Impact Area
HA 203	NA	Eucalyptus Fire Area	Impact Area ¹
HA 204	NA	Units 14/19	Impact Area
HA 205	NA	Units 15/21	Impact Area
HA 206	NA	Units 32/34	Impact Area
HA 207	NA	Units 1/2/3	Impact Area
HA 208	NA	Unit 4	Impact Area
HA 209	NA	Units 11/12	Impact Area
HA 210	NA	Units 5A/9	Impact Area
HA 211	NA	Units 7/10/33	Impact Area
HA 212	NA	Unit 23	Impact Area
HA 213	NA	Unit 25	Impact Area
HA 214	NA	Unit 28	Impact Area
HA 215	NA	Unit 31	Impact Area
HA 216	NA	Unit 6	Impact Area
HA 217	NA	Ranges 43 48 South	Impact Area
HA 218	NA	ESCA Interim Action Ranges	Impact Area
HA 219	NA	BLM Area B	Military Munitions Training Areas
HA 221	NA	Unit 22	Impact Area
HA 222	NA	Unit 18	Impact Area
HA-223	NA	Unit 5	Impact Area

Notes

HA Historical Area NA Not Applicable

1. Portion of HA 203 falls outside the Impact Area to the East.

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
Previously Assigned HAs with New Recommendation of No Further BRA Action											
HA-30	4,5,23	8/2026	30/30A	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP	Mixed Use	Habitat Management	This range was constructed in 1964 and used for BCT training until 1975. The range was reactivated in 1983 and deactivated in 1989. The range was listed as a Technique of Fire Range on the 1973 SOP, as a MOBA range in 1982 with blank ammo only, and as a Squad Defense ARTEP range in 1984. The range was not listed in the 1991 and 1992 SOPs. The area may have been used as a range in the 1950s based on the 1956 training map that shows a Submachine gun range in the area. Further BRA review was recommended in 2006. The range falls within Units 4, 5 and 23. The portion of the range that includes the area of firing points was evaluated as part of Unit 4 (HA-208), including a reconnaissance, and sampling in 2013. The downrange portion was evaluated as part of Unit 23 (HA-221) including a reconnaissance, and sampling in 2017. BRA reconnaissance was conducted in Unit 5 in 2022.	Reconnaissance Complete	Reconnaissance Complete	Not Applicable	No further BRA action within HA-208 and HA-212. BRA reconnaissance was conducted in Unit 5 in 2022. No further BRA action for area within Unit 5 (HA-223).
HA-34	17	12/2014	34	Machine Gun Assault Range, Close Combat Course, Mortar Range	Mixed Use	Habitat Management	Range has been in use since 1950s. Records indicate it was used as a Close Combat Course from the late 1950s through late 1960s. SOP from 1973 indicates it was a Machine Gun Assault Course. By 1980 the range was used as a mortar range to support Range 31. SOP from 6/91 indicates that the range was inactive. An initial visit to the site indicates that there are areas with greater than 10 percent spent ammunition.	Remediation Complete	Remediation Complete	Site Characterization Complete	No further BRA action.
HA-37	21	12/2014	37	25m Night Record Fire, Quick Kill and Night Fire, Rifle Grenade Range, Old Bazooka Range	Mixed Use	Habitat Management	According to range control records and historical training maps this range was used as a bazooka range and may also have been used as a rifle grenade range in the late 1950s. The range was labeled as a night firing range on 1961 maps. SOPs from 1973 to 1992 indicate the range was a 25 and 50 m range for night firing. The firing line was 185 meters with up to 60 firing points.	Remediation Complete	Remediation Complete	Not Applicable	No further BRA action.
HA-38	21	12/2014	38	Zero Rane, 25 M-2 Submachine Gun Shotgun	Mixed Use	Habitat Management	Range labeled as a rifle grenade range on training maps dated 1968 through 1984. May also have been present in the 1950s and 1960s but location is difficult to evaluate from the existing training maps. SOPs from 1973 through 1992 indicate the was used for machine gun, rifle, and pistol firing.	Remediation Complete	Site Characterization Complete	Not Applicable	No further BRA action.
HA-41	18	3/2005	41	Sub-Caliber Moving Target/Mortar	Mixed Use	Habitat Management	Appears this area of the inland ranges has been used since at least the 1940s. Use has changed from a close combat course in the 1940s and early 1950s to a mortar range in the late 1950s through present. Some spent small arms ammunition may be present at this range; however it does not appear that the range was used for small arms training in the more recent (1960s through 1990s) past. Two soil borings were sampled for explosives as part of the Basewide RI/FS. No explosives were detected. MEC remedial action was completed in Units 18 in 2009. During the remedial action no evidence indicating potential soil contamination was found within the unit in areas other than those already known and characterized for soil remediation.	Literature Review Complete	Literature Review Complete	Not Applicable	No Further BRA Action

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-42	18, Ranges 43-48 South	3/2005	42	Mortar Range (Long Range)	Explosives	Habitat Management	Appears this area has been used since at least the mid 1940s. The area was used as a mortar firing range from at least 1973 to 1993. Use prior to 1973 is not documented, but it appears based on review of maps that it may have been used for mortar fire as early as the 1950s. It is not known if small arms were used in the 1940s as part of the Grant training area. Six soil borings were sampled for explosives in this area as part of the Basewide RI/FS in 1994. No explosives were detected. HA-42 falls in Unit 18 and Ranges 43-48. MEC remedial action was completed in Units 18 in 2009. During the remedial action no evidence indicating potential soil contamination was found within the unit in areas other than those already known and characterized for soil remediation. MEC remedial action was conducted in Ranges 43-48 in 2003-2005. This information was available to at the time of the development of Site 39 Feasibility Study Addendum and Site 39 ROD Amendment, and no additional BRA action or soil remediation was identified within Ranges 43-48 other than the specific HAs.	literature Review Complete, Combined with HA-73	literature Review Complete	Not Applicable	No Further BRA Action
HA-70	11, 25	5/2019	NA	Small Arms Firing Course	Small Arms	Habitat Management	Range only shown on the After 1953 and 1958 Training Maps. Course is not shown on any other reviewed training maps. Initial visit by HLA in March 1999 indicated small arms use in the area.	Reconnaissance Complete	Reconnaissance Complete	Not Applicable	No further BRA action. Refer to HA-209 and HA-213.
HA-72	17, 20	3/2005	NA	Close Combat Course No. 2	Mixed Use	Habitat Management	Area appears to have been used for training since the 1950s as a Close Combat Course. Uses in more recent years are described under Range 34 above. HA-72 was mislabeled in the 2012 BRA report.	Refer to HA-34.	Refer to HA-34.	Refer to HA-34.	No further BRA action. Refer to HA-34.
HA-73	18	3/2005	NA	Grant Close Combat Course	Mixed Use	Habitat Management	Range was labeled for Close Combat in the 1940s. It is not known whether small arms were used at this range in the 1940s. Range location is shown in the 1945 training map. The 1953 training map shows the range area named Grant training area. After the 1940s, the range area was used as a mortar range. The 1958 training areas and facilities map labeled the area as Grant. MEC remedial action was completed in Units 18 in 2009. During the remedial action no evidence indicating potential soil contamination was found within the unit in areas other than those already known and characterized for soil remediation.	literature Review Complete, Combined with HA-42	literature Review Complete, Combined with HA-42	Not Applicable	No Further BRA Action
HA-153	Not Applicable	8/2012	MRS-27U	Training Site 21	Training Area Other (Bivouac)	Habitat Management	This site is adjacent to HA-164 (Site MRS-32()). This area was used from the 1970s to closure as an overnight bivouac area. Only small arms blanks were found during a site walk by a UXO safety specialist. MRS-27U was subsequently evaluated as a Track 1 site. The evaluation found no evidence of training for firing tank mounted .30 caliber and/or .50 caliber machine guns in the area. No additional investigation is warranted regarding the potential for firing tank mounted .30 caliber and/or .50 caliber machine guns.	Not Applicable	Not Applicable	Literature Review Complete	No further BRA action.

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-158	Not Applicable	3/2020	HA-35, 35A, MRS-28	MOUT Site	Mixed Use	Development	This site includes Impossible City, a mock city. Several Buildings within the city were live fire small arms sites. A tire house with sand-filled tires was constructed. live small arms fire and use of high explosives was authorized. Thus, this area might have been used as an EOD area. It was an active training area in 2006 and no further BRA was recommended. The property was transferred in 2009 for like-uses (continued use for law enforcement training). The FOSETS noted no further action under BRA. The ESCA Group 3 MRA ROD indicated no further BRA action was required.	Reconnaissance Complete	Reconnaissance Complete	Reconnaissance Complete	No further BRA action.
HA-202	Watkins Gate Burn Area	3/2020	NA	Watkins Gate Burn Area	Mixed Use	Habitat Management	The site is located in the northwest corner of the former Impact Area. The vegetation was burned in 2003 allowing better access. BRA was conducted, and no further BRA was recommended (2006). Munitions response in the northern and the southern unburned corners was completed in 2014. BRA was conducted in the northern and southern unburned portions in 2015. Portions of HA-18, -19, -21, -22, -49, -51, -52, -53, -54, -55, -56, -57, and -58 fall within HA-202.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-203	Eucalyptus Fire Area	11/2006	NA	Eucalyptus Fire Area	Mixed Use	Habitat Management	This site is located in the northeastern part of the former Impact Area. The vegetation burned as part of a fire in 2003 allowing for better access. Portions of HA-34, -35, -69, and -158 fall within HA-203. The BRA in 2006 recommended no further BRA action at HA-203 outside existing HAs. The MOUT complex (HA-35, HA-69 and HA-158) was an active training area in 2006; no further BRA is recommended in this revision. Remediation in progress at the time at HA-34 has been completed.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-204	14,19	1/2012	NA	Units 14/19	Mixed Use	Habitat Management	This site is located in the northern part of the former Impact Area. A controlled burn was conducted in October/November 2009 allowing better access. HA-39, -40, 40A, and 41 fall within HA-204. The BRA in 2006 recommended no further BRA action at HA-204 outside existing HAs. Remediation in progress at the time at HA-39, 40/40A has been completed. The portion of HA-41 within HA-204 has been evaluated for BRA as part of Units 14/19.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action. Refer to HA-41 for further information.
HA-205	15,21	01/2012	NA	Units 15/21	Mixed Use	Habitat Management	This site is located in the northern part of the former Impact Area. A controlled burn was conducted in 2010 allowing better access. The BRA in 2012 recommended no further BRA action at HA-205 and HA-36. Remediation in progress at the time at HA-37 and HA-38 has been completed.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
Previously Assigned HAs Requiring Further Action											

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-18D	Not Applicable	1/2019	18	Record Firing Range	Small Arms	Development	Range 18 is shown on maps dating back to 1961 and is present on the 1960 photo mosaic. Use of the range is documented as Record Range from 1973 to present. Maps from 1945 do show a practice 30 cal AA, Dummy Grenade and 30 cal Machine Gun range in southern (Inland from current position) portion of the range. Evidence of these ranges is present on the 1947, 1949, and 1951 aerial photograph, and the 1960 and 1965 aerial photo mosaics. The remedial action was conducted in 2002. Post-remediation health risk assessment for the Seaside sites was conducted in 2008. Due to a change in state screening level for lead for residential use, HA-18D was re-evaluated for lead in 2019.	Remediation Complete	Not Applicable	Not Applicable	Further evaluation of HA-18D is in progress.
HA-23D	Not Applicable	1/2019	23	Squad Attack Range, Rifle Squad Tactical Range, Trainfire II Range Complex	Mixed Use	Development	Area of Range 23 appears to have been used for training since at least 1945 and as a range from at least the mid 1950s. Use of the range appears to have changed some over time, starting as a Trainfire Range Complex, becoming a Rifle Squad Tactical Range in 1965. Because the range was used as a squad attack range, no fixed firing points are present. Movement downrange was limited to 700 meters due to Range 19 and 25 safety fans. Site characterization sampling was conducted in 1999 and 2003. Post-remediation health risk assessment for the Seaside sites was conducted in 2008. Due to a change in state screening level for lead for residential use, HA-23D was re-evaluated for lead in 2019.	Site Characterization Complete	Site Characterization Complete	Not Applicable	Further evaluation of HA-23D is in progress.
HA-27	1, 7, 33	3/2020	27	Fire Movement Course, SAW Table I IV, Close Combat Course	Small Arms	Habitat Management	This range was constructed in 1967. It was placed on inactive status in 1975, reopened in 1984, operated until 1989, and was converted to SAW in 1990. In April 1973 the range operated as a Close Combat Course with targets about 50 to 250m. In 1992 targets were located at 100, 200, and 300m. A night firing course may have operated in this area in the 1950s. This area was labeled as such on the 1956 training map. This range falls within HA-207 and HA-211 and was further evaluated as part of the unit-wide BRA cleanup evaluation.	Remediation Complete	Not Applicable	Not Applicable	Limited remediation for lead in Range 27. Refer to HA-207 and HA-211 for further information.

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-31	11, 31	1/2019	31	Platoon Attack Course, Demolition Range	Mixed Use	Habitat Management	This range is present on maps as far back as 1964. In 1973 the SOP indicated that the range was a Demolition Range for the 49th OD (EOD). Range control records indicate the Platoon Attack Range was constructed in 1974 or 1975, SOPs indicate Range was used as a Platoon Attack Course from at least 1980 to 1993. One boring was sampled during the Basewide RI/FS. No explosives were detected. This range was further evaluated as part of the unit-wide BRA cleanup evaluation.	SI Sampling Complete	SI Sampling Compete	Not Applicable	Further BRA action required as part of HA-215 unit-wide evaluation. No further BRA evaluation within HA-209. Refer to HA-209 and HA-215 for further information.
HA-31A	9, 31	1/2019	NA	STT Range 23	Mixed Use	Habitat Management	This range is present on the 1964 Training map. This range was further evaluated as part of the unit-wide BRA evaluation.	literature Review Complete	Literature Review Complete	Not Applicable	Further BRA action required as part of HA-215 unit-wide evaluation. No further BRA action within HA-210. Refer to HA-210 and HA-215 for further information.
HA-32	13, 17, 20	3/2005	32	Wild Cat Ridge Day/Night Combat Course, Attack Helicopter and UH-1 Door Gunnery, Live Fire Exercise, Day/Night Combo	Mixed Use	Habitat Management	Area around Range 32 appears to have been used for training exercises from as early as the 1940s to the late 1980s. Use ranged from a submachine gun training area in the 1940s, to unspecified training area in the 1950s, as inactive through most of the 1970s, and as a helicopter attack range in the 1980s. Site visit in 2001 indicated several areas around Wildcat ridge and Wildcat Canyon that may have been used for small arms training; however, concentrations of spent ammunition were not evident. HA-32 falls in Unit 13, 17 and 20.	Limited reconnaissance and mapping	Limited reconnaissance and mapping	Not Applicable	Reconnaissance/sampling after MEC removal.
Newly Assigned HAs with Recommendation of No Further BRA Action											
HA-207	1, 2, 3	3/2020	HA-23H, 23M, 24H, 26H, 27,60, 61H 62, 63, 64H	Units 1/2/3	Mixed Use	Habitat Management	Units 1, 2, and 3 are located in the southwestern edge part of the Impact Area. Several individual HAs had previously been evaluated. MEC remedial action was completed in Units 1/2/3 in 2010-2018. BRA was conducted in Units 1/2/3 (HA-207), including a reconnaissance, and sampling in 2016 and 2018.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-208	4	5/2014	HA-28, 29, 30, 66	Unit 4	Mixed Use	Habitat Management	Unit 4 is located in the southern part of the Impact Area. several individual HAs had previously been evaluated. MEC remedial action was completed in Unit 4 in 2012. BRA was conducted in Unit 4 (HA-208), including a reconnaissance, and sampling in 2013.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-209	11, 12	5/2014	HA-31, Austin Antitank Range	Units 11/12	Mixed Use	Habitat Management	Units 11 and 12 are located in the central part of the Impact Area. Several individual HAs had previously been evaluated. MEC remedial action was completed in Units 11/12 in 2011-2013. BRA was conducted in Units 11/12 (HA-209), including a reconnaissance, and sampling in 2013.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-210	5A,9	3/2018	HA-30, 31A, 68	Units 5A/9	Mixed Use	Habitat Management	Units 5A and 9 are located in the southeastern corner of the Impact Area. Several individual HAs had previously been evaluated. MEC remedial action was completed in Units 5A/9 in 2015. BRA was conducted in Units 5A/9 (HA-210), including a reconnaissance, and sampling in 2017.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-212	23	3/2018	HA-29, 30, 30A, 65, 66, 68, Austin Antitank Ranges	Unit23	Mixed Use	Habitat Management	Unit 23 is located in the southern western area of the Impact Area. Several individual HAs had previously been evaluated. MEC remedial action was completed in Unit 23 in 2011-2016. BRA was conducted in Unit 23 (HA-212), including a reconnaissance, and sampling in 2017.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.

Table 3.1 Historical Areas and Site Status (Revision 3)

Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-213	25	5/2019	HA-68, 70	Unit25	Mixed Use	Habitat Management	Unit 25 is located in the southeastern edge of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Unit 25 in 2015-2017. BRA was conducted in Unit 25 (HA-213), including a reconnaissance, and sampling in 2018.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-214	28	5/2019	HA-36, Combat in Cities, Rifle Grenade Range	Unit28	Mixed Use	Habitat Management	This site is located in the northeastern portion of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Unit 28 in 2015-2017. BRA was conducted in Unit 28 (HA-214), including a reconnaissance, and sampling in 2018.	SI Sampling Complete	SI Sampling Compete	Not Applicable	No further BRA action.
HA-216		1/2015	HA-27A	Unit6	Small Arms	Habitat Management	Unit 6 is located in the southwestern corner of the Impact Area. HA-27A had previously been evaluated. MEC remedial action was completed in Unit 6 in 2012-2013. BRA was conducted in Unit 6 (HA-216), including a reconnaissance.	Reconnaissance Complete	Reconnaissance Complete	Not Applicable	No further BRA action.
HA-217	Ranges 43-48	9/2020	HA-42, 43,48H	Ranges 43-48 South	Mixed Use	Habitat Management	This site is located on the northern edge of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Ranges 43-48 as an interim action in 2003-2005. This information was available to at the time of the development of Site 39 Feasibility Study Addendum and Site 39 ROD Amendment, and no additional BRA action or soil remediation was identified within Ranges 43-48 other than the specific HAS.	Literature Review Complete	Literature Review Complete	Not Applicable	No further BRA action.
HA-218	Ranges 43-48	4/2020	HA-43, 44, 45,46H, 47	ESCA Interim Action Ranges	Mixed Use	Habitat Management/ Development	This site located outside the Impact Area to the north. Several individual HAS had previously been evaluated. MEC remedial action was completed in Ranges 43-48 as an interim action in 2003-2005. This information was available to at the time of the development of Site 39 Feasibility Study Addendum and Site 39 ROD Amendment, and no additional BRA action or soil remediation was identified within Ranges 43-48 other than the specific HAS. Soil remedial action in HA-44 has been completed.	Literature Review Complete	Literature Review Complete	Not Applicable	No further BRA action.
HA-221	22	9/2022	HA-39, 40, 41, 74	Unit22	Mixed Use	Habitat Management	Unit 22 is located in the northern part of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Units 22 in 2009. During the remedial action no evidence indicating potential soil contamination was found within the unit in areas other than those already known and characterized for soil remediation.	Literature Review Complete	Literature Review Complete	Not Applicable	No Further BRA Action
HA-222	18	9/2022	HA-41, 42, 73	Unit 18	Mixed Use	Habitat Management	Unit 18 is located in the northern part of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Units 18 in 2009. During the remedial action no evidence indicating potential soil contamination was found within the unit in areas other than those already known and characterized for soil remediation.	Literature Review Complete	Literature Review Complete	Not Applicable	No Further BRA Action
HA-223	5	8/2026	HA-28, 29, 30, 66, 68	Unit 5	Mixed Use	Habitat Management	Unit 5 is located in the southern part of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Unit 5 in 2024. During the remedial action no evidence indicating potential soil contamination was found within the unit. BRA reconnaissance was conducted in Unit 5 in 2022.	Reconnaissance Complete	Reconnaissance Complete	Not Applicable	No Further BRA action.

Table 3.1 Historical Areas and Site Status (Revision 3)

Newly Assigned HAS Requiring Further Investigation											
Historical Training Area Reference Number	Unit	Revision Date	Range(s)/Site Number	Range/Site Name(s)	Range Type ¹	Proposed Reuse	Comments	Site Status			Recommend
								Small Arms	Explosives	Other	
HA-211	7, 10, 33	3/2020	HA-26, 27, 27A, 28, 54, 56, 58, 60, 63, 64, 65, 66, 68, Austin Antitank Ranges	Units 7/10/33	Mixed Use	Habitat Management	Units 7, 10 and 33 are located in the southwestern part of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in Units 7/10/33 in 2012-2014. BRA was conducted in Units 7/10/33 (HA-211), including a reconnaissance, and sampling in 2016 and 2018.	SI Sampling Complete. Area-wide average lead concentration in Unit 33 exceeded the screening	SI Sampling Complete	Not Applicable	No further BRA action for explosive residues. limited remediation recommended for elevated lead in a portion of Range 27 within Unit 33.
HA-215	31	1/2019	HA-31A, 31, 68	Unit 31	Mixed Use	Habitat Management	Unit 31 is located in the southeastern edge of the Impact Area. Several individual HAS had previously been evaluated. MEC remedial action was completed in the primary burn containment area of Unit 31 in 2015-2016. BRA was conducted in that portion of Unit 31 (HA-215), including a reconnaissance, and sampling in 2018.	SI Sampling Complete in accessible areas	SI Sampling Complete in accessible areas	Not Applicable	Further BRA Action is required in the densely vegetated areas following vegetation removal. limited remediation recommended for lead removal.
HA-219	Sub-areas B-2A, B-3	10/2020	HA-97, 121, 139,170,178, 183H, 184H, 186, 188, 201	BLM Area B	Mixed Use	Habitat Management	This site located outside the Impact Area to the north. Several individual HAS had previously been evaluated. MEC remedial action was completed in sub-areas B-2A and B-3, except in Unit A, in 2017-2019. BRA was conducted in sub-areas B-2A and B-3 (HA-219) except in Unit A, including a reconnaissance.	Reconnaissance Complete except in Unit A	Reconnaissance Complete except in Unit A	Not Applicable	Further BRA Action required in Unit A in Sub-Area B-3. No further BRA action needed for the remainder of the area.
Other											
HA-118	NA	NA	MRS-15 BLM	BLM	Explosives	Habitat Management	This site covers a large portion of the Site 39 Habitat Reserve Areas. This area was previously subdivided into historical areas HA-18H through HA-76. The development and habitat area boundaries have been revised based on East Garrison and Parker Flats Land Use Modification Assessment (Zander 2002) and the Revised Attachment A- HMP map (March 2006). The BRA program has retained the HA boundaries to preserve HA-specific evaluations and recommendations. These were further grouped into unit-wide HAS renamed per this BRA. Refer to the HAS within the table for further information on work completed at the site. Reconnaissance and sampling have been completed in portions of the area.	Refer to this table for further information on individual HAS. literature Review Complete.	Refer to this table for further information on individual HAS. literature Review Complete.	Refer to this table for further information on individual HAS. literature Review Complete.	Refer to this table for further information on individual HAS.

Notes

ESCA - Environmental Services Cooperative Agreement NA - Not Applicable

BLM- Bureau of Land Management

BRA - Basewide Range Assessment

CBRA - Comprehensive Basewide Range Assessment

HA- Historical Area

MOUT - Military Operations in Urban Terrain

SI - Site Inspection

HA-220 was skipped when assigning the new HAS.

Small Arms - Range was authorized for small arms ammunitions and historical and reconnaissance data indicate that primary use was for small arms training.

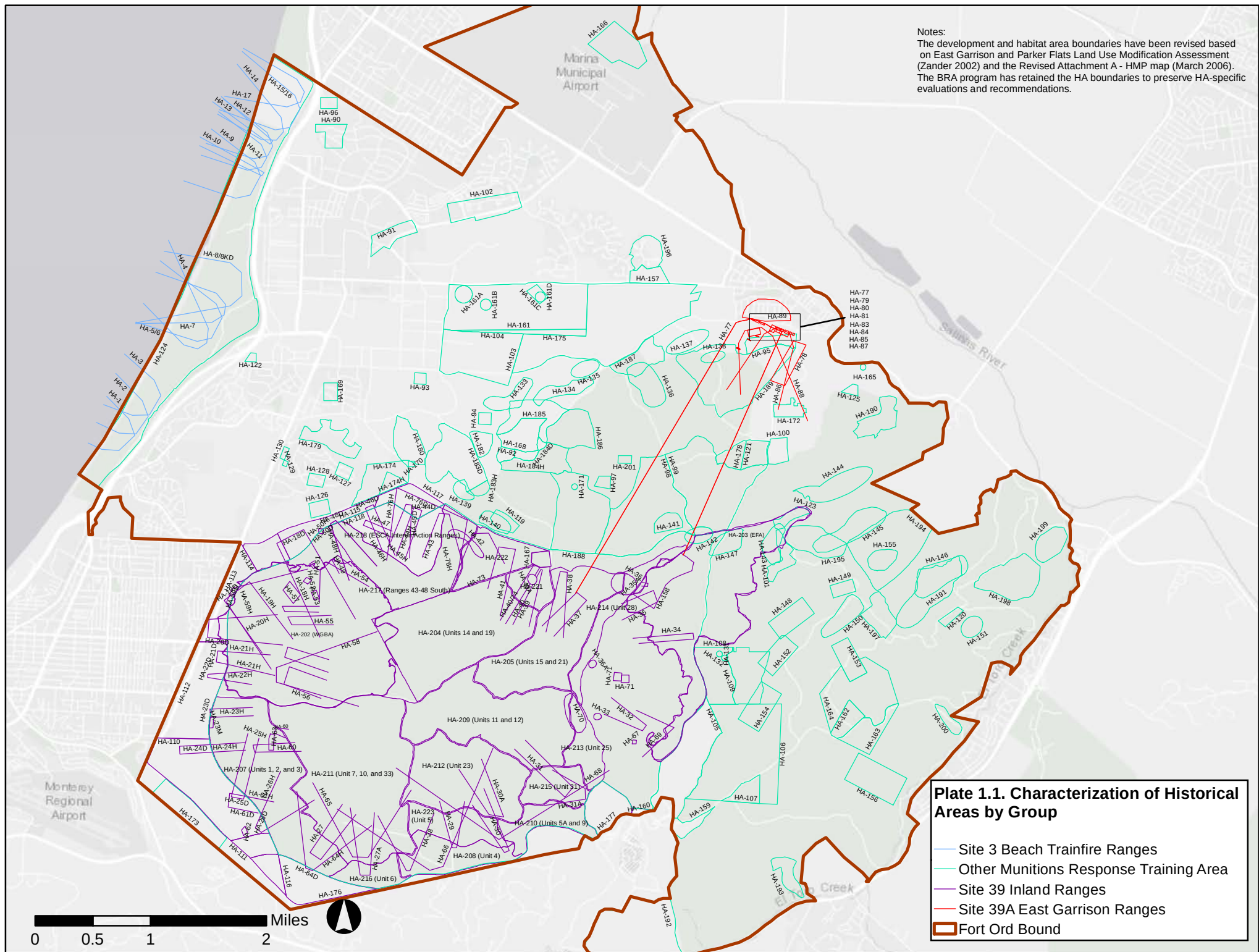
Mixed Use - Range was authorized for small arms ammunition and other military munitions, or historical and reconnaissance data indicate that both small arms and larger military munitions were used at the range. Explosives - Range was authorized for explosive military munitions such as high explosive hand grenades, mortars, rockets, or artillery, or was used as an burn/open detonation disposal area.

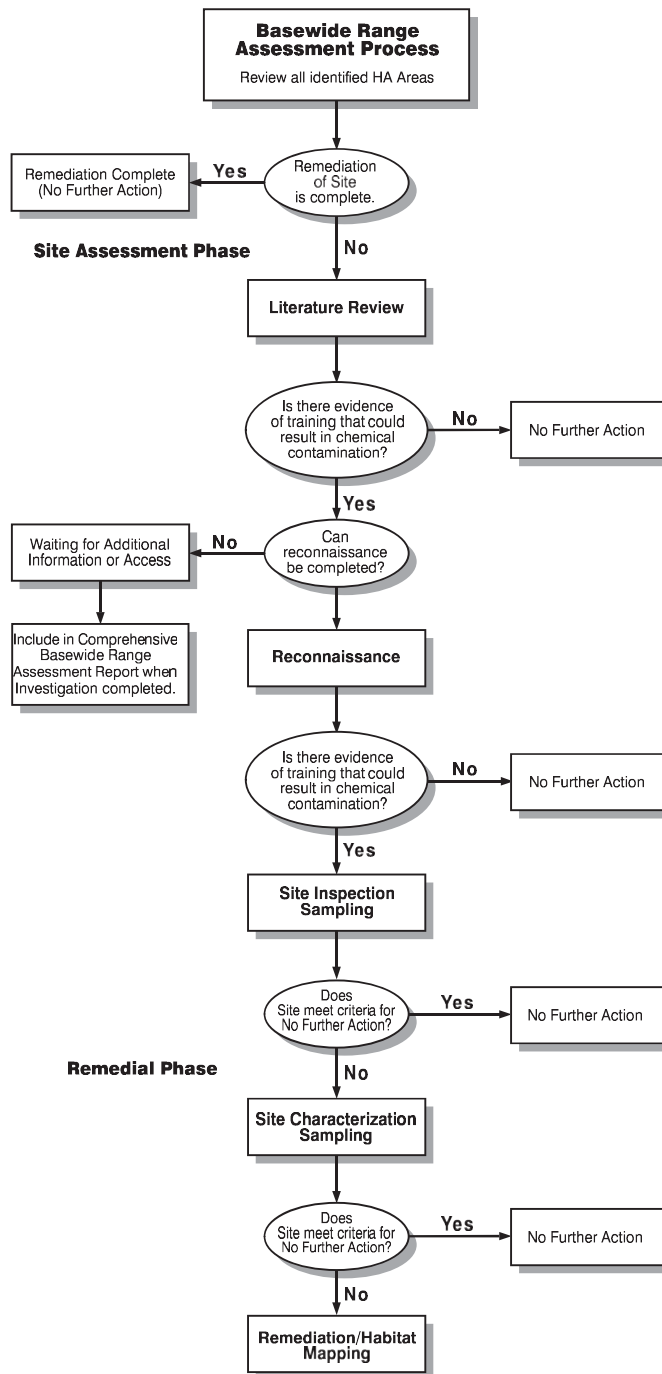
Training Area/Other - Site was used as a training area and the use of military munitions is known or suspected. These areas are located outside the Impact Area. If the primary use of the are is known it is provided in the table.

PLATES

Notes:

The development and habitat area boundaries have been revised based on East Garrison and Parker Flats Land Use Modification Assessment (Zander 2002) and the Revised Attachment A - HMP map (March 2006). The BRA program has retained the HA boundaries to preserve HA-specific evaluations and recommendations.





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JOB NUMBER
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Basewide Range Assessment Process
Review of All Identified HA Areas
Comprehensive Basewide Range Assessment Report
Former Fort Ord
Monterey County, California

APPROVED

DATE
6/04

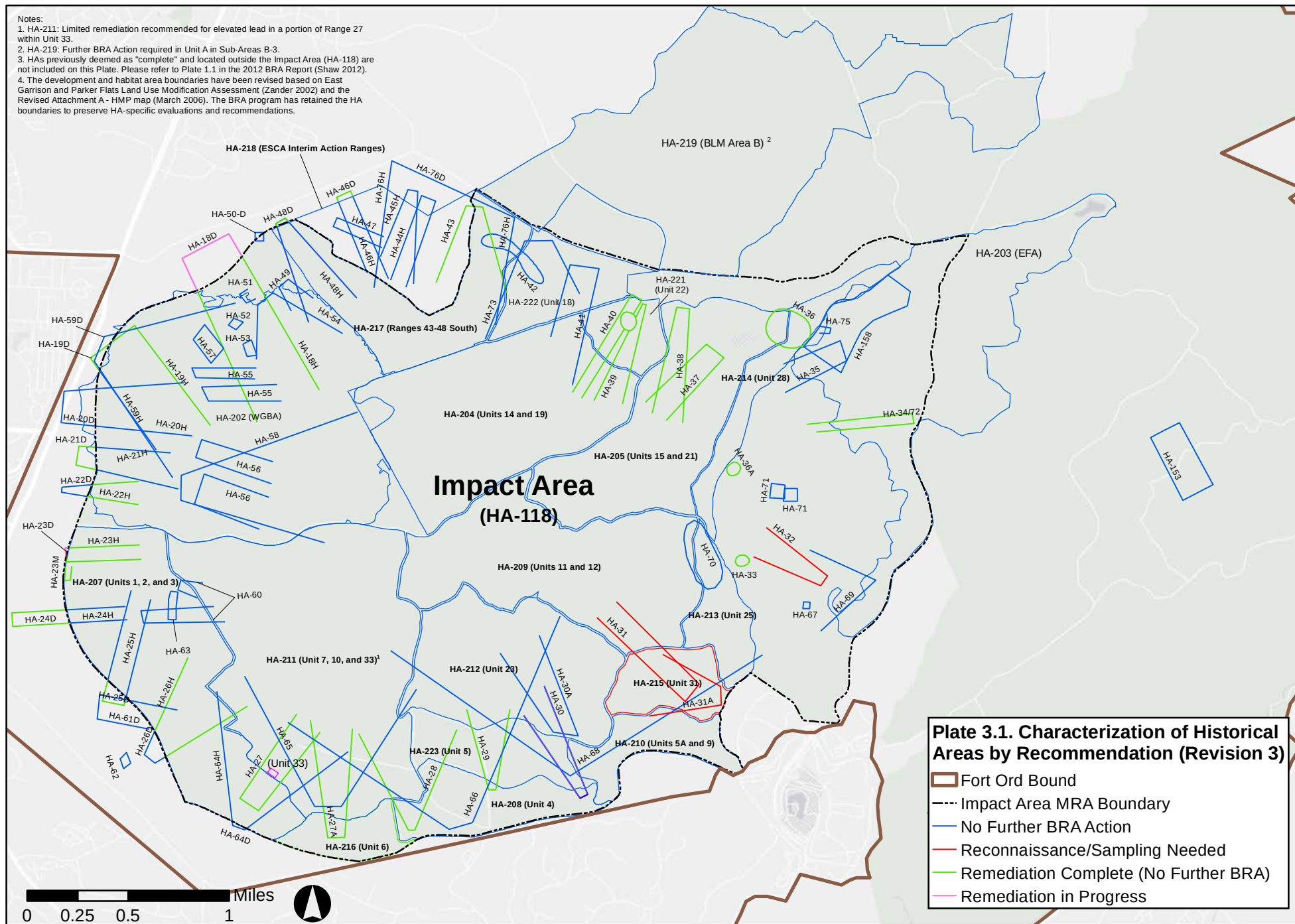
REVISED DATE

PLATE

1.2

Notes:

1. HA-211: Limited remediation recommended for elevated lead in a portion of Range 27 within Unit 33.
2. HA-219: Further BRA Action required in Unit A in Sub-Areas B-3.
3. HAs previously deemed as "complete" and located outside the Impact Area (HA-118) are not included on this Plate. Please refer to Plate 1.1 in the 2012 BRA Report (Shaw 2012).
4. The development and habitat area boundaries have been revised based on East Garrison and Parker Flats Land Use Modification Assessment (Zander 2002) and the Revised Attachment A - HMP map (March 2006). The BRA program has retained the HA boundaries to preserve HA-specific evaluations and recommendations.



APPENDIX A – Basewide Range Assessment Results (Revision 3)

A.1 HA-18D, DEVELOPMENT PORTION

STATUS: FURTHER EVALUATION IN PROGRESS

LOCATION: NORTHWEST OF THE IMPACT AREA

HISTORICAL AREAS (HAs) WITHIN: HA-114 AND HA-115

A.1.1 SITE DESCRIPTION AND BACKGROUND

Site HA-18D, is located northwest and outside the Impact Area Munitions Response Area (MRA) (PLATE 3.1). HA-18D is the portion of historical Range 18 that occurs in an area designated in the Fort Ord Reuse Plan for future development. HA-18D was evaluated in the 2012 Basewide Range Assessment (BRA) which recommended no further BRA action based on previously completed remediation (Shaw 2012). Because HA-18D is designated for development that could include residential use, the area was re-evaluated for lead protectiveness as defined in the *Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California* (KEMRON 2019). HA-18D falls within two historical areas HA-114 and HA-115. HA-114 and HA-115 sites correspond to MRS-SEA.3 and MRS-SEA.4 and were previously deemed for no further investigation warranted. Range use in this area included the use of practice 30 caliber AAs, Dummy Grenades and 30 caliber Machine guns. Further information on HA-18D, HA-114 and HA-115 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.1.2 PREVIOUS SITE CHARACTERIZATION AND MUNITIONS RESPONSE

Prior to the BRA, HA-18D was characterized for metals. Elevated levels of lead were found and removed in 1999. Confirmation samples from HA-18D were collected to confirm that the remediation goals set in the *Draft Final Sampling and Analysis Plan Characterization and Remediation Confirmation, Site 39, Ranges 18 and 19, Former Fort Ord, California* of 400 milligram per kilogram (mg/kg) were met (IT Corporation 2002). The upper confidence level (UCL) for HA-18D was calculated at 99.4 mg/kg.

Munitions responses in HA-18D were completed as part of the Environmental Services Cooperative Agreement (ESCA) Group 1 Seaside Munitions Response Area. As described in the ESCA Group 1 ROD, subsurface MEC removal has been conducted in MRS SEA.3 and MRS-SEA.4 (Army 2018). Additionally, the future residential use-portions of the sites were further subjected to the residential quality assurance process and have been determined acceptable for residential use from the munitions response perspective.

Further detailed information on remedial and sampling activities in each individual HA prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.1.3 LEAD RE-EVALUATION

Lead was re-evaluated based upon a revised health guidance value (HGV) established in 2007 by the Office of Environmental Health Hazard Assessment (OEHHA). In 2011, California Department of Toxic Substances Control (DTSC) updated the LeadSpread model that had been used in the human health risk assessment at Fort Ord. In 2018 DTSC promulgated the "Toxicity Criteria Rule" that established a new toxicity criterion for lead. HA-18D was one of the many sites re-evaluated for protectiveness with the

new screening level of 80 mg/kg for residential use (KEMRON 2019). The 95 percent upper confidence limit (UCL) values of the post-remediation confirmation soil sample results were calculated and compared to the default screening level (KEMRON 2019). The UCL at HA-18D exceeded the 80 mg/kg screening level. A change in lead cleanup level is currently being discussed between the Army and the regulatory agencies.

A.1.4 RECOMMENDATION

Since lead levels exceed the 80 mg/kg screening level, the Army is currently working with DTSC and the Environmental Protection Agency (EPA) to develop and memorialize an appropriate site-specific lead remediation goal (KEMRON 2019). Further evaluation of HA-18D is in progress.

A.1.5 REFERENCES

IT Corporation, 2002. *Draft Final, Sampling and Analysis Plan, Characterization and Remediation Confirmation, Site 39 Ranges 18 and 19, Former Fort Ord California*. (AR# RI-035A)

KEMRON, 2019. *Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California*. (AR# BW-2674C)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

United States Department of the Army (Army), 2018. *Record of Decision, Group 1, Seaside and Parker Flats (Phase II) Munitions Response Areas, Former Fort Ord, California*. (AR# ESCA-0359)

A.2 HA-23D, DEVELOPMENT PORTION

STATUS: FURTHER EVALUATION IN PROGRESS

LOCATION: WEST OF THE IMPACT AREA

HISTORICAL AREAS (HAs) WITHIN: HA-112

A.2.1 SITE DESCRIPTION AND BACKGROUND

Site HA-23D, is located west and outside the Impact Area Munitions Response Area (MRA) (PLATE 3.1). HA-23D is the portion of Range 23 that occurs in an area designated in the Fort Ord Reuse Plan for future development. HA-23D was evaluated in the 2012 Basewide Range Assessment (BRA) which recommended no further BRA action based on previously completed site characterization (Shaw 2012). Because HA-23D is designated for development that could include residential use, the area was re-evaluated for lead protectiveness as defined in the *Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California* (KEMRON 2019). HA-23D falls within the southern part of former range/historical area HA-112 corresponding to MRS-SEA.1. HA-112 was deemed for no further BRA action. Range use included a Trainfire Range Complex and a Rifle Squad Tactical Range. Small arms ammunition and military munitions used included 5.56mm, 7.62mm, and 40mm practice grenades (KEMRON 2019). Further information on HA-23D and HA-112 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.2.2 PREVIOUS SITE CHARACTERIZATION AND MUNITIONS RESPONSE

Prior to the BRA, HA-23D was characterized for explosives and metals. Site characterization sampling was performed in 1999 and 2003. Lead was detected in all five samples collected at concentrations ranging from 33.6 to 435 milligram per kilogram (mg/kg). The EPA Region IX residential preliminary remediation goal of 400 mg/kg for lead in soil was used as the target cleanup level. Since four of the five samples were below the established cleanup level and the fifth sample was just above the cleanup level, no further investigation warranted was recommended for this area (Shaw 2012). A human health risk assessment was conducted in 2008 which found that the amount of risk due to an exposure to lead in soil was below the levels of concern established by the EPA (MACTEC/Shaw 2008). Munitions responses in HA-23D were completed as part of the Environmental Services Cooperative Agreement (ESCA) Group 1 Seaside Munitions Response Area. As described in the ESCA Group 1 ROD (Army 2018), subsurface MEC removal has been conducted in MRS-SEA.1. Additionally, the future residential use-portions of the sites were further subjected to the residential quality assurance process and have been determined acceptable for residential use from the munitions response perspective. Further detailed information on sampling activities in HA-23D prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.2.3 SITE CHARACTERIZATION

As part of the lead re-evaluation of HA-23D, soil sampling was conducted at HA-23D in September 2016 and January 2016 in accordance with the *Final Historical Area (HA) 23D Sampling Work Plan, Former Fort Ord, California* (Gilbane 2015).

A.2.3.1 APPROACH

In order to obtain representative results from each location, samples were collected using an incremental sampling composite. Four incremental sampling grid locations were collected at HA-23D and analyzed for lead (Gilbane 2015). Each established decision unit (DU) was subdivided into a uniform grid system consisting of 30 individual grids of equal size. Equal volume increments of soil were collected from each of the individual grids within a DU and combined into a single bulk sample for processing and analysis. Three replicate samples for each depth interval were collected from each DU. Further detailed information can be found in the *Final Historical Area (HA) 23D Sampling Work Plan, Former Fort Ord, California* (Gilbane 2015).

A.2.3.2 SITE CHARACTERIZATION RESULTS

The 95 percent upper confidence level (UCL) lead concentration for HA-23D was calculated at 174.7 mg/kg. Soil sample results can be found in Tables 1 and 2 pulled from the *Lead Re-Evaluation Technical Memorandum* (KEMRON 2019). Lead was re-evaluated based upon a revised health guidance for lead in blood established by the California Office of Environmental Health Hazard Assessment (OEHHA) which triggered changes to the California Department of Toxic Substances Control (DTSC) methodology for calculating health risk (KEMRON 2019). A lead screening level of 80 mg/kg based on the state guidance was used during the evaluation. The UCL at HA-23D exceeds the new 80 mg/kg screening level (KEMRON 2019). A change in lead cleanup level is currently being discussed between the Army and the regulatory agencies.

A.2.4 RECOMMENDATION

Since lead levels exceed the 80 mg/kg screening level, the Army is currently working with DTSC and the Environmental Protection Agency (EPA) to develop and memorialize an appropriate site-specific lead remediation goal (KEMRON 2019). Further evaluation of HA-23D is in progress.

A.2.5 REFERENCES

- Gilbane, 2015. *Final Historical Area (HA) 23D Sampling Work Plan, Former Fort Ord, California*. (AR# BW-2760A)
- KEMRON, 2019. *Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California*. (AR# BW-2674C)
- MACTEC/Shaw, 2008. *Final Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California, Revision 0*. (AR# BW-2423F)
- Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)
- United States Department of the Army (Army), 2018. *Record of Decision, Group 1, Seaside and Parker Flats (Phase II) Munitions, Response Areas, Former Fort Ord, California*. (AR# ESCA-0359)

Table 1. HA 23D Residential and Firewise Area Decision Units Results

Location	Sample Date	Sample ID	Lab Sample	Depth (feet BGS)	Lead (mg/kg)	Average Lead (mg/kg)	RSD (%)	ITRC 95% UCL (mg/kg)
Evaluation Criteria					NA	NA	NA	80 to 400
HA23D-FW01	Sep 14 2015	HA23D-FW01-00-A-0.5	FA27617-14	0-0.5	93.1	96.1	13.23	128.1
	Sep 14 2015	HA23D-FW01-00-B-0.5	FA27617-15	0-0.5	110			
	Sep 14 2015	HA23D-FW01-00-C-0.5	FA27617-16	0-0.5	85.1			
HA23D-FW01	Sep 14 2015	HA23D-FW01-00-C-1.0	FA27617-19R	0.5-1.0	44.4	47.2	9.7	58.8
	Sep 14 2015	HA23D-FW01-00-B-1.0	FA27617-18R	0.5-1.0	44.7			
	Sep 14 2015	HA23D-FW01-00-A-1.0	FA27617-17R	0.5-1.0	52.5			
HA23D-RD01	Sep 2 2015	HA23D-RD01-00-A-0.5	FA27415-1	0-0.5	41.8	40.7	8.00	48.9
	Sep 2 2015	HA23D-RD01-00-B-0.5	FA27415-2	0-0.5	37.0			
	Sep 2 2015	HA23D-RD01-00-C-0.5	FA27415-3	0-0.5	43.2			
HA23D-RD02	Sep 2 2015	HA23D-RD02-00-A-0.5	FA27415-7	0-0.5	56.3	59.8	5.25	67.7
	Sep 2 2015	HA23D-RD02-00-B-0.5	FA27415-8	0-0.5	62.3			
	Sep 2 2015	HA23D-RD02-00-C-0.5	FA27415-9	0-0.5	60.9			
HA23D-RD03	Sep 3 2015	HA23D-RD03-00-A-0.5	FA27415-14	0-0.5	128	117	19.21	173.0
	Sep 3 2015	HA23D-RD03-00-B-0.5	FA27415-15	0-0.5	131			
	Sep 3 2015	HA23D-RD03-00-C-0.5	FA27415-16	0-0.5	90.8			
HA23D-RD03	Sep 3 2015	HA23D-RD03-00-C-1.0	FA27415-23R	0.5-1.0	93.2	89.8	21.4	138.0
	Sep 3 2015	HA23D-RD03-00-B-1.0	FA27415-22R	0.5-1.0	107			
	Sep 3 2015	HA23D-RD03-00-A-1.0	FA27415-21R	0.5-1.0	69.1			
HA23D-RD04	Sep 3 2015	HA23D-RD04-00-A-0.5	FA27415-18	0-0.5	231	238	2.43	252.5
	Sep 3 2015	HA23D-RD04-00-B-0.5	FA27415-19	0-0.5	241			
	Sep 3 2015	HA23D-RD04-00-C-0.5	FA27415-20	0-0.5	241			
HA23D-RD04	Sep 3 2015	HA23D-RD04-00-A-1.0	FA27415-24R	0.5-1.0	101 J	69.3	59.8	173.6
	Sep 3 2015	HA23D-RD04-00-B-1.0	FA27415-25R	0.5-1.0	22.4 J			
	Sep 3 2015	HA23D-RD04-00-C-1.0	FA27415-26R	0.5-1.0	84.5 J			
HA23D-RD05	Sep 8 2015	HA23D-RD05-00-B-0.5	FA27415-28	0-0.5	121	134	8.48	162.6
	Sep 8 2015	HA23D-RD05-00-A-0.5	FA27415-27	0-0.5	139			
	Sep 8 2015	HA23D-RD05-00-C-0.5	FA27415-29	0-0.5	142			
HA23D-RD05	Sep 8 2015	HA23D-RD05-00-B-1.0	FA27415-35R	0.5-1.0	16.9 J	22.8	43.1	47.5
	Sep 8 2015	HA23D-RD05-00-A-1.0	FA27415-34R	0.5-1.0	17.3 J			
	Sep 8 2015	HA23D-RD05-00-C-1.0	FA27415-36R	0.5-1.0	34.1 J			
HA23D-RD06	Sep 9 2015	HA23D-RD06-00-B-0.5	FA27538-8	0-0.5	241	263	10.3	330.8
	Sep 9 2015	HA23D-RD06-00-A-0.5	FA27538-7	0-0.5	293			
	Sep 9 2015	HA23D-RD06-00-C-0.5	FA27538-9	0-0.5	254			
HA23D-RD06	Sep 9 2015	HA23D-RD06-00-A-1.0	FA27538-10R	0.5-1.0	49.2	45.1	21.6	69.7
	Sep 9 2015	HA23D-RD06-00-C-1.0	FA27538-12R	0.5-1.0	52.2			
	Sep 9 2015	HA23D-RD06-00-B-1.0	FA27538-11R	0.5-1.0	34.0			
HA23D-RD07	Sep 9 2015	HA23D-RD07-00-C-0.5	FA27538-16	0-0.5	226	268	16.23	377.9
	Sep 9 2015	HA23D-RD07-00-B-0.5	FA27538-15	0-0.5	266			
	Sep 9 2015	HA23D-RD07-00-A-0.5	FA27538-14	0-0.5	313			
HA23D-RD07	Sep 10 2015	HA23D-RD07-00-A-1.0	FA27538-20R	0.5-1.0	97.8 J	96.4	46.9	210.4
	Sep 10 2015	HA23D-RD07-00-C-1.0	FA27538-22R	0.5-1.0	141 J			
	Sep 10 2015	HA23D-RD07-00-B-1.0	FA27538-21R	0.5-1.0	50.5 J			
HA23D-RD08	Sep 9 2015	HA23D-RD08-00-C-0.5	FA27538-19	0-0.5	102	98.0	23.67	156.4
	Sep 9 2015	HA23D-RD08-00-B-0.5	FA27538-18	0-0.5	119			
	Sep 9 2015	HA23D-RD08-00-A-0.5	FA27538-17	0-0.5	73.1			
HA23D-RD08	Sep 10 2015	HA23D-RD08-00-B-1.0	FA27538-24R	0.5-1.0	32.5 J	59.7	64.8	157.1
	Sep 10 2015	HA23D-RD08-00-C-1.0	FA27538-25R	0.5-1.0	104 J			
	Sep 10 2015	HA23D-RD08-00-A-1.0	FA27538-23R	0.5-1.0	42.6 J			
HA23D-RD09	Sep 11 2015	HA23D-RD09-00-A-0.5	FA27617-1	0-0.5	104	103	8.78	125.4
	Sep 11 2015	HA23D-RD09-00-B-0.5	FA27617-2	0-0.5	93.1			
	Sep 11 2015	HA23D-RD09-00-C-0.5	FA27617-3	0-0.5	111			
HA23D-RD09	Sep 11 2015	HA23D-RD09-00-B-1.0	FA27617-8R	0.5-1.0	88.5	91.7	4.1	101.1
	Sep 11 2015	HA23D-RD09-00-A-1.0	FA27617-7R	0.5-1.0	90.9			
	Sep 11 2015	HA23D-RD09-00-C-1.0	FA27617-9R	0.5-1.0	95.8			
HA23D-RD10	Sep 11 2015	HA23D-RD10-00-B-0.5	FA27617-5	0-0.5	80.1	81.6	16.50	115.4
	Sep 11 2015	HA23D-RD10-00-C-0.5	FA27617-6	0-0.5	68.9			
	Sep 11 2015	HA23D-RD10-00-A-0.5	FA27617-4	0-0.5	95.7			
HA23D-RD10	Sep 11 2015	HA23D-RD10-00-C-1.0	FA27617-12R	0.5-1.0	79.1	104.0	26.1	172.4
	Sep 11 2015	HA23D-RD10-00-B-1.0	FA27617-11R	0.5-1.0	133			
	Sep 11 2015	HA23D-RD10-00-A-1.0	FA27617-10R	0.5-1.0	100			

Notes:

mg/kg = milligrams per kilogram

Non-detections are reported down to the limit of detection (LOD)

Highlighted values indicate that the associated result is above the Evaluation Criteria

RSD = relative standard deviation

ITRC 95% UCL = Chebychev UCL

BGS = below ground surface

J = Estimated: The analyte was detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria and/or the analyte was detected at a concentration between the LOQ and Evaluation Criteria

< = Undetected: The analyte was analyzed for, but not detected

+ = The associated value is biased high

- = The associated value is biased low

Table 2. HA 23D Step-Out Decision Units Results

Location	Sample Date	Sample ID	Lab Sample	Depth (feet BGS)	Lead (mg/kg)	Average Lead (mg/kg)	RSD (%)	ITRC 95% UCL (mg/kg)
Evaluation Criteria					NA	NA	NA	80 to 400
HA23D-1-SO	Sep 8 2015	HA23D-1-SO-00-B-0.5	FA27415-31R	0-0.5	19.1	23.3	29.2	40.5
	Sep 8 2015	HA23D-1-SO-00-A-0.5	FA27415-30R	0-0.5	31.2			
	Sep 8 2015	HA23D-1-SO-00-C-0.5	FA27415-32R	0-0.5	19.7			
HA23D-2-SO	Sep 9 2015	HA23D-2-SO-00-B-0.5	FA27538-2R	0-0.5	31.7	32.1	10.6	40.7
	Sep 9 2015	HA23D-2-SO-00-A-0.5	FA27538-1R	0-0.5	28.9 J+			
	Sep 9 2015	HA23D-2-SO-00-C-0.5	FA27538-3R	0-0.5	35.7			
HA23D-3-SO	Sep 17 2015	HA23D-3-SO-00-B-0.5	FA27722-2R	0-0.5	113	89.3	25.5	146.5
	Sep 17 2015	HA23D-3-SO-00-A-0.5	FA27722-1R	0-0.5	67.7			
	Sep 17 2015	HA23D-3-SO-00-C-0.5	FA27722-3R	0-0.5	87.1			
HA23D-3-SO	Jan 7 2016	HA23D-3-SO-00-A-1.0	FA30565-19	0.5-1.0	82.7 J	53.5	47.3	117.2
	Jan 7 2016	HA23D-3-SO-00-B-1.0	FA30565-20	0.5-1.0	40.3 J			
	Jan 7 2016	HA23D-3-SO-00-C-1.0	FA30565-21	0.5-1.0	37.5 J			
HA23D-4-SO	Sep 16 2015	HA23D-4-SO-00-A-0.5	FA27721-3R	0-0.5	94.7 J	158.9	48.3	352.2
	Sep 16 2015	HA23D-4-SO-00-C-0.5	FA27721-4R	0-0.5	244 J			
	Sep 16 2015	HA23D-4-SO-00-B-0.5	FA27721-5R	0-0.5	138 J			
HA23D-4-SO	Jan 7 2016	HA23D-4-SO-00-B-1.0	FA30565-16	0.5-1.0	40.5	46.8	28.8	80.8
	Jan 7 2016	HA23D-4-SO-00-A-1.0	FA30565-15	0.5-1.0	37.6			
	Jan 7 2016	HA23D-4-SO-00-C-1.0	FA30565-17	0.5-1.0	62.3			
HA23D-5-SO	Sep 16 2015	HA23D-5-SO-00-C-0.5	FA27721-1R	0-0.5	87.1	85.6	7.9	102.7
	Sep 16 2015	HA23D-5-SO-00-B-0.5	FA27721-2R	0-0.5	78.2			
	Sep 16 2015	HA23D-5-SO-00-A-0.5	FA27721-6R	0-0.5	91.5			
HA23D-5-SO	Jan 6 2016	HA23D-5-SO-00-B-1.0	FA30565-12	0.5-1.0	23.5 J	27.4	36.4	52.6
	Jan 6 2016	HA23D-5-SO-00-A-1.0	FA30565-13	0.5-1.0	20.0 J			
	Jan 6 2016	HA23D-5-SO-00-C-1.0	FA30565-14	0.5-1.0	38.8 J			
HA23D-6-SO	Sep 15 2015	HA23D-6-SO-00-B-0.5	FA27720-2R	0-0.5	93.4	102.5	21.0	156.5
	Sep 15 2015	HA23D-6-SO-00-C-0.5	FA27720-3R	0-0.5	127			
	Sep 15 2015	HA23D-6-SO-00-A-0.5	FA27720-1R	0-0.5	87.0			
HA23D-6-SO	Jan 6 2016	HA23D-6-SO-00-B-1.0	FA30565-8	0.5-1.0	41.6 J	25.0	57.7	61.2
	Jan 6 2016	HA23D-6-SO-00-A-1.0	FA30565-9	0.5-1.0	17.2 J			
	Jan 6 2016	HA23D-6-SO-00-C-1.0	FA30565-11	0.5-1.0	16.1 J			
HA23D-7-SO	Sep 15 2015	HA23D-7-SO-00-C-0.5	FA27720-6T	0-0.5	50.2 J	122.7	52.1	283.7
	Sep 15 2015	HA23D-7-SO-00-B-0.5	FA27720-5T	0-0.5	147 J			
	Sep 15 2015	HA23D-7-SO-00-A-0.5	FA27720-4T	0-0.5	171 J			
HA23D-7-SO	Jan 5 2016	HA23D-7-SO-00-A-1.0	FA30565-5	0.5-1.0	134	122.2	18.2	178.1
	Jan 5 2016	HA23D-7-SO-00-B-1.0	FA30565-6	0.5-1.0	136			
	Jan 5 2016	HA23D-7-SO-00-C-1.0	FA30565-7	0.5-1.0	96.6			
HA23D-8-SO	Jan 5 2016	HA23D-8-SO-00-A-1.0	FA30565-1	0.5-1.0	33.0 J+	26.3	28.0	44.9
	Jan 5 2016	HA23D-8-SO-00-B-1.0	FA30565-2	0.5-1.0	18.4 J+			
	Jan 5 2016	HA23D-8-SO-00-C-1.0	FA30565-4	0.5-1.0	27.5 J+			
HA23D-8-SO	Sep 17 2015	HA23D-8-SO-00-B-0.5	FA27722-7T	0-0.5	159 J	84.9	75.9	246.9
	Sep 17 2015	HA23D-8-SO-00-A-0.5	FA27722-8T	0-0.5	42.8 J			
	Sep 17 2015	HA23D-8-SO-00-C-0.5	FA27722-9T	0-0.5	52.8 J			
HA23D-9-SO	Sep 21 2015	HA23D-9-SO-00-A-0.5	FA27823-1R	0-0.5	33.9 J	25.3	30.9	45.0
	Sep 21 2015	HA23D-9-SO-00-B-0.5	FA27823-2R	0-0.5	23.4 J			
	Sep 21 2015	HA23D-9-SO-00-C-0.5	FA27823-3R	0-0.5	18.6 J			

Notes:

mg/kg = milligrams per kilogram

Non-detections are reported down to the limit of detection (LOD)

Highlighted values indicate that the associated result is above the Evaluation Criteria

RSD = relative standard deviation

ITRC 95% UCL = Chebychev UCL

BGS = below ground surface

J = Estimated: The analyte was detected; however, the result is estimated due to discrepancies in meeting certain analyte-specific quality control criteria and/or the analyte was detected at a concentration between the LOQ and Evaluation Criteria

< = Undetected: The analyte was analyzed for, but not detected

+ = The associated value is biased high

- = The associated value is biased low

A.3 HA-27

STATUS: RECOMMEND LIMITED REMEDIATION FOR LEAD

LOCATION: SOUTHWESTERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.3.1 SITE DESCRIPTION AND BACKGROUND

Site HA-27, located within Unit 1 (HA-207) and Units 7 and 33 (HA-211), is located on the southwestern edge of the Impact Area (PLATE 3.1). The majority of HA-27 is located within Unit 33. Historical documents indicate that HA-27 (Range 27) was constructed in 1967 and listed as a Fire Movement Course. A 1956 training map indicates a Night Firing Course in the vicinity of Range 27, although no additional details are available. Historical aerial photos show an active range at this location in 1969, but not in 1966. Beginning in April 1973, the range was converted to a Fire and Movement or Close Combat Course. It was placed on inactive status in 1975 and reopened from 1984 to 1989. In 1990, it was converted to a squad automatic weapon (SAW) range. Targets for the various courses used over the years ranged from 50 to 300 meters. Listed ammunition used onsite includes 5.56mm and 7.62mm small arms ammunition. Further information on HA-27 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.3.2 PREVIOUS SITE CHARACTERIZATION

Site characterization sampling was conducted in 2001 and 2003. Analytical results for four locations showed lead concentrations ranging from 760 to 2,150 milligrams per kilogram (mg/kg) as described in the *2012 Comprehensive BRA Report* (Shaw 2012). Remedial action was recommended for HA-27 and was completed in 2009.

A.3.3 COMPLETED MUNITIONS RESPONSE

HA-27 was identified as having low probability of encountering munitions and explosives of concern (MEC) and thus did not require pre-remediation MEC removal. Post-remediation MEC removal was conducted and completed after remedial actions were completed. Further information can be found in *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014).

Munitions responses have been completed in Unit 1 (HA-207) and Units 7 and 33 (HA-211). See site reports for HA-207/HA-211.

A.3.4 REMEDIAL ACTION

Remedial action at HA-27 was conducted in November 2009 in the areas with elevated lead levels. During remedial activities, unexploded ordnance (UXO) technicians were on site visually inspecting during all excavation activities for MEC. Following remedial actions, confirmation sampling for lead was conducted and a range-wide weighted average concentration of 140 mg/kg was achieved. Remedial activities included remediation via excavation to the range-wide weighted average for lead of 225 mg/kg as described in the *2012 Comprehensive BRA Report* (Shaw 2012). Further information can also be found

in *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014).

A.3.5 RECONNAISSANCE

Upon completion of MEC removal, the BRA evaluation was implemented as part of the Unit 1 (HA-207) and Units 7 and 33 (HA-211) evaluations (See section HA-211).

A.3.6 SITE CHARACTERIZATION

Soil sampling was performed during March 2016 in Unit 1 of HA-207. Explosive residues (HMX, RDX, and TNT) were not detected in any of the Unit 1 samples. Lead was detected at concentrations ranging from 1.3 mg/kg to 84.8 mg/kg, none of which exceeded the 225 mg/kg cleanup level (KEMRON 2020). Refer to HA-207 for further detailed information.

Soil sampling was performed during March 2016 in Unit 7 of HA-211. Additionally, soil sampling was conducted in March 2016 which follow up work conducted in September 2016 and November 2016, and February and December 2018 in Unit 33 of HA-211. Unit 33 (HA-211) soil sample results indicated an area-weighted average lead concentration of 329.87 mg/kg, exceeding the 225 mg/kg cleanup level. Lead concentrations within a portion of Range 27 in Unit 33 did exceed the protectiveness thresholds specified in the Site 39 ROD Amendment (Army 2009). Unit 33 is comprised of “Very High” quality habitat. Limited remediation of soils is recommended in the Range 27 area to bring the area-weighted-average lead concentrations below the criteria threshold and maintain the habitat (KEMRON 2020). Refer to HA-211 for further detailed information.

Further information can also be found in *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South, Former Fort Ord, Monterey County, California* (KEMRON 2020).

A.3.7 RECOMMENDATION

Based on recent investigations, limited remediation of soils is recommended in HA-27 to bring the area-weighted-average lead concentrations below the criteria threshold and maintain the habitat (KEMRON 2020).

A.3.8 REFERENCES

Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California*. (AR# RI-047C)

KEMRON, 2020. *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South, Former Fort Ord, Monterey County, California*. (AR# BW-2831B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.4 HA-30

STATUS: NO FURTHER BRA ACTION IN HA-208 AND HA-212; NO FURTHER BRA ACTION IN HA-223 (UNIT 5)

LOCATION: EASTERN SECTION OF THE IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-208, HA-212, and HA-223

A.4.1 SITE DESCRIPTION AND BACKGROUND

HA-30, located within Unit 4 (HA-208), Unit 23 (HA-212), and Unit 5 (HA-223), is located on the eastern edge of the Impact Area Munitions Response Area (MRA) (PLATE 3.1). Range use at HA-30 includes as a rifle squad tactical range, technique of fire range, squad defense, and ARTEP range. Further historical information on HA-30 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.4.2 PREVIOUS SITE CHARACTERIZATION

Per the *2012 BRA Report*, a literature review was completed and SI sampling following MEC removal was recommended.

A.4.3 COMPLETED MUNITIONS RESPONSE

In Unit 4 (part of HA-208), technology-aided surface MEC removal was completed from August 2011 through May 2012 and a digital geophysical mapping (DGM) survey was completed from January 2012 to April 2013. In Unit 23 (HA-212), technology-aided surface MEC removal was conducted in 2011 and July 2015 through July 2016, and a DGM survey was completed from November 2015 until October 2016. Further information on the munitions response in these areas can be found in *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord California* (Gilbane 2014a) and *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (KEMRON 2017). In Unit 5 (HA-223), technology-aided surface MEC removal was completed in 2022, followed by DGM and limited subsurface removals as described in *Draft Final, MRS-BLM Unit 5, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2025).

A.4.4 SITE CHARACTERIZATION

Soil sampling was conducted in HA-208 and HA-212. No further BRA action was recommended in HA-208 and HA-212 (see section for HA-208 and HA-212). BRA reconnaissance was conducted in Unit 5 (HA-223) and no further BRA action is required.

A.4.5 RECOMMENDATION

No further BRA action is required.

A.4.6 REFERENCES

- Gilbane, 2014. *Final, MRS-BLM Units 4,11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-0799B)
- KEMRON, 2017. *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California.* (AR# OE-0893A)
- KEMRON, 2023. *Site Evaluation Results, Basewide Range Assessment Investigation, Unit 5.* (AR# BW-2929A)
- KEMRON, 2025. *Draft Final, MRS-BLM Unit 5, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-1036A)
- Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

A.5 HA-31

STATUS: RECOMMEND RECONNAISSANCE FOR LEAD AND EXPLOSIVES, RECOMMEND FURTHER BRA ACTION

LOCATION: SOUTHEASTERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.5.1 SITE DESCRIPTION AND BACKGROUND

Site HA-31, located within Unit 11 and 12 (HA-209) and Unit 31 (HA-215), is located on the southeastern edge of the Impact Area (PLATE 3.1). The use of the area includes a demolition range and a platoon attack course. Further information on HA-31 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.5.2 PREVIOUS SITE CHARACTERIZATION

Soil samples were collected and analyzed for explosives and metals. No further sampling was recommended for the site as described in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.5.3 COMPLETED MUNITIONS RESPONSE

Following vegetation clearance, technology-aided surface MEC removal was completed from August 2011 through May 2012. A digital geophysical mapping (DGM) survey was completed from January 2012 to April 2013. Subsequently, in 2015 a subsurface removal operation targeting large projectiles at shallow depths was conducted in Units 11 and 12. MEC remedial actions were completed in the area of HA-31 that falls within Units 11 and 12 (HA-209). Further detailed information can be found in the *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Gilbane 2014a). Munitions response is complete (see section for HA-209).

In Unit 31, which covers 103 acres, MEC removal was completed in the 57-acre perimeter fuel-break area. Vegetation clearance occurred in the fuel break areas of HA-215 in June 2015 (northern portion) and July 2016 (other portions of the fuel-break area). Following vegetation clearance, technology-aided surface MEC removal was conducted in 2015 and 2016, and DGM surveys were performed in 2015 and 2017. Completion of the remaining MEC removal is pending a prescribed burn. Further detailed information can be found in the *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California* (KEMRON 2020). See section for HA-215.

A.5.4 RECONNAISSANCE

Reconnaissance was conducted following vegetation removal and removal activities as part of the BRA evaluation of HA-209 in 2012. Reconnaissance is complete in the portion of HA-31 that falls within HA-209 (see section for HA-209). Further detailed information can also be found in the *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4, 11, and 12, Former Fort Ord, California* (Gilbane 2014b).

Reconnaissance and field evaluation were performed on the fuel break area of HA-215 for lead and explosives in soil in 2017. Further reconnaissance is recommended in the portion of HA-31 that falls

within HA-215 (see section for HA-215). Further detailed information can also be found in the *Sampling Result Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase I, Former Fort Ord, Monterey County, California* (KEMRON 2019).

A.5.5 SITE CHARACTERIZATION

Within Unit 11, an elevated lead concentration was found in one location (11-11) located within Range 31 (HA-31). Step-out samples indicated that the area of affected soil was limited to a single target. All area-weighted lead concentrations were below the 225 mg/kg ecological cleanup level proposed in the Site 39 ROD Amendment (Army 2009). Explosive residues were not detected in any samples. See HA-209 for further information.

Soil sampling was performed in 2018 via seven-point incremental sampling as part of the HA-215 BRA evaluation. Elevated lead concentrations were found in Range 31 (HA-31) exceeding the 225 mg/kg ecological cleanup level in the *Site 39 ROD Amendment* (KEMRON 2019). See section HA-215 for further detailed information.

A.5.6 RECOMMENDATION

Based on previous investigations and the completed field work in HA-209, no further investigation is warranted in HA-31 that falls within HA-209.

Following additional vegetation reduction, an additional BRA evaluation should be performed which includes additional sampling for explosive residues and lead in the portion of HA-31 that falls within HA-215.

A.5.7 REFERENCES

Gilbane, 2014a. *Final, MRS-BLM Units 4,11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0799B)

Gilbane, 2014b. *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4,11, and 12, Former Fort Ord, California*. (AR# RI-048A)

KEMRON, 2019. *Sampling Result Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase I, Former Fort Ord, Monterey County, California*. (AR# BW-2856A)

KEMRON, 2020. *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California*. (AR# OE-0975A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.6 HA-31A

STATUS: RECOMMEND FURTHER BRA ACTION

LOCATION: SOUTHEASTERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.6.1 SITE DESCRIPTION AND BACKGROUND

Site HA-31A, located within Unit 31 (HA-215) and Units 9 (HA-210), is located on the southeastern edge of the Impact Area (PLATE 3.1). The majority of HA-31A is located within Unit 31. The use of the area is identified as STT Range 23.

A.6.2 PREVIOUS SITE CHARACTERIZATION

A range evaluation was recommended following additional MEC removal as described in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.6.3 COMPLETED MUNITIONS RESPONSE

MEC remedial actions were conducted in Unit 31 in 2015, 2016, and in 2017. Due to dense vegetation, MEC removal has not been completed. Further detailed information can be found in the *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California* (KEMRON 2020). See section HA-215 for further detailed information.

A.6.4 RECONNAISSANCE

Reconnaissance and field evaluation was only performed in the fuel break areas for lead and explosives (HMX, RDX, and TNT) in soil. Site reconnaissance was performed in 2017.

A.6.5 SITE CHARACTERIZATION

Soil sampling was performed in 2018 via seven-point incremental sampling as part of the HA-215 BRA evaluation. Elevated lead concentrations were found in Range 31A (HA-31A) exceeding the 225 mg/kg ecological cleanup level in the *Site 39 ROD Amendment* (KEMRON 2019). See section HA-215 for further detailed information.

A.6.5 RECOMMENDATION

Based on HA-215 activities, further BRA evaluation is required in HA-31A.

A.6.6 REFERENCES

KEMRON, 2019. *Sampling Result Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase I, Former Fort Ord, Monterey County, California.* (AR# BW-2856A)

KEMRON, 2020. *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California.* (AR# OE-0975A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

A.7 HA-32

STATUS: LIMITED RECONNAISSANCE COMPLETE, RECOMMEND ADDITIONAL RECONNAISSANCE FOLLOWING MEC REMOVAL

LOCATION: SOUTHEASTERN SECTION OF THE IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.7.1 SITE DESCRIPTION AND BACKGROUND

HA-32, located within Unit 13, Unit 17, and Unit 20, is located on the southeastern portion of the Impact Area Munitions Response Area (MRA) (PLATE 3.1). HA-32 falls in the Wildcat Ridge area, east of Impossible Canyon Road. This area appears to have been used for training exercises from as early as the 1940s until the late 1980s. Use of the range varied from submachine gun training in the 1940s, unspecified training in the 1950s, inactive during most of the 1970s, and as a helicopter attack range in the 1980s. Site visits in 1999 and 2000 in the area around Wildcat Ridge indicated that the area may have been used for small arms training. However, concentrations of spent small arms ammunition were not evident. Further historical information on HA-32 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.7.2 RECONNAISSANCE

Per the *2012 Comprehensive BRA Report*, a limited reconnaissance site visit was performed in 2001 and the area was identified as requiring MEC sampling or removal prior to completing additional reconnaissance.

A.7.3 COMPLETED MUNITIONS RESPONSE

A field evaluation of Units 13, 17 and 20 were conducted in 2017-2018, including site visits and transect sampling for munitions (KEMRON 2019). MEC remedial actions have not been completed in these units.

A.7.4 RECOMMENDATION

Additional reconnaissance is recommended within HA-32.

A.7.5 REFERENCES

KEMRON, 2019. *Field Evaluation Report, Munitions Response, MRS-BLM Units 13/17/20*. (AR# OE-0956A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.8 HA-34

STATUS: REMEDIATION COMPLETE FOR LEAD, NO FURTHER BRA ACTION

LOCATION: EASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-203

A.8.1 SITE DESCRIPTION AND BACKGROUND

Site HA-34, located within Unit 17, is located on the eastern edge of the Impact Area Munitions Response Area (MRA), south of the intersection of Eucalyptus Road and Barloy Canyon Road and part of the habitat portion of the site (PLATE 3.1). HA-34 is a subarea of Site 39 Inland Ranges and part of the habitat reserve as defined in the *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* (Gilbane 2014). Range use at HA-34 includes a Close Combat Course, Machine Gun Assault Course, and a mortar range. Further historical information on HA-34 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.8.2 PREVIOUS SITE CHARACTERIZATION

Previous investigations in 2006 identified elevated levels of lead above the Record of Decision (ROD) ecological screening level of 225 milligram per kilogram (mg/kg) (Army 2009). Characterization of the site identified approximately 23,670 cubic yards of soil requiring remediation in a 7.9-acre area. Further remediation was deemed necessary under the Site 39 Feasibility Study Addendum. Further information on sampling activities and results in HA-34 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.8.3 COMPLETED MUNITIONS RESPONSE

A surface removal of munitions and explosives of concern (MEC) was conducted within the Eucalyptus Fire Area as a Time-Critical Removal Action in 2003 (Shaw 2005). A MEC remedial action was performed within Range 34 in 2010 prior to soil remediation activities (Shaw, 2011). Technology-aided surface MEC remediation occurred in August 2010 followed by a digital geophysical mapping (DGM) survey in October 2010 and was completed in November 2010. A DGM survey was completed only over 3 acres, the remaining 4.8 acres was not accessible due to steep slopes. No MEC item was encountered and approximately 40 pounds of munitions debris (MD) was removed from Range 34. HA-34 was identified as having moderate to high probability of encountering MEC and required MEC removal to depth within the footprint of the remediation areas prior to excavation for soil remediation (Gilbane 2014). A subsurface investigation was performed using the “mag and dig” method for all 7.9 acres of the proposed lead remediation area to the proposed depth of remediation plus one foot. 6,210 pounds of munitions debris (MD), four unexploded ordnance (UXO) items, and 9,356 pounds of range-related debris were recovered during pre-remediation MEC removal. During soil excavation for lead remediation from July to November 2011, 28 additional MD items and one UXO item were found and removed. Following soil excavation activities, post-remediation MEC removal was conducted from November 2011 to January 2012 within the footprint of excavation areas to a depth of 4 feet below ground surface (bgs). This included a DGM survey on 5.34 acres where 1,682 individual dig targets could be identified. After QC review, 1,335 targets were identified for intrusive investigation. Following the DGM survey, the “mag

and dig” method was performed in the 3.16-acre saturated response areas where DGM targets were not selected. Post-remediation MEC removal recovered approximately 356 pounds of MD, 363 pounds of range-related debris, and no MEC was found. Further detailed information can be found in the *Final Remedial Action Completion Report Site 39 Inland Range Habitat Reserve* (Gilbane 2014).

A.8.4 REMEDIAL ACTION

The remedial action objective (RAO) at HA-34 was to excavate to a range-wide weighted average for lead at or below the ecological screening level of 225 mg/kg and to focus on areas with expended small ammunition, target boxes, and target lanes. Following vegetation clearance and confirmation samples, approximately 29,330 cubic yards of soil with an excavation depth ranging from 1 to 5 feet was removed from the site (Gilbane 2014).

A.8.5 SITE CHARACTERIZATION

Following excavation, post-remediation confirmation soil samples were collected from the excavation area from July 2011 through November 2011. Samples were analyzed for both explosives and lead. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 ROD Amendment* (Army 2009) for protection of human health and the environment.

A.8.5.1 APPROACH

A total of 166 confirmation soil samples were collected from the bottom of the excavation during remedial activities. Additionally, bias samples were collected in the following areas: 21 sidewall samples, two random surface samples, three samples from locations where large amounts of MD were removed, and three samples from 55-gallon drums that were found during excavation. Over-excavation samples were also collected in areas where additional excavation was required beyond the original planned depth, a total of 32 over-excavated samples were collected (Gilbane 2014).

A.8.5.2 SITE CHARACTERIZATION RESULTS

Three sidewall samples had lead concentrations ranging between 3,000 and 12,000 mg/kg. An additional 5,660 cubic yards were excavated on site following soil sampling results. Soil excavation and locations of confirmation samples are provided in Figure K34-2 pulled from the *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* Report (Gilbane 2014). Pre- and post- remediation soil sample results for lead are provided in Tables K34-2 also pulled from the *Gilbane 2014* Report. The lead range-wide weighted average was calculated using the pre-remediation (non-excavated area) and post-remediation (excavated area) results. A range-wide weighted average concentration of lead at 217 mg/kg was achieved at HA-34 (Gilbane 2014). Additionally, final confirmation results for trinitrotoluene (TNT), cyclotetramethylene tetranitramine (HMX), cyclotrimethylene trinitramine (RDX), and Total Petroleum Hydrocarbons are provided in Tables K34-3 through K34-6 (Gilbane 2014).

A.8.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that lead concentrations do not exceed the protectiveness thresholds specified in the ROD amendment (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-34. Additionally, no additional excavation is required since confirmation sampling results and the range-wide weighted average are both below established screening levels (Gilbane 2014).

A.8.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California.* (AR# RI-041E)

Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California.* (AR# RI-047C)

Shaw, 2005. *Final After-Action Report, Time Critical Removal Action and Military Munitions Reconnaissance, Eucalyptus Fire Area, Former Fort Ord, California.* (AR# OE-0499G)

Shaw, 2011. *Range 34 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California.* (AR# OE-0744)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

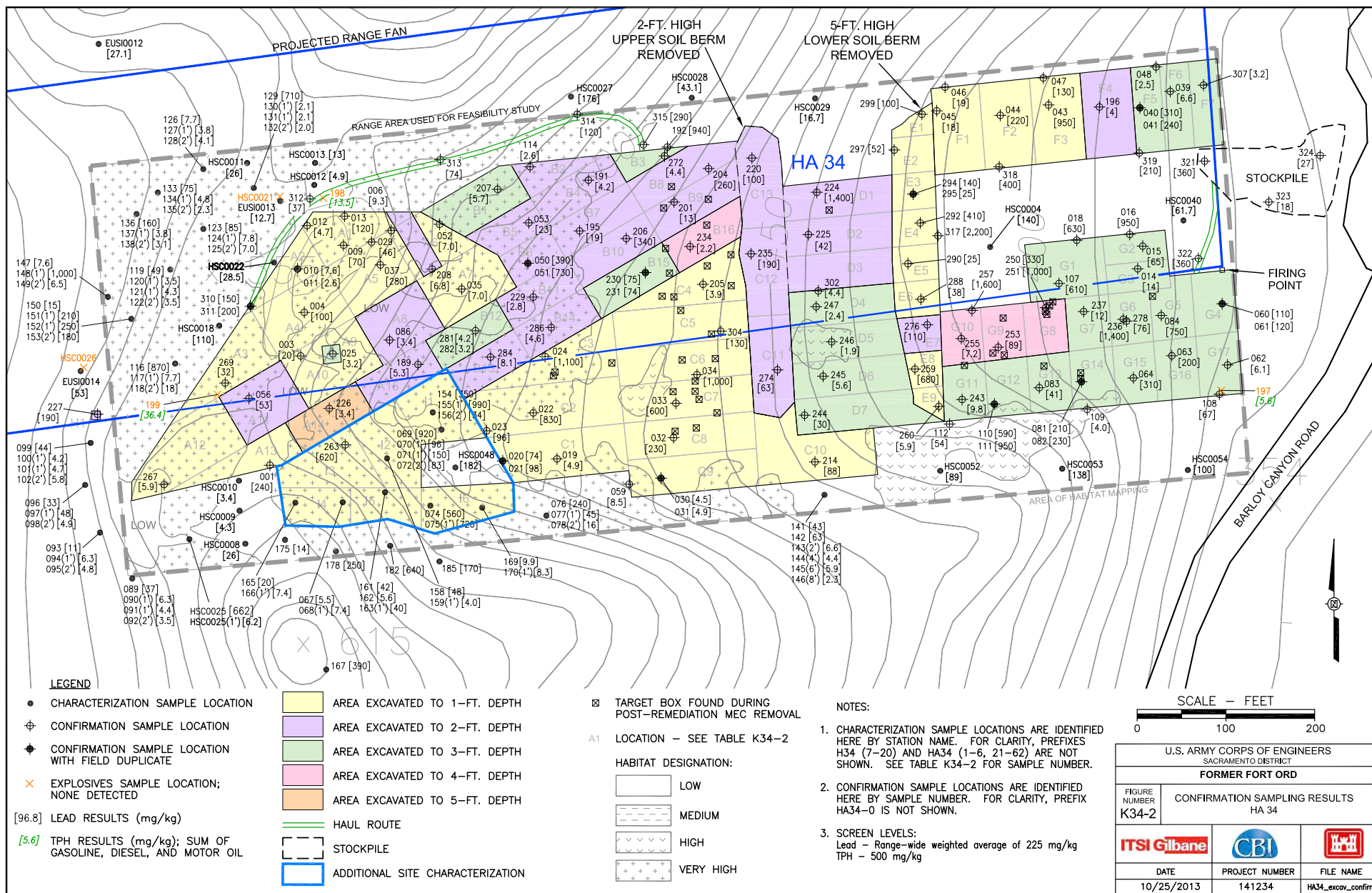


Table K34-2
Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
Excavated Area																	
A1	H34HSC0014	H34HSC0014-1	1/8/2003	10	10	0	HA34-009	7/28/2011	70					70	70	0	
						0.5	HA34-012	7/28/2011	4.7					4.7	0.5	Sidewall	
						0.5	HA34-013	7/28/2011	120					120	0.5	Sidewall	
A2						1	HA34-010	7/28/2011	7.6					7.6	7.6	0	
A3	H34HSC0019	H34HSC0019A-1	6/24/2003	130	130	0	HA34-269	10/19/2011	32					32	32	0	
A4						1	HA34-004	7/26/2011	100					100	100	0	
A5						1	HA34-029	8/3/2011	46						46	0	
						1	HA34-037	8/8/2011	280					280	280	0	
A6	H34HSC0016	H34HSC0016-1	1/8/2003	2900	2900	0											
	H34HSC0016	H34HSC0016-2	1/8/2003	25		1	HA34-006	7/26/2011	9.3						9.3	0	
						1	HA34-052	8/10/2011	7.0						7.0	0	
						1	HA34-054	8/10/2011	6400								
A7						2	HA34-208	9/7/2011		6.8J				6.8	6.8	0	
						1	HA34-035	8/8/2011	7.0					7.0	7.0	0	
A8						1	HA34-028	8/3/2011	34000								
						0.5	HA34-036	8/8/2011	7500								Surface bias
						2	HA34-086	8/18/2011		3.4J				3.4	3.4	0	
A9	H34HSC0015	H34HSC0015-1	1/8/2003	1900	1900	0											
	H34HSC0015	H34HSC0015-2	1/8/2003	2400		1											
	H34HSC0015	H34HSC0015-3	1/8/2003	1400		2											
A10						3	HA34-025	8/2/2011	3.2					3.2	3.2	0	
						1	HA34-003	7/26/2011	20					20	20	0	
A11	H34HSC0020	H34HSC0020A-1	6/24/2003	460	460	0											
						1	HA34-005	7/26/2011	3900								
						1	HA34-008	7/28/2011	3800								Surface bias
						2	HA34-056	8/16/2011		53				53	53	0	
A12	HA34HSC0024	HA34HSC0004-1M	12/15/2004	195	195	0	HA34-267	10/19/2011	5.9U					5.9	5.9	0	
A13	HA34HSC0024	HA34HSC0004M-2M	12/15/2004	7.53		1	HA34-001	7/26/2011	240					240	240	0	
A14						1	HA34-002	7/26/2011	1900								
						2	HA34-085	8/18/2011		19000J							
						3	HA34-188	8/31/2011			3000						
						4	HA34-212	9/8/2011				8500					
						5	HA34-226	9/21/2011					3.4J	3.4	3.4	0	
A15						1	HA34-087	8/29/2011	30000								
						2	HA34-189	8/31/2011		5.3				5.3	5.3	0	
B1						2	HA34-049		3800								
B2						3	HA34-207	9/7/2011		5.7				5.7	5.7	0	
						2	HA34-114	8/23/2011	2.6					2.6	2.6	0	
B3						0.5	HA34-192	8/31/2011	940						940	0.5	Sidewall
						2	HA34-202	9/7/2011		3400							
						3	HA34-272	10/19/2011			4.4U			4.4	4.4	0	
B4						2	HA34-191	8/31/2011	4.2					4.2	4.2	0	
B5						2	HA34-053	8/10/2011	23					23	23	0	
B6						2	HA34-051	8/10/2011	730					730	730	0	FD of HA34-050
B7	HA34HSC0035	HA34HSC0035-1	10/30/2006	945J	945	0											
	HA34HSC0035	HA34HSC0035-2	10/30/2006	749		1											
	HA34HSC0035	HA34HSC0035-3	10/30/2006	4.90		2	HA34-195	8/31/2011	19					19	19	0	
B8	H34HSC0017	H34HSC0017-1	1/8/2003	1200	1200	0											
	H34HSC0017	H34HSC0017-24	1/8/2003	290		1											
						2	HA34-204	9/7/2011	260					260	260	0	
B9	HA34HSC0036	HA34HSC0036-1	10/30/2006	2930J	2930	0											
	HA34HSC0036	HA34HSC0036-2	10/30/2006	627		1											
	HA34HSC0036	HA34HSC0036-3	10/30/2006	17		2	HA34-201	9/7/2011	13					13	13	0	
B10						2	HA34-206	9/7/2011	340					340	340	0	
B11						1	HA34-113	8/23/2011	2200								
						2	HA34-229	9/26/2011		2.8				2.8	2.8	0	

Table K34-2
Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Alternative Range-wide Weighted Average (mg/kg) ^{2,3}	Sample Depth (feet bgs)	
B12						1	HA34-088	8/18/2011	26000								
						2	HA34-190	8/31/2011		1500							
						3	HA34-281	10/20/2011			4.2			4.2	4.2	0	
B13	HA34HSC0005	H34HSC0005-1	1/7/2003	1600	1600	0											
	HA34HSC0005	H34HSC0005-2	1/7/2003	480		1											
	HA34HSC0006	H34HSC0006-14	1/7/2003	3100	3100	0											
	HA34HSC0006	H34HSC0006-2	1/7/2003	13000		1											
	HA34HSC0006	H34HSC0006-3	1/7/2003	120J-		2	HA34-284	10/20/2011	8.1					8.1	8.1	0	
B14						2	HA34-286	10/20/2011	4.6					4.6	4.6	0	
B15						2	HA34-193	8/31/2011	2300								
						3	HA34-230	9/26/2011		75				75	75	0	
B16						2	HA34-210	9/8/2011	2100								
						3	HA34-221	9/21/2011		4900J							
						4	HA34-234	9/29/2011			2.2			2.2	2.2	0	
C1	HA34HSC0049	HA34HSC0049-1	10/30/2006	757J	757	0											
	HA34HSC0049	HA34HSC0049-2	10/30/2006	36		1	HA34-019	8/2/2011	4.9					4.9	4.9	0	
C2						0.5	HA34-021	8/2/2011	98						98	0.5	Sidewall, FD of HA34-020
	H34HSC0007	H34HSC0007-1	1/7/2003	720	720	0											
						1	HA34-022	8/2/2011	830					830	830	0	
C3	HA34HSC0041	HA34HSC0041-1	10/30/2006	785J	785	0											
	HA34HSC0041	HA34HSC0041-2	10/30/2006	122		1	HA34-024	8/2/2011	1100					1100	1100	0	
C4						1	HA34-205	9/7/2011	3.9					3.9	3.9	0	
C5						1	HA34-304	10/20/2011	130					130	130	0	
C6	HA34HSC0042	HA34HSC0042-1	10/30/2006	3670J	3670	0											
	HA34HSC0042	HA34HSC0042-2	10/30/2006	163		1	HA34-034	8/8/2011	1000					1000	1000	0	
C7						1	HA34-033	8/8/2011	600					600	600	0	
C8						1	HA34-032	8/8/2011	230					230	230	0	
C9	HA34HSC0050	HA34HSC0050-14	10/30/2006	251J	251	0											
	HA34HSC0050	HA34HSC0050-2	10/30/2006	19		1	HA34-031	8/8/2011	4.9					4.9	4.9	0	FD of HA34-030
						0.5	HA34-059	8/16/2011	8.5						8.5	0.5	Sidewall
C10	HA34HSC0051	HA34HSC0051-1	10/30/2006	234J	234	0											
	HA34HSC0051	HA34HSC0051-2	10/30/2006	9.3		1	HA34-214	9/21/2011	88J					88	88	0	
	HA34HSC0046	HA34HSC0046-1	10/26/2006	1150	1150	0											
C11	HA34HSC0046	HA34HSC0046-2	10/26/2006	43		1	HA34-215	9/21/2011	1800J								
	HA34HSC0046	HA34HSC0046-3	10/26/2006	40		2	HA34-274	10/19/2011	63					63	63	0	
	HA34HSC0046	HA34HSC0046-4	10/26/2006	36		3										1	
	HA34HSC0046	HA34HSC0046-5	10/26/2006	52		4										2	
	HA34HSC0046	HA34HSC0046-6	10/26/2006	60		5										3	
C12	HA34HSC0037	HA34HSC0037-1	10/26/2006	1170	1170	0											
	HA34HSC0037	HA34HSC0037-2	10/26/2006	46		1	HA34-219	9/21/2011	2400J								
	HA34HSC0037	HA34HSC0037-3	10/26/2006	14		2	HA34-235	9/29/2011		190				190	190	0	
	HA34HSC0037	HA34HSC0037-4	10/26/2006	15		3										1	
	HA34HSC0037	HA34HSC0037-5	10/26/2006	6.6		4										2	
	HA34HSC0037	HA34HSC0037-6	10/26/2006	104		5										3	
C13	HA34HSC0033	HA34HSC0033-1	10/26/2006	290	290	0											
	HA34HSC0033	HA34HSC0033-2	10/26/2006	36		1	HA34-211	9/8/2011	4500								
	HA34HSC0033	HA34HSC0033-3	10/26/2006	16		2	HA34-220	9/21/2011		100J				100	100	0	
	HA34HSC0033	HA34HSC0033-4	10/26/2006	42		3										1	
	HA34HSC0033	HA34HSC0033-5	10/26/2006	44		4										2	
	HA34HSC0033	HA34HSC0033-6	10/26/2006	20		5										3	
D1						2	HA34-224	9/21/2011	1400J					1400	1400	0	
D2	HA34HSC0038	HA34HSC0038-1	10/30/2006	1060J	1060	0											
	HA34HSC0038	HA34HSC0038-2	10/30/2006	299		1											
D3	HA34HSC0038	HA34HSC0038-3	10/30/2006	39		2	HA34-225	9/21/2011	42J					42	42	0	
						2	HA34-302	10/20/2011		4.4				4.4	4.4	0	
D4						2	HA34-218	9/21/2011	3000J								
						3	HA34-247	10/5/2011		2.4				2.4	2.4	0	

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Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Alternative Range-wide Weighted Average (mg/kg) ^{2,3}	Sample Depth (feet bgs)	
D5	HA34HSC0043	HA34HSC0043-1	10/30/2006	4310J	4310	0											
	HA34HSC0043	HA34HSC0043-2	10/30/2006	1060		1											
	HA34HSC0043	HA34HSC0043-3	10/30/2006	223		2	HA34-232	9/26/2011	3100								
D6						3	HA34-246	10/5/2011		1.9				1.9	1.9	0	
						2	HA34-217	9/21/2011	3900J								
D7						3	HA34-245	10/5/2011		5.6				5.6	5.6	0	
						2	HA34-216	9/21/2011	5100J								
E1						3	HA34-244	10/5/2011		30				30	30	0	
	HA34HSC0034	HA34HSC0034-1	10/26/2006	1500	1500	0											
	HA34HSC0034	HA34HSC0034-2	10/26/2006	1080		1											
	HA34HSC0034	HA34HSC0034-3	10/26/2006	491		2											
	HA34HSC0034	HA34HSC0034-4	10/26/2006	417		3											
	HA34HSC0034	HA34HSC0034-5	10/26/2006	269		4											
E2						5											
						6	HA34-299	10/20/2011	100					100	100	0	
E3						6	HA34-297	10/20/2011	52					52	52	0	
E4						6	HA34-294	10/20/2011	140					140	140	0	
						6	HA34-292	10/20/2011	410					410	410	0	
						0.5	HA34-317	11/14/2011	2200						2200	0.5	Sidewall
E5	HA34HSC0039	HA34HSC0039-1	10/26/2006	824	824	0											
	HA34HSC0039	HA34HSC0039-2	10/26/2006	720		1											
	HA34HSC0039	HA34HSC0039-3	10/26/2006	1710		2											
	HA34HSC0039	HA34HSC0039-4	10/26/2006	418		3											
	HA34HSC0039	HA34HSC0039-5	10/26/2006	638		4											
	HA34HSC0039	HA34HSC0039-6	10/26/2006	667		5											
E6						6	HA34-290	10/20/2011	25					25	25	0	
						6	HA34-288	10/20/2011	38					38	38	0	
E7						6	HA34-258	10/12/2011	5500								
						7	HA34-276	10/19/2011		110				110	110	0	
E8	HA34HSC0047	HA34HSC0047-1	10/26/2006	3840	3840	0											
	HA34HSC0047	HA34HSC0047-2	10/26/2006	4060		1											
	HA34HSC0047	HA34HSC0047-3	10/26/2006	636		2											
	HA34HSC0047	HA34HSC0047-4	10/26/2006	479		3											
	HA34HSC0047	HA34HSC0047-5	10/26/2006	58		4											
	HA34HSC0047	HA34HSC0047-6	10/26/2006	349		5											
E9						6	HA34-259	10/12/2011	680					680	680	0	
						6	HA34-260	10/12/2011	5.9					5.9	5.9	0	
F1	HA34HSC0030	HA34HSC0030-1	10/31/2006	233J	233	0											
	HA34HSC0030	HA34HSC0030-2	10/31/2006	90.8J		1	HA34-045	8/10/2011	18					18	18	0	
F2						0.5	HA34-046	8/10/2011	19						19	0.5	Sidewall
						1	HA34-044	8/10/2011	220					220	220	0	
F3						0.5	HA34-318	11/14/2011	400						400	0.5	Sidewall
	HA34HSC0031	HA34HSC0031-1	10/31/2006	322J	322	0											
F4	HA34HSC0031	HA34HSC0031-2	10/31/2006	172J		1	HA34-043	8/10/2011	950					950	950	0	
						0.5	HA34-047	8/10/2011	130						130	0.5	Sidewall
F5						1	HA34-042	8/10/2011	3000								
						2	HA34-196	8/31/2011		4				4	4	0	
F6						3	HA34-040	8/10/2011	310					310	310.0	0	
						0.5	HA34-048	8/10/2011	2.5							1.5	Sidewall
F7						1.5	HA34-319	11/14/2011	210							1.5	Sidewall
						3	HA34-039	8/10/2011	6.6					6.6	6.6	0	
F7	HA34HSC0032	HA34HSC0032-1	10/25/2006	257	257	0											
	HA34HSC0032	HA34HSC0032-2	10/25/2006	595		1											
	HA34HSC0032	HA34HSC0032-3	10/25/2006	632		2											
						3	HA34-307	10/26/2011	3.2					3.2	3.2	0	

Table K34-2
Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1,2}	Alternative Range-wide Weighted Average (mg/kg) ^{2,3}	Sample Depth (feet bgs)	
G1	HA34HSC0003	H34HSC0003-1	1/7/2003	970	970	0											
	HA34HSC0003	H34HSC0003-2	1/7/2003	390		1											
						2	HA34-017	8/2/2011	2700								
						3	HA34-107	8/23/2011		610				610	610	0	
G2						1	HA34-018	8/2/2011	630						630	1	Sidewall
	HA34HSC0002	H34HSC0002-1	1/7/2003	1000	1000	0											
	HA34HSC0002	H34HSC0002-2	1/7/2003	14000		1											
	HA34HSC0002	H34HSC0002-3	1/7/2003	2900		2											
G3						3	HA34-015	8/2/2011	65					65	65	0	
						1.5	HA34-016	8/2/2011	950							1.5	Sidewall
						3	HA34-014	8/2/2011	14					14	14	0	
G4	HA34HSC0001	H34HSC0001-1	1/7/2003	1900	1900	0											
	HA34HSC0001	H34HSC0001-2	1/7/2003	1900		1											
	HA34HSC0001	H34HSC0001-3	1/7/2003	1300		2											
						3	HA34-061	8/16/2011	120					120	120	0	FD of HA34-060
G5						3	HA34-084	8/18/2011	750					750	750	0	
G6						3	HA34-236	9/29/2011	1400					1400	1400	0	
						4	HA34-278	10/19/2011	76					76	76	0	
G7						3	HA34-237	9/29/2011	12					12	12	0	
G8	HA34HSC0045	HA34HSC0045-1	10/25/2006	9730	9730	0											
	HA34HSC0045	HA34HSC0045-2	10/25/2006	5900		1											
	HA34HSC0045	HA34HSC0045-3	10/25/2006	692		2											
						3	HA34-238	9/29/2011	6100								
G9						4	HA34-251	10/12/2011		1000				1000	1000	0	FD of HA34-250
						3	HA34-242	10/5/2011	2800								
						4	HA34-253	10/12/2011		89				89	89	0	
G10	HA34HSC0044	HA34HSC0044-1	10/31/2006	4260J	4260	0											
	HA34HSC0044	HA34HSC0044-2	10/31/2006	2550J-		1											
	HA34HSC0044	HA34HSC0044-34	10/31/2006	3410		2											
						3	HA34-239	9/29/2011	3300								
G11						1	HA34-257	10/12/2011		1600				1600	1600	1	Sidewall
						4	HA34-255	10/12/2011		7.2						2	
						1.5	HA34-112	8/23/2011	54							1.5	Sidewall
						3	HA34-243	10/5/2011	9.8							3	
G12						3	HA34-111	8/23/2011	950					950	950	0	FD of HA34-110
G13						3	HA34-083	8/18/2011	41					41	41	0	
G14						3	HA34-082	8/18/2011	230					230	230	0	FD of HA34-081
						1.5	HA34-109	8/23/2011	4							1.5	Sidewall
G15						3	HA34-064	8/16/2011	310					310	310	0	
G16						3	HA34-063	8/16/2011	200					200	200	0	
G17						3	HA34-062	8/16/2011	6.1					6.1	6.1	0	
						1.5	HA34-108	8/23/2011	67							1.5	Sidewall
I1		HA34-154	8/25/2011	350	350	0											
						1	HA34-155	8/25/2011	990					990	990	0	
						2	HA34-156	8/25/2011	34							1	
		HA34-069	8/17/2011	920	920	0											
I2						1	HA34-071	8/17/2011	150					150	150	0	FD of HA34-070
						2	HA34-072	8/17/2011	83							1	
						0.5	HA34-058	8/16/2011	12000								Sidewall
		HA34-157	8/25/2011	6800	6800	0											
I3						1	HA34-158	8/25/2011	48J					48	48	0	
						2	HA34-159	8/25/2011	4.0							1	
						0.5	HA34-026	8/3/2011	4200								Sidewall
						0.5	HA34-027	8/3/2011	3000								Sidewall
						1	HA34-263	10/12/2011		620				620	620	0	

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Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type		
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)			
I4		HA34-066	8/17/2011	1300	1300	0													
						1	HA34-067	8/17/2011	5.5					5.5	5.5	0			
						2	HA34-068	8/17/2011	7.4							1			
		HA34-164	8/25/2011	620J	620	0													
I5						1	HA34-165	8/25/2011	20J					20	20	0			
						2	HA34-166	8/25/2011	7.4J							1			
		HA34-160	8/25/2011	2500	2500	0													
						1	HA34-161	8/25/2011	42					42	42	0			
I6						2	HA34-163	8/25/2011	40J							1			
		HA34-073	8/17/2011	2800	2800	0													
						1	HA34-074	8/17/2011	560					560	560	0			
						2	HA34-075	8/17/2011	720						720	1			
I6		HA34-168	8/25/2011	790J	790	0													
						1	HA34-169	8/25/2011	9.9J					9.9	9.9	0			
						2	HA34-170	8/25/2011	8.3J							1			
						0	HA34-321	11/17/2011	360J-					360	360	0	Stockpile		
Stockpile					0	HA34-323	11/17/2011	18J-					18	18	0	Stockpile			
Stockpile					0	HA34-324	11/17/2011	27J-					27	27	0	Stockpile			
Haul Road					0	HA34-322	11/17/2011	360J-					360	360	0	Haul road			
Haul Road					0	HA34-311	11/17/2011	200J-					200	200	0	FD of HA34-310, haul road			
Haul Road					0	HA34-312	11/2/2011	37J-					37	37	0	Haul road			
Haul Road					0	HA34-313	11/2/2011	74J-					74	74	0	Haul road			
Haul Road					0	HA34-314	11/2/2011	120J-					120	120	0	Haul road			
Haul Road					0	HA34-315	11/2/2011	290J-					290	290	0	Haul road			
Excavation Area Average					1724	mg/kg											222	240	mg/kg
Excavation Area					8.5	acres											8.5	8.5	acres
Number of Samples					105	41	134					26	4	1	1	102	117		
Non-Excavated Area																			
	H34HSC0008	H34HSC0008-1	1/8/2003	26	26	0								26	26	0			
	H34HSC0009	H34HSC0009-1	1/8/2003	4.3	4.3	0								4.3	4	0			
	H34HSC0010	H34HSC0010-1	1/8/2003	3.4	3.4	0								3.4	3	0			
	H34HSC0011	H34HSC0011-1	1/8/2003	26	26	0								26	26	0			
	H34HSC0012	H34HSC0012-1	1/8/2003	4.9	4.9	0								4.9	5	0			
	H34HSC0013	H34HSC0013-1	1/8/2003	13	13	0								13	13	0			
	H34HSC0018	H34HSC0018A-1	6/24/2003	110	110	0								110	110	0			
	HA34HSC0004	H34HSC0004-1	1/7/2003	140	140	0								140	140	0			
	HA34HSC0022	HA34HSC0002-1M	12/15/2004	28.5	28.5	0								28.5	29	0			
	HA34HSC0025	HA34HSC0005-1M	12/15/2004	662	662	0								662	662	0			
	HA34HSC0025	HA34HSC0005M-2M	12/15/2004	6.24		1										1			
	HA34HSC0029	HA34HSC0029-1	10/30/2006	16.7J	17	0								16.7	17	0			
	HA34HSC0040	HA34HSC0040-1	10/25/2006	62	62	0								61.7	62	0			
	HA34HSC0048	HA34HSC0048-1	10/30/2006	182J	182	0								182	182	0			
	HA34HSC0052	HA34HSC0052-1	10/30/2006	89J	89	0								89	89	0			
	HA34HSC0053	HA34HSC0053-14	10/30/2006	138J	138	0								138	138	0			
	HA34HSC0054	HA34HSC0054-14	10/25/2006	100	100	0								100	100	0			
	EUSI0013	EUSI0013-1M	4/5/2005	12.7	12.7	0								12.7	13	0			
		HA34-076	8/17/2011	240	240	0								240	240	0			
		HA34-077	8/17/2011	45		1										1			
		HA34-078	8/17/2011	16		2										2			
		HA34-116	8/29/2011	870J	870	0								870	870	0			
		HA34-117	8/29/2011	7.7J		1										1			
		HA34-118	8/29/2011	18J		2										2			
		HA34-119	8/29/2011	49J	49	0								49	49	0			
		HA34-121	8/29/2011	4.3J		1										1	FD of HA34-120		
		HA34-122	8/29/2011	3.5J		2										2			
		HA34-123	8/29/2011	85J	85	0								85	85	0			
		HA34-124	8/29/2011	7.8J		1										1			

Table K34-2
Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
		HA34-125	8/29/2011	7J		2										2	
		HA34-126	8/29/2011	7.7J	7.7	0								7.7	8	0	
		HA34-127	8/29/2011	3.8J		1										1	
		HA34-128	8/29/2011	4.1J		2										2	
		HA34-129	8/29/2011	710J	710	0								710	710	0	
		HA34-130	8/29/2011	2.1J		1										1	
		HA34-132	8/29/2011	2J		2										2	
		HA34-133	8/29/2011	75J	75	0								75	75	0	
		HA34-134	8/29/2011	4.8J		1										1	
		HA34-135	8/29/2011	2.3J		2										2	
		HA34-136	8/30/2011	160J	160	0								160	160	0	
		HA34-137	8/30/2011	3.8J		1										1	
		HA34-138	8/30/2011	3.1J		2										2	
		HA34-142	8/25/2011	63	63	0								63	63	0	FD of HA34-141
		HA34-143	8/25/2011	6.6		2										2	
		HA34-144	8/25/2011	4.4		4										4	
		HA34-145	8/25/2011	5.9		6										6	
		HA34-146	8/25/2011	2.3		8										8	
		HA34-147	8/25/2011	7.6	7.6	0								7.6	8	0	
		HA34-148	8/25/2011	1000		1									1000	1	
		HA34-149	8/25/2011	6.5		2										2	
		HA34-150	8/25/2011	15	15	0								15	15	0	
		HA34-152	8/25/2011	250		1									250	1	FD of HA34-151
		HA34-153	8/25/2011	180		2										2	
		HA34-175	8/31/2011	14	14	0								14	14	0	
		HA34-178	8/31/2011	250	250	0								250	250	0	
		HA34-182	8/31/2011	640	640	0								640	640	0	
		HA34-185	8/31/2011	170		1										1	
Non-Excavation Area Average					155	mg/kg									155	183	mg/kg
Non-Excavation Area					5.3	acres									5.3	5.3	acres
Number of Samples				57	31	00000								31	33		
Weighted Average for Area Used for Feasibility Study ¹					1121	mg/kg									196	218	mg/kg
Total Area					13.8	acres									13.8	13.8	acres
Number of Samples				162	72	13426411								133	150		
Outside Feasibility Study Area																	
	HA34HSC0027	HA34HSC0027-1	10/30/2006	176	176	0								176	176	0	
	HA34HSC0028	HA34HSC0028-1	10/30/2006	43	43	0								43	43	0	
	HA34HSC0055	HA34HSC0055-1	10/25/2006	21	21	0								21	21	0	
	HA34HSC0056	HA34HSC0056-1	10/25/2006	12	12	0								12	12	0	
	HA34HSC0057	HA34HSC0057-1	10/25/2006	4.9	4.9	0								4.9	4.9	0	
	HA34HSC0058	HA34HSC0058-1	10/25/2006	15	15	0								15	15	0	
	HA34HSC0059	HA34HSC0059-1	10/25/2006	8.9	8.9	0								8.9	8.9	0	
	HA34HSC0060	HA34HSC0060-1	10/25/2006	32	32	0								32	32	0	
	HA34HSC0061	HA34HSC0061-1	10/24/2006	91	91	0								91	91	0	
	HA34HSC0062	HA34HSC0062-1	10/24/2006	50	50	0								50	50	0	
	EUSI008	EUSI008-1M	4/4/2005	874	874	0								874	874	0	
	EUSI008	EUSI008-2M	4/4/2005	7.52		1										1	
	EUSI010	EUSI010-1M	4/5/2005	12	12	0								12	12	0	
	EUSI011	EUSI011-1M	4/5/2005	16	16	0								16	16	0	
	EUSI012	EUSI012-1M	4/5/2005	27	27	0								27	27	0	
	EUSI014	EUSI014-1M	4/5/2005	53	53	0								53	53	0	
		HA34-089	8/18/2011	37	37	0								37	37	0	
		HA34-090	8/18/2011	6.3		1										1	
		HA34-092	8/18/2011	3.5		2										2	
		HA34-093	8/18/2011	11.0	11.0	0								11.0	11.0	0	

Table K34-2
Analytical Results for Lead
Historical Area 34

Location	Pre-Remediation						Post-Remediation										Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	CNF5 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
		HA34-094	8/18/2011	6.3		1										1	
		HA34-095	8/18/2011	4.8		2										2	
		HA34-096	8/18/2011	33	33	0								33	33	0	
		HA34-097	8/18/2011	48		1										1	
		HA34-098	8/18/2011	4.9		2										2	
		HA34-099	8/18/2011	44	44	0								44	44	0	
		HA34-101	8/18/2011	4.7		1										1	FD of HA34-100
		HA34-102	8/18/2011	5.8		2										2	
		HA34-103	8/18/2011	55	55	0								55	55	0	
H1		HA34-104	8/18/2011	5100J	5100	1											
		HA34-105	8/18/2011	15J		2	HA34-227	9/21/2011	190					190	190	1	
		HA34-167	8/25/2011	340	340	0								340	340	0	
		HA34-185	8/31/2011	170	170	0								170	170	0	

Notes:

excavated site characterization sample
 CNF confirmation sample
 CNF2 confirmation sample collected after over-excavation
 CNF3 third confirmation sample collected after second over-excavation
 CNF4 fourth confirmation sample collected after third over-excavation
 CNF5 fifth confirmation sample collected after fourth over-excavation
 FD field duplicate, the highest of the pair is shown on this table
 feet bgs feet below ground surface
 J Result is estimated.
 J- Result is estimated negative.
 mg/kg milligrams per kilogram

¹ Only surface samples are used for calculating the range-wide weighted average.

² The range-wide weighted average was calculated using the following formula:

$$\text{Range-wide weighted average} = \frac{(\text{excavated area average} \times \text{excavated area acreage}) + ((\text{non-excavated area average} \times \text{non-excavated area acreage}))}{\text{excavated area acreage} + \text{non-excavated area acreage}}$$

³ In addition to surface samples, includes sidewall samples up to 1-foot below ground surface and floor samples from 1-foot that have lead concentrations >225mg/kg.

Table K34-3
Analytical Results for TNT
Historical Area 34

Location	Pre-Remediation					Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	TNT (ug/kg)	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area											
A3					1	HA34-199	8/31/2011	<200	<200	0	
G17					3	HA34-197	8/31/2011	<200	<200	0	
Non-Excavated Area											
	HA34HSC0021	HA34HSC0001-1	12/15/2004	<78	0				<230	0	
					0	HA34-198	8/31/2011	<200	<200	0	

Notes:

CNF confirmation sample
feet bgs feet below ground surface
TNT trinitrotoluene
ug/kg microgram per kilogram
<200 less than the reporting limit

**Table K34-4
Analytical Results for HMX
Historical Area 34**

Location	Pre-Remediation					Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	HMX (ug/kg)	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area											
A3					1	HA34-199	8/31/2011	<200	<200	0	
G17					3	HA34-197	8/31/2011	<200	<200	0	
Non-Excavated Area											
	HA34HSC0021	HA34HSC0001-1	12/15/2004	<85	0				<230	0	
					0	HA34-198	8/31/2011	<200	<200	0	

Notes:

CNF confirmation sample
feet bgs feet below ground surface
HMX cyclotetramethylene tetranitramine
ug/kg microgram per kilogram
<200 less than the reporting limit

**Table K34-5
Analytical Results for RDX
Historical Area 34**

Location	Pre-Remediation						Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	RDX (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area												
A3					N/D	1	HA34-199	8/31/2011	<200	<200	0	
G17					N/D	3	HA34-197	8/31/2011	<200	<200	0	
Non-Excavated Area												
	HA34HSC0021	HA34HSC0001-1	12/15/2004	<88	N/D	0				<230	0	
					N/D	0	HA34-198	8/31/2011	<200	<200	0	

Notes:

CNF confirmation sample
feet bgs feet below ground surface
RDX cyclotrimethylene trinitramine
ug/kg microgram per kilogram
<200 less than the reporting limit

Table K34-6
Analytical Results for Total Petroleum Hydrocarbons
Historical Area 34

Location	Pre-Remediation					Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	Total Petroleum Hydrocarbons (mg/kg) ¹	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg) ¹	Final Confirmation Result (mg/kg) ¹	Sample Depth (feet bgs)	
Excavated Area											
A3					1	HA34-199	8/31/2011	36	36	0	
G17					3	HA34-197	8/31/2011	5.6	5.6	0	
Non-Excavated Area											
	H34HSC0011	H34HSC0011-1	1/8/2003	65	0			65	65	0	
	H34HSC0011	H34HSC0011-2	6/24/2003	16	1			16		1	
	H34HSC0011	H34HSC0011-3	6/24/2003	23	2			23		2	
	H34HSC0018	H34HSC0018-1	6/24/2003	30	0			30	30	0	
	H34HSC0018	H34HSC0018-2	6/24/2003	24	1			24		1	
	H34HSC0018	H34HSC0018-3	6/24/2003	15	2			15		2	
					0	HA34-198	8/31/2011	14	14	0	

Notes:

CNF confirmation sample
feet bgs feet below ground surface
mg/kg milligram per kilogram

¹ Concentration shown is the sum of diesel, gasoline, and motor oil.

A.9 HA-37

STATUS: REMEDIATION COMPLETE FOR LEAD, RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHEASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-205

A.9.1 SITE DESCRIPTION AND BACKGROUND

Site HA-37, located within Unit 21, is located on the northeastern part of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-37 is a subarea of Site 39 Inland Ranges and part of the habitat reserve as defined in the *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* (Gilbane 2014). Ranges at HA-37 includes a Night Firing Range, rifle grenade and hand grenade ranges. Further historical information on HA-37 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.9.2 PREVIOUS SITE CHARACTERIZATION

Previous investigations in 2008 identified approximately 19,430 cubic yards of soil requiring remediation in a 6.2-acre area with depths ranging from 1 to 7 feet below ground surface (bgs) due to elevated lead concentrations greater than the ecological cleanup level of 225 milligram per kilogram (mg/kg). In 2011, an additional site characterization was conducted after munitions response activities and an additional 240 cubic acres were identified for soil remediation. Further information on previous investigations and results in HA-37 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.9.3 COMPLETED MUNITIONS RESPONSE

In Unit 21, the MR included a prescribed burn to remove vegetation, surface munitions and explosives of concern (MEC) removal, and a digital geophysical mapping (DGM) survey. Following the DGM survey, “mag and dig” methods were conducted within the HA-37 soil remediation area. The proposed lead remediation area was investigated to the proposed depth of remediation plus one foot. For remediation areas that had more than a 4-foot depth of planned excavation, MEC removal was conducted in two steps: 1) MEC was removed from 0 to 4 feet bgs followed by soil remediation (excavation) and then 2) MEC was removed from the next 4-foot depth followed by final soil remediation (excavation) (Gilbane 2014). Approximately 5,851 pounds of munition debris (MD), 15,941 pounds of range related debris (RRD), 15 MEC-unexploded ordnance (UXO) items and one MEC-Discarded Military Munitions (DMM) were recovered during pre-remediation removal in March and August 2011. During excavation from May to November 2011, 20 MD and 1 MEC-DMM items were found. Additionally, identified areas with a high density of MD were excavated in a two-phase approach in August 2011 to January 2013 which included excavation via armored equipment and mechanically screening stockpiled and excavated soil. During this two-phase approach, 29 MEC-UXO items were found during soil remediation. Post-remediation MEC removal was conducted from October 2011 to January 2012 on the surface within the footprint of the excavation. A DGM survey identified, 2,123 individual dig targets in 6.8 acres and 3.33 acres of saturated “mag and dig” areas. After quality control (QC) review, 1,452 targets were identified for intrusive investigation. Approximately 29,657 pounds of MD, 25 UXO items, and 721 pounds of RDD

were recovered. Subsurface removal was not completed in 7 partial grids. Further information can be found in the *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014).

A.9.4 REMEDIAL ACTION

The remedial action objective (RAO) was to excavate all soil with lead concentrations greater than 225 mg/kg. Approximately 33,670 cubic yards of soil were excavated, which included 18,440 cubic yards in accordance with the proposed volume identified and an additional 15,230 cubic yards required to meet the RAO (Gilbane 2014).

A.9.5 SITE CHARACTERIZATION

Following excavation, confirmation samples were collected from March to April 2013. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.9.5.1 APPROACH

A total of 187 confirmation samples for lead were collected during remedial activities; 102 of the 187 were final confirmation samples. Additionally, bias samples were collected in the following areas: 31 sidewall samples, 8 bias samples to confirm that contaminated soil did not remain in-situ soil, and 15 samples from locations where large amounts of MD were removed during pre-remediation MEC removal to confirm explosive constituents do not exist. Bias samples were collected for explosive constituents. 35 over-excavation samples were collected where additional excavation was required beyond the original planned depth (Gilbane 2014).

A.9.5.2 SITE CHARACTERIZATION RESULTS

No explosive constituents were detected above the screening level described in the Site 39 ROD amendment. A range-wide weighted average concentration of lead at 31 mg/kg was achieved at HA-37. Soil excavation boundaries and locations of the confirmation samples can be found on Figures M37-3 through M37-5 pulled from *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* Report (Gilbane 2014). Soil sample results are provided in Tables M37-3 through M37-6 also pulled from the *Gilbane 2014* Report.

A.9.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that lead concentrations do not exceed the protectiveness thresholds specified in the Site 39 ROD amendment (Army 2009). No further investigation is warranted regarding explosive residues and metals in soil at HA-37. Additionally, no additional excavation is required based on confirmation sampling results and the range-wide weighted average (Gilbane 2014).

A.9.7 REFERENCES

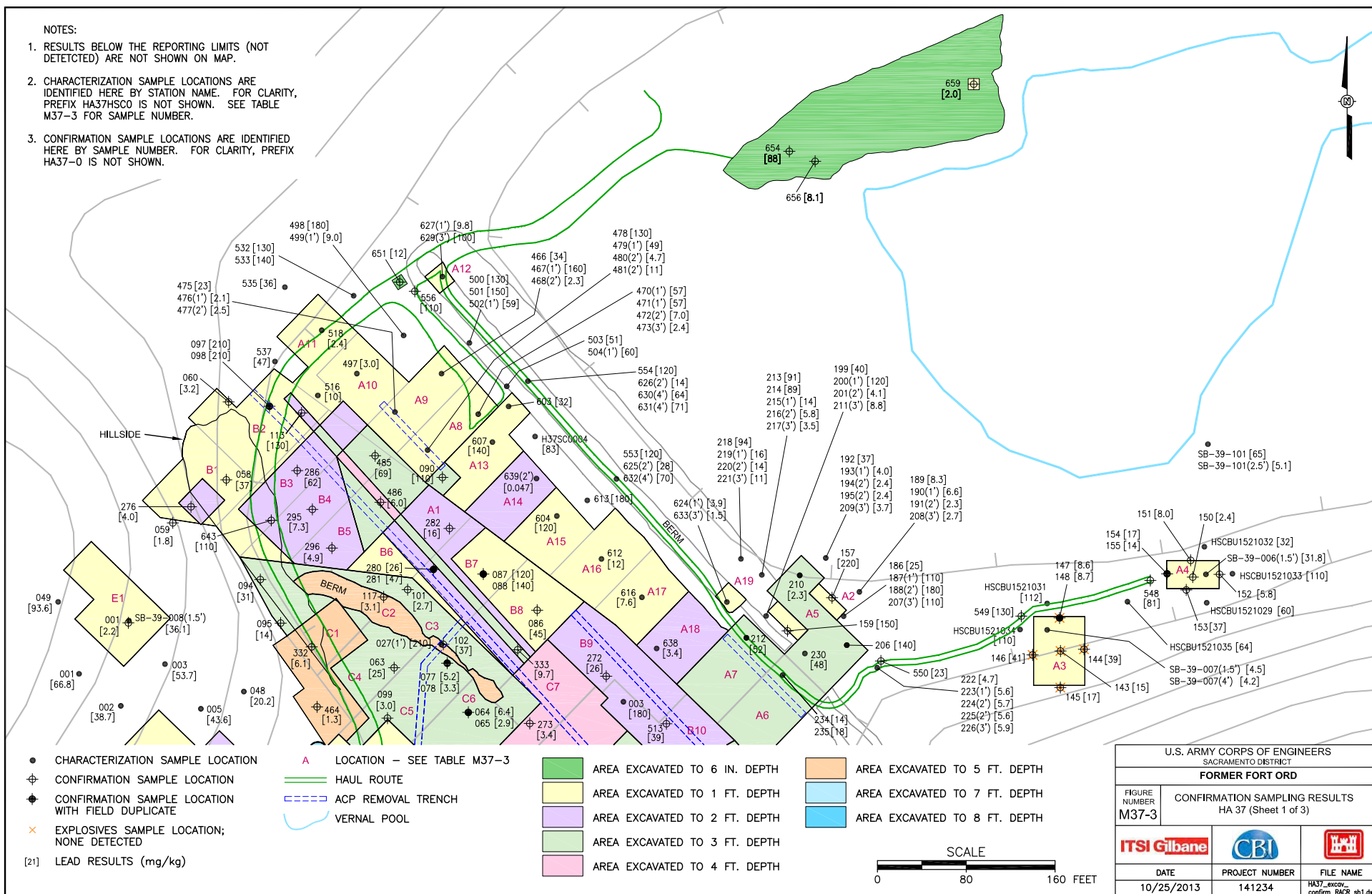
Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California.* (AR# RI-041E)

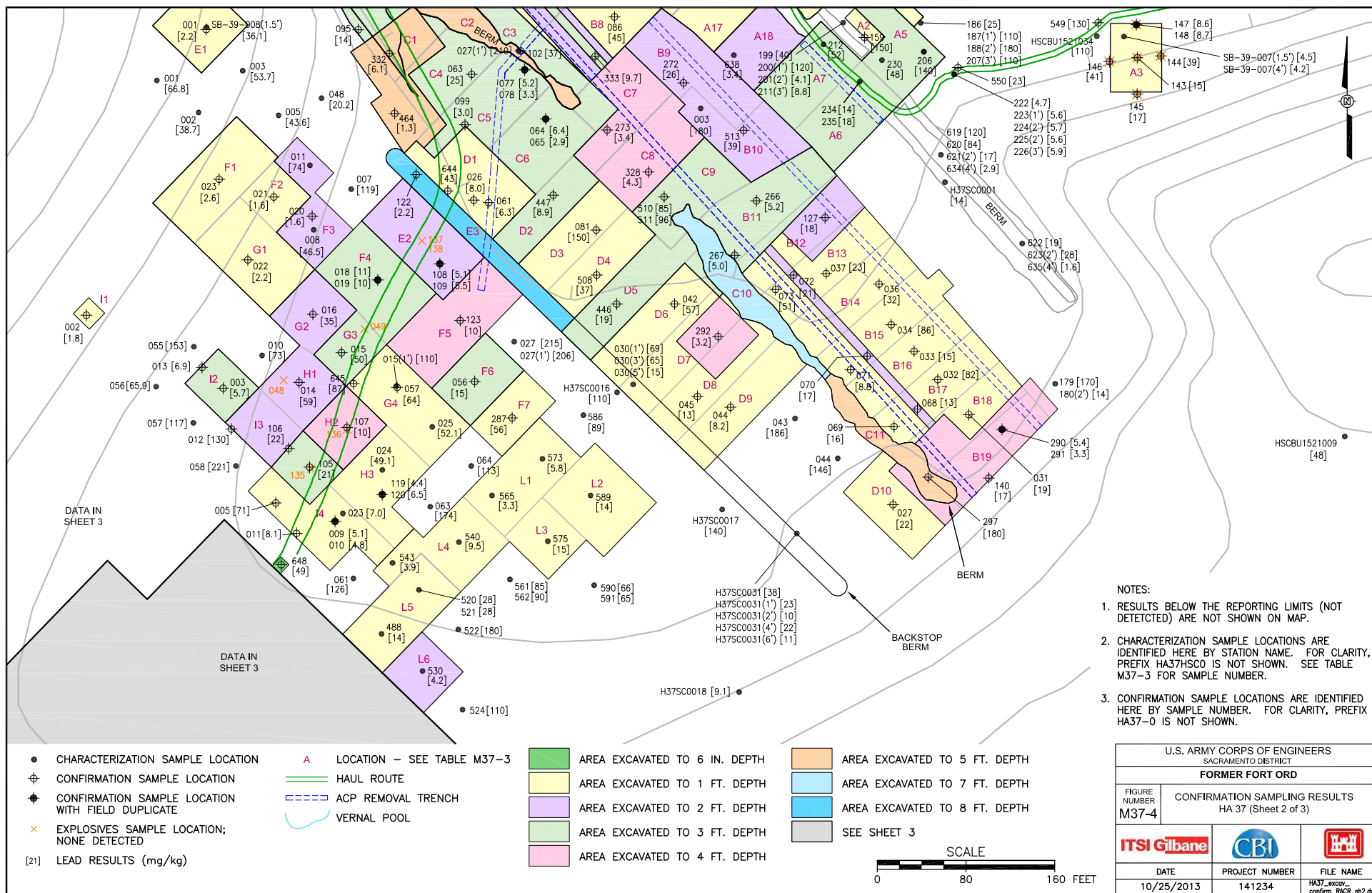
Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California.* (AR# RI-047C)

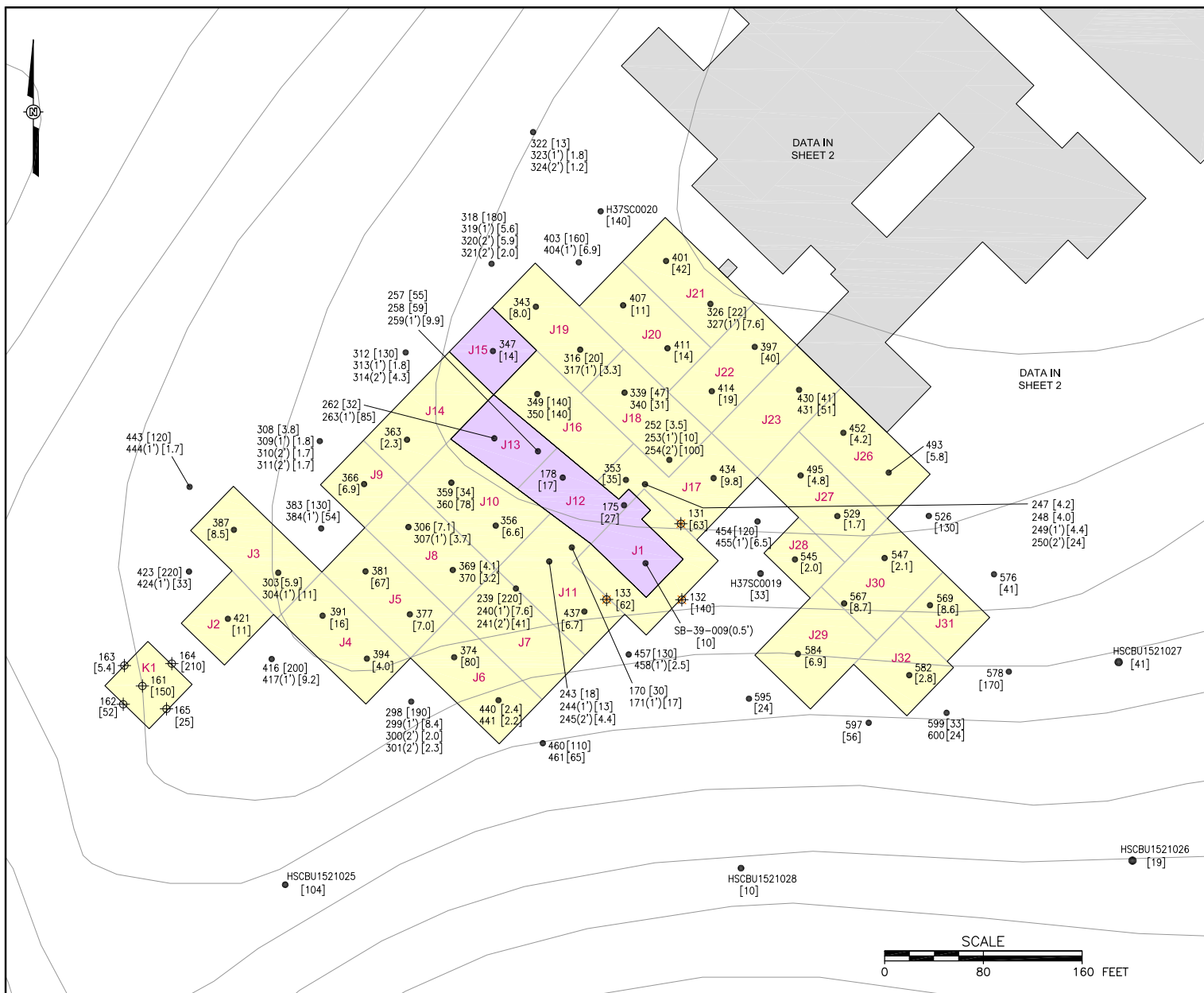
Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

NOTES:

1. RESULTS BELOW THE REPORTING LIMITS (NOT DETECTED) ARE NOT SHOWN ON MAP.
2. CHARACTERIZATION SAMPLE LOCATIONS ARE IDENTIFIED HERE BY STATION NAME. FOR CLARITY, PREFIX HA37HSCO IS NOT SHOWN. SEE TABLE M37-3 FOR SAMPLE NUMBER.
3. CONFIRMATION SAMPLE LOCATIONS ARE IDENTIFIED HERE BY SAMPLE NUMBER. FOR CLARITY, PREFIX HA37-0 IS NOT SHOWN.







LEGEND

- CHARACTERIZATION SAMPLE LOCATION
- ⊕ CONFIRMATION SAMPLE LOCATION
- ◆ CONFIRMATION SAMPLE LOCATION WITH FIELD DUPLICATE
- ✕ EXPLOSIVES SAMPLE LOCATION; NONE DETECTED

[21] LEAD RESULTS (mg/kg)

A LOCATION - SEE TABLE M37-3

- AREA EXCAVATED TO 1 FT. DEPTH
- AREA EXCAVATED TO 2 FT. DEPTH
- SEE SHEET 2

NOTES:

1. RESULTS BELOW THE REPORTING LIMITS (NOT DETECTED) ARE NOT SHOWN ON MAP.
2. CHARACTERIZATION SAMPLE LOCATIONS ARE IDENTIFIED HERE BY STATION NAME. FOR CLARITY, PREFIX HA37HSC0 IS NOT SHOWN. SEE TABLE M37-3 FOR SAMPLE NUMBER.
3. CONFIRMATION SAMPLE LOCATIONS ARE IDENTIFIED HERE BY SAMPLE NUMBER. FOR CLARITY, PREFIX HA37-0 IS NOT SHOWN.

U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

FORMER FORT ORD

FIGURE NUMBER
M37-5

CONFIRMATION SAMPLING RESULTS
HA 37 (Sheet 3 of 3)



DATE	PROJECT NUMBER	FILE NAME
10/25/2013	141234	HA37_m37-5_confirm_TM_sh3.dwg

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)
Excavated Area																
A1	H37HSC0100	H37HSC0100-1	8/19/2003	1200	1200		0									
	H37HSC0100	H37HSC0100-2	8/19/2003	7000		J	1									
	H37HSC0100	H37HSC0100-3	8/19/2003	3600			2									
							3	HA37-090	7/11/2011	110J				110	110	0
A2	HSCBU1521010	HSCBU1521010-1	2/15/2011	660	660	J	0.08									
							0.5	HA37-157	8/9/2011	220					220	0.5
							0.5	HA37-159	8/9/2011	150					150	0.5
A3	HSCBU1521030	HSCBU1521030-1	2/16/2011	228	228	J	0									
	SB-39-007	9415G039272F	4/13/1994	235	235		0									
							1	HA37-143	8/3/2011	15				15	15	0
							0.5	HA37-144	8/3/2011	39				39	39	0.5
							0.5	HA37-145	8/3/2011	17				17	17	0.5
							0.5	HA37-146	8/3/2011	41				41	41	0.5
							0.5	HA37-148	8/3/2011	8.7				8.7	8.7	0.5
	SB-39-007	9415G039273F	4/13/1994	4.5			2.5									1.5
	SB-39-007	9415G039274F	4/13/1994	4.2			5									4
	SB-39-006	9415G039275F	4/13/1994	298	298		0									
A4							1	HA37-150	8/9/2011	2.4				2.4	2.4	0
							1	HA37-151	8/9/2011	8.0				8.0	8.0	0
							1	HA37-152	8/9/2011	5.8				5.8	5.8	0
							1	HA37-153	8/9/2011	37				37	37	0
							1	HA37-154	8/9/2011	17				17	17	0
	SB-39-006	9415G039276F	4/13/1994	31.8			2.5									1.5
A5		HA37-156	8/9/2011	620			1									
		HA37-158	8/9/2011	2800			0.5									Sidewall
		HA37-160	8/9/2011	440			0.5									Sidewall
		HA37-183	9/1/2011	150	150	J-	0									FD of HA37-182
		HA37-184	9/1/2011	4400		J-	1									
		HA37-185	9/1/2011	2600		J-	2									
							3	HA37-206	9/1/2011	140J				140	140	0
		HA37-196	9/1/2011	320	320	J-	0									
		HA37-197	9/1/2011	9.3		J-	1									
		HA37-198	9/1/2011	2.0		J-	2									
							3	HA37-210	9/1/2011	2.3J				2.3	2.3	0
		HA37-227	9/1/2011	400	400		0									
		HA37-228	9/1/2011	130			1									
		HA37-229	9/1/2011	16			2									
A6							3	HA37-230	9/1/2011	48				48	48	0
		HA37-231	9/1/2011	50	50		0									
		HA37-232	9/1/2011	6.9			1									
		HA37-233	9/1/2011	790			2									
A7							3	HA37-235	9/1/2011	18				18	18	0
		HA37-202	9/1/2011	140	140		0									FD of HA37-234
		HA37-204	9/1/2011	15			1									FD of HA37-203
		HA37-205	9/1/2011	1500			2									
A8							3	HA37-212	9/1/2011	52J						
		HA37-469	10/17/2011	420	420		0							52	52	0
							1	HA37-470	10/17/2011	57				57	57	0
							2	HA37-472	10/17/2011	7						1
							3	HA37-473	10/17/2011	2.4						2
							1	HA37-478	10/18/2011	130				130	130	0
							2	HA37-479	10/18/2011	49						1
							3	HA37-481	10/18/2011	11						2
																FD of HA37-480

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
A9		HA37-465	10/17/2011	250	250		0										
							1	HA37-466	10/17/2011	34				34	34	0	
							2	HA37-467	10/17/2011	160						1	
							3	HA37-468	10/17/2011	2.3						2	
							1	HA37-475	10/18/2011	23				23	23	0	
							2	HA37-476	10/18/2011	2.1						1	
							3	HA37-477	10/18/2011	2.5						2	
A10		HA37-496	10/25/2011	230	230	J-	0										
							1	HA37-497	10/25/2011	3.0				3.0	3.0	0	
A11		HA37-515	11/1/2011	610	610		0										
							1	HA37-516	11/1/2011	10				10	10	0	
		HA37-517	11/1/2011	420	420		0										
							1	HA37-518	11/1/2011	2.4				2.4	2.4	0	
A12 (Berm)		HA37-555	11/9/2011	330	330		0										Depth based on top of excavated berm
							2	HA37-627	1/16/2012	9.8				9.8	9.8	0	
							4	HA37-629	1/17/2012	100J						2	
A13		HA37-557	11/9/2011	1000	1000		0										
							1	HA37-603	1/16/2012	32				32	32	0	
		HA37-606	1/16/2012	620	620		0										
							1	HA37-607	1/16/2012	140				140	140	0	
A14		HA37-608	1/16/2012	640	640		0										
		HA37-609	1/16/2012	2900			1										
							2	HA37-639	5/30/2012	4.7J-				4.7	4.7	0	
A15		HA37-558	11/9/2011	1100	1100		0										
A16							1	HA37-604	1/16/2012	120				120	120	0	
		HA37-610	1/16/2012	520	520		0										
A17							1	HA37-612	1/16/2012	12				12	12	0	
		HA37-615	1/16/2012	1600	1600		0										
							1	HA37-616	1/16/2012	7.6				7.6	7.6	0	
A18		HA37-559	11/9/2011	840	840		0										
		HA37-605	1/16/2012	280			1										
		HA37-617	1/16/2012	350	350		0										
		HA37-618	1/16/2012	280			1										
							2	HA37-638	5/30/2012	3.4J-				3.4	3.4	0	
A19 (Berm)		HA37-551	11/9/2011	440	440		0										Depth based on top of excavated berm
							2	HA37-624	1/16/2012	3.9				3.9	3.9	0	
							4	HA37-633	1/17/2012	1.5J						2	
B1	H37SC0005	H37HSC0005-1	12/17/2002	440	440		0										
							1	HA37-058	6/28/2011	37				37	37	0	
							0.5	HA37-059	6/28/2011	1.8					2.0	0.5	Sidewall
							1	HA37-115	7/13/2011	330J							Bias
B2							2	HA37-276	9/9/2011		4.0			4.0	4.0	0	
							0.5	HA37-060	6/28/2011	3.2					3.2	0.5	Sidewall
							1	HA37-097	7/11/2011	210J				210	210	0	
B3							1	HA37-113	7/13/2011	130J				130	130	0	Target box bias
							1	HA37-093	7/11/2011	3300J							
							2	HA37-286	9/15/2011		62J			62	62	0	
B4							1	HA37-092	7/11/2011	7600J							
							0.5	HA37-114	7/13/2011	1500J							Sidewall
							2	HA37-285	9/15/2011		5300J						
							1.5	HA37-288	9/15/2011		3300J						Sidewall
							2	HA37-295	9/19/2011			7.3UJ		7.3	7.3	0	

Table M37-3
Analytical Results for Lead
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Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
							0	HA37-334	9/28/2011		930						
							0	HA37-426	10/4/2011		940						
							3	HA37-485	10/19/2011			69J		69	69	0	
B5							1	HA37-091	7/11/2011	4600J							
							1	HA37-112	7/13/2011	16000J							Target box bias
							1	HA37-116	7/13/2011	1200J							Bias
							2	HA37-284	9/15/2011		3800J						
							0	HA37-335	9/28/2011	390							
							0	HA37-427	10/4/2011	330							
							4	HA37-486	10/19/2011		6.0J			6.0	6.0	0	
							2	HA37-296	9/19/2011		4.9UJ			4.9	4.9	0	
B6							1	HA37-089	7/11/2011	18000							
							2	HA37-282	9/14/2011		16J			16	16	0	
B7							1	HA37-088	7/11/2011	140J				140	140	0	FD of HA37-087
							2	HA37-111	7/13/2011	320J							Target box bias
							2	HA37-281	9/14/2011		47J			47	47	0	FD of HA37-280
B8							1	HA37-086	7/11/2011	45J				45	45	0	
							1	HA37-110	7/13/2011	1000J							Target box bias
							2	HA37-279	9/14/2011		470J						
B9							3	HA37-333	9/28/2011			9.7		9.7	9.7	0	
	HA37HSC0031	HA37HSC0031-1	10/5/2006	1820	1820		0										
	HA37HSC0031	HA37HSC0031-2	10/5/2006	176		J	1										
	HA37HSC0034	HA37HSC0034-1	11/30/2006	3020	3020	J	0										
	HA37HSC0029	HA37HSC0029-1	10/5/2006	2010	2010		0										
	HA37HSC0029	HA37HSC0029-2	10/5/2006	120			1	HA37-085	7/11/2011	6700							
B10							2	HA37-272	9/8/2011		26			26	26	0	
	HA37HSC0033	HA37HSC0033-14	10/5/2006	4610	4610		0										
	HA37HSC0033	HA37HSC0033-2	10/5/2006	985		J	1										
	H37SC0003	H37HSC0003-1	12/17/2002	1800	1800		0										
	H37SC0003	H37HSC0003-2	12/17/2002	1100		J-	1										
	H37SC0003	H37HSC0003-3	12/17/2002	180		J-	2							180	180	0	
B11							2	HA37-513	10/26/2011	39				39	39	0	
							1	HA37-040	6/27/2011	440							
							1	HA37-074	6/29/2011	670							
							1	HA37-075	6/29/2011	4200							
							2	HA37-126	7/19/2011		1200						CNF2 of HA37-074
							3	HA37-266	9/6/2011			5.2		5.2	5.2	0	
B12							1	HA37-038	6/27/2011	2300							
							2	HA37-127	7/19/2011		18			18	18	0	CNF2 of HA37-038
B13							1	HA37-037	6/27/2011	23				23	23	0	
							2	HA37-072	6/29/2011	21				21	21	0	
							1	HA37-073	6/29/2011	51				51	51	0	
B14							1	HA37-036	6/27/2011	32				32	32	0	
B15	H37SC0002	H37HSC0002-1	12/17/2002	520	520		0										
							1	HA37-034	6/27/2011	86				86	86	0	
							2	HA37-070	6/29/2011	17				17	17	0	
B16							1	HA37-071	6/29/2011	8.8				8.8	8.8	0	
							1	HA37-033	6/22/2011	15				15	15	0	
B17							1	HA37-032	6/22/2011	82				82	82	0	
							2	HA37-068	6/29/2011	13				13	13	0	
							1	HA37-069	6/29/2011	16				16	16	0	
B18							1	HA37-031	6/22/2011	19				19	19	0	
							1	HA37-030	6/22/2011	2600							
							0.5	HA37-140	8/2/2011	17J					17	0.5	Sidewall

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Historical Area 37

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	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
B19							2	HA37-141	8/2/2011	370J							
							2	HA37-066	6/29/2011	2000							
							2	HA37-067	6/29/2011	8500							
							3	HA37-124	7/19/2011		270						
							3	HA37-264	9/6/2011		280						
							4	HA37-290	9/19/2011			5.4J		5.4	5.4	0	
C1	H37SC0006	H37HSC0006-1	12/17/2002	110000	110000		0										
	H37SC0006	H37HSC0006-2	12/17/2002	1100		J-	1										
	H37SC0006	H37HSC0006-3	12/17/2002	960		J-	2										
	H37SC0007	H37HSC0007-1	12/17/2002	140000	140000		0										
	H37SC0007	H37HSC0007-2	12/17/2002	42000		J-	1										
	H37SC0007	H37HSC0007-3	12/17/2002	10000		J-	2										
							1.5	HA37-094	7/11/2011	31J					31	0.5	Sidewall
							1.5	HA37-095	7/11/2011	14J					14	0.5	Sidewall
							3	HA37-083	7/6/2011	940							
							4	HA37-278	9/14/2011		26000						
						5	HA37-332	9/28/2011			6.1		6.1	6.1	0		
C2	H37SC0027	H37HSC0027-1	12/18/2002	3000	3000		0										
	H37SC0027	H37HSC0027-2	12/18/2002	22000			1										
	H37SC0027	H37HSC0027-3	12/18/2002	12000			2										
	H37SC0027	H37HSC0027-5	12/18/2002	670			4										
	H37SC0027	H37HSC0027-7	12/18/2002	210			6	HA37-117	7/13/2011	3.1J				3.1	3.1	0	Bias
						5	HA37-102	7/11/2011	37J				37	37	0		
C3						3	HA37-101	7/11/2011	2.7J				2.7	2.7	0		
C4	H37SC0009	H37HSC0009-1	12/17/2002	3500	3500		0										
	H37SC0009	H37HSC0009-2	12/17/2002	1200		J-	1										
	H37SC0009	H37HSC0009-3	12/17/2002	13000		J-	2										
	H37SC0008	H37HSC0008-1	12/17/2002	46000	46000		0										
	H37SC0008	H37HSC0008-2	12/17/2002	47000		J-	1										
	H37SC0008	H37HSC0008-3	12/17/2002	960		J-	2										
							3	HA37-063	6/29/2011	25				25	25	0	
							2.5	HA37-096	7/11/2011	58000J							Sidewall
						2.5	HA37-275	9/8/2011		13000						Sidewall	
						4	HA37-331	9/28/2011			1400					FD of HA37-330	
						5	HA37-464	10/17/2011				1.3	1.3	1.3	0		
C5						3	HA37-077	7/6/2011	5.2				5.2	5.2	0	FD of HA37-078	
						3	HA37-099	7/11/2011	3.0J				3.0	3.0	0		
C6	H37SC0010	H37HSC0010-1	12/17/2002	3200	3200		0										
	H37SC0010	H37HSC0010-2	12/17/2002	64		J-	1										
	H37SC0010	H37HSC0010-3	12/17/2002	1100		J-	2										
						3	HA37-064	6/29/2011	6.4				6.4	6.4	0		
C7	H37HSC0101	H37HSC0101-1	8/19/2003	3400	3400		0										
	H37HSC0101	H37HSC0101-2	8/19/2003	2300		J	1										
	H37HSC0101	H37HSC0101-3	8/19/2003	830			2										
	HA37HSC0035	HA37HSC0035-14	11/30/2006	3150	3150	J	0										
	HA37HSC0036	HA37HSC0036-1	11/30/2006	488	488		0										
	HA37HSC0036	HA37HSC0036-2	11/30/2006	505	505		0										
	HA37HSC0036	HA37HSC0036-3	11/30/2006	1020			2										
	HA37HSC0028	HA37HSC0028-1	10/5/2006	1050	1050		0										
	HA37HSC0028	HA37HSC0028-2	10/5/2006	1340			1										
	HA37HSC0028	HA37HSC0028-34	10/5/2006	1780			2										
							3	HA37-079	7/6/2011	1300							
							4	HA37-273	9/8/2011		3.4			3.4	3.4	0	

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Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
C8	HA37HSC0030	HA37HSC0030-1	10/5/2006	809	809		0										
	HA37HSC0030	HA37HSC0030-24	10/5/2006	2070			1										
	HA37HSC0030	HA37HSC0030-3	10/5/2006	1530			2										
	HA37HSC0037	HA37HSC0037-1	11/30/2006	1260	1260		0										
	HA37HSC0037	HA37HSC0037-2	11/30/2006	1920			1										
							2	HA37-121	7/19/2011	990							
							3	HA37-274	9/8/2011		950						
C9							4	HA37-328	9/28/2011			4.3		4.3	4.3	0	
	HA37HSC0032	HA37HSC0032-1	10/5/2006	405	405		0										
	HA37HSC0032	HA37HSC0032-2	10/5/2006	5750		J	1										
	HA37HSC0032	HA37HSC0032-3	10/5/2006	1060			2										
C10 (Berm)							3	HA37-511	10/26/2011	96				96	96	0	FD of HA37-510
	H37SC0026	H37HSC0026-1	12/18/2002	21000	21000		0										Depth based on top of excavated berm
	H37SC0026	H37HSC0026-2	12/18/2002	2900			1										
	H37SC0026	H37HSC0026-3	12/18/2002	2600			2										
	H37SC0026	H37HSC0026-5	12/18/2002	3000			4										
	H37SC0026	H37HSC0026-7	12/18/2002	1300			5										
							6	HA37-041	6/27/2011	6600							
C11 (Berm)							7	HA37-128	7/19/2011		2000						
							8	HA37-267	9/6/2011			5.0		5.0	5.0	0	
	H37SC0032	H37HSC0032-1	12/19/2002	22000	22000		0										Depth based on top of excavated berm
	H37SC0032	H37HSC0032-2	12/19/2002	1200			1										
	H37SC0032	H37HSC0032-3	12/19/2002	19000			2										
D1							4										
							5	HA37-029	6/22/2011	2500							FD of HA37-028
							6	HA37-297	9/19/2011		180			180	180	0	
							1	HA37-026	6/22/2011	8.0				8.0	8.0	0	
							1	HA37-061	6/28/2011	6.3				6.3	6.3	0	
D2	HA37HSC0047	HA37HSC0047-1	12/5/2006	2980	2980		0										
							1	HA37-080	7/6/2011	24000							
							1	HA37-100	7/11/2011	8600J							
							2	HA37-271	9/6/2011		3700						
							2	HA37-329	9/28/2011			1000					
D3							3	HA37-447	10/13/2011				9.2	9.2	9.2	0	
	HA37HSC0038	HA37HSC0038-1	11/30/2006	3170	3170		0										
D4							1	HA37-081	7/6/2011	150				150	150	0	
D5							1	HA37-508	10/26/2011	37				37	37	0	
	HA37HSC0039	HA37HSC0039-14	12/4/2006	21500	21500		0										
							1	HA37-082	7/6/2011	600							
							2	HA37-270	9/6/2011		350						
							2	HA37-293	9/19/2011			60000J					Bias
D6							2	HA37-294	9/19/2011			4200J					
							3	HA37-446	10/13/2011				24	24	24	0	
	HA37HSC0040	HA37HSC0040-1	12/4/2006	9150	9150		0										
D7							1	HA37-042	6/27/2011	57				57	57	0	
	HA37HSC0041	HA37HSC0041-1	12/4/2006	848	848		0										
	H37SC0030	H37HSC0030-1	12/19/2002	1600	1600		0										
	H37SC0030	H37HSC0030-2	12/19/2002	110			1	HA37-043	6/27/2011	9000							
							2	HA37-125	7/19/2011		7100						
	H37SC0030	H37HSC0030-3	12/19/2002	69			3	HA37-268	9/6/2011			990					
D7							4	HA37-292	9/19/2011				3.2J	3.2	3.2	0	
	H37SC0030	H37HSC0030-5	12/19/2002	65			4									3	

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	H37SC0030	H37HSC0030-74	12/19/2002	15			6									5	
D8							1	HA37-045	6/27/2011	13				13	13	0	
D9	HA37HSC0042	HA37HSC0042-1	12/4/2006	444	444		0										
							1	HA37-044	6/27/2011	8.2				8.2	8.2	0	
	HA37HSC0045	HA37HSC0045-1	12/5/2006	419	419		0										
D10	HA37HSC0046	HA37HSC0046-1	12/5/2006	314	314		0										
							1	HA37-027	6/22/2011	22				22	22	0	
	HA37HSC0050	HA37HSC0050-1	12/7/2006	242	242		0										
	HA37HSC0051	HA37HSC0051-1	12/7/2006	791	791		0										
E1	SB-39-008	9415G039281F	4/15/1994	2700	2700		0										
							1	HA37-001	6/7/2011	2.2				2.2	2.2	0	
	SB-39-008	9415G039282F	4/15/1994	36.1			2.5									1.5	
	HA37HSC0018	HA37HSC0018-1	10/4/2006	1010	1010		0										
	HA37HSC0018	HA37HSC0018-2	10/4/2006	32.2		J	1										
E2	HA37HSC0013	HA37HSC0013-1	10/4/2006	838	838		0										
	HA37HSC0013	HA37HSC0013-2	10/4/2006	11.8		J	1	HA37-024	6/22/2011	520							
							2	HA37-109	7/13/2011		5.5J			5.5	5.5	0	FD of HA37-108
																	Depth based on top of excavated berm
	H37SC0028	H37HSC0028-1	12/18/2002	260	260		0										
	H37SC0028	H37HSC0028-2	12/18/2002	14			1										
	H37SC0028	H37HSC0028-3	12/18/2002	1400			2										
	H37SC0028	H37HSC0028-5	12/18/2002	140			4										
	H37SC0028	H37HSC0028-7	12/18/2002	8400			5										
E3 (Berm)																	Depth based on top of excavated berm
	H37SC0029	H37HSC0029-14	12/19/2002	450	450		0										
	H37SC0029	H37HSC0029-2	12/19/2002	930			1										
	H37SC0029	H37HSC0029-3	12/19/2002	790			2										
	H37SC0029	H37HSC0029-5	12/19/2002	540			4										
	H37SC0029	H37HSC0029-7	12/19/2002	1000			5										
							6	HA37-025	6/22/2011	260							
							7	HA37-122	7/19/2011		2.2			2.2	2.2	0	
F1	HA37HSC0052	HA37HSC0052-1	12/7/2006	303	303		0										
	HA37HSC0004	HA37HSC0004-1	10/4/2006	366	366		0										
	HA37HSC0004	HA37HSC0004-2	10/4/2006	33.6	33.6		1	HA37-023	6/22/2011	2.6				2.6	2.6	0	
F2	HA37HSC0006	HA37HSC0006-14	10/4/2006	8390	8390		0										
	HA37HSC0006	HA37HSC0006-2	10/4/2006	41.1	41.1	J	1	HA37-021	6/22/2011	1.6				1.6	1.6	0	
	HA37HSC0008	HA37HSC0008-1	10/4/2006	11300	11300		0										
	H37SC0011	H37HSC0011-1	12/17/2002	860	860		0										
F3	HA37HSC0008	HA37HSC0008-2	10/4/2006	308			1										
							2	HA37-020	6/22/2011	1.6				1.6	1.6	0	
	HA37HSC0008	HA37HSC0008-3	10/4/2006	46.5			2							46.5	46.5	0	
	H37SC0011	H37HSC0011-3	12/17/2002	74		J-	2							74	74	0	
	HA37HSC0017	HA37HSC0017-1	10/4/2006	7430	7430		0										
	HA37HSC0017	HA37HSC0017-2	10/4/2006	7820		J	1										
	HA37HSC0017	HA37HSC0017-3	10/4/2006	949			2										
	H37SC0013	H37HSC0013-1	12/17/2002	25000	25000		0										
	H37SC0013	H37HSC0013-2	12/17/2002	800		J-	1										
	H37SC0013	H37HSC0013-3	12/17/2002	860		J-	2										
	HA37HSC0012	HA37HSC0012-1	10/4/2006	1240	1240		0										
	HA37HSC0012	HA37HSC0012-2	10/4/2006	662		J	1										
	HA37HSC0012	HA37HSC0012-3	10/4/2006	119			2										
							3	HA37-018	6/22/2011	11				11	11	0	
	HA37HSC0021	HA37HSC0021-1	10/4/2006	723	723		0										
	HA37HSC0021	HA37HSC0021-2	10/4/2006	417		J	1										

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
F5	HA37HSC0021	HA37HSC0021-3	10/4/2006	708			2										
	HA37HSC0022	HA37HSC0022-1	10/4/2006	458	458		0										
	HA37HSC0022	HA37HSC0022-2	10/4/2006	757			1										
	HA37HSC0022	HA37HSC0022-3	10/4/2006	236			2										
							3	HA37-055	6/28/2011	2500							FD of HA37-054
F6							4	HA37-123	7/19/2011		10			10	10	0	
	HA37HSC0026	HA37HSC0026-1	10/4/2006	692	692		0										
	HA37HSC0026	HA37HSC0026-2	10/4/2006	2340		J	1										
	HA37HSC0026	HA37HSC0026-3	10/4/2006	252			2										
							3	HA37-056	6/28/2011	15				15	15	0	
F7	HA37HSC0065	HA37HSC0065-1	12/18/2006	230	230		0										
G1							1	HA37-287	9/15/2011	56J				56	56	0	
	HA37HSC0053	HA37HSC0053-1	12/7/2006	532	532		0										
	HA37HSC0054	HA37HSC0054-1	12/7/2006	1870	1870		0										
G2							1	HA37-022	6/22/2011	2.2				2.2	2.2	0	
	HA37HSC0011	HA37HSC0011-1	10/4/2006	294	294		0										
	HA37HSC0011	HA37HSC0011-2	10/4/2006	302			1										
G3	HA37HSC0011	HA37HSC0011-3	10/4/2006	72.1	72.1		2	HA37-016	6/14/2011	35				35	35	0	
	HA37HSC0016	HA37HSC0016-1	10/4/2006	1490	1490		0										
	HA37HSC0016	HA37HSC0016-2	10/4/2006	675		J	1										
	HA37HSC0016	HA37HSC0016-3	10/4/2006	534			2										
							3	HA37-015	6/14/2011	50				50	50	0	
G4	H37SC0015	H37HSC0015-1	12/17/2002	1100	1100		0										
	H37SC0015	H37HSC0015-2	12/17/2002	150		J-	1	HA37-057	6/28/2011	64				64	64	0	
	H37SC0015	H37HSC0015-3	12/17/2002	110		J-	2									1	
	HA37HSC0025	HA37HSC0025-1	10/4/2006	500	500		0										
	HA37HSC0025	HA37HSC0025-2	10/5/2006	52.1			1							52.1	52.1	0	
H1	HA37HSC0015	HA37HSC0015-1	10/24/2006	516	516		0										
	HA37HSC0015	HA37HSC0015-2	10/24/2006	147			1										
	H37SC0014	H37HSC0014-1	12/17/2002	5600	5600		0										
	H37SC0014	H37HSC0014-2	12/17/2002	40000		J-	1										
	H37SC0014	H37HSC0014-3	12/17/2002	130		J-	2	HA37-014	6/14/2011	59				59	59	0	
H2	HA37HSC0020	HA37HSC0020-1	10/24/2006	753	753		0										
	HA37HSC0020	HA37HSC0020-2	10/24/2006	2530			1										
	HA37HSC0020	HA37HSC0020-3	10/24/2006	247			2										
							3	HA37-008	6/14/2011	2000							
							4	HA37-107	7/13/2011		10J			10	10	0	
H3	HA37HSC0062	HA37HSC0062-1	12/18/2006	1160	1160		0										
	HA37HSC0024	HA37HSC0024-1	10/24/2006	320	320		0										
	HA37HSC0024	HA37HSC0024-2	10/24/2006	49.1			1							49.1	49.1	0	
I1							1	HA37-120	7/19/2011	6.5				6.5	6.5	0	FD of HA37-119
	H37SC0012	H37HSC0012-1	12/17/2002	230	230		0										
I2							1	HA37-002	6/7/2011	1.8				1.8	1.8	0	
	HA37HSC0009	HA37HSC0009-1	10/24/2006	602	602		0										
	HA37HSC0009	HA37HSC0009-2	10/24/2006	323			1										
	HA37HSC0009	HA37HSC0009-3	10/24/2006	257			2										
							3	HA37-003	6/7/2011	5.7				5.7	5.7	0	
I3							1.5	HA37-013	6/14/2011	6.9					6.9	0.5	Sidewall
	HA37HSC0014	HA37HSC0014-1	10/24/2006	410	410		0										
	HA37HSC0014	HA37HSC0014-2	10/24/2006	578			1										
	HA37HSC0014	HA37HSC0014-3	10/24/2006	220			2										
	HA37HSC0019	HA37HSC0019-1	10/24/2006	912	912		0										
	HA37HSC0019	HA37HSC0019-2	10/24/2006	892			1										
	HA37HSC0019	HA37HSC0019-3	10/24/2006	215			2	HA37-004	6/7/2011	800							

Table M37-3
Analytical Results for Lead
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Location	Pre-Remediation							Post-Remediation									Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
							1.5	HA37-012	6/14/2011	130					130	0.5	Sidewall
							3	HA37-105	7/13/2011		21			21	21	0	
							2.5	HA37-106	7/13/2011		22				22	0.5	Sidewall
I4	HA37HSC0059	HA37HSC0059-1	12/7/2006	4470	4470		0										
	HA37HSC0060	HA37HSC0060-1	12/7/2006	434	434		0										
	HA37HSC0023	HA37HSC0023-1	10/24/2006	619	619		0										
	HA37HSC0023	HA37HSC0023-2	10/24/2006	7.0			1							7.0	7.0	0	
							1	HA37-009	6/14/2011	5.1				5.1	5.1	0	
							0.5	HA37-005	6/7/2011	71					71	0.5	Sidewall
J1							0.5	HA37-011	6/14/2011	8.1					8.1	0.5	Sidewall
	HSCBU1521036	HSCBU1521036-1	2/16/2011	1430	1430	J	0.08										
	HSCBU1521037	HSCBU1521037-1	2/16/2011	411	411	J	0.08										
	HSCBU1521038	HSCBU1521038-1	2/16/2011	1520	1520	J	0.08										
	SB-39-009	9415G039279F	4/15/1994	1660	1660		0										
							1	HA37-130	7/28/2011	380							
							0.5	HA37-131	7/28/2011	63					63	0.5	Sidewall
							0.5	HA37-132	7/28/2011	140					140	0.5	Sidewall
							0.5	HA37-133	7/28/2011	62					62	0.5	Sidewall
							0.5	HA37-134	7/28/2011	1500							Sidewall
J2	SB-39-009	9415G039280F	4/15/1994	10			2.5								10	0.5	Sidewall
		HA37-419	10/4/2011	540	540		0										
J3		HA37-302	9/21/2011	520	520	J-	0	HA37-421	10/4/2011	11				11	11	0	
							1	HA37-303	9/21/2011	5.9J-				5.9	5.9	0	
							2	HA37-304	9/21/2011	11J-						1	
		HA37-386	10/4/2011	640	640	J	0										
							1	HA37-387	10/4/2011	8.5J				8.5	8.5	0	
J4		HA37-389	10/4/2011	450	450	J	0										
							1	HA37-391	10/4/2011	16J				16	16	0	
		HA37-393	10/4/2011	320	320	J	0										
J5							1	HA37-394	10/4/2011	4J				4.0	4.0	0	
		HA37-376	10/4/2011	580	580	J	0										
							1	HA37-377	10/4/2011	7J				7.0	7.0	0	
J6							1	HA37-381	10/4/2011	J				67	67	0	
		HA37-373	10/4/2011	670	670	J	0										
							1	HA37-374	10/4/2011	80J				80	80	0	
J7							0										
		HA37-238	9/6/2011	9900	9900	J	0										FD of HA37-237
							1	HA37-239	9/6/2011	220J				220	220	0	
							2	HA37-240	9/6/2011	7.6J						1	
J8							3	HA37-241	9/6/2011	41J						2	
		HA37-305	9/21/2011	2000	2000	J-	0										
							1	HA37-306	9/21/2011	7.1J-				7.1	7.1	0	
							2	HA37-307	9/21/2011	3.7J-						1	
		HA37 -368	10/3/2011	430	430		0										
J9							1	HA37 -369	10/3/2011	4.1				4.1	4.1	0	
		HA37 -365	10/3/2011	260	260	J+	0										
							1	HA37 -366	10/3/2011	6.9				6.9	6.9	0	

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Analytical Results for Lead
Historical Area 37**

Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
J10		HA37 -355	10/3/2011	790	790	J+	0										
		HA37 -358	10/3/2011	390	390	J+	1	HA37 -356	10/3/2011	6.6J+				6.6	6.6	0	
							0										
J11		HA37 -360	10/3/2011				1	HA37 -360	10/3/2011	78J+				78	78	0	FD of HA37-359
		HA37-169	8/15/2011	4500	4500	J	0										
							1	HA37-170	8/15/2011	30				30	30	0	
							2	HA37-171	8/15/2011	17						1	
		HA37-242	9/6/2011	840	840	J	0										
							1	HA37-243	9/6/2011	18J				18	18	0	
							2	HA37-244	9/6/2011	13J						1	
							3	HA37-245	9/6/2011	4.4J						2	
		HA37-436	10/13/2011	450	450		0										
J12							1	HA37-437	10/13/2011	6.7				6.7	6.7	0	
		HA37-166	8/9/2011	800	800	J	0										
		HA37-167	8/9/2011	270		J	1										
		HA37-173	8/15/2011	140	140	J	0										FD of HA37-172
		HA37-174	8/15/2011	490		J	1										
				27			2	HA37-175	8/15/2011	27J				27	27	0	
		HA37-176	8/15/2011	150	150	J	0										
		HA37-177	8/15/2011	800			1										
							2	HA37-178	8/15/2011	17J				17	17	0	
J13		HA37-255	9/6/2011	260	260	J	0										
		HA37-256	9/6/2011	3100		J	1										
							2	HA37-258	9/6/2011	59				59	59	0	FD of HA37-257
							3	HA37-259	9/6/2011	9.9						1	
		HA37-260	9/6/2011	250	250		0										
		HA37-261	9/6/2011	240			1										
							2	HA37-262	9/6/2011	32				32	32	0	
J14		HA37 -362	10/3/2011	340	340	J+	0										
							1	HA37 -363	10/3/2011	2.3J+				2.3	2.3	0	
J15		HA37 -345	10/3/2011	190	190	J+	0										
		HA37 -346	10/3/2011	250		J+	1										
J16							2	HA37 -347	10/3/2011	14				14	14	0	
		HA37 -348	10/3/2011	320	320	J+	0										
J17							1	HA37 -349	10/3/2011	140J+				140	140	0	
		HA37-246	9/6/2011	170	170	J	0										
							1	HA37-247	9/6/2011	4.2J				4.2	4.2	0	
							2	HA37-249	9/6/2011	4.4J						1	
							3	HA37-250	9/6/2011	24J						2	
		HA37 -352	10/3/2011	230	230	J+	0										
J18							1	HA37 -353	10/3/2011	35J+				35	35	0	
		HA37-433	10/13/2011	490	490		0										
							1	HA37-434	10/13/2011	9.8				9.8	9.8	0	
		HA37-251	9/6/2011	250	250	J	0										
							1	HA37-252	9/6/2011	3.5J				3.5	3.5	0	
							2	HA37-253	9/6/2011	10J						1	
							3	HA37-254	9/6/2011	100J						2	
		HA37 -338	10/3/2011	360	360	J+	0										
							1	HA37 -339	10/3/2011	47J+				47	47	0	

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Analytical Results for Lead
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Location	Pre-Remediation							Post-Remediation									Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
J19		HA37-315	9/21/2011	250	250	J-	0	HA37-316	9/21/2011	20J-				20	20	0	
							2	HA37-317	9/21/2011	3.3J-						1	
		HA37 -342	10/3/2011	780	780	J+	0	HA37 -343	10/3/2011	8.0J+				8.0	8.0	0	
							1										
J20		HA37-406	10/4/2011	720	720		0	HA37-407	10/4/2011	11				11	11	0	
		HA37-409	10/4/2011	290	290		0										
							1	HA37-411	10/4/2011	14				14	14	0	
J21		HA37-325	9/21/2011	360	360	J-	0	HA37-326	9/21/2011	22J-				22	22	0	
							2	HA37-327	9/21/2011	7.6J-						1	
		HA37-399	10/4/2011	480	480	J	0	HA37-401	10/4/2011	42J				42	42	0	
							1										
J22		HA37-396	10/4/2011	360	360		0	HA37-397	10/4/2011	40J				40	40	0	
		HA37-413	10/4/2011	530	530		0										
							1	HA37-414	10/4/2011	19				19	19	0	
J23		HA37-429	10/13/2011	420	420		0	HA37-431	10/13/2011	51				51	51	0	FD of HA37-430
J26		HA37-450	10/17/2011	440	440		0										FD of HA37-451
							1	HA37-452	10/17/2011	4.2				4.2	4.2	0	
		HA37-492	10/25/2011	400	400	J-	0	HA37-493	10/25/2011	5.8J-				5.8	5.8	0	
J27		HA37-494	10/25/2011	300	300	J-	0	HA37-495	10/25/2011	4.8J-				4.8	4.8	0	
		HA37-528	11/1/2011	310	310		0	HA37-529	11/1/2011	1.7UJ				1.70	1.70	0	
							1										
J28		HA37-544	11/9/2011	500	500		0	HA37-545	11/9/2011	2.0J				2.0	2.0	0	
J29		HA37-583	12/12/2011	340	340		0	HA37-584	12/12/2011	6.9				6.9	6.9	0	
		HA37-546	11/9/2011	460	460		0	HA37-547	11/9/2011	2.1J				2.1	2.1	0	
J30		HA37-566	11/22/2011	710	710		0	HA37-567	11/22/2011	8.7				8.7	8.7	0	
							1										
J31		HA37-568	11/22/2011	400	400		0	HA37-569	11/22/2011	8.6				8.6	8.6	0	
J32		HA37-581	12/12/2011	460	460		0	HA37-582	12/12/2011	2.8				2.8	2.8	0	FD of HA37-580
							1										
K1	HSCBU1521011	HSCBU1521011-1	2/15/2011	747	747	J	0.08	HA37-161	8/9/2011	150				150	150	0	
							1	HA37-162	8/9/2011	52				52	52	0.5	Sidewall
							0.5	HA37-163	8/9/2011	5.4				5.4	5.4	0.5	Sidewall
							0.5	HA37-164	8/9/2011	210				210	210	0.5	Sidewall
							0.5	HA37-165	8/9/2011	25				25	25	0.5	Sidewall
L1		HA37-564	11/22/2011	1700	1700		0	HA37-565	11/22/2011	3.3				3.3	3.3	0	
		HA37-571	12/12/2011	590	590		0	HA37-573	12/12/2011	5.8				5.8	5.8	0	
							1										
L2		HA37-588	1/5/2012	240	240		0	HA37-589	1/5/2012	14				14	14	0	
							1										

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Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type											
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)										
L3		HA37-574	12/12/2011	740	740		0																				
							1	HA37-575	12/12/2011	15				15	15	0											
L4		HA37-539	11/9/2011	670	670		0																				
							1	HA37-540	11/9/2011	9.5J				9.5	9.5	0											
		HA37-541	11/9/2011	720	720		0																				
							1	HA37-543	11/9/2011	3.9UJ				3.9	3.9	0											
L5		HA37-487	10/25/2011	390	390	J-	0																				
							1	HA37-488	10/25/2011	14J-				14	14	0											
		HA37-519	11/1/2011	490	490		0																				
L6							1	HA37-520	11/1/2011	28J				28	28	0											
		HA37-489	10/25/2011	120	120	J-	0																				
		HA37-490	10/25/2011	240		J-	1																				
							2	HA37-530	11/1/2011	4.2				4.2	4.2	0											
Excavation Area Average					3495	mg/kg										31		34		mg/kg							
Excavation Area					11.2	acres										11.2		11.2		acres							
Number of Samples					276	161										144		21		8		3		174		194	
Non-Excavated Area																											
	H37SC0001	H37HSC0001-1	12/12/2002	14	14		0								14	14	0										
	H37SC0004	H37HSC0004-1	12/17/2002	83	83		0								83	83	0										
	H37SC0016	H37HSC0016-1	12/17/2002	110	110		0								110	110	0										
	H37SC0017	H37HSC0017-1	12/18/2002	140	140		0								140	140	0										
	H37SC0018	H37HSC0018-1	12/18/2002	9.1	9.1		0								9	9	0										
	H37SC0019	H37HSC0019-1	12/18/2002	33	33		0								33	33	0										
	H37SC0020	H37HSC0020-1	12/18/2002	140	140		0								140	140	0										
	H37SC0031	H37HSC0031-1	12/19/2002	38	38		0								38	38	0										
	H37SC0031	H37HSC0031-2	12/19/2002	23	23		1										1										
	H37SC0031	H37HSC0031-3	12/19/2002	10	10		2										2										
	H37SC0031	H37HSC0031-5	12/19/2002	22	22		4										4										
	H37SC0031	H37HSC0031-7	12/19/2002	11	11		6										6										
	HA37HSC0001	HA37HSC0001-1	10/4/2006	66.8	66.8		0								66.8	66.8	0										
	HA37HSC0002	HA37HSC0002-1	10/4/2006	38.7	38.7		0								38.7	38.7	0										
	HA37HSC0003	HA37HSC0003-1	10/4/2006	53.7	53.7		0								53.7	53.7	0										
	HA37HSC0005	HA37HSC0005-1	10/4/2006	43.6	43.6		0								43.6	43.6	0										
	HA37HSC0007	HA37HSC0007-1	10/4/2006	119	119		0								119	119	0										
	HA37HSC0010	HA37HSC0010-1	10/24/2006	73	73		0								73	73	0										
	HA37HSC0027	HA37HSC0027-1	10/4/2006	215	215		0								215	215	0										
	HA37HSC0027	HA37HSC0027-2	10/4/2006	206	206		1										1										
	HA37HSC0043	HA37HSC0043-1	12/5/2006	186	186		0								186	186	0										
	HA37HSC0044	HA37HSC0044-1	12/5/2006	146	146		0								146	146	0										
	HA37HSC0048	HA37HSC0048-1	12/7/2006	20.2	20.2		0								20.2	20.2	0										
	HA37HSC0049	HA37HSC0049-1	12/7/2006	93.6	93.6		0								93.6	93.6	0										
	HA37HSC0055	HA37HSC0055-1	12/7/2006	153	153		0								153	153	0										
	HA37HSC0056	HA37HSC0056-1	12/7/2006	65.9	65.9		0								65.9	65.9	0										
	HA37HSC0057	HA37HSC0057-1	12/7/2006	117	117		0								117	117	0										
	HA37HSC0058	HA37HSC0058-14	12/7/2006	221	221		0								221	221	0										
	HA37HSC0061	HA37HSC0061-14	12/18/2006	126	126		0								126	126	0										
	HA37HSC0063	HA37HSC0063-1	12/18/2006	174	174		0								174	174	0										
	HA37HSC0064	HA37HSC0064-1	12/18/2006	113	113		0								113	113	0										
	HSCBU1521025	HSCBU1521025-1	2/16/2011	104	104	J	0.08								104	104	0.08										
	HSCBU1521028	HSCBU1521028-1	2/16/2011	10	10	J	0.08								10	10	0.08										
		HA37-179	8/15/2011	170	170	J	0								170	170	0										
		HA37-180	8/15/2011	14	14	J	2										2										
		HA37-186	9/1/2011	25	25	J-	0								25	25	0										
		HA37-187	9/1/2011	110	110	J-	1										1										

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation									Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
		HA37-188	9/1/2011	180	180	J-	2									2	
		HA37-207	9/1/2011	110	110	J	3									3	
			HA37-189	9/1/2011	8.3	8.3	J-	0							8.3	8.3	0
		HA37-190	9/1/2011	6.6	6.6	J-	1									1	
		HA37-191	9/1/2011	2.3	2.3	J-	2									2	
		HA37-208	9/1/2011	2.7	2.7	J	3									3	
			HA37-192	9/1/2011	37	37	J-	0							37	37	0
		HA37-193	9/1/2011	4.0	4.0	J-	1									1	
		HA37-194	9/1/2011	2.4	2.4	J-	2									2	
		HA37-209	9/1/2011	3.7	3.7	J	3									3	
			HA37-199	9/1/2011	40	40	J-	0							40	40	0
		HA37-200	9/1/2011	120	120	J-	1									1	
		HA37-201	9/1/2011	4.1	4.1	J-	2									2	
		HA37-211	9/1/2011	8.8	8.8	J	3									3	
			HA37-213	9/1/2011	91	91	J	0							91	91	0
		HA37-215	9/1/2011	14	14	J	1									1	
		HA37-216	9/1/2011	5.8	5.8	J	2									2	
		HA37-217	9/1/2011	3.5	3.5	J	3									3	
			HA37-218	9/1/2011	94	94	J	0							94	94	0
		HA37-219	9/1/2011	16	16	J	1									1	
		HA37-220	9/1/2011	14	14	J	2									2	
		HA37-221	9/1/2011	11	11	J	3									3	
			HA37-222	9/1/2011	4.7	4.7		0							4.7	4.7	0
		HA37-223	9/1/2011	5.6	5.6		1									1	
		HA37-224	9/1/2011	5.7	5.7		2									2	
		HA37-226	9/1/2011	5.9	5.9		3									3	
			HA37-298	9/21/2011	190	190	J-	0							190	190	0
		HA37-299	9/21/2011	8.4	8.4	J-	1									1	
		HA37-301	9/21/2011	2.3	2.3	J-	2									2	FD of HA37-300
		HA37-308	9/21/2011	3.8	3.8	J-	0							3.8	3.8	0	
		HA37-309	9/21/2011	1.8	1.8	J-	1									1	
		HA37-310	9/21/2011	1.7	1.7	J-	2									2	
		HA37-312	9/21/2011	130	130	J-	0							130	130	0	
		HA37-313	9/21/2011	1.8	1.8	J-	1									1	
		HA37-314	9/21/2011	4.3	4.3	J-	2									2	
		HA37-318	9/21/2011	180	180	J-	0							180	180	0	
		HA37-319	9/21/2011	5.6	5.6	J-	1									1	
		HA37-320	9/21/2011	5.9	5.9	J-	2									2	
		HA37-322	9/21/2011	13	13	J-	0							13	13	0	
		HA37-323	9/21/2011	1.8	1.8	J-	1									1	
		HA37-324	9/21/2011	1.2	1.2	J-	2									2	
		HA37-383	10/4/2011	130	130	J	0							130	130	0	
		HA37-384	10/4/2011	54	54	J	1									1	
		HA37-403	10/4/2011	160	160		0							160	160	0	
		HA37-404	10/4/2011	6.9	6.9		1									1	
		HA37-416	10/4/2011	200	200		0							200	200	0	
		HA37-417	10/4/2011	9.2	9.2		1									1	
		HA37-423	10/4/2011	220	220		0							220	220	0	
		HA37-424	10/4/2011	33	33		1									1	
		HA37-443	10/13/2011	120	120		0							120	120	0	
		HA37-444	10/13/2011	1.7	1.7		1									1	
		HA37-454	10/17/2011	120	120		0							120	120	0	
		HA37-455	10/17/2011	6.5	6.5		1									1	
		HA37-457	10/17/2011	130	130		0							130	130	0	

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
		HA37-458	10/17/2011	2.5	2.5		1									1	
		HA37-460	10/17/2011	110	110		0							110	110	0	
		HA37-498	10/25/2011	180	180	J-	0							180	180	0	
		HA37-499	10/25/2011	9.0	9.0	J-	1									1	
		HA37-501	10/25/2011	150	150	J-	0							150	150	0	FD of HA37-500
		HA37-502	10/25/2011	59	59	J-	1									1	
		HA37-503	10/25/2011	51	51	J-	0							51	51	0	
		HA37-504	10/25/2011	60	60	J-	1									1	
		HA37-522	11/1/2011	180	180		0							180	180	0	
		HA37-524	11/1/2011	110	110		0							110	110	0	
		HA37-526	11/1/2011	130	130		0							130	130	0	
		HA37-533	11/9/2011	140	140		0							140	140	0	
		HA37-537	11/9/2011	47	47		0							47	47	0	
Haul Road		HA37-548	11/9/2011	81	81		0							81	81	0	
Haul Road		HA37-549	11/9/2011	130	130		0							130	130	0	
Haul Road		HA37-550	11/9/2011	23	23		0							23	23	0	
Haul Road		HA37-556	11/9/2011	110	110		0							110	110	0	
		HA37-562	11/22/2011	90	90		0							90	90	0	FD of HA37-561
		HA37-576	12/12/2011	41	41		0							41	41	0	
		HA37-578	12/12/2011	170	170		0							170	170	0	
		HA37-586	1/5/2012	89	89		0							89	89	0	
		HA37-590	1/5/2012	66	66		0							66	66	0	
		HA37-595	1/5/2012	24	24		0							24	24	0	
		HA37-597	1/5/2012	56	56		0							56	56	0	
		HA37-599	1/5/2012	33	33		0							33	33	0	
		HA37-613	1/16/2012	180	180		0							180	180	0	
Berm		HA37-553	11/9/2011	120	120		0							120	120	0	Depth based on top of excavated berm
		HA37-625	1/16/2012	28	28		2									2	
		HA37-632	1/17/2012	70	70	J	4									4	
Berm		HA37-554	11/9/2011	120	120		0							120	120	0	Depth based on top of excavated berm
		HA37-626	1/16/2012	14	14		2									2	
		HA37-631	1/17/2012	71	71	J	4									4	FD of HA37-30
Berm		HA37-619	11/9/2011	120	120		0							120	120	0	Depth based on top of excavated berm
		HA37-621	1/16/2012	17	17		2									2	
		HA37-634	1/17/2012	2.9	2.9		4									4	
Berm		HA37-622	11/9/2011	19	19		0							19	19	0	Depth based on top of excavated berm
		HA37-623	1/16/2012	28	28		2									2	
		HA37-635	1/17/2012	1.6	1.6	J	4									4	
						0	HA37-641	3/12/2013	6900								Bias Haul Road
						0.5	HA37-651	3/27/2013			12			12	12	0.5	Bias Haul Road
							0	HA37-643	3/12/2013	110				110	110	0	Bias Haul Road
							0	HA37-644	3/12/2013	43				43	43	0	Bias Haul Road
							0	HA37-645	3/12/2013	87				87	87	0	Bias Haul Road
							0	HA37-646	3/12/2013	400							Bias Haul Road
							0.5	HA37-648	3/26/2013		49			49	49	0.5	Bias Haul Road
							0	HA37-654	4/3/2013	88				88	88	0	Stockpile
							0	HA37-656	4/3/2013	8.1				8.1	8.1	0	Stockpile
							0	HA37-658	4/3/2013	270							Stockpile
							0.5	HA37-659	4/3/2013		2			2	2	0.5	Stockpile

Table M37-3
Analytical Results for Lead
Historical Area 37

Location	Pre-Remediation							Post-Remediation								Sample Type	
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Qualifier	Sample Depth (feet bgs) ⁴	Sample Number	Sample Date	CNF (mg/kg)	CNF2 (mg/kg)	CNF3 (mg/kg)	CNF4 (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}		Sample Depth (feet bgs)
Non-Excavated Area Average					68	mg/kg									94	94	mg/kg
Non-Excavated Area					14.4	acres									14.4	14.4	acres
Number of Samples					129										82	82	
Total Combined Weighted Average					1567	mg/kg									67	68	mg/kg
					25.6	acres									25.6	25.6	acres
Number of Samples					405										256	276	
Outside Feasibility Study																	
	SB-39-101	9415G039277F	4/15/1994	65	65		0							65	65	0	
	SB-39-101	9415G039278F	4/15/1994	5	5		2							5	5	2	
	H37SC0021	H37HSC0021-1	12/18/2002	9	9		0							9	9	0	
	H37SC0022	H37HSC0022-1	12/18/2002	4	4		0							4	4	0	
	H37SC0023	H37HSC0023-1	12/18/2002	8	8		0							8	8	0	
	H37SC0024	H37HSC0024-1	12/18/2002	9	9		0							9	9	0	
	H37SC0025	H37HSC0025-1	12/18/2002	13	13		0							13	13	0	
	HSCBU1521029	HSCBU1521029-1	2/16/2011	59.8	59.8		0.08							59.8	59.8	0.08	
	HSCBU1521031	HSCBU1521031-1	2/16/2011	112	112		0.08							112	112	0.08	
	HSCBU1521032	HSCBU1521032-1	2/16/2011	32	32		0.08							32	32	0.08	
	HSCBU1521033	HSCBU1521033-1	2/16/2011	110	110		0.08							110	110	0.08	
	HSCBU1521034	HSCBU1521034-1	2/16/2011	110	110		0.08							110	110	0.08	
		HA37-535	11/9/2011	36	36		0							36	36	0	

Notes:

- excavated site characterization sample
- CNF confirmation sample
- CNF2 confirmation sample collected after over-excavation
- FD field duplicate, the highest of the pair is shown on this table
- feet bgs feet below ground surface
- J Result is estimated.
- J- Result is estimated with a negative bias.
- J+ Result is estimated with a positive bias.
- mg/kg milligrams per kilogram
- NS not sampled
- U Result is non-detect to the value reported.
- +3 Excavation is from a berm thus shown to be higher in elevation than the ground surface.
- 1 Only surface samples are used for calculating the range-wide weighted average.
- 2 The range-wide weighted average was calculated using the following formula:
Range-wide weighted average =
$$\frac{(\text{excavated area average} \times \text{excavated area acreage}) + ([\text{non-excavated area average} \times \text{non-excavated area acreage}] \times \text{excavated area acreage} + \text{non-excavated area acreage})}{\text{excavated area acreage} + \text{non-excavated area acreage}}$$
- 3 In addition to surface samples, includes sidewall samples up to 1-foot bgs in depth.
- 4 All depths are relative to original ground surface prior to excavation.

Table M37-4
Analytical Results for TNT
Historical Area 37

Location	Pre-Remediation						Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	TNT (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area												
H1						2	HA37-048	6/27/2011	<200	200	0	
G3						3	HA37-049	6/27/2011	<210	210	0	
J1						0.5	HA37-130	7/28/2011	<200	200		
J1						0.5	HA37-131	7/28/2011	<200	200	0.5	
J1						0.5	HA37-132	7/28/2011	<200	200	0.5	
J1						0.5	HA37-133	7/28/2011	<190	190	0.5	
J1						0.5	HA37-134	7/28/2011	<200	200		
I3						3	HA37-135	7/28/2011	<200	200	0	
H2						4	HA37-136	7/28/2011	<200	200	0	
E2						2	HA37-137	7/28/2011	<200	200	0	
A3						1	HA37-143	8/3/2011	<200	200	0.5	
A3						0.5	HA37-144	8/3/2011	<200	200	0.5	
A3						0.5	HA37-145	8/3/2011	<200	200	0.5	
A3						0.5	HA37-146	8/3/2011	<200	200	0.5	
A3						1	HA37-148	8/3/2011	<210	210	0	FD of HA37-147

Notes:
 <200 less than the reporting limit
 CNF confirmation sample
 FD field duplicate
feet bgs feet below ground surface
TNT trinitrotoluene
ug/kg microgram per kilogram

Table M37-5
Analytical Results for HMX
Historical Area 37

Location	Pre-Remediation						Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	HMX (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area												
H1						2	HA37-048	6/27/2011	<200	200	0	
G3						3	HA37-049	6/27/2011	<210	210	0	
J1						0.5	HA37-130	7/28/2011	<200	200		
J1						0.5	HA37-131	7/28/2011	<200	200	0.5	
J1						0.5	HA37-132	7/28/2011	<200	200	0.5	
J1						0.5	HA37-133	7/28/2011	<190	190	0.5	
J1						0.5	HA37-134	7/28/2011	<200	200		
I3						3	HA37-135	7/28/2011	<200	200	0	
H2						4	HA37-136	7/28/2011	<200	200	0	
E2						2	HA37-137	7/28/2011	<200	200	0	
A3						1	HA37-143	8/3/2011	<200	200	0.5	
A3						0.5	HA37-144	8/3/2011	<200	200	0.5	
A3						0.5	HA37-145	8/3/2011	<200	200	0.5	
A3						0.5	HA37-146	8/3/2011	<200	200	0.5	
A3						1	HA37-148	8/3/2011	<210	210	0	FD of HA37-147
Outside Feasibility Study												
	HA34HSC0001	HA34HSC0001-1	12/15/2004	0	N/D	0						
	HA34HSC0003	HA34HSC0003-1	12/15/2004	0	N/D	0						
	HA34HSC0026	HA34HSC0006-1	12/15/2004	0	N/D	0						
	EUSI004	EUSI004-1	4/4/2005	0	N/D	0						
	EUSI005	EUSI005-1	4/4/2005	0	N/D	0						
	EUSI006	EUSI006-1	4/4/2005	0	N/D	0						
	EUSI007	EUSI007-1	4/4/2005	0	N/D	0						
	EUSI008	EUSI008-1	4/4/2005	0	N/D	0						

Notes:
<200 less than the reporting limit
CNF confirmation sample
FD field duplicate
feet bgs feet below ground surface
HMX cyclotetramethylene tetranitramine
ug/kg microgram per kilogram

Table M37-6
Analytical Results for RDX
Historical Area 37

Location	Pre-Remediation						Post-Remediation					Sample Type
	Station Name	Sample Number	Sample Date	RDX (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Final Confirmation Result (ug/kg)	Sample Depth (feet bgs)	
Excavated Area												
H1						2	HA37-048	6/27/2011	<200	200	0	
G3						3	HA37-049	6/27/2011	<210	210	0	
J1						0.5	HA37-130	7/28/2011	<200	200		
J1						0.5	HA37-131	7/28/2011	<200	200	0.5	
J1						0.5	HA37-132	7/28/2011	<200	200	0.5	
J1						0.5	HA37-133	7/28/2011	<190	190	0.5	
J1						0.5	HA37-134	7/28/2011	<200	200		
I3						3	HA37-135	7/28/2011	<200	200	0	
H2						4	HA37-136	7/28/2011	<200	200	0	
E2						2	HA37-137	7/28/2011	<200	200	0	
A3						1	HA37-143	8/3/2011	<200	200	0.5	
A3						0.5	HA37-144	8/3/2011	<200	200	0.5	
A3						0.5	HA37-145	8/3/2011	<200	200	0.5	
A3						0.5	HA37-146	8/3/2011	<200	200	0.5	
A3						1	HA37-148	8/3/2011	<210	210	0	FD of HA37-147

Notes:
<200 less than the reporting limit
CNF confirmation sample
FD field duplicate
feet bgs feet below ground surface
RDX cyclotrimethylene trinitramine
ug/kg microgram per kilogram

A.10 HA-38

STATUS: REMEDIATION COMPLETE FOR LEAD, RECOMMEND NO BRA ACTION

LOCATION: NORTHEASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-205 (Units 15 and 21)

A.10.1 SITE DESCRIPTION AND BACKGROUND

Site HA-38, located within Unit 21, is located on the northeastern part of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-38 is a subarea of Site 39 Inland Ranges and part of the habitat reserve as defined in the *Final Remedial Action Completion Report (RACR) Site 39 Inland Ranges Habitat Reserve* (Gilbane 2014). Range use at HA-38 includes a rifle grenade range and was used for machine gun, rifle, and pistol firing. Further historical information on HA-38 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.10.2 PREVIOUS SITE CHARACTERIZATION

A reconnaissance was conducted in Range 38 in April 2001. To evaluate the potential for lead, antimony and copper in soil, SI sampling was conducted in July 2001. On the basis of the SI sampling results, no further action was recommended in the BRA prepared in 2005 (Shaw 2012). HA-38 was not identified in the Site 39 Feasibility Study Addendum for remediation. However, HA-38 was evaluated following the process of the FS Addendum based on similar HAs. The sampling investigations in 2008 identified approximately 2,044 cubic yards (cy) of soil with lead contamination requiring remediation in a 1.3-acre area. Analytical results for explosive constituents (RDX, HMX, and TNT) were all below the reporting limits (Gilbane 2014). Further information on previous investigations and results in HA-38 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.10.3 COMPLETED MUNITIONS RESPONSE

Munitions response (MR), including surface MEC removal and digital geophysical mapping (DGM), was completed in Unit 21 (which includes HA-38) in 2011 (Shaw 2011). HA-38 was identified as having moderate to high probability of encountering munitions and explosives of concern (MEC) and required MEC removal to depth within the footprint of the remediation areas prior to excavation. Pre-remediation subsurface MEC removal was conducted from July 2011 to May 2012. A digital geophysical mapping (DGM) survey was conducted and identified a total of 828 individual dig targets in 1.07 acres and identified saturated “mag and dig” areas in 0.23 acres. After quality control (QC) review, 743 targets were identified for intrusive investigation. “Mag and dig” was conducted in the 0.23 acre saturated area and the proposed lead remediation area was investigated to the proposed depth plus one foot. Two unexploded ordnance (UXO) items were recovered during pre-remediation MEC removal. Intrusive investigation recovered 679 pounds of munitions debris (MD) and 74 pounds of range-related debris. No MEC items were found during soil remediation activities. Post-remediation MEC removal was conducted in April 2013. A DGM survey identified 172 individual dig targets. After QC review, 138 targets were identified for intrusive investigation. Approximately 148 pounds of MD were removed during the MEC removal action. No MEC was recovered during the post-remediation MEC removal.

Further detailed information can be found in the *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* Report (Gilbane 2014).

A.10.4 REMEDIAL ACTION

The remedial action objective (RAO) was to excavate all soil with lead concentrations greater than 225 mg/kg. Approximately 2,214 cubic yards of soil were excavated from an approximate area of 1.48 acres (Gilbane 2014).

A.10.5 SITE CHARACTERIZATION

After completion of excavation, confirmation samples were collected in January 2013. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.10.5.1 APPROACH

A total of 14 confirmation samples were collected during remedial activities. Additionally, two bias samples were collected from the excavation sidewall to confirm that soil contamination did not extend outside the excavation area (Gilbane 2014).

A.10.5.2 SITE CHARACTERIZATION RESULTS

No explosive constituents were detected above the screening level described in the Site 39 ROD Amendment. A range-wide weighted average concentration of lead at 71 mg/kg was achieved at HA-38. Pre- and post-remediation soil sample results for lead are provided in Tables N38-2 pulled from the *Final Remedial Action Completion Report Site 39 Inland Ranges Habitat Reserve* Report (Gilbane 2014). The lead range-wide weighted average was calculated using the pre-remediation (non-excavated area) and post-remediation (excavated area) results. Additionally, final confirmation results for trinitrotoluene (TNT), cyclotetramethylene tetranitramine (HMX), and cyclotrimethylene trinitramine (RDX) are provided in Tables N38-3 through N38-5 pulled from the *Gilbane 2014* Report. Excavation limits and soil locations are provided in Figure N38-2 pulled from the *Gilbane 2014* Report.

A.10.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-38. Additionally, no additional excavation is required based on confirmation sampling results and the range-wide weighted lead average result (Gilbane 2014).

A.10.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California.* (AR# RI-041E)

Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California.* (AR# RI-047C)

Shaw, 2011. *MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-072B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

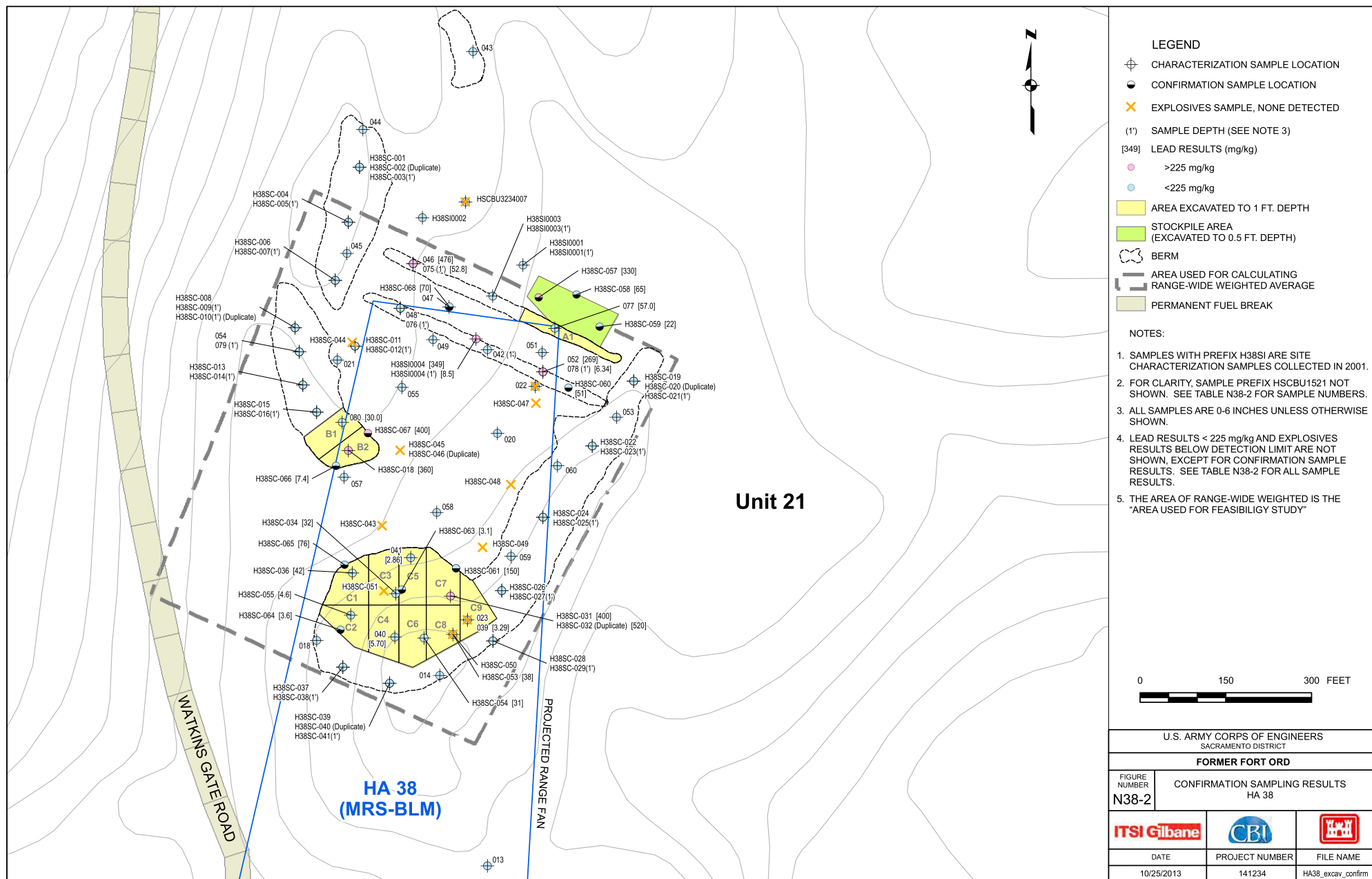


Table N38-2
Analytical Results for Lead
Historical Area 38

Location	Pre-Remediation						Post-Remediation						Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
Excavated Area													
A1		HSCBU1521050-1	4/7/11	2610	2610	0							
		HSCBU1521077-2	4/28/11	57		1			57	57	57	0	
B1		HSCBU1521056-1	4/7/11	2580	2580	0							
		HSCBU1521080-2	4/28/11	30		1			30	30	30	0	
B2		H38SC-017	9/6/11	2000	2000	0							
		H38SC-018	9/6/11	360		1			360	360	360	0	
						0.5	H38SC-066	1/15/2013	7.4		7.4	0.5	Sidewall bias
C1						0	H38SC-067	1/15/2013	400	400	400	0	Haul road bias
		H38SC-035	9/6/11	18000	18000	0							
		H38SC-036	9/6/11	42		1			42	42	42	0	
C2						0	H38SC-065	1/15/2013	76	76	76	0	Haul road bias
		HSCBU1521017-1	2/15/11	248J	248	0							
						1	H38SC-055	11/6/2012	4.6	4.6	4.6	0	
C3						0.5	H38SC-064	1/15/2013	3.6		3.6	0.5	Sidewall bias
		H38SC-033	9/6/11	850	850	0							
C4		H38SC-034	9/6/11	32		1			32	32	32	0	
		HSCBU1521016-1	2/15/11	4120	4120	0							
C5		HSCBU1521040-2	4/7/11	5.7		1			5.7	5.7	5.7	0	
		HSCBU1521019-1	2/15/11	291J	291	0							
		HSCBU1521041-2	4/7/11	2.86		1			2.86	2.86	2.86	0	
C6						0	H38SC-063	1/15/2013	3.1	3.1	3.1	0	Haul road bias
		HSCBU1521015-1	2/15/11	2160J	2160	0							
C7						1	H38SC-054	11/6/2012	31	31	31	0	
		H38SC-030	9/6/11	520	520	0							
		H38SC-032	9/6/11	520		1			520	520	520	0	FD of H38HSC-031
C8						0	H38SC-061	1/15/2013	150	150	150	0	Haul road bias
						1	H38SC-053	11/6/2012	38	38	38	0	
C9		HSCBU1521023-1	2/16/11	808	808	0							
		HSCBU1521039-2	4/7/11	3.29		1			3.29	3.29	3.29	0	
						0.5	H38SC-057	1/15/2013	330	330	330	0	Sidewall bias
						0.5	H38SC-058	1/15/2013	65	65	65	0	Sidewall bias
						0.5	H38SC-059	1/15/2013	22	22	22	0	Sidewall bias
Excavation Area Average					3108	mg/kg	114					104 mg/kg	
Excavation Area					1.3	acres	1.3					1.3 acres	
Number of Samples					20	11	21					19	
												21	

Table N38-2
Analytical Results for Lead
Historical Area 38

Location	Pre-Remediation						Post-Remediation						Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
Non-Excavated Area													
		HSCBU1521014-1	2/15/11	29.9J	29.9	0			29.9	29.9	29.9	0	
		HSCBU1521018-1	2/15/11	37J	37	0			37	37	37	0	
		HSCBU1521046-1	4/7/11	476	476	0			476	476	476	0	
		HSCBU1521075-2	4/28/11	52.8		1						1	
		HSCBU1521042-2	4/7/11	28.4		1						1	
		HSCBU1521052-1	4/7/11	269	269	0			269	269	269	0	
		HSCBU1521078-2	4/28/11	6.34		1						1	
		HSCBU1521020-1	2/15/11	31.4J-	31.4	0			31.4	31.4	31.4	0	
		HSCBU1521021-1	2/15/11	22.3J-	22.3	0			22.3	22.3	22.3	0	
		HSCBU1521022-1	2/15/11	103J-	103	0			103	103	103	0	
		HSCBU1521045-1	4/7/11	4.97	4.97	0			4.97	4.97	4.97	0	
		HSCBU1521047-1	4/7/11	116	116	0			116	116	116	0	
		HSCBU1521048-1	4/7/11	20.8	20.8	0			20.8	20.8	20.8	0	
		HSCBU1521076-2	4/28/11	6.07		1						1	
		HSCBU1521049-1	4/7/11	35.2	35.2	0			35.2	35.2	35.2	0	
		HSCBU1521051-1	4/7/11	92.1	92.1	0			92.1	92.1	92.1	0	
		HSCBU1521053-1	4/7/11	12.7	12.7	0			12.7	12.7	12.7	0	
		HSCBU1521054-14	4/7/11	9.29	9.29	0			9.29	9.29	9.29	0	FD of HSCBU1521054-1
		HSCBU1521079-2	4/28/11	2.95		1						1	
		HSCBU1521055-1	4/7/11	27	27	0			27	27	27	0	
		HSCBU1521057-1	4/7/11	56	56	0			56	56	56	0	
		HSCBU1521058-1	4/7/11	15.1	15.1	0			15.1	15.1	15.1	0	
		HSCBU1521059-1	4/7/11	67.1	67.1	0			67.1	67.1	67.1	0	
		HSCBU1521060-1	4/7/11	17.8	17.8	0			17.8	17.8	17.8	0	
		H38SI0003-1	7/31/01	124	124	0			124	124	124	0	
		H38SI0003-2	7/31/01	5.6		1						1	
		H38SI0004-1	7/31/01	349	349	0			349	349	349	0	
		H38SI0004-2	7/31/01	8.5		1						1	
		H38SC-004	9/6/11	2.5	2.5	0			2.5	2.5	2.5	0	
		H38SC-005	9/6/11	1.7		1						1	
		H38SC-006	9/6/11	3.1	3.1	0			3.1	3.1	3.1	0	
		H38SC-007	9/6/11	1.9		1						1	
		H38SC-008	9/6/11	12	12	0			12	12	12	0	
		H38SC-009	9/6/11	11		1						1	
		H38SC-011	9/6/11	9.7	9.7	0			9.7	9.7	9.7	0	
		H38SC-012	9/6/11	4.0		1						1	

Table N38-2
Analytical Results for Lead
Historical Area 38

Location	Pre-Remediation						Post-Remediation						Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
		H38SC-013	9/6/11	2.1	2.1	0			2.1	2.1	2.1	0	
		H38SC-014	9/6/11	1.9		1						1	
		H38SC-015	9/6/11	15	15	0			15	15	15	0	
		H38SC-016	9/6/11	2.7		1						1	
		H38SC-020	9/6/11	6.5	6.5	0			6.5	6.5	6.5	0	FD of H38HSC-019
		H38SC-021	9/6/11	10		1						1	
		H38SC-022	9/6/11	40	40	0			40	40	40	0	
		H38SC-023	9/6/11	25		1						1	
		H38SC-024	9/6/11	13	13	0			13	13	13	0	
		H38SC-025	9/6/11	22		1						1	
		H38SC-026	9/6/11	86	86	0			86	86	86	0	
		H38SC-027	9/6/11	52		1						1	
		H38SC-028	9/6/11	93	93	0			93	93	93	0	
		H38SC-029	9/6/11	23		1						1	
		H38SC-037	9/6/11	16	16	0			16	16	16	0	
		H38SC-038	9/6/11	10		1						1	
		H38SC-039	9/6/11	32	32	0			32	32	32	0	
		H38SC-041	9/6/11	24		1						1	
						0	H38SC-060	1/15/2013	51	51	51	0	Haul road bias
						0	H38SC-068	1/15/2013	70	70	70	0	Haul road bias
Non-Excavation Area Average					66	mg/kg	66					66 mg/kg	
Non-Excavation Area					10.2	acres	10.2					10.2 acres	
Number of Samples				54	34		36				36	36	
Weighted Average for Area Used for Feasibility Study ¹					410	mg/kg	71					70 mg/kg	
Total Combined Acreage					11.5	acres	11.5					11.5 acres	
Number of Samples				74	45		57				55	57	

**Table N38-2
Analytical Results for Lead
Historical Area 38**

Location	Pre-Remediation						Post-Remediation						Sample Type
	Station Name	Sample Number	Sample Date	Lead (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (mg/kg)	Range-wide Weighted Average (mg/kg) ^{1, 2}	Alternative Range-wide Weighted Average (mg/kg) ^{2, 3}	Sample Depth (feet bgs)	
Outside Feasibility Study													
		HSCBU1521013-1	2/15/11	6.54		0							
		HSCBU1521043-1	4/7/11	4.11		0							
		HSCBU1521044-14	4/7/11	4.86		0							FD of HSCBU1521044-1
		H38SC-001	9/6/11	8.0		0							
		H38SC-003	9/6/11	3.0		1							
		H38SI0001-1	7/31/01	119		0							
		H38SI0001-2	7/31/01	14.3		1							
		HSCBU3234007	5/5/11	45.8		0							

Notes:

- excavated site characterization sample
- CNF confirmation sample
- FD field duplicate, the highest of the pair is shown on this table
- feet bgs feet below ground surface
- J Result is estimated.
- J- Result is estimated negative.
- mg/kg milligram per kilogram

¹ Only surface samples are used for calculating the range-wide weighted average.

² The range-wide weighted average was calculated using the following formula:

$$\text{Range-wide weighted average} = \frac{([\text{excavated area average} \times \text{excavated area acreage}] + ([\text{non-excavated area average} \times \text{non-excavated area acreage}])}{\text{excavated area acreage} + \text{non-excavated area acreage}}$$

³ In addition to surface samples, includes sidewall samples.

**Table N38-3
Analytical Results for TNT
Historical Area 38**

Location	Pre-Remediation						Post-Remediation				Sample Type
	Station Name	Sample Number	Sample Date	TNT (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Sample Depth (feet bgs)	
Excavated Area											
C3		H38SC-051	9/9/2011	<200		0			200		
C8		H38SC-050	9/9/2011	<210		0			210		
C9		HSCBU1521023-1	2/16/2011	<800		0.08			800		
Non-Excavated Area											
		H38SC-043	9/9/2011	<200		0			200		
		H38SC-044	9/9/2011	<200		0			200		
		H38SC-046	9/9/2011	<210		0			210		FD of H38HSC-045
		H38SC-047	9/9/2011	<210		0			210		
		H38SC-048	9/9/2011	<200		0			200		
		H38SC-049	9/9/2011	<200		0			200		
		HSCBU1521003-1	2/15/2011	<400		0.08			400		
		HSCBU1521005-1	2/15/2011	<400		0.08			400		
		HSCBU1521006-1	2/15/2011	<400		0.08			400		
		HSCBU1521008-1	2/15/2011	<400		0.08			400		
		HSCBU1521022-1	2/15/2011	<400		0.08			400		
		HSCBU1521024-1	2/16/2011	<400		0.08			400		
		HSCBU1521025-1	2/16/2011	<400		0.08			400		
		HSCBU1521026-1	2/16/2011	<400		0.08			400		
		HSCBU1521027-1	2/16/2011	<400		0.08			400		
		HSCBU1521028-1	2/16/2011	<400		0.08			400		
		HSCBU1521036-1	2/16/2011	<400		0.08			400		
		HSCBU1521061-1	4/14/2011	<400		0.08			400		
		HSCBU1521062-1	4/14/2011	<400		0.08			400		
		HSCBU1521063-1	4/14/2011	<400		0.08			400		
		HSCBU1521064-1	4/14/2011	<400		0.08			400		
		HSCBU1521065-1	4/14/2011	<400		0.08			400		
		HSCBU1521066-1	4/14/2011	<400		0.08			400		
		HSCBU1521067-1	4/14/2011	<400		0.08			400		
		HSCBU1521068-1	4/14/2011	<400		0.08			400		
		HSCBU1521069-1	4/14/2011	<400		0.08			400		
		HSCBU1521070-1	4/14/2011	<400		0.08			400		
Outside Feasibility Study											
		HSCBU3234007-1	2/15/2011	<400		0.08			400		

Notes:

excavated site characterization sample

< result is below the reporting limit

CNF confirmation sample

FD field duplicate, the highest of the pair is shown on this table

feet bgs feet below ground surface

TNT trinitrotoluene

ug/kg microgram per kilogram

**Table N38-4
Analytical Results for HMX
Historical Area 38**

Location	Pre-Remediation						Post-Remediation				Sample Type
	Station Name	Sample Number	Sample Date	HMX (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Sample Depth (feet bgs)	
Excavated Area											
C3		H38SC-051	9/9/2011	<200		0			200		
C8		H38SC-050	9/9/2011	<210		0			210		
C9		HSCBU1521023-1	2/16/2011	<800		0.08			800		
Non-Excavated Area											
		H38SC-043	9/9/2011	<200		0			200		
		H38SC-044	9/9/2011	<200		0			200		
		H38SC-046	9/9/2011	<210		0			210		FD of H38HSC-045
		H38SC-047	9/9/2011	<210		0			210		
		H38SC-048	9/9/2011	<200		0			200		
		H38SC-049	9/9/2011	<200		0			200		
		HSCBU1521003-1	2/15/2011	<400		0.08			400		
		HSCBU1521005-1	2/15/2011	<400		0.08			400		
		HSCBU1521006-1	2/15/2011	<400		0.08			400		
		HSCBU1521008-1	2/15/2011	<400		0.08			400		
		HSCBU1521022-1	2/15/2011	<400		0.08			400		
		HSCBU1521024-1	2/16/2011	<400		0.08			400		
		HSCBU1521025-1	2/16/2011	<400		0.08			400		
		HSCBU1521026-1	2/16/2011	<400		0.08			400		
		HSCBU1521027-1	2/16/2011	<400		0.08			400		
		HSCBU1521028-1	2/16/2011	<400		0.08			400		
		HSCBU1521036-1	2/16/2011	<400		0.08			400		
		HSCBU1521061-1	4/14/2011	<400		0.08			400		
		HSCBU1521062-1	4/14/2011	<400		0.08			400		
		HSCBU1521063-1	4/14/2011	<400		0.08			400		
		HSCBU1521064-1	4/14/2011	<400		0.08			400		
		HSCBU1521065-1	4/14/2011	<400		0.08			400		
		HSCBU1521066-1	4/14/2011	<400		0.08			400		
		HSCBU1521067-1	4/14/2011	<400		0.08			400		
		HSCBU1521068-1	4/14/2011	<400		0.08			400		
		HSCBU1521069-1	4/14/2011	<400		0.08			400		
		HSCBU1521070-1	4/14/2011	<400		0.08			400		
Outside Feasibility Study											
		HSCBU3234007-1	2/15/2011	<400		0.08			400		

Notes:

-  excavated site characterization sample
- < result is below the reporting limit
- CNF confirmation sample
- FD field duplicate, the highest of the pair is shown on this table
- feet bgs feet below ground surface
- HMX cyclotetramethylene tetranitramine
- ug/kg microgram per kilogram

**Table N38-5
Analytical Results for RDX
Historical Area 38**

Location	Pre-Remediation						Post-Remediation				Sample Type
	Station Name	Sample Number	Sample Date	RDX (ug/kg)	Qualifier	Sample Depth (feet bgs)	Sample Number	Sample Date	CNF (ug/kg)	Sample Depth (feet bgs)	
Excavated Area											
C3		H38SC-051	9/9/2011	<200		0			200		
C8		H38SC-050	9/9/2011	<210		0			210		
C9		HSCBU1521023-1	2/16/2011	<800		0.08			800		
Non-Excavated Area											
		H38SC-043	9/9/2011	<200		0			200		
		H38SC-044	9/9/2011	<200		0			200		
		H38SC-046	9/9/2011	<210		0			210		FD of H38HSC-045
		H38SC-047	9/9/2011	<210		0			210		
		H38SC-048	9/9/2011	<200		0			200		
		H38SC-049	9/9/2011	<200		0			200		
		HSCBU1521003-1	2/15/2011	<400		0.08			400		
		HSCBU1521005-1	2/15/2011	<400		0.08			400		
		HSCBU1521006-1	2/15/2011	<400		0.08			400		
		HSCBU1521008-1	2/15/2011	<400		0.08			400		
		HSCBU1521022-1	2/15/2011	<400		0.08			400		
		HSCBU1521024-1	2/16/2011	<400		0.08			400		
		HSCBU1521025-1	2/16/2011	<400		0.08			400		
		HSCBU1521026-1	2/16/2011	<400		0.08			400		
		HSCBU1521027-1	2/16/2011	<400		0.08			400		
		HSCBU1521028-1	2/16/2011	<400		0.08			400		
		HSCBU1521036-1	2/16/2011	<400		0.08			400		
		HSCBU1521061-1	4/14/2011	<400		0.08			400		
		HSCBU1521062-1	4/14/2011	<400		0.08			400		
		HSCBU1521063-1	4/14/2011	<400		0.08			400		
		HSCBU1521064-1	4/14/2011	<400		0.08			400		
		HSCBU1521065-1	4/14/2011	<400		0.08			400		
		HSCBU1521066-1	4/14/2011	<400		0.08			400		
		HSCBU1521067-1	4/14/2011	<400		0.08			400		
		HSCBU1521068-1	4/14/2011	<400		0.08			400		
		HSCBU1521069-1	4/14/2011	<400		0.08			400		
		HSCBU1521070-1	4/14/2011	<400		0.08			400		
Outside Feasibility Study											
		HSCBU3234007-1	2/15/2011	<400		0.08			400		

Notes:

- excavated site characterization sample
- < result is below the reporting limit
- CNF confirmation sample
- FD field duplicate, the highest of the pair is shown on this table
- feet bgs feet below ground surface
- RDX cyclotrimethylene trinitramine
- ug/kg microgram per kilogram

A.11 HA-41

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.11.1 SITE DESCRIPTION AND BACKGROUND

Site HA-41, located within Unit 19 (HA-204) and Unit 18 (HA-222), is located on the northern edge of the Impact Area (PLATE 3.1). The majority of HA-41 is located within Unit 18. The use of the area includes a close combat range and a mortar range. Further information on HA-41 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.11.2 PREVIOUS SITE CHARACTERIZATION

Two soil borings were sampled for explosives and metals as part of the Basewide RI/FS, but no explosives were detected as described in the *2012 Comprehensive BRA Report* (Shaw 2012). Reconnaissance after MEC remediation had been recommended in 2005 for HA-41.

A.11.3 COMPLETED MUNITIONS RESPONSE

Following prescribed burn in 2008, MEC remedial actions were completed in Units 18 (and Unit 22) in 2009. Further detailed information can be found in the *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Shaw 2011). Munitions response is complete (see section for HA-221/222).

A.11.4 RECONNAISSANCE

Reconnaissance was conducted in conjunction with the MEC removal operations. Field personnel were trained to recognize and report evidence of potential soil contamination during MEC remedial action work. No such evidence was noted within Unit 18 in areas other than those already known and characterized for soil remediation, as reported in *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California* (Shaw 2009).

A.11.5 RECOMMENDATION

Based on previous investigations and the completed field work in HA-222, soil sampling is not warranted and no further BRA action is recommended for HA-41.

A.11.6 REFERENCES

Shaw, 2009. *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0704)

Shaw, 2011. *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0721B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.12 HA-42

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.12.1 SITE DESCRIPTION AND BACKGROUND

Site HA-42, located within Unit 18 (HA-222) and Ranges 43-48 South (HA-217), is located on the northern edge of the Impact Area (PLATE 3.1). The use of the area includes a mortar/long range. Further information on HA-42 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.12.2 PREVIOUS SITE CHARACTERIZATION

Six soil borings were sampled for explosives and metals as part of the Basewide RI/FS, but no explosives were detected as described in the *2012 Comprehensive BRA Report* (Shaw 2012). Additional evaluation of this HA was recommended following MEC clearance.

A.12.3 COMPLETED MUNITIONS RESPONSE

Following prescribed burn in 2008, MEC remedial actions were completed in Units 18 (and Unit 22) in 2009. MEC remedial action in Ranges 43-48 (includes HA-217) has been conducted as an interim action. During the interim action in 2003-2005, surface removal, and subsurface removal in portions of the area, were conducted (Parsons 2007). Further detailed information can be found in the *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Shaw 2011) and *MRS Ranges 43-48 South MEC Remedial Action Report* (KEMRON 2020). Munitions response is complete (see section for HA-221/222 and HA-217).

A.12.4 RECONNAISSANCE

Reconnaissance was conducted in conjunction with the MEC removal operations. Field personnel were trained to recognize and report evidence of potential soil contamination during MEC remedial action work in Unit 18. No such evidence was noted within Unit 18 in areas other than those already known and characterized for soil remediation, as reported in *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California* (Shaw 2009). MEC remedial action has been conducted in Ranges 43-48 as an interim action. During the interim action in 2003-2005, surface removal, and subsurface removal in portions of the area, were conducted (Parsons 2007). The MEC removal information for Ranges 43-48 were available at the time of the development of Site 39 Feasibility Study Addendum and Site 39 ROD Amendment, and no additional BRA action or soil remediation was identified within Ranges 43-48 other than the specific areas listed in those documents.

A.12.5 RECOMMENDATION

Based on previous investigations and the completed field work in HA-222 and HA-217, soil sampling is not warranted, reconnaissance is complete, and no further BRA action is recommended for HA-42.

A.12.6 REFERENCES

KEMRON, 2020. *MRS-Ranges 43-48 South Munitions and Explosives of Concern Remedial Action Report, Former Fort Ord, California.* (AR# OE 0984A)

Parsons, 2007. *Final, MRS-Ranges 43-48, Interim Action, Technical Information Paper, Volume 1.* (AR# OE-0590L)

Shaw, 2009. *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California.* (AR# OE-0704)

Shaw, 2011. *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-0721B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

A.13 HA-70

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHEASTERN AREA OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.13.1 SITE DESCRIPTION AND BACKGROUND

Site HA-70, located within Unit 11 (HA-209) and Unit 25 (HA-213), is located on the southeastern area of the Impact Area (PLATE 3.1). The majority of HA-70 is located within Unit 25. The use of the area includes a small arms firing course. Further information on HA-70 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.13.2 PREVIOUS SITE CHARACTERIZATION

Prior site reconnaissance for lead and explosives was conducted for HA-70 in 1999 by Harding Lawson Associates (HLA). Sampling for explosives was not recommended at the time. Further evaluation was recommended pending Munitions and Explosives of Concern (MEC) removal. as described in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.13.3 COMPLETED MUNITIONS RESPONSE

MEC remedial actions were completed as part of Units 11 and 25 cleanup actions. Further detailed information can be found in the *Final, MRS-BLM Unit 25, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2019) and the *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Gilbane 2014). Munitions response is complete (see section for HA-209 and HA-213).

A.13.4 RECONNAISSANCE

Upon completion of MEC removal, the BRA evaluation was implemented on both Units 11/12 and Unit 25 to identify whether elevated concentrations of Contaminants of Concern (COCs; metals and explosives residues) were present. Reconnaissance was completed as part Units 11/12 and Unit 25 (see section for HA-209 and HA-213).

A.13.5 RECOMMENDATION

Based on previous investigations and the completed field work in HA-209 and HA-213, no further BRA action is recommended for HA-70.

A.13.6 REFERENCES

Gilbane, 2014. *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-0799B)

KEMRON, 2019. *Final, MRS-BLM Unit 25, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California.* (AR# OE-0940B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

A.14 HA-72

STATUS: SEE HA-34, REMEDIATION COMPLETE FOR LEAD, NO FURTHER INVESTIGATION WARRANTED

LOCATION: EASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-203 (Eucalyptus Fire Area)

A.14.1 SITE DESCRIPTION

This range was mislabeled in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012). As reported in the 2009 BRA, HA-72 was identified as Range 34 (HA-34) (Shaw 2009). Soil remedial action in HA-34 has been completed. Further discussion of this range, including the results of site characterization results and remedial action is provided in Section A.3.

A.14.2 REFERENCES

Shaw, 2009. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord California Revision 1.* (AR# BW-2300J)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2.* (AR# BW-2300L)

A.15 HA-73

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-42

A.15.1 SITE DESCRIPTION AND BACKGROUND

Site HA-73 is located on the northern edge of the Impact Area (PLATE 3.1). Per the *2012 Comprehensive Basewide Range Assessment (BRA) Report*, HA-73 was combined with HA-42. The use of the area is labeled as the Grant Close Combat Range and area was used as a mortar training area. Further information on HA-73 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012). See section for HA-42, HA-217, and HA-222 for further information on completed reconnaissance, site characterization and munitions response activities.

A.15.2 RECOMMENDATION

No further BRA action is warranted based on completed activities in HA-42, HA-217, and HA-222.

A.15.3 REFERENCES

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.16 HA-118

STATUS: SEE INDIVIDUAL HAS FOR RECOMMENDATIONS

LOCATION: HABITAT MANGEMENT AREA OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-18H to HA-76, HA-202 to HA-218, HA-221, and HA-222

A.16.1 SITE DESCRIPTION AND BACKGROUND

Site HA-118, also known as the greater Habitat Management area, (PLATE 3.1). Per the *2012 Comprehensive BRA Report*, HA-118 was subdivided into historical areas HA-18H through HA-76. Additional BRA evaluations have been conducted in munitions response work units where munitions and explosives of concern (MEC) remedial action and associated vegetation removal made the areas accessible to conduct BRA evaluation. Several of the units are within the Impact Area (HA-118) and are assigned HA numbers HA 202 to HA-218, HA-221, and HA-222. These unit-level HAs typically included range-level HAs. Further information regarding each individual HA can be either found in the *2012 Comprehensive BRA Report* and/or in this BRA Report.

A.16.2 REFERENCES

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.17 HA-153

STATUS: NO FURTHER BRA ACTION

LOCATION: EASTERN AREA OUTSIDE SITE 39 INLAND RANGES

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.17.1 SITE DESCRIPTION AND BACKGROUND

Site HA-153, located within BLM land, is located on the eastern area outside the Site 39 Inland ranges (PLATE 3.1). HA-153 (MRS-27U) is adjacent to HA-164 (MRS-32A/B/C) in the vicinity of the probable location of Tank Gunnery Range within the former location of the Oil Well Road training area in the 1950s training maps. These ranges overlap one another and were analyzed concurrently. HA-164 was deemed for No Further Action as stated in the 2012 *Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012), but the HA-153 portion of the was not finalized yet. Range use at HA-153 included a bivouac area. Further historical information on HA-153 and HA-164 is provided in Appendix A in the 2012 *Comprehensive BRA Report* (Shaw 2012).

A.17.2 PREVIOUS SITE CHARACTERIZATION

During a previous site walk in October 1999 by a UXO safety specialist, only small arms blanks were found on HA-153 (Army 2012). No MEC or munitions debris items have been found at HA-153. Per the 2012 *Comprehensive BRA Report*, it was recommended reconnaissance of the site to evaluate the potential for spent small arms ammunition related to possible training for firing tank mounted .30 caliber and/or .50 caliber machine guns (Army 2012).

A.17.3 COMPLETED MUNITIONS RESPONSE

In 2012, MRS-27U (HA-153) was evaluated as a Track 1 MRS as a part of BLM Area A in *Track 1, Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California* (Army 2012). MRS-27U is adjacent to MRS-32A/B/C in the vicinity of the probable location of Tank Gunnery Range within the former location of the Oil Well Road training area in the 1950s training maps. During a previous evaluation for the Oil Well Road sites, it was suggested that the Tank Gunnery Range was used for firing tank-mounted .30 caliber and/or .50 caliber machine guns. Based on training maps, tank target locations would have been located to the northwest and away from these sites. No indication of tank firing or related evidence in expected downrange areas were found during investigations (e.g., shell casings and military munitions fragments) (Army 2012).

A.17.4 RECOMMENDATION

No additional investigation is warranted regarding the potential for firing tank mounted .30 caliber and/or .50 caliber machine guns. No further BRA is recommended for HA-153.

A.17.5 REFERENCES

Army, 2012. *Track 1, Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California*. (AR# OE-0780)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.18 HA-158, MOUT COMPLEX

STATUS: RECONNAISSANCE COMPLETE FOR EXPLSOIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHEASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-35 AND 35A

A.18.1 SITE DESCRIPTION AND BACKGROUND

Site HA-158 (MRS-28) includes Impossible City, which was a facility used for military operations in urbanized terrain (MOUT) training. It is located in the northeastern part of the historical Impact Area. Several buildings within the city were live fire small arms sites. A tire house with sand-filled tires was constructed. Live small arms fire and use of high explosives was authorized. Thus, this area might have been used as an EOD area. HA-158 is a subarea of Site 39. The boundary of MRS-28 (designated as development area) has been revised based on East Garrison and Parker Flats Land Use Modification Assessment (Zander 2002) and the Revised Attachment A – HMP map (March 2006). The BRA program has retained the HA boundaries to preserve HA-specific evaluations and recommendations.

Three former ranges/historical areas extend into HA-158. Below is a table listing the former ranges that extend into HA-158:

Historical Areas Associated with HA-220

Historical Area	Military History and Training Activities
HA-35	38-caliber and 45-caliber pistol fire
HA-35A	38-caliber and 45-caliber pistol fire

Further information on each individual HA within HA-158 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

The proposed uses at the site are consistent with current site usage which includes the MOUT training area for tactical/law enforcement and emergency service provider training by Monterey Peninsula College (MPC).

A.18.2 PREVIOUS SITE CHARACTERIZATION

This area was mapped as part of the site reconnaissance conducted in October 2001. It was an active training area in 2006 and no further BRA was recommended (Shaw 2012).

A.18.3 COMPLETED MUNITIONS RESPONSE

As part of the Environmental Services Cooperative Agreement (ESCA), the property was transferred in 2009 for like-uses (continued use for law enforcement training). *Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET5)* (Army 2007) noted no further action under BRA. As described in *Record of Decision Group 3 Del Rey Oaks/Monterey, Laguna Seca Parking, and MOUT Site Munitions Response Areas, Former Fort Ord, California* (Army 2014), munitions

response actions in MRS-28 included sampling investigations and a visual surface removal of munitions and explosives of concern (MEC). Based on the work performed, the final selected remedy is land use controls (Army 2014). The ESCA Group 3 MRA ROD indicated no further BRA action was required.

A.18.4 RECOMMENDATION

HA-158 was transferred for “like-use” with no future soil contamination-related activity required. No further BRA action is recommended at HA-158.

A.18.5 REFERENCES

Army, 2007. *Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET 5)*. (AR# FOSET-004J)

Army, 2014. *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*. (AR# ESCA-0293)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

Zander Associates (Zander), 2002. *Assessment, East Garrison – Parker Flats, Land Use Modifications, Fort Ord, California*. (AR# BW-2180)

A.19 HA-202, WATKINS GATE BURN AREA (WGBA)

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, NO FURTHER BRA ACTION

LOCATION: NORTHWEST CORNER OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-18, 22, 48, 49, 50, 51, 54, AND 59

A.19.1 SITE DESCRIPTION AND BACKGROUND

Site HA-202, the Watkins Gate Burn Area (WGBA), is located in the northwest corner of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). It is important to note that HA-202 is further separated into northern and southern areas which are not defined in PLATE 3.1. HA-202 is a subarea of Site 39 and part of the Combined Units defined in the *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 1,2,3,7,10,33 and Watkins Gate Burn Area North and South, Former Fort Ord, Monterey County, California* (KEMRON 2020).

Eight former ranges/historical areas extend into HA-202. Below is a table listing the former ranges that extend into HA-202:

Historical Areas Associated with HA-202

Historical Area	Military History and Training Activities
HA-18	Record Firing Range
HA-19	Record Firing Range
HA-21	10m Machine Gun/25m Rifle Range
HA-22	0.50 caliber Machine Gun Range
HA-48	14.5mm Artillery and Mortar Subcaliber Range, Light Antitank Weapons Range, Sniper Training
HA-49	Machine Gun 30 caliber
HA-50	Booby Traps
HA-51	30 caliber AA Practice
HA-52	Dummy Grenade
HA-53	Live Hand Grenade
HA-54	Mortar Range No. 2
HA-55	Carbine Transition Course, Rocket Launcher Course
HA-56	Rifle Transition Course, Combat in Cities No. 1
HA-57	Close Combat Course No. 1
HA-58	MG Table 2, Weapons Demonstration Range

Further information on each individual HA within HA-202 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

Previously, HA-202 only included the burned portion of the WGBA and was deemed for no further BRA investigation as noted in the *2012 Comprehensive BRA Report* (Shaw 2012). Following MEC removal in 2013, the un-burned northern and southern portions of the WGBA were added to HA-202 for further BRA evaluation. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.19.2 PREVIOUS SITE CHARACTERIZATION

Following the 2003 prescribed burn and surface MEC removal, a Site Inspection was conducted on the cleared and burned areas of HA-202 for both explosives and metals in 2004 and 2005. No further BRA action was recommended for the burned areas of HA-202. Revision 2 site report (version dated 2006) noted that lead concentration exceeded the 225 mg/kg threshold at one sampling location (WGS1HA032), and that the location would be evaluated as part of the remediation area in HA-56/HA-58. Revision 2 site reports for HA-56/HA-58 (version dated 2005) indicate that habitat mapping was in progress. The sampling data were available to at the time of the development of Site 39 Feasibility Study Addendum and Site 39 ROD Amendment, and no additional BRA action or soil remediation was identified within WGBA other than the specific areas listed in those documents. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-202 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.19.3 COMPLETED MUNITIONS RESPONSE

Surface MEC removal occurred in the 2003 burned areas of the Watkins Gate Burn Area. Following the 2003 prescribed burn and prior to 2012, 518 MEC items were encountered and removed from HA-202 as part of field work activities.

In the un-burned northern and southern portions of HA-202, technology-aided surface MEC removal began in August 2013 and was completed in May 2014. A total of 34 MEC items were recovered. Additionally, a digital geophysical mapping (DGM) survey was conducted from August 2013 until October 2014. An estimated 6,300 pounds of MD and an estimated 31,000 pounds of range-related debris (RRD) and other debris were removed as part of subsurface MEC removal activities. Further detailed information can be found in *MRS-BLM Watkins Gate Burn Area MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (KEMRON 2015).

A.19.4 RECONNAISSANCE

A complete unit reconnaissance and field evaluation was performed in the un-burned northern and southern areas of HA-202 for lead and explosives in soil. Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of contaminants of concern (COCs).

A.19.5 SITE CHARACTERIZATION

Soil sampling was performed in February and March 2016 with follow-on work conducted in September and November 2016, and February and December 2018 in the un-burned northern and southern areas.

Sample analytical data was evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (KEMRON 2020).

A.19.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampled using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2020). Additional deeper samples and step-out samples were collected if COCs were found to exceed the concentration thresholds specified in the *Site 39 ROD Amendment* (Army 2009). Nine sample locations were collected at HA-202, 7 sample locations for lead and 2 sample locations for both lead and explosives (KEMRON 2020). Sample locations can be found on Figure 8 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2020).

A.19.5.2 SITE CHARACTERIZATION RESULTS

In the un-burned northern and southern areas of HA-202, explosives were not detected in any of the samples analyzed for explosives residues. Lead was detected at concentrations ranging from 6.7 milligram per kilogram (mg/kg) to 130 mg/kg, which does not exceed the ecological cleanup level of 225 mg/kg for lead (KEMRON 2020). Soil sample results are provided in Table 2 pulled from the *KEMRON 2020 Report*.

A.19.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-202 (KEMRON 2020). Additionally, lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA investigation was recommended for the burned areas of HA-202 as stated in the *2012 Comprehensive BRA Report* (Shaw 2012) and no further investigation is warranted in the additional un-burned northern and southern areas of HA-202 regarding both explosive residues and metals in soil.

A.19.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

KEMRON, 2015. *MRS-BLM Watkins Gate Burn Area MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0832A)

KEMRON, 2020. *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 1,2,3,7,10,33 and Watkins Gate Burn Area North and South, Former Fort Ord, Monterey County, California*. (AR# BW-2831B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

- Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed
- Previous Soil Sample Location
- Previous Boring Location
- Previous Remediation Area
- Area of Previously Completed Remediation or Characterization (not included in this evaluation)
- Permanent Fuel Break
- Impact Area Boundary
- MD Weight Removed
- < 50 Lbs MD
- 50 - 100 Lbs MD
- > 100 Lbs MD
- Range Fan

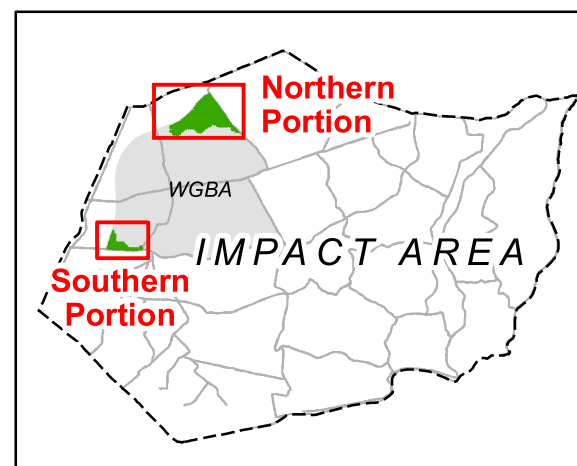
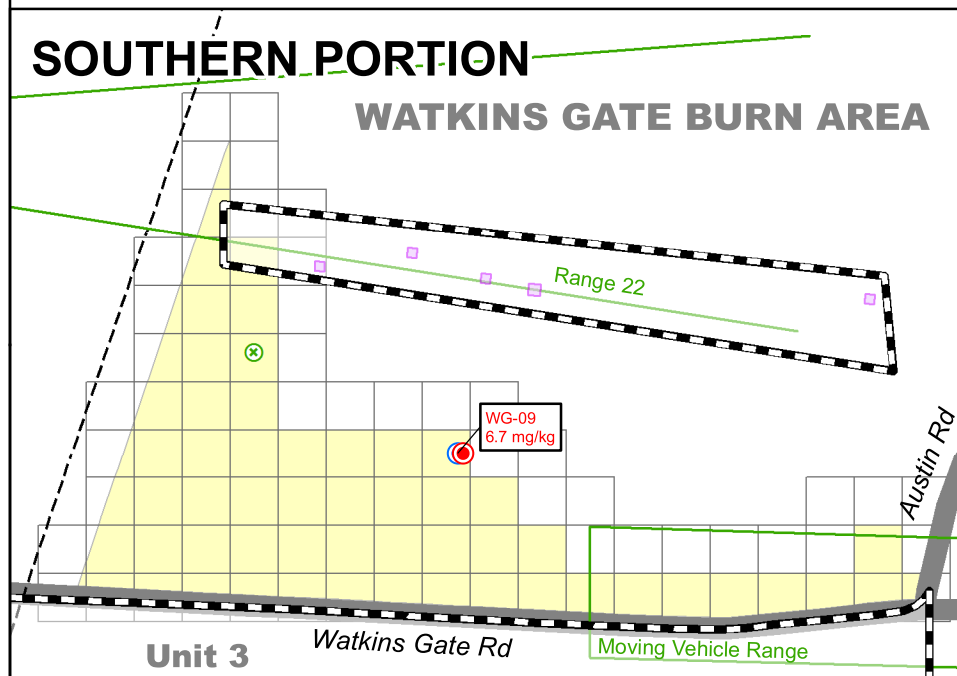
Note:
Samples not displaying results for explosives were analyzed for lead only.

NORTHERN PORTION

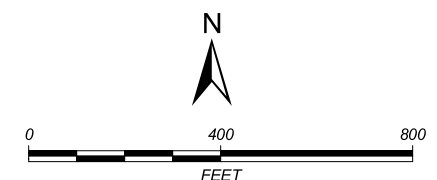


SOUTHERN PORTION

WATKINS GATE BURN AREA



SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
WG-1	Lead	42.5 mg/kg	—	Accumulations of lead
WG-2	Lead	130 mg/kg	—	Accumulations of lead
WG-3	Lead	20.1 mg/kg	—	Accumulations of lead
WG-4	Lead, Explosives	16.5 mg/kg	ND	Accumulations of lead; Removal of MEC; High volume of MD removed
WG-5	Lead, Explosives	18.9 mg/kg	ND	Accumulations of lead; Removal of MEC; High volume of MD removed
WG-6	Lead	24.7 mg/kg	—	Accumulations of lead; Removal of MEC; High volume of MD removed
WG-7	Lead, Explosives	14.3 mg/kg	ND	Probable former target
WG-8	Lead	70 mg/kg	—	Accumulations of lead
WG-9	Lead	6.7 mg/kg	—	Accumulations of lead



U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

FIGURE
NUMBER
8

FORMER FORT ORD
WGBA Soil Analytical Results

Gilbane

KEMRON



DATE

PROJECT NUMBER

FILE NAME

2/1/2017

See Footer

Path: G:\ArcGIS\USACE\Fort_Ord\PROJECTS\Basewide_Range_Assessment\Map_Docs\Results\WGBA_lead_results_prelim_V2.mxd

Table 2. Sampling Results
Sampling Results Technical Memorandum
Basewide Range Assessment Investigation
Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South

Unit	Location	Depth (ft)	Date	Sample ID	Analyte	Result	Qualifier
	33-01-SO14	0.0	2/6/2018	33-01SOM050000	Lead	515 mg/kg	
	33-01-SO14	1.0	2/6/2018	33-01SOM050001	Lead	12.4 mg/kg	
	33-01-SO15	0.0	2/6/2018	33-01SOM060000	Lead	148 mg/kg	
	33-01-SO15+	0.0	2/6/2018	33-01SOM060000	Lead	150 mg/kg	J
	33-01-SO15	1.0	2/6/2018	33-01SOM060001	Lead	323 mg/kg	J
	33-01-SO15+	1.0	2/6/2018	33-01SOM060001	Lead	339 mg/kg	
	33-01-SO16	0.0	2/7/2018	33-01SOM070000	Lead	184 mg/kg	
	33-01-SO16	1.0	2/7/2018	33-01SOM070001	Lead	1.3 mg/kg	J
	33-01-SO17	0.0	2/7/2018	33-01SOM080000	Lead	105 mg/kg	
	33-01-SO17	1.0	2/7/2018	33-01SOM080001	Lead	1.2 mg/kg	J
	33-01-SO17	1.0	2/7/2018	33-01SOM080001Q	Lead	1.3 mg/kg	J
	33-01-SO18	0.0	2/7/2018	33-01SOM090000	Lead	184 mg/kg	
	33-01-SO18	1.0	2/7/2018	33-01SOM090001	Lead	1.2 mg/kg	J
	33-01-SO19	0.0	2/7/2018	33-01SOM100000	Lead	771 mg/kg	
	33-01-SO19+	0.0	2/7/2018	33-01SOM100000	Lead	778 mg/kg	J
	33-01-SO19	1.0	2/7/2018	33-01SOM100001	Lead	1.9 mg/kg	J
	33-01-SO20	0.0	9/25/2018	33-01SO200000	Lead	127 mg/kg	J
	33-01-SO20	0.0	9/25/2018	33-01SO200000Q	Lead	40.1 mg/kg	J
	33-01-SO21	0.0	9/25/2018	33-01SO210000	Lead	51.2 mg/kg	
	33-01-SO22	0.0	9/25/2018	33-01SO220000	Lead	59 mg/kg	
	33-01-SO23	0.0	9/25/2018	33-01SO230000	Lead	102 mg/kg	
	33-01-SO24	0.0	9/26/2018	33-01SO240000	Lead	318 mg/kg	
	33-01-SO25	0.0	9/26/2018	33-01SO250000	Lead	153 mg/kg	
	33-01-SO26	0.0	9/26/2018	33-01SO260000	Lead	27 mg/kg	
	33-02	0.0	03/16/16	33-02SC0000	Lead	9.8 mg/kg	
	33-03	0.0	03/15/16	33-03SC0000	Lead	10.3 mg/kg	J
	33-03	0.0	03/15/16	33-03SC0000Q	Lead	3.2 mg/kg	J
	33-04	0.0	03/15/16	33-04SC0000	Lead	3 mg/kg	
	33-05	0.0	03/16/16	33-05SC0000	Lead	12.3 mg/kg	
	33-06	0.0	03/15/16	33-06SC0000	Lead	8.5 mg/kg	
	33-07	0.0	03/15/16	33-07SC0000	Lead	4 mg/kg	
	33-08	0.0	03/16/16	33-08SC0000	Lead	7.5 mg/kg	J
	33-08	0.0	03/16/16	33-08SC0000Q	Lead	22.4 mg/kg	J
	33-09	0.0	03/15/16	33-09SC0000	Lead	148 mg/kg	
	33-10	0.0	03/14/16	33-10SC0000	Lead	133 mg/kg	
	33-11	0.0	03/14/16	33-11SC0000	Lead	4.6 mg/kg	
	33-12	0.0	03/16/16	33-12SC0000	Lead	2.3 mg/kg	
	33-13	0.0	03/15/16	33-13SC0000	Lead	12.4 mg/kg	
WGBA	WG-01	0.0	03/16/16	WG-01SC0000	Lead	42.5 mg/kg	
	WG-02	0.0	03/17/16	WG-02SC0000	Lead	130 mg/kg	
	WG-03	0.0	03/17/16	WG-03SC0000	Lead	20.1 mg/kg	

Table 2. Sampling Results
Sampling Results Technical Memorandum
Basewide Range Assessment Investigation
Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South

Unit	Location	Depth (ft)	Date	Sample ID	Analyte	Result	Qualifier
	WG-04	0.0	03/02/16	WG-04SC0000	Lead	16.5 mg/kg	
	WG-04	0.0	03/02/16	WG-04SC0000	TNT	ND ug/kg	U
	WG-04	0.0	03/02/16	WG-04SC0000	RDX	ND ug/kg	U
	WG-04	0.0	03/02/16	WG-04SC0000	HMX	ND ug/kg	U
	WG-05	0.0	03/02/16	WG-05SC0000	Lead	18.9 mg/kg	
	WG-05	0.0	03/02/16	WG-05SC0000	TNT	ND ug/kg	U
	WG-05	0.0	03/02/16	WG-05SC0000	RDX	ND ug/kg	U
	WG-05	0.0	03/02/16	WG-05SC0000	HMX	ND ug/kg	U
	WG-06	0.0	03/17/16	WG-06SC0000	Lead	21.1 mg/kg	
	WG-06	0.0	03/17/16	WG-06SC0000Q	Lead	24.7 mg/kg	
	WG-07	0.0	03/02/16	WG-07SC0000	Lead	14.3 mg/kg	
	WG-07	0.0	03/02/16	WG-07SC0000	TNT	ND ug/kg	U
	WG-07	0.0	03/02/16	WG-07SC0000	RDX	ND ug/kg	U
	WG-07	0.0	03/02/16	WG-07SC0000	HMX	ND ug/kg	U
	WG-08	0.0	03/17/16	WG-08SC0000	Lead	70 mg/kg	
	WG-09	0.0	03/16/16	WG-09SC0000	Lead	6.7 mg/kg	
Equipment Rinsate Samples							
			02/17/16	02-ER01SC	Lead	1.9 ug/L	J
			02/18/16	02-ER02SC	Lead	ND ug/L	U
			02/22/16	02-ER03SC	Lead	ND ug/L	U
			02/23/16	02-ER04SC	Lead	ND ug/L	U
			02/24/16	02-ER05SC	Lead	ND ug/L	U
			02/25/16	02-ER06SC	Lead	ND ug/L	U
			02/29/16	02-ER07SC	Lead	ND ug/L	U
			03/01/16	02-ER08SC	Lead	ND ug/L	U
			03/01/16	02-ER08SC	TNT	ND ug/L	U
			03/01/16	02-ER08SC	RDX	ND ug/L	U
			03/01/16	02-ER08SC	HMX	ND ug/L	U
			03/02/16	03-ER09SC	Lead	ND ug/L	U
			03/02/16	03-ER09SC	TNT	ND ug/L	U
			03/02/16	03-ER09SC	RDX	ND ug/L	U
			03/02/16	03-ER09SC	HMX	ND ug/L	U
			03/03/16	03-ER10SC	Lead	ND ug/L	U
			03/07/16	07-ER11SC	Lead	ND ug/L	U
			03/08/16	07-ER12SC	Lead	ND ug/L	U
			03/09/16	10-ER13SC	Lead	ND ug/L	U
			03/10/16	10-ER14SC	Lead	ND ug/L	U
			03/14/16	33-ER-15SC	Lead	ND ug/L	U
			03/15/16	33-ER16	Lead	ND ug/L	U
			09/21/16	33-ER-01SC0000	Lead	ND ug/L	UJ-
			03/16/16	WG-ER17	Lead	ND ug/L	U

Table 2. Sampling Results
Sampling Results Technical Memorandum
Basewide Range Assessment Investigation
Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South

Unit	Location	Depth (ft)	Date	Sample ID	Analyte	Result	Qualifier
			03/17/16	WG-ER18	Lead	ND ug/L	U
			11/16/16	33-01-ERSC111616	Lead	ND ug/L	
			11/17/16	33-01-ERSC111716	Lead	ND ug/L	
			02/06/18	33-ER01SC020618	Lead	0.42 ug/L	J
			02/07/18	33-ER01SC020718	Lead	1.5 ug/L	J
			09/25/18	33-ER02SC092518	Lead	1.1 ug/L	J
			09/26/18	33-ER02SC092618	Lead	0 ug/L	U

Notes:

ug/L = micrograms per liter

mg/kg = milligrams per kilogram

ND = Not detected at laboratory limit of detection

J = Indicates a result greater than the method detection limit but less than the limit of quantitation

J+ = Estimated value with a potential high bias

J- = Estimated value with a potential low bias

U = Indicates a result less than the method detection limit

* = Sample analysis was requested for general screening purposes after expiration of the method holding time

+ = unexpected initial results prompted a rerun of the sample

A.20 HA-203, EUCALYPTUS FIRE AREA

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: EAST-CENTRAL PORTION OF THE FORMER FORT ORD

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-34, -35, -69, AND -158

A.20.1 SITE DESCRIPTION AND BACKGROUND

Site HA-203, also known as the Eucalyptus Fire Area, is located in the east-central portion of the former Fort Ord and includes the northeastern part of the former Fort Ord Impact Area. The area includes 367 acres within the impact area and 270 acres on adjacent property located east of the impact area. This area contains several historical areas (HAs) (PLATE 3.1).

Four former ranges/historical areas extend into HA-203. Below is a table listing the former ranges that extend into HA-203.

Historical Areas Associated with HA-203

Historical Area	Military History and Training Activities
HA-34	Machine Gun Assault Range, Close Combat Course, Mortar Range
HA-35	MOUT Complex
HA-69	Barloy Canyon Sub MG Range
HA-158	MOUT Site

Further historical information on HA-203 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.20.2 PREVIOUS SITE CHARACTERIZATION

HA-203 encompasses the areas burned in 2003 by the accidental Eucalyptus Fire. Surface munitions removal was conducted. Reconnaissance of areas within the Eucalyptus Fire Area that were not already located within other HAs was performed in fall of 2004 by MACTEC/Shaw personnel. During the reconnaissance, 17 areas containing potential targets, or accumulations of spent small arms ammunition were identified.

Soil samples were collected at the 17 locations during March and April 2005. The samples were collected from the surface and 1- and 2-feet below ground surface (bgs). All surface soil samples were analyzed for metals (antimony, lead, and copper), and the subsurface samples were archived by the laboratory pending results of the surface samples. The 1-foot sample from EUSI0008 was subsequently analyzed for metals. No other 1-foot or 2-foot samples required additional analyses. The data indicates that surface soil at EUSI0008 had a lead concentration of 874 milligrams per kilogram (mg/kg), which exceeded the characterization goal of 225 mg/kg. Additional sampling around EUSI0008 was recommended.

Surface soil was also analyzed for explosive compounds at five of the 17 sample locations (EUSI0004 through -0008). Analytical results indicated that the explosive compounds were below laboratory reporting limits for all samples.

Subsequently, at the time of HA-34 site characterization, additional sampling was conducted around EUSI0008. The results indicated that there was no additional metals impact in this area and no further action for this area was recommended in the 2012 BRA Report (Shaw 2012). Further information on sampling activities and results in HA-203 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.20.3 COMPLETED MUNITIONS RESPONSE

Following the accidental burn, munitions response (MR) action to remove surface munitions and explosives of concern (MEC) in the burned area was conducted. Further information on the munitions response in the Eucalyptus Fire Area can be found in *Final After Action Report, Time-Critical Removal Action and Military Munitions Reconnaissance, Eucalyptus Fire Area, Former Fort Ord, California, Revision 0* (Shaw 2005). It is important to note that there are several pockets of unburned areas (not shown on PLATE 3.1) within HA-203 that were not part of the surface MEC removal. Surface removal in these pockets will be conducted as part of Unit 17 in the future.

A.20.4 SITE CHARACTERIZATION

Additional soil sampling was conducted near the location of sample EUSI0008 with the elevated lead concentration at the time of HA-34 site characterization. No further BRA action was recommended for this location in Revision 2 (see section for HA-34).

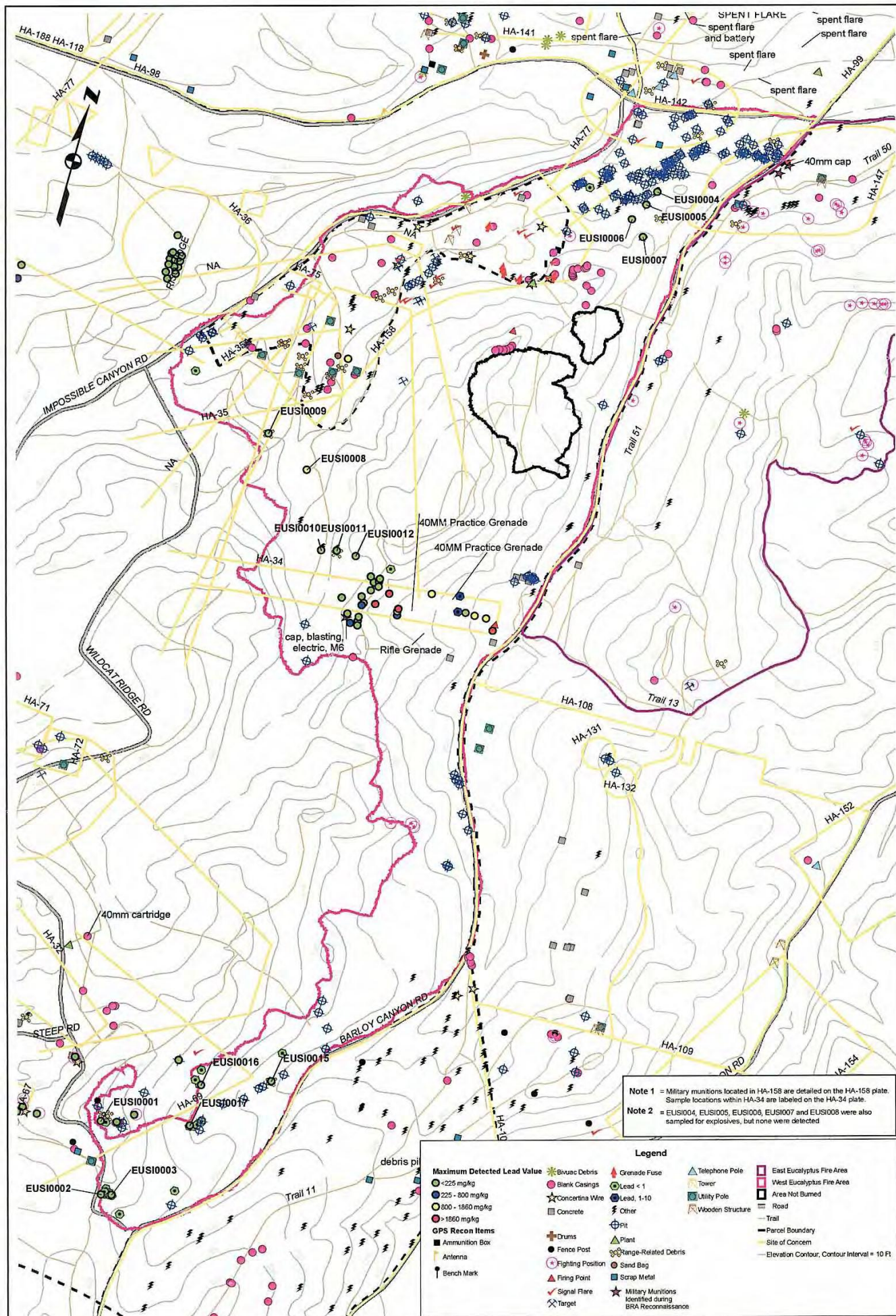
A.20.5 RECOMMENDATION

No further investigation is recommended.

A.20.6 REFERENCES

Shaw, 2005. *Final After Action Report, Time Critical Removal Action and Military Munitions Reconnaissance, Eucalyptus Fire Area, Former Fort Ord, California*. (AR# OE-0499G)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



DRAWN: LDP, FPC
 ENGINEER: SCALE: 1" = 750'
 CHECKED: wpc APPROVED: BDF
 03/2006 DATE:

MACTEC

Basewide Range
 Assessment Report
 Former Fort Ord, California

Eucalyptus Fire Area
 Investigation Results

PLATE
A.203.1

Fort Ord GIS - HA203_EUSI_BRA_LI.mxd - 03/28/2005

A.21 HA-204

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN SECTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: N/A

A.21.1 SITE DESCRIPTION AND BACKGROUND

Site HA-204, also known as Units 14 and 19, is located on the northern portion of the Impact Area (PLATE 3.1). Units 14 and 19 are approximately 522 acres.

Three former ranges/historical areas extend into HA-204. Below is a table listing the former ranges that extend into HA-204.

Historical Areas Associated with HA-204

Historical Area	Military History and Training Activities
HA-39	Bench Rest Rifle Range
HA-40	Infiltration Course, 10m and 25m Machine Gun and Rifle Range/Field Flame Expediency Training
HA-41	Sub-Caliber Moving Target/Mortar

The *2012 Comprehensive Basewide Range Assessment (BRA) Report* recommended no further BRA action at HA-204 outside existing HAs (HA-39, -40, and -40A) and recommended reconnaissance for small arms use after MEC removal at HA-41. Further information on HA-204 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.21.2 PREVIOUS SITE CHARACTERIZATION

Explosive ordnance target areas located within the Inland Ranges were sampled as part of the Site 39 Remedial Investigation in 1995. Based on available information at the time, a bias sampling program was developed to focus on areas most likely to contain detectable amounts of explosives and metals. Thirteen soil borings were drilled 5 feet below ground surface (bgs) within HA-204. Explosive constituents were not detected in any samples collected. Lead was detected with a maximum concentration of 148 milligram/kilogram (mg/kg) in SB-39-41.

Three additional soil samples were collected from Units 14 and 14A as part of the Watkins Gate Burn investigation in 2005. Explosives were not detected in any of the samples collected. Lead was detected with a maximum concentration of 15 mg/kg (sample WGIHA029).

Further soil sampling was conducted from June to October 2010 which included biased and grid sampling. Sample locations were selected based on visual observations during munitions response activities and reconnaissance conducted after surface MEC removal. Explosive results were all below screening levels. Lead was below screening levels except for one sample, (HSCBU1419028-2), located within HA-41, that showed lead with a concentration of 327 mg/kg. This sample was one of 16 samples

located within a target berm, which had a range-wide average of 52.1 mg/kg for lead, less than the range-wide average screening level of 225 mg/kg established in the *Site 39 ROD Amendment*.

Further information on sampling activities and results in HA-204 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.21.3 COMPLETED MUNITIONS RESPONSE

Following prescribed burn in 2009, MEC remedial actions were completed in Units 14 and 19 in 2010. Further detailed information on the munitions response in HA-204 can be found in the *Draft, MRS-BLM Units 14 and 19, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Shaw 2011). Munitions response is complete (see section for HA-221/222).

A.21.4 RECONNAISSANCE

Reconnaissance was conducted in conjunction with the MEC removal operations. Field personnel were trained to recognize and report evidence of potential soil contamination during MEC remedial action work. Reconnaissance was conducted from June to September 2010. Further information is provided in the *2012 Comprehensive BRA Report* (Shaw 2012). The portion of HA-41 within Unit 19 was evaluated as part of the reconnaissance in Unit 19, and subsequent soil sampling.

A.21.5 RECOMMENDATION

Based on previous investigations and the completed field work, no further BRA action is recommended for HA-204.

A.21.6 REFERENCES

Shaw, 2011. *Draft, MRS-BLM Units 14 and 19, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0753)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.22 HA-205, Units 15 and 21

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN SECTION OF THE FORMER FORT ORD IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-36, -37 AND -38

A.22.1 SITE DESCRIPTION AND BACKGROUND

Site HA-205, also known as Units 15 and 21, is located in the northern portion of the former Fort Ord Impact Area. The area includes 405 acres within the impact area. Unit 15 is bounded to the west, north, east, and south, respectively, by Orion Road, Watkins Gate Road, Chinook Road, and Hawkeye Road. Unit 21 is bounded to the west, north, east, and south, respectively by Watkins Gate Road, Dallas Road, Riso Ridge, and Chinook Road. This area contains several historical areas (HAs) (PLATE 3.1).

Four former ranges/historical areas extend into HA-205. Below is a table listing the former ranges that extend into HA-205.

Historical Areas Associated with HA-205

Historical Area	Military History and Training Activities
HA-36	Fragmentation Hand Grenade
HA-37	25m Night Record Fire, Quick Kill and Night Fire, Rifle Grenade Range, Old Bazooka Range
HA-38	Zero Range, 25 M-2 Submachine Gun Shotgun

Further historical information on HA-205 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.22.2 PREVIOUS SITE CHARACTERIZATION

Explosive ordnance target areas located within this area were samples as part of the Site 39 Remedial Investigation (HLA 1995).

In 1994, twenty soil borings were drilled up to a maximum depth of 5 feet below ground surface within the area of Units 15 and 21. The compound 2,4,6- trinitrotoluene (TNT) was not detected in any of the samples collected. Cyclogrimethylene trinitramine (RDX) was detected in one sample with a concentration of 0.22 milligrams per kilogram (mg/kg). Cyclotetramethylene tetranitramine (HMX) was detected in one sample with a concentration of 0.19 mg/kg. Lead was detected with a maximum concentration of 1,660 mg/kg. An additional thirteen soil samples were collected from within Unit 21 in 2001. Lead was detected in one soil sample at 349 mg/kg.

Additional soil sampling was conducted from February to April 2011. Lead exceeded the 225 mg/kg screening level in 16 samples ranging from 228 to 4,120 mg/kg. Ten were collected from HA-38 and six from HA-37. All of the other samples were below the 225 mg/kg SL with the exception of sample HSCBU1521005-1. Explosives were not detected in any samples collected.

Plates A205.1 and A205.2 pulled from the 2012 BRA Report show the soil boring locations. Further information on sampling activities and results in HA-205 prior to 2012 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.22.3 COMPLETED MUNITIONS RESPONSE

Following a controlled burn conducted in late 2010, surface removal of munitions and explosives of concern (MEC) was completed in January 2011. Further information on the munitions response in the *Final, MRS-BLM Units 15, 21, 32, and 34, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (ITSI Gilbane 2013).

A.22.4 SITE CHARACTERIZATION

Additional soil sampling and remedial actions were conducted in HA-37 and HA-38. CBRA Revision 2 recommended no further BRA action for HA-205 except on HA-37 and HA-38. Remedial actions in HA-37 and HA-38 have now been completed and the results are described in A.09 and A.10, respectively, of Revision 3.

A.22.5 RECOMMENDATION

No further investigation is recommended.

A.22.6 REFERENCES

- HLA, 1995. *Final, Basewide Remedial Investigation/Feasibility Study, Fort Ord, California*. (AR# BW-1283J)
- ITSI Gilbane, 2013. *Final, MRS-BLM Units 15, 21, 32, and 34, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0783B)
- Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.23 HA-207, UNIT 1,2, AND 3

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHWESTERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-23H, 23M, 24H, 25H, 26H, 27,60, 61H 62, 63, 64H AND AUSTIN ANTI TANK RANGES

A.23.1 SITE DESCRIPTION AND BACKGROUND

Site HA-207, Units 1, 2 and 3, is located on the southwestern edge of the Impact Area Munitions Response Area (MRA) adjacent to the western boundary and part of the habitat portion of the site (PLATE 3.1). HA-207 is a subarea of Site 39 and part of the Combined Units defined in the *Sampling Results Technical Memorandum Sites 39 Units 1, 2, 3, 7, 10, 33, and WGBA North and South* (KEMRON 2020). Tactic training and various weapons including rifles, automatic weapons, and explosive projectiles were used throughout HA-207.

Twelve former ranges/historical areas extend into HA-207. Below is a table listing the former ranges that extend into HA-207.

Historical Areas Associated with HA-207

Historical Area	Military History and Training Activities
HA-23H	Squad Attack Range, Rifle Squad Tactical Range, Trainfire II Range Complex
HA-23M	Dragon Tracking Range (Nonfiring Range)
HA-24H	Sniper Range
HA-26H	Offensive Overhead Firing Course, Table VII Range, Table VIII Range, Range 41
HA-27	Fire Movement Course, SAW Table I-IV, Close Combat Course
HA-60	Squad Problems Range
HA-61H	A. R. Table VII Range, A. R. Table VII Range
HA-62	Machine Gun Transition
HA-63	Small Arms Firing Course, Rifle Night Firing
HA-64H	Rifle Night Firing

Further information on each individual HA within HA-207 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

HA-207 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and

investigations within each unit or area. This data was then used to help aid in further investigation of the entire area.

A.23.2 PREVIOUS SITE CHARACTERIZATION

Explosive ordnance target areas within the Impact Area MRA were sampled for explosives and metals as part of the Site 39 Remedial Investigation and results are presented in the *Final, Basewide Remedial Investigation/Feasibility Study, Former Fort Ord, California* (HLA 1995). Individual HAs within HA-207 have been evaluated and the *2012 Comprehensive BRA Report* recommended no further BRA. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-207 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.23.3 COMPLETED MUNITIONS RESPONSE

Surface munitions and explosives of concern (MEC) remedial action in Range 26 (an area encompassing HA-26) was completed in April 2010. MEC was not encountered during this operation. Further information can be found in *Range 26 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (Shaw 2011). Subsurface MEC removal was conducted in 2010 as part of the soil remedial action in HA-26. Digital and analog investigations resulted in the recovery of 12 MEC items, 4,316 pounds of munitions debris (MD), and 7,557 pounds of range-related debris. During the soil removal operations, 13 MD items were recovered. Post-remediation DGM indicated high density of anomalies (Gilbane 2014).

Subsurface MEC removals in HA-27 located within HA-207 was completed. 12 unexploded ordnance (UXO) items were recovered during pre-soil remediation, zero MEC items were recovered during soil remediation and during post-soil remediation. Further detailed information can be found in *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California* (Gilbane 2014).

The MEC remedial action in the remainder of Units 1, 2, and 3 was conducted from 2012 to 2015, resulting in recovery of 137 MEC items. Subsurface removal was conducted in portions of the units in 2017 resulting in the recovery of 22 MEC items. Three MEC items had been removed from the subsurface removal operation in the 100-foot buffer. Further information can be found in *MRS-BLM Units 1,2, and 3, Munitions and Explosives of Concern, Remedial Action Report, Revision 1, Former Fort Ord, California* (KEMRON 2018). Specific types of munitions require special procedures due to the potential to be used for delivery of chemical warfare agent and because the filler cannot be confirmed visually. All such items previously discovered at Fort Ord have been examined through the special procedures and subsequently determined to contain smoke fillers and been detonated. Subsurface removal in 2017 included intrusive investigation of 126 anomalies that could potentially represent unknown filler items within a portion of Unit 3, to reduce the probability that an unknown filler item would be encountered in the future. Three MEC items were removed. In 2018, an additional 189 anomalies in the remaining portion of Unit 3 were intrusively investigated, resulting in the recovery of two MEC items. The two phases of anomaly investigation resulted in removal (to 12 inches in depth) of subsurface anomalies in Unit 3 that could potentially represent unknown filler items, including 4-inch Stokes mortar projectiles, 4.2-inch mortar projectiles, and Livens Projectors. All the munitions items that required the unknown filler procedures were subsequently determined to be smoke filled and detonated. (KEMRON 2019) Further detailed information can be found in *MRS-BLM Units 1,2, and 3,*

Munitions and Explosives of Concern, Remedial Action Report, Revision 1, Former Fort Ord, California (KEMRON 2018) and the *Addendum to Final MRS-BLM Units 1,2, and 3, Munitions and Explosives of Concern, Remedial Action Report Revision 1, Former Fort Ord, California* (KEMRON 2019).

A.23.4 RECONNAISSANCE

Upon completion of MEC removal, the BRA evaluation is implemented unit wide to identify whether elevated concentrations of contaminants of concern (COCs; metals and explosive residues) are still present. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil (KEMRON 2020). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.23.5 SITE CHARACTERIZATION

Soil sampling was performed in 2016 with follow-up work in 2018. Sample analytical data were evaluated and compared to the concentration thresholds specified in the Site 39 Record of Decision (ROD) Amendment for protection of human health and the environment (KEMRON 2020).

A.23.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampled using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2020). Additional deeper samples and step-out samples were collected if COCs were found to exceed the concentration thresholds specified in the *Site 39 ROD Amendment* (Army 2009). The following samples were collected from each Unit with HA-207:

- Unit 1: 12 sample locations were collected, 9 sample locations for lead, 1 sample location for explosives, and 2 sample locations for both lead and explosives.
- Unit 2: 76 sample locations were located, 74 samples locations for lead and two locations for both lead and explosives.
- Unit 3: 9 sample locations were located, 5 samples locations for lead and 4 locations for both lead and explosives.

Sample locations can be found on Figures 2 through 4 pulled from the *Sampling Results Technical Memorandum Report* (KEMRON 2020).

A.23.5.2 SITE CHARACTERIZATION RESULTS

Explosive residues were not detected in any samples. Lead results ranged from 1.3 milligram per kilogram (mg/kg) to 214 mg/kg, all below the ecological cleanup level of 225 mg/kg. Soil sample results are displayed on Figures 2 through 4 pulled from the *Sampling Results Technical Memorandum Report* (KEMRON 2020).

A.23.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-207. Additionally, lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further investigation warranted is recommended regarding explosive residues and metals in soil at HA-207.

A.23.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California*. (AR# RI-047C)

Harding Lawson Associates (HLA), 1995. *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California*. (AR# BW-1283A)

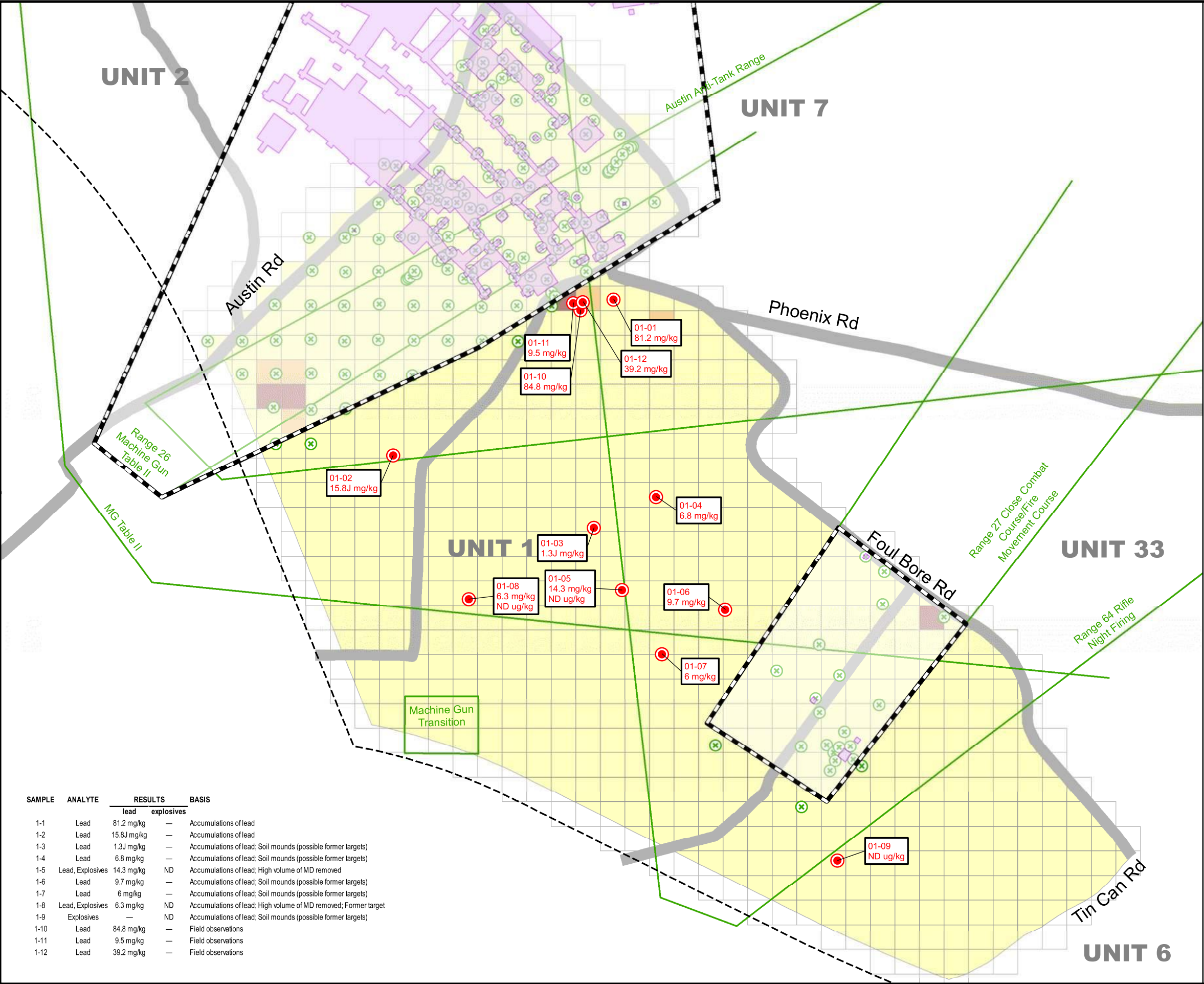
KEMRON, 2018. *MRS-BLM Units 1,2, and 3, Munitions and Explosives of Concern, Remedial Action Report, Revision 1, Former Fort Ord, California* (AR# OE-0920C)

KEMRON, 2019. *Addendum to Final MRS-BM Units 1,2, and 3, Munitions and Explosives of Concern, Remedial Action Report Revision 2, Former Fort Ord, California* (AR# OE-0920E)

KEMRON, 2020. *Final Sampling Results Technical Memorandum Basewide Range Assessment Investigation, Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South*. (AR# BW-2831B)

Shaw, 2011. *Range 26 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0738)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
1-1	Lead	81.2 mg/kg	—	Accumulations of lead
1-2	Lead	15.8J mg/kg	—	Accumulations of lead
1-3	Lead	1.3J mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
1-4	Lead	6.8 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
1-5	Lead, Explosives	14.3 mg/kg	ND	Accumulations of lead; High volume of MD removed
1-6	Lead	9.7 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
1-7	Lead	6 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
1-8	Lead, Explosives	6.3 mg/kg	ND	Accumulations of lead; High volume of MD removed; Former target
1-9	Explosives	—	ND	Accumulations of lead; Soil mounds (possible former targets)
1-10	Lead	84.8 mg/kg	—	Field observations
1-11	Lead	9.5 mg/kg	—	Field observations
1-12	Lead	39.2 mg/kg	—	Field observations

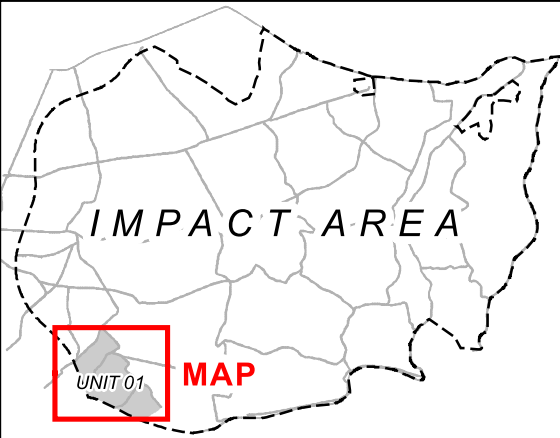
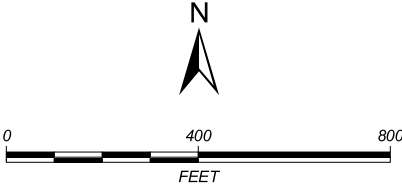
- Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed
- Previous Sample Location
- MD Weight Removed

< 50 Lbs MD

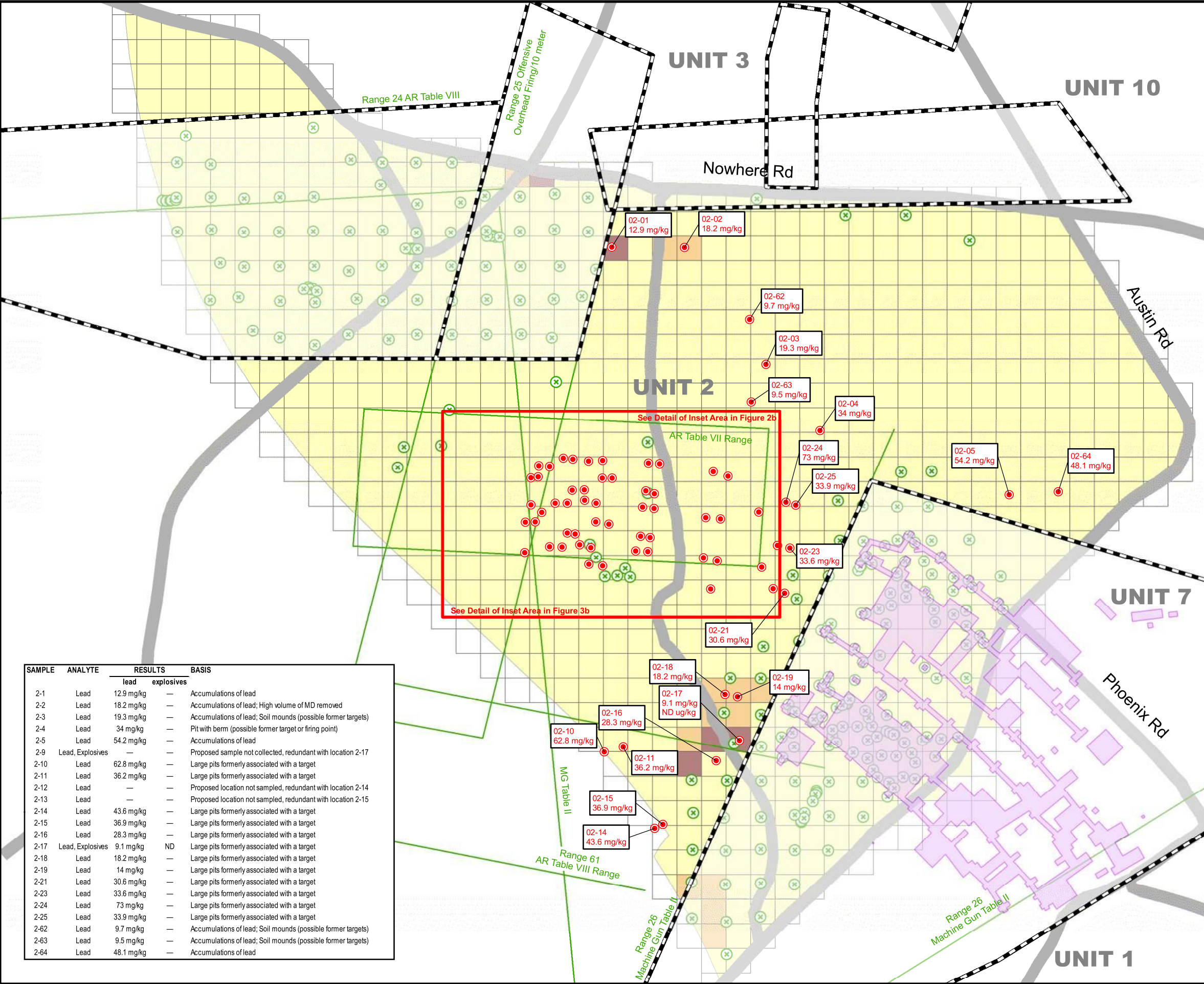
50 - 100 Lbs MD

> 100 Lbs MD
- Range Fan
- Previous Remediation Area
- Area of Previously Completed Remediation or Characterization (not included in this evaluation)
- Permanent Fuel Break
- Impact Area Boundary

Note:
Samples not displaying results for explosives were analyzed for lead only.



U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT		
FIGURE NUMBER 2	FORMER FORT ORD Unit 1 Soil Analytical Results	
DATE	PROJECT NUMBER	FILE NAME
2/1/2017		See Footer



SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
2-1	Lead	12.9 mg/kg	—	Accumulations of lead
2-2	Lead	18.2 mg/kg	—	Accumulations of lead; High volume of MD removed
2-3	Lead	19.3 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
2-4	Lead	34 mg/kg	—	Pit with berm (possible former target or firing point)
2-5	Lead	54.2 mg/kg	—	Accumulations of lead
2-9	Lead, Explosives	—	—	Proposed sample not collected, redundant with location 2-17
2-10	Lead	62.8 mg/kg	—	Large pits formerly associated with a target
2-11	Lead	36.2 mg/kg	—	Large pits formerly associated with a target
2-12	Lead	—	—	Proposed location not sampled, redundant with location 2-14
2-13	Lead	—	—	Proposed location not sampled, redundant with location 2-15
2-14	Lead	43.6 mg/kg	—	Large pits formerly associated with a target
2-15	Lead	36.9 mg/kg	—	Large pits formerly associated with a target
2-16	Lead	28.3 mg/kg	—	Large pits formerly associated with a target
2-17	Lead, Explosives	9.1 mg/kg	ND	Large pits formerly associated with a target
2-18	Lead	18.2 mg/kg	—	Large pits formerly associated with a target
2-19	Lead	14 mg/kg	—	Large pits formerly associated with a target
2-21	Lead	30.6 mg/kg	—	Large pits formerly associated with a target
2-23	Lead	33.6 mg/kg	—	Large pits formerly associated with a target
2-24	Lead	73 mg/kg	—	Large pits formerly associated with a target
2-25	Lead	33.9 mg/kg	—	Large pits formerly associated with a target
2-62	Lead	9.7 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
2-63	Lead	9.5 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
2-64	Lead	48.1 mg/kg	—	Accumulations of lead

Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed

Previous Sample Location

MD Weight Removed

< 50 Lbs MD

50 - 100 Lbs MD

> 100 Lbs MD

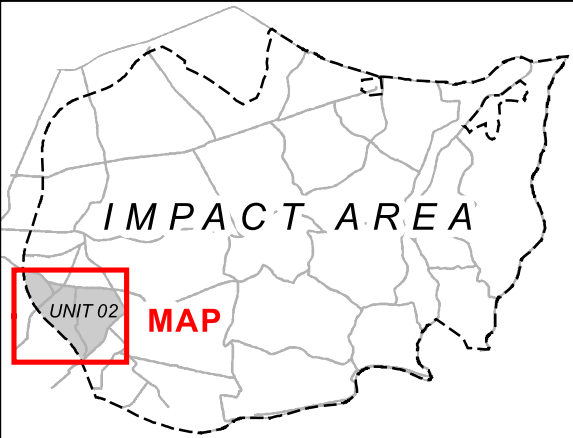
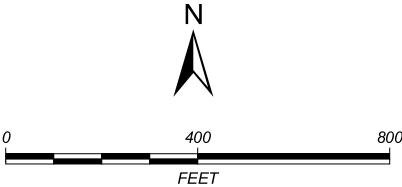
Range Fan

Previous Remediation Area

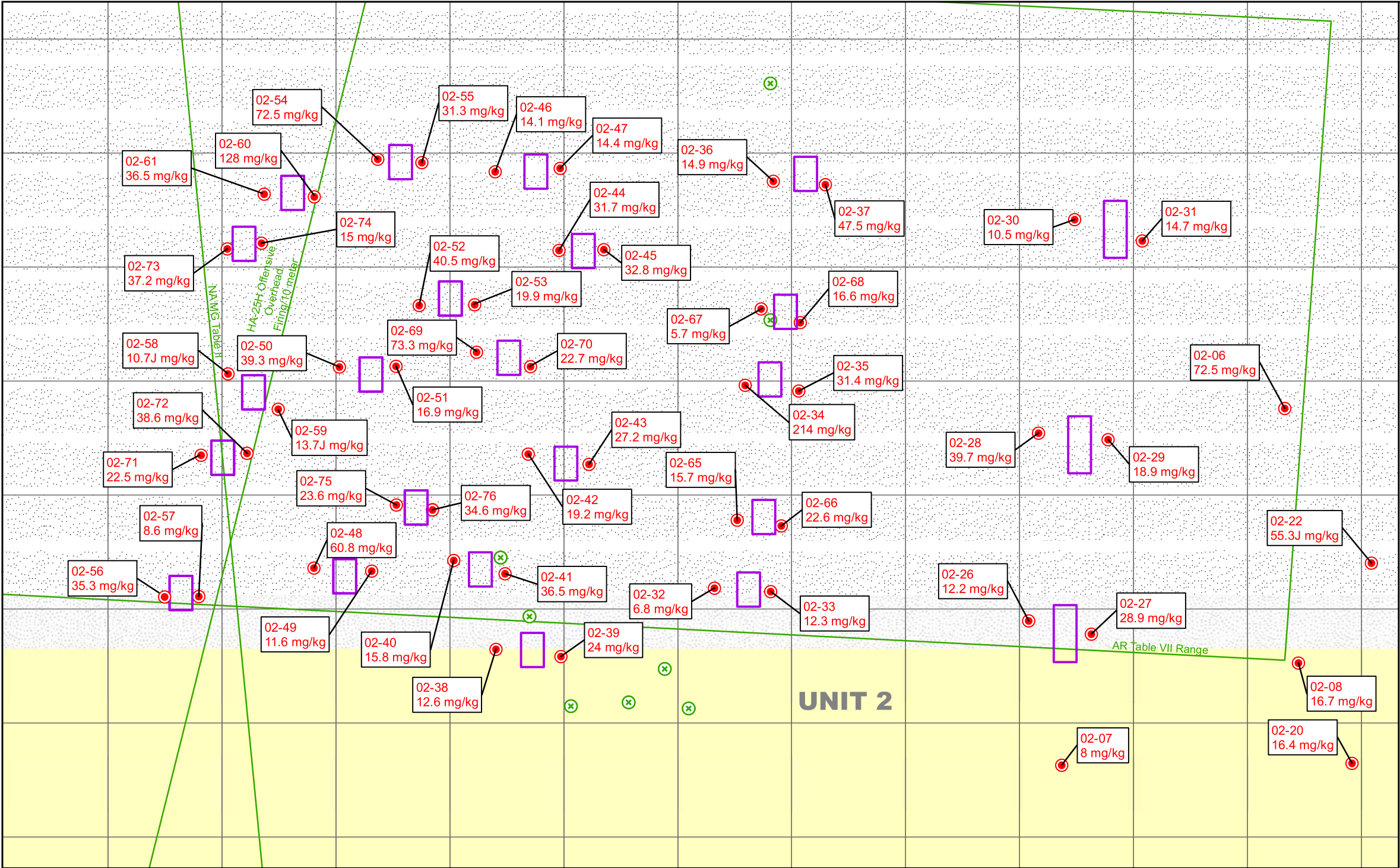
Area of Previously Completed Remediation or Characterization (not included in this evaluation)

Permanent Fuel Break

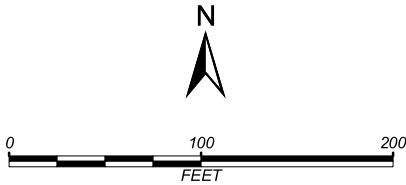
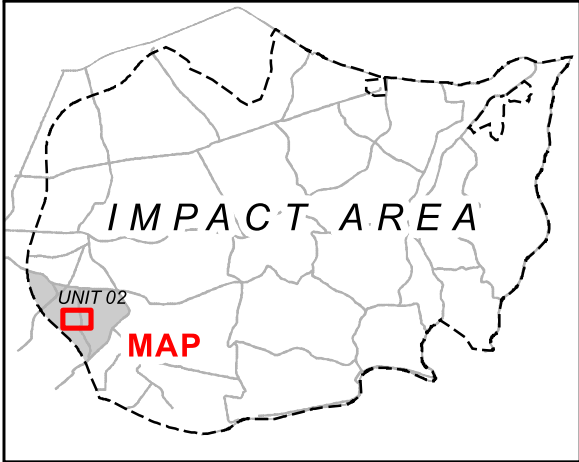
Note:
Samples not displaying results for explosives were analyzed for lead only.



U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT		
Plate A.25.3	FORMER FORT ORD Unit 2 Soil Analytical Results	
DATE	PROJECT NUMBER	FILE NAME
2/1/2017	141234	See Footer



SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
2-6	Lead	72.5 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
2-7	Lead	8 mg/kg	—	Accumulations of lead
2-8	Lead	16.7 mg/kg	—	Accumulations of lead
2-20	Lead	16.4 mg/kg	—	Large pits formerly associated with a target
2-22	Lead	55.3J mg/kg	—	Large pits formerly associated with a target
2-26	Lead	12.2 mg/kg	—	Large pits formerly associated with a target
2-27	Lead	28.9 mg/kg	—	Large pits formerly associated with a target
2-28	Lead	39.7 mg/kg	—	Large pits formerly associated with a target
2-29	Lead	18.9 mg/kg	—	Large pits formerly associated with a target
2-30	Lead	10.5 mg/kg	—	Large pits formerly associated with a target
2-31	Lead	14.7 mg/kg	—	Large pits formerly associated with a target
2-32	Lead	6.8 mg/kg	—	Large pits formerly associated with a target
2-33	Lead	12.3 mg/kg	—	Large pits formerly associated with a target
2-34	Lead	214 mg/kg	—	Large pits formerly associated with a target
2-35	Lead	31.4 mg/kg	—	Large pits formerly associated with a target
2-36	Lead	14.9 mg/kg	—	Large pits formerly associated with a target
2-37	Lead	47.5 mg/kg	—	Large pits formerly associated with a target
2-38	Lead	12.6 mg/kg	—	Large pits formerly associated with a target
2-39	Lead	24 mg/kg	—	Large pits formerly associated with a target
2-40	Lead	15.8 mg/kg	—	Large pits formerly associated with a target
2-41	Lead	36.5 mg/kg	—	Large pits formerly associated with a target
2-42	Lead	19.2 mg/kg	—	Large pits formerly associated with a target
2-43	Lead	27.2 mg/kg	—	Large pits formerly associated with a target
2-44	Lead	31.7 mg/kg	—	Large pits formerly associated with a target
2-45	Lead	32.8 mg/kg	—	Large pits formerly associated with a target
2-46	Lead	14.1 mg/kg	—	Large pits formerly associated with a target
2-47	Lead	14.4 mg/kg	—	Large pits formerly associated with a target
2-48	Lead	60.8 mg/kg	—	Large pits formerly associated with a target
2-49	Lead	11.6 mg/kg	—	Large pits formerly associated with a target
2-50	Lead	39.3 mg/kg	—	Large pits formerly associated with a target
2-51	Lead	16.9 mg/kg	—	Large pits formerly associated with a target
2-52	Lead	40.5 mg/kg	—	Large pits formerly associated with a target
2-53	Lead	19.9 mg/kg	—	Large pits formerly associated with a target
2-54	Lead	72.5 mg/kg	—	Large pits formerly associated with a target
2-55	Lead	31.3 mg/kg	—	Large pits formerly associated with a target
2-56	Lead	35.3 mg/kg	—	Large pits formerly associated with a target
2-57	Lead	8.6 mg/kg	—	Large pits formerly associated with a target
2-58	Lead	10.7J mg/kg	—	Large pits formerly associated with a target
2-59	Lead	13.7J mg/kg	—	Large pits formerly associated with a target
2-60	Lead	128 mg/kg	—	Large pits formerly associated with a target
2-61	Lead	36.5 mg/kg	—	Large pits formerly associated with a target
2-65	Lead	15.7 mg/kg	—	Field Observations
2-66	Lead	22.6 mg/kg	—	Field Observations
2-67	Lead	5.7 mg/kg	—	Field Observations
2-68	Lead	16.6 mg/kg	—	Field Observations
2-69	Lead	73.3 mg/kg	—	Field Observations
2-70	Lead	22.7 mg/kg	—	Field Observations
2-71	Lead	22.5 mg/kg	—	Field Observations
2-72	Lead	38.6 mg/kg	—	Field Observations
2-73	Lead	37.2 mg/kg	—	Field Observations
2-74	Lead	15 mg/kg	—	Field Observations
2-75	Lead	23.6 mg/kg	—	Field Observations
2-76	Lead	34.6 mg/kg	—	Field Observations

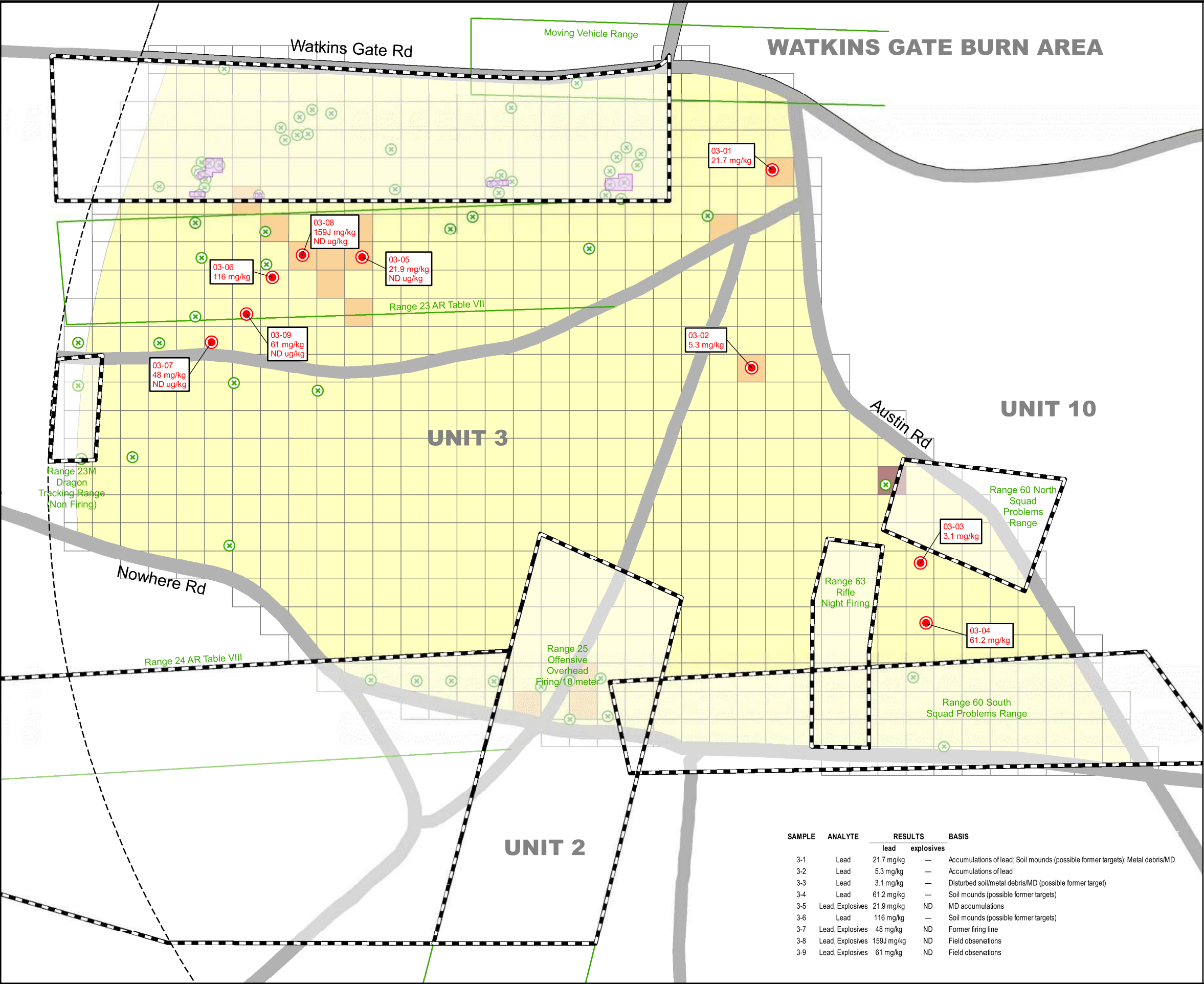


- Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed
- ⊗

 Previous Sample Location
- Pop-up Target Pit (location approximate)
- MD Weight Removed
- < 50 Lbs MD
- 50 - 100 Lbs MD
- > 100 Lbs MD
- Range Fan

Note:
Samples not displaying results for explosives were analyzed for lead only.

U.S. ARMY CORPS OF ENGINEERS SACRAMENTO DISTRICT		
FIGURE NUMBER 3a	FORMER FORT ORD Unit 2 Soil Analytical Results	
DATE	PROJECT NUMBER	FILE NAME
2/1/2017	141234	See Footer



Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed

Previous Sample Location

MD Weight Removed

- < 50 Lbs MD
- 50 - 100 Lbs MD
- > 100 Lbs MD

Range Fan

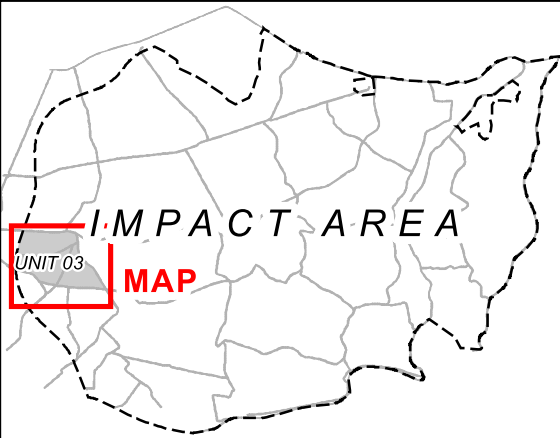
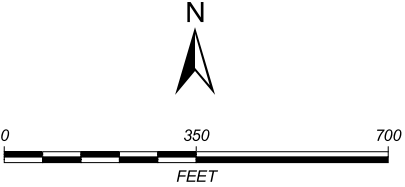
Previous Remediation Area

Area of Previously Completed Remediation or Characterization (not included in this evaluation)

Permanent Fuel Break

Impact Area Boundary

Note:
Samples not displaying results for explosives were analyzed for lead only.



U.S. ARMY CORPS OF ENGINEERS
SACRAMENTO DISTRICT

FIGURE
NUMBER
4

FORMER FORT ORD
Unit 3 Soil Analytical Results

Gilbane

KEMRON



DATE

PROJECT NUMBER

FILE NAME

2/1/2017

See Footer

SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
3-1	Lead	21.7 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets); Metal debris/MD
3-2	Lead	5.3 mg/kg	—	Accumulations of lead
3-3	Lead	3.1 mg/kg	—	Disturbed soil/metal debris/MD (possible former target)
3-4	Lead	61.2 mg/kg	—	Soil mounds (possible former targets)
3-5	Lead, Explosives	21.9 mg/kg	ND	MD accumulations
3-6	Lead	116 mg/kg	—	Soil mounds (possible former targets)
3-7	Lead, Explosives	48 mg/kg	ND	Former firing line
3-8	Lead, Explosives	159J mg/kg	ND	Field observations
3-9	Lead, Explosives	61 mg/kg	ND	Field observations

A.24 HA-208, UNIT 4

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-28, 29, 30, AND 66

A.24.1 SITE DESCRIPTION AND BACKGROUND

Site HA-208, Unit 4, is located on the southern edge of the Impact Area encompassing part of the Impact Area Munitions Response Area (MRA) adjacent to the southern boundary and part of the habitat portion of the site (PLATE 3.1). HA-208 is a subarea of Site 39 defined in the *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4, 11, and 12, Former Fort Ord, California* (Gilbane 2014a).

Four former ranges/historical areas extend into HA-208. Below is a table listing the former ranges that extend into HA-208.

Historical Areas Associated with HA-208

Historical Area	Military History and Training Activities
HA-28	Technique of Fire Range, Rifle Squad Tactical Range, Automatic Rifle and ARTEP Range
HA-29	Machine Gun Assault Range, Squad Battle Drill and Assault Range, 10m Machine Gun, 25 m Zero, M-3 Machine Gun
HA-30	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP
HA-66	Carbine Table XI

Further information on each individual HA within HA-208 is provided in Appendix A in the 2012 *Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

HA-208 was further evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.24.2 PREVIOUS SITE CHARACTERIZATION

Prior to this BRA, initial characterization was conducted via limited soil sampling in select accessible areas. This led to remediation actions to reduce contaminants of concern (COCs) in several former ranges. Access to much of the area was limited by dense vegetation and potential hazards from MEC, so

further evaluation of COCs in soil in these remaining areas was deferred pending MEC removal. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-208 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.24.3 COMPLETED MUNITIONS RESPONSE

Four MEC items were previously found at Unit 4 as part of the MEC sampling activities. Technology-aided surface MEC removal was completed from August 2011 through May 2012. A digital geophysical mapping (DGM) survey was completed from January 2012 to April 2013. 63 MEC items were found and removed from Unit 4; one MEC-unexploded ordinance (UXO) item was found during subsurface MEC removal activities (Gilbane 2014b). Detailed information can be found in *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord California* (Gilbane 2014b).

A.24.4. RECONNAISSANCE

Following MEC removal activities and clearing of vegetation, the BRA evaluation was implemented unit wide to identify whether elevated concentrations of COCs (metals and explosive residues) are still present, including the collection of samples in areas that had not been previously evaluated. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil (Gilbane 2014a). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.24.5 SITE CHARACTERIZATION

Sampling was performed between March and August 2013. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (KEMRON 2020).

A.24.5.1 APPROACH

Soil sampling criteria included nature of range use, types and density of MEC/MD found, locations of former targets, structures, impact berms, accumulations of lead, and other physical evidence found. If elevated COCs were found, additional sampling was conducted to identify the lateral and vertical extent of each area of effected soil. Fourteen locations were chosen in this area based upon representing potential worst-case scenarios most likely to contain elevated lead, antimony, copper, and explosives (RDX and HMX). Three locations (4-03, 4-04, and 4-08) were further evaluated based upon initial characterization. 16-step-out discrete location samples were collected for lead at 4-03, 8 step-out location samples were collected for lead at 4-04, and a co-located sample was collected for copper at 4-08. Sample locations can be found on Figure 1, 2 and 5 pulled from the *BRA Investigation Technical Memorandum Report* (Gilbane 2014a).

A.24.5.2 SITE CHARACTERIZATION RESULTS

Explosive residues were not detected in any samples. The following detections were found at HA-208:

- 4-03 (suspected isolated soil mound that was comprised of material that had been relocated): Elevated lead concentrations were found in the initial surface and subsurface sample as well in three of the 16 step-out samples collected.
- 4-04 (former target): Elevated lead concentrations were found in the initial surface sample and in one step-out sample ten feet to the southwest.
- 4-08: Copper was detected at 4,400 milligram per kilogram (mg/kg) in a surface sample. An additional co-located sample and quality control (QC) sample was collected, neither indicated elevated copper concentrations. It was determined this was not representative of the general conditions in this area and the initial sample had an anomalous copper fragment.

Soil sample results are displayed on Figures 2 and 5 pulled from the *BRA Investigation Technical Memorandum Report* (Gilbane 2014a).

Based upon the above characterization results, area-weighted-concentrations were calculated for lead to further analyze lead distribution. All area-weighted lead concentrations were below the 225 mg/kg ecological cleanup level considered proposed in the *Site 39 ROD Amendment* (Army 2009).

A.24.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-208. Additionally, area-weighted lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009) and potential remedial activity of elevated COCs are estimated to be greater than the potential benefits (Gilbane 2014a). No further BRA action is warranted regarding explosive residues and metals in soil at HA-208.

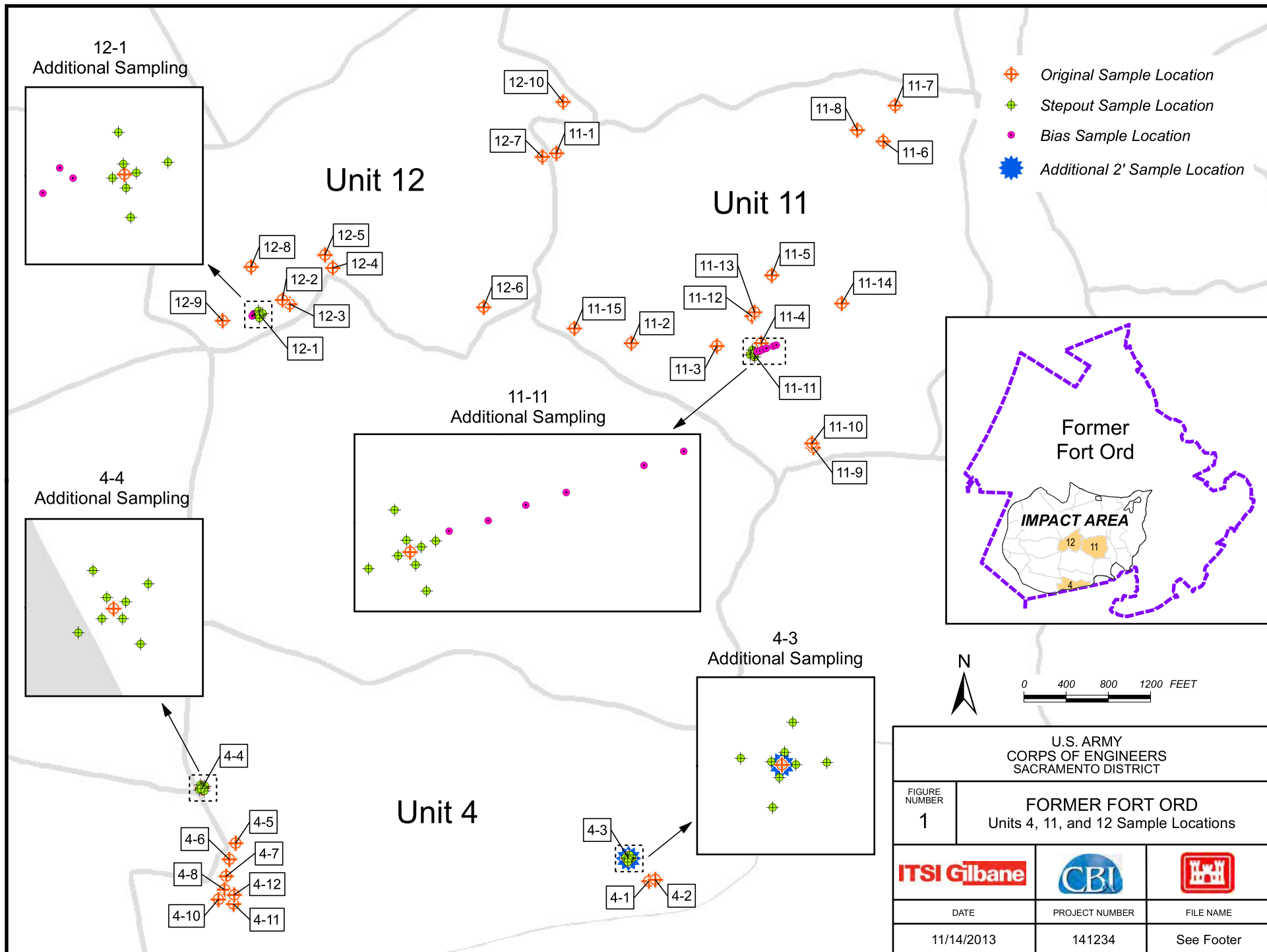
A.24.7 REFERENCES

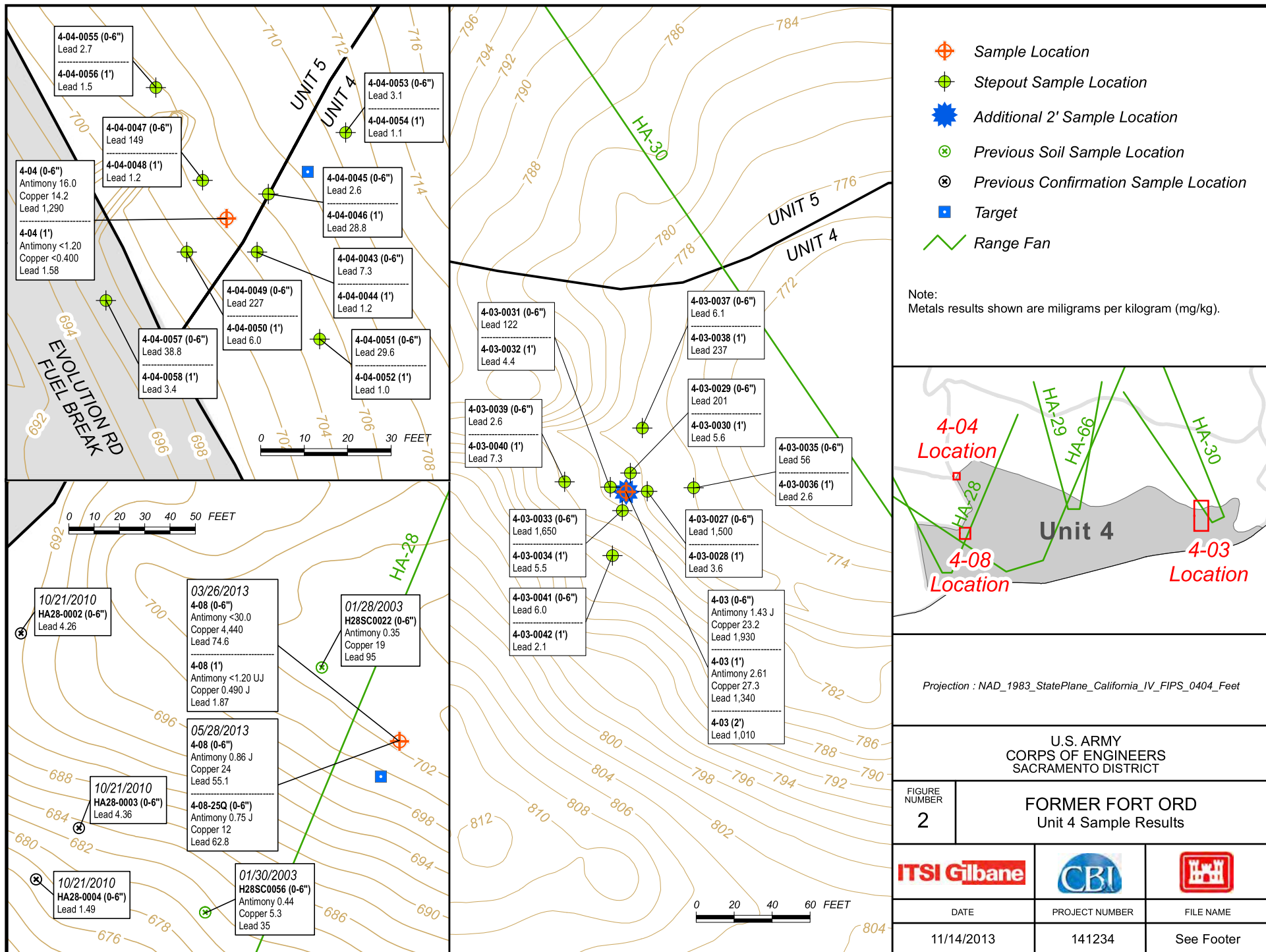
Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

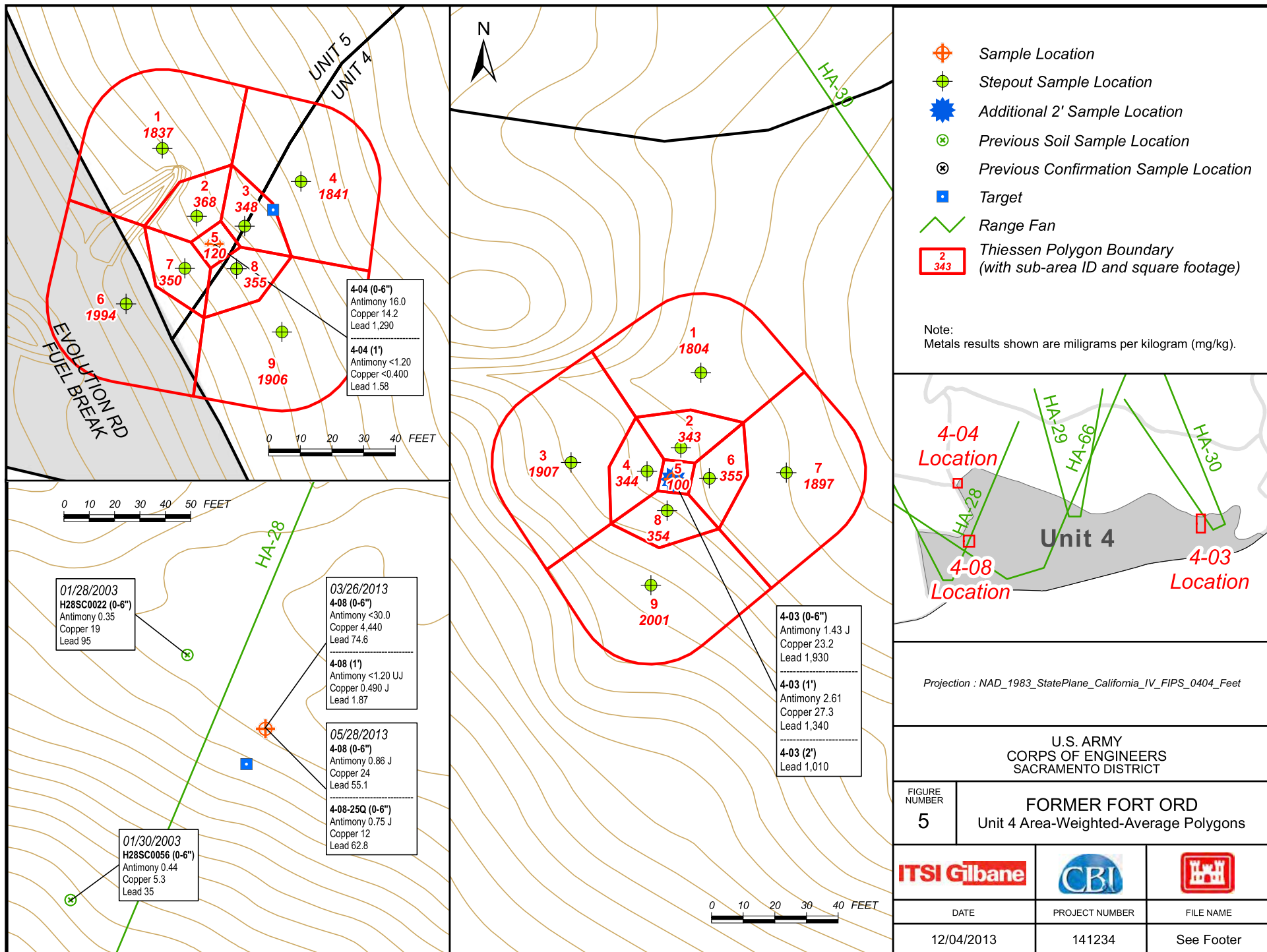
Gilbane, 2014a. *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4,11, and 12, Former Fort Ord, California* (AR# RI-048A)

Gilbane, 2014b. *Final, MRS-BLM Units 4,11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (AR# OE-0799B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. January. (AR# BW-2300L)







A.25 HA-209, UNIT 11 AND 12

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: CENTRAL PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-31 AND AUSTIN ANTITANK RANGE

A.25.1 SITE DESCRIPTION AND BACKGROUND

Site HA-209, also known as Unit 11 and 12, is located in the central area of the Impact Area encompassing part of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-209 is a subarea of Site 39 defined in the *Final Technical Memorandum Basewide Range Assessment (BRA) Investigation, Units 4, 11, and 12, Former Fort Ord, California* (Gilbane 2014a).

Two former ranges/historical areas extend into HA-209. Below is a table listing the former ranges that extend into HA-208.

Historical Areas Associated with HA-209

Historical Area	Military History and Training Activities
HA-31	Platoon Attack Course, Demolition Range

Further information on each individual HA within HA-209 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-209 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.25.2 PREVIOUS SITE CHARACTERIZATION

Prior to this BRA, initial characterization was conducted via limited soil sampling in select accessible areas within. Access to much of the area was limited by dense vegetation and potential hazards from MEC, so further evaluation of COCs in soil in these remaining areas was deferred pending MEC removal. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-209 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.25.3 COMPLETED MUNITIONS RESPONSE

MEC items were previously found at Units 11 and 12 as part of the MEC sampling activities. Technology-aided surface MEC removal was completed from August 2011 through May 2012. A digital geophysical mapping (DGM) survey was completed from January 2012 to April 2013. 571 MEC items were found and removed from Unit 11 and 270 MEC items were removed from Unit 12 (Gilbane 2014b). Subsequently, in 2015 a subsurface removal operation targeting large projectiles at shallow depths was conducted in Units 11 and 12. 589 anomalies were intrusively investigated, resulting in the recovery of 171 MEC items. Detailed information can be found in *Final, MRS-BLM Units 4, 11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord California* (Gilbane 2014b).

A.25.4. RECONNAISSANCE

Following MEC removal activities and clearing of vegetation in 2011-2012, the BRA evaluation was implemented to identify whether elevated concentrations of COCs (metals and explosive residues) are still present, including the collection of samples in areas that had not been previously evaluated. A complete unit reconnaissance and field evaluation was performed on this area for lead, copper, antimony, and explosives (HMX, RDX, and TNT) in soil (Gilbane 2014a). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.25.5 SITE CHARACTERIZATION

Sampling was performed between March and August 2013. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* (Army 2009) for protection of human health and the environment.

A.25.5.1 APPROACH

Soil sampling sample criteria included nature of range use, types and density of MEC/MD found, locations of former targets, structures, impact berms, accumulations of lead, and other physical evidence found. If elevated COCs were found, additional sampling was conducted to identify the lateral and vertical extent of each area of affected soil. The following samples were collected from each Unit within HA-209:

- Unit 11: 21 sample locations were collected. One location (11-11) located within Range 31 (HA-31) was further evaluated based upon elevated lead concentrations.
- Unit 12: 13 locations were collected. Additional samples were collected from nearby targets and as discrete step-out samples adjacent to 12-01 due to elevated lead concentrations.

Sample locations can be found on Figures 1, 3, 4, 6, and 7 pulled from the *BRA Investigation Technical Memorandum* (Gilbane 2014a).

A.25.5.2 SITE CHARACTERIZATION RESULTS

Explosive residues were not detected in any samples. The following detections were found at HA-209:

- Unit 11: An elevated lead concentration was found in one location (11-11) located within Range 31 (HA-31). Step-out samples indicate that the area of affected soil is limited to a single target.

- Unit 12: An elevated lead concentration was found at one initial surface sample (12-01). Samples were collected from nearby targets and step-out samples adjacent to 12-01 were collected. Elevated lead concentrations were not detected in any additional samples collected, which indicated the affected soil does not extent significantly beyond the surface soil in the immediate vicinity of the initial sample

Soil sample results are displayed on Figures 3 and 4 pulled from the *BRA Investigation Technical Memorandum* (Gilbane 2014a).

Based upon the above characterization results, area-weighted-concentrations were calculated for lead to further analyze lead distribution. All area-weighted lead concentrations were below the 225 mg/kg ecological cleanup level proposed in the *Site 39 ROD Amendment* (Army 2009).

It is important to note that the BRA evaluation of portion of HA-31 within HA-209 is completed. See HA-215 (Unit 31) for information on further evaluation of HA-31 within Unit 31.

A.25.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-209. Additionally, area-weighted lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009) and potential remedial activity of elevated COCs are estimated to be greater than the potential benefits (Gilbane 2014a). No further BRA action is warranted regarding explosive residues and metals in soil at HA-209.

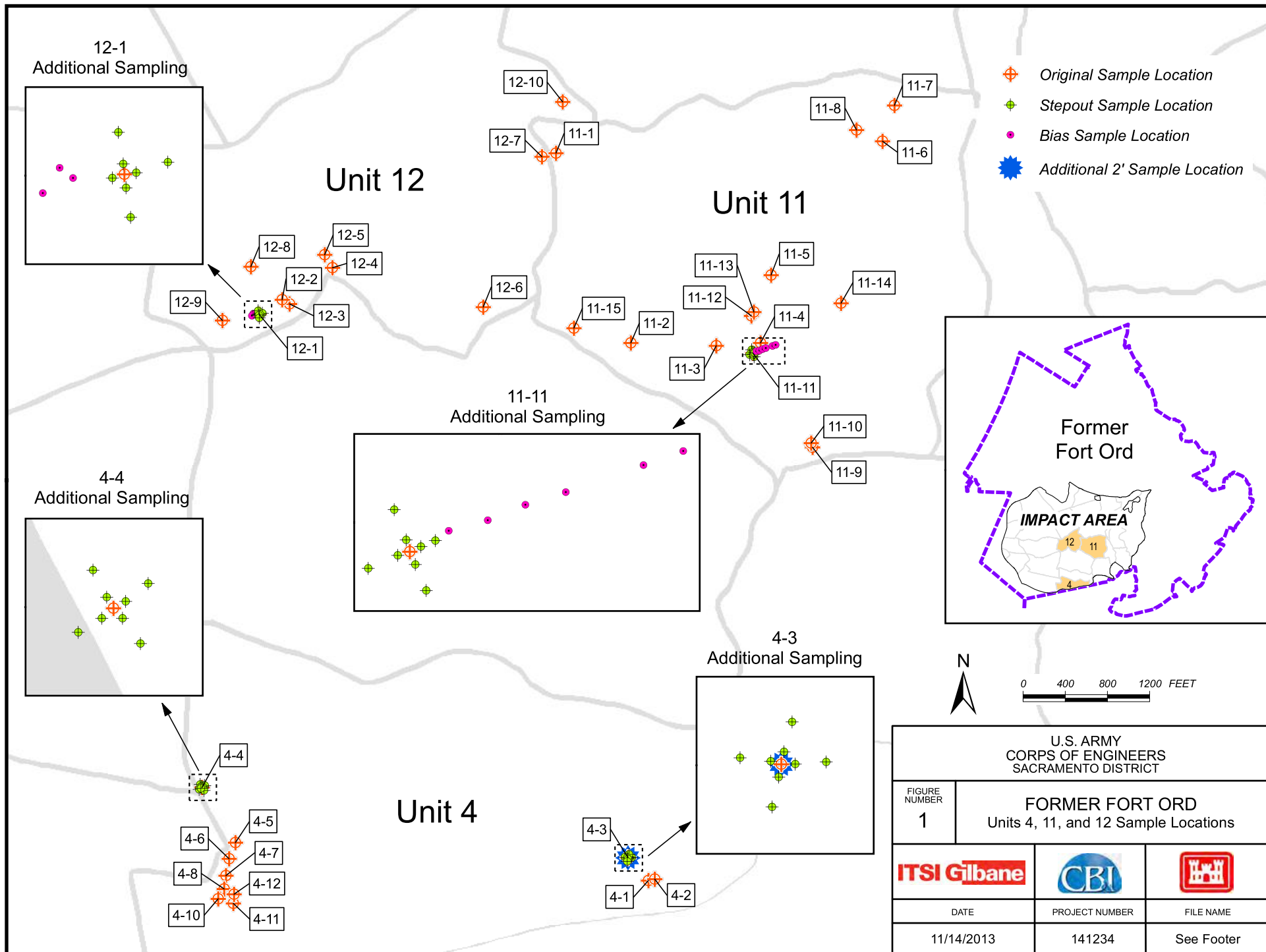
A.25.7 REFERENCES

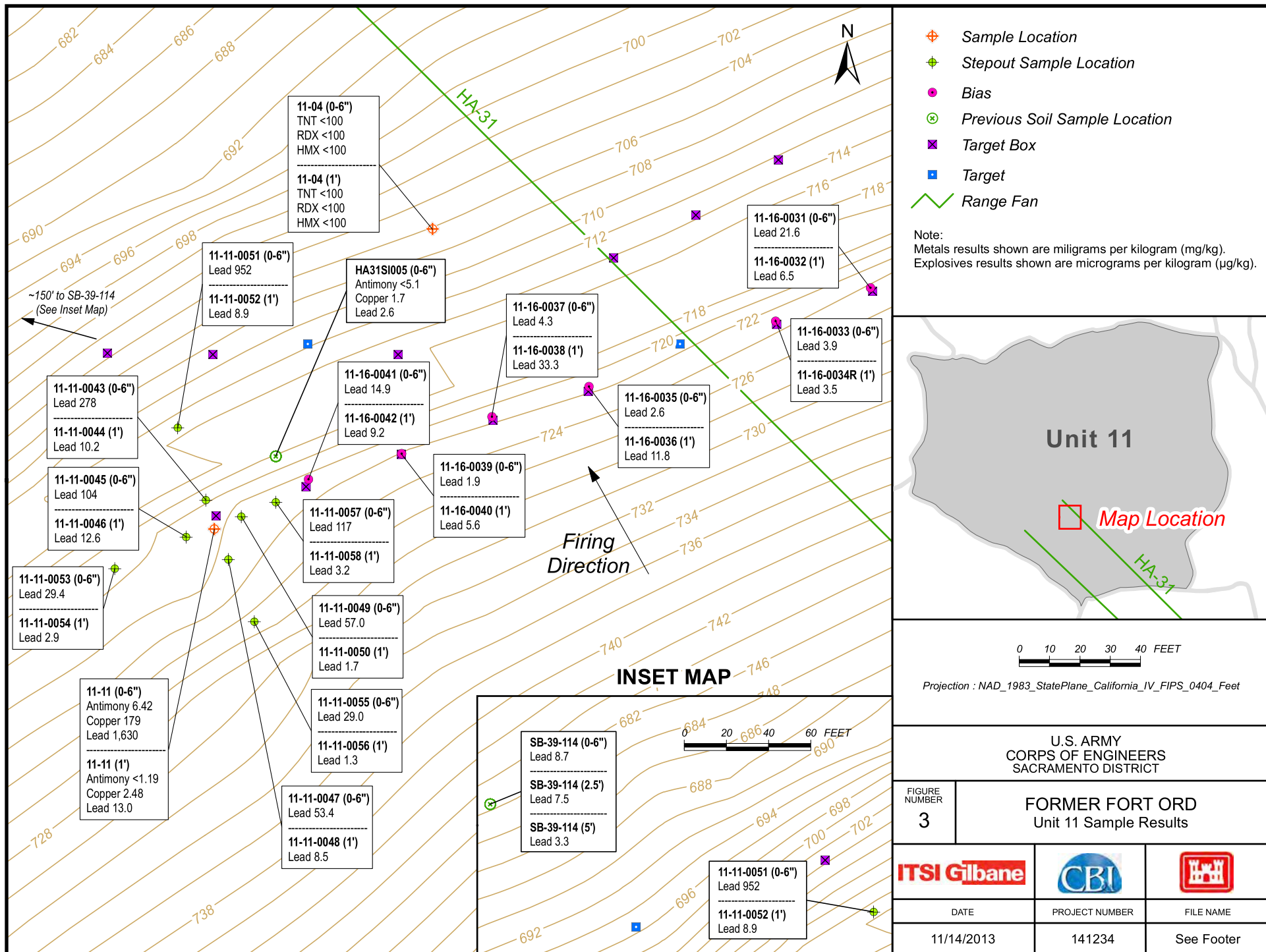
Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

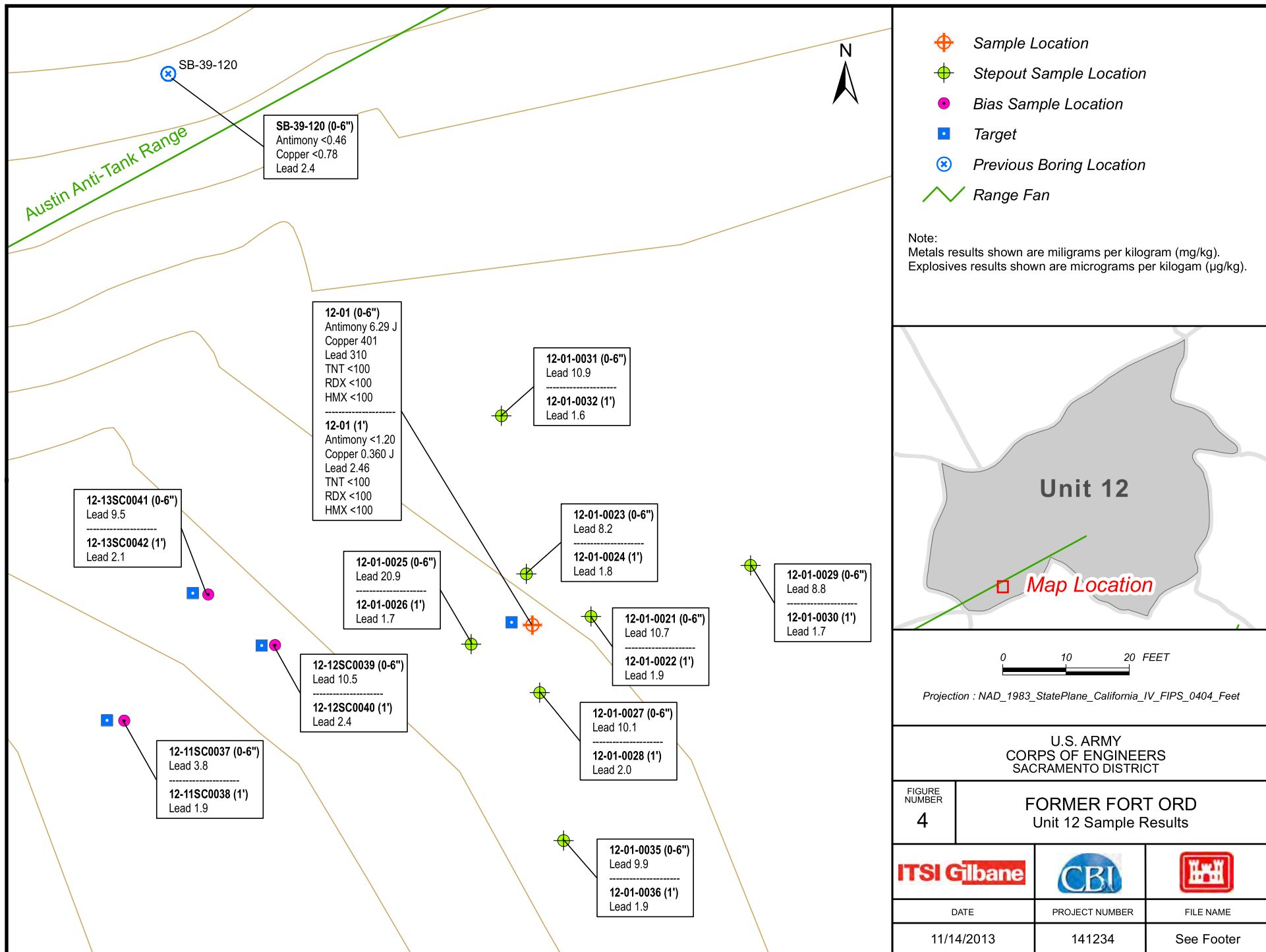
Gilbane, 2014a. *Final Technical Memorandum Basewide Range Assessment Investigation, Units 4,11, and 12, Former Fort Ord, California*. (AR# RI-048A)

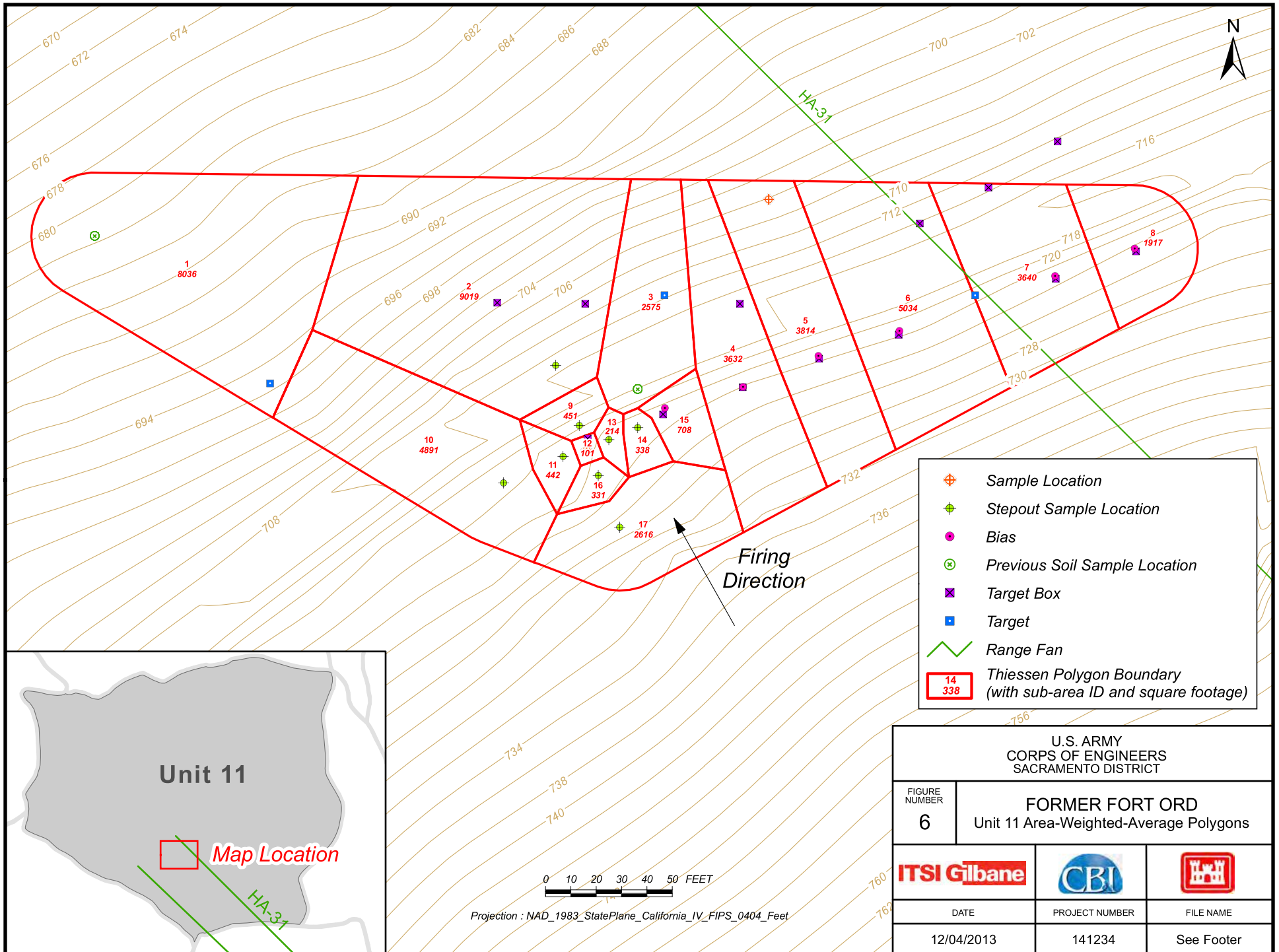
Gilbane, 2014b. *Final, MRS-BLM Units 4,11, and 12, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0799B)

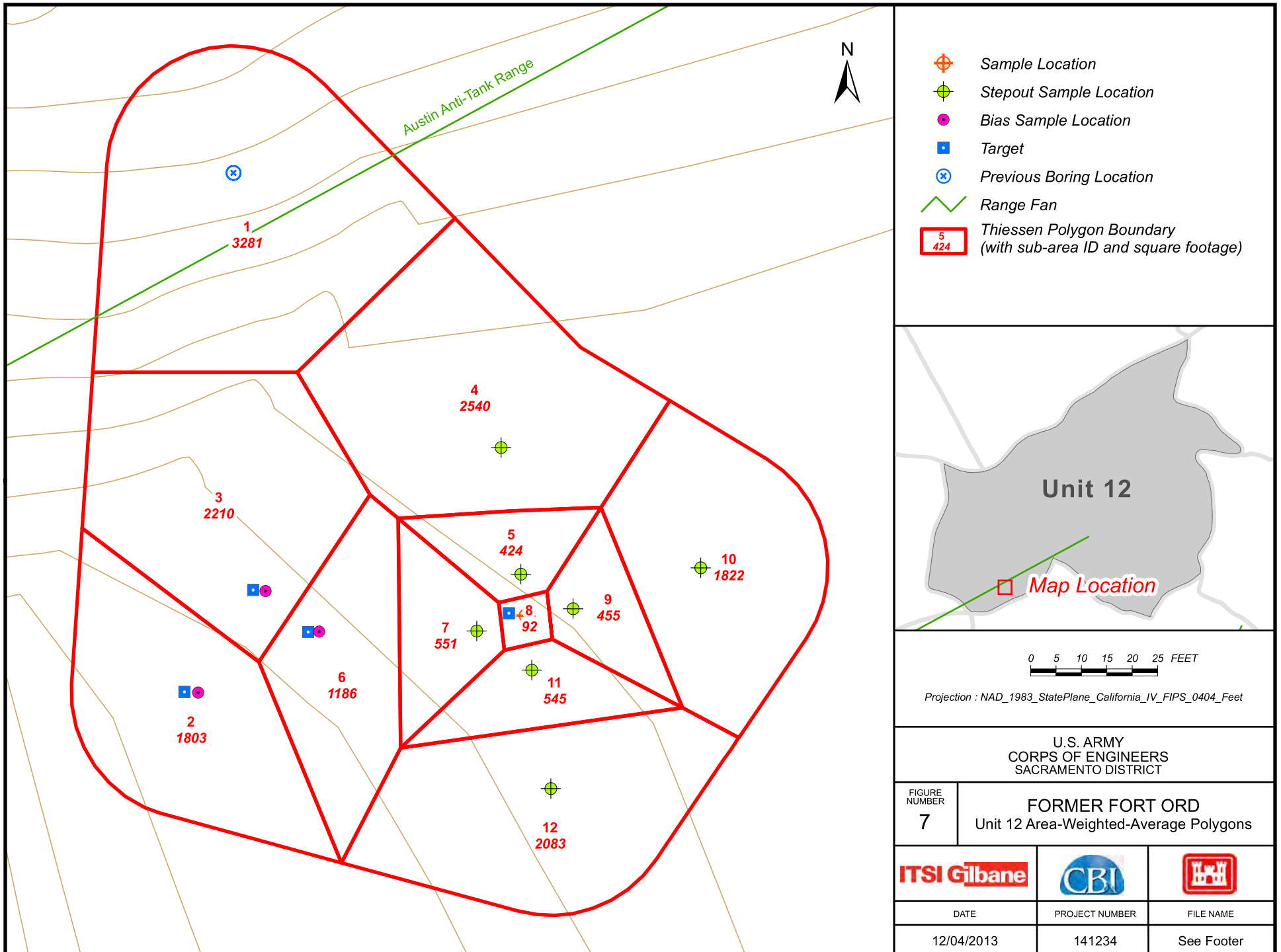
Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)











A.26 HA-210, UNIT 5A AND 9

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHEAST CORNER OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-30, HA-31A AND 68

A.26.1 SITE DESCRIPTION BACKGROUND

Site HA-210, also known as Units 5a and 9, is located in the southeastern corner of the Impact Area MRA and part of the habitat portion of the site (PLATE 3.1). HA-210 is a subarea of Site 39 and part of the Basewide Range Assessment (BRA) evaluation as defined in the *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 5A and 9* (KEMRON 2018).

Three former ranges/historical areas extend into HA-210. Below is a table listing the former ranges that extend into HA-210.

Historical Areas Associated with HA-210

Historical Area	Military History and Training Activities
HA-30	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP
HA-31A	STT Range 23
HA-68	Sub Mach Gun DSMTD

Further information on each individual HA within HA-210 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-210 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.26.2 PREVIOUS SITE CHARACTERIZATION

Prior to this BRA, initial characterization was conducted. Access to much of the area was limited by dense vegetation and potential hazards from MEC. The *2012 Comprehensive BRA Report* recommended “No Further BRA” for HA-68 (Shaw 2012). Access was limited so reconnaissance was recommended after MEC removal in HA-30 and HA-31A. Further information on BRA in each individual HA prior to 2012 within HA-210 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.26.3 COMPLETED MUNITIONS RESPONSE

MEC items were previously found at HA-210 which included two discarded military munition (DMM) items in 2001 and 2011. Technology-aided surface MEC removal was conducted from July 2015 and October 2015 (KEMRON 2017). A total of 21 MEC items were found during surface MEC removal, all within Unit 9 and all classified as unexploded ordnance (UXO). Digital geophysical mapping (DGM) surveys were conducted across the entirety of the accessible areas within Units 5A and 9. DGM-based subsurface MEC removal was conducted within 1.2 acres of Unit 5A and within the 100-foot buffer in Units 5A and 9. In the 1.2 acres of Unit 5A, 198 targets were reacquired; 74 targets were removed during this phase of work and 124 targets were eliminated during reacquisition. No MEC items were encountered during this work (KEMRON 2017). In the 100-foot Impact Area buffer, four MEC items were found and removed from Unit 9 and one MEC item from Unit 5A. Detailed information can be found in *Draft Final, MRS-BLM Units 5a and 9, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2017).

A.26.4. RECONNAISSANCE

Historical data was compiled and further evaluated by performing additional field reconnaissance to examine suspect areas identified from existing data and to identify additional areas of potential concern that may have not been previously identified. Based on evaluation of the data, no further action was recommended for Unit 5A. A complete unit reconnaissance and field evaluation was performed on Unit 9 for lead and explosives (HMX, RDX, and TNT) in soil (KEMRON 2018). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.26.5 SITE CHARACTERIZATION

Sampling was performed in Unit 9 during March 2017. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.26.5.1 APPROACH

Soil sampling sample criteria included nature of range use, types and density of MEC/MD found, locations of former targets, structures, impact berms, accumulations of lead, and other physical evidence found. Based on this available data, 11 locations were chosen in HA-210 based upon areas that would most likely contain elevated COCs. To obtain representative results for each location, samples were collected using seven-point incremental sampling. 7 of the 11 locations were evaluated for lead and all 11 locations were evaluated for explosive residues (HMX, RDX, TNT). Sample locations can be found on Figure 3 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2018).

A.26.5.2 SITE CHARACTERIZATION RESULTS

Explosives were not detected in any samples and lead was detected at concentrations ranging from 5.0 to 15.3 milligram per kilogram (mg/kg) (KEMRON 2018). Soil sample results are displayed on Figure 3 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2018).

A.26.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-210. Additionally, lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-210.

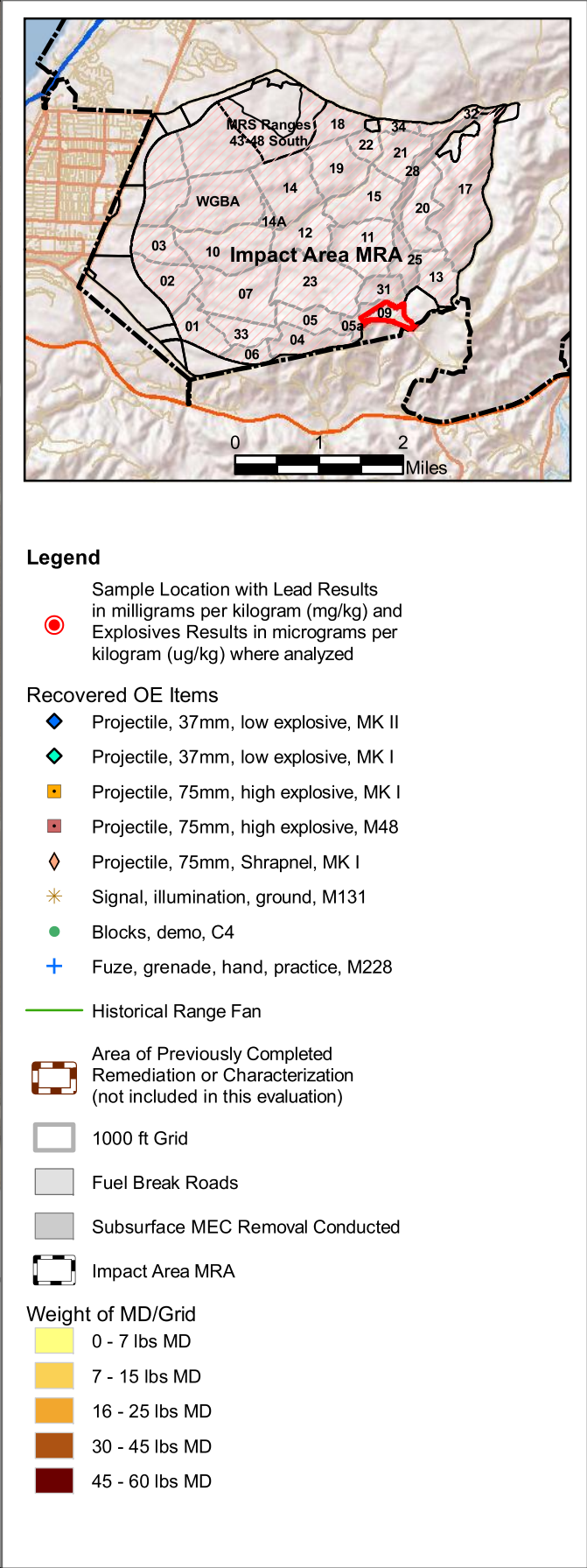
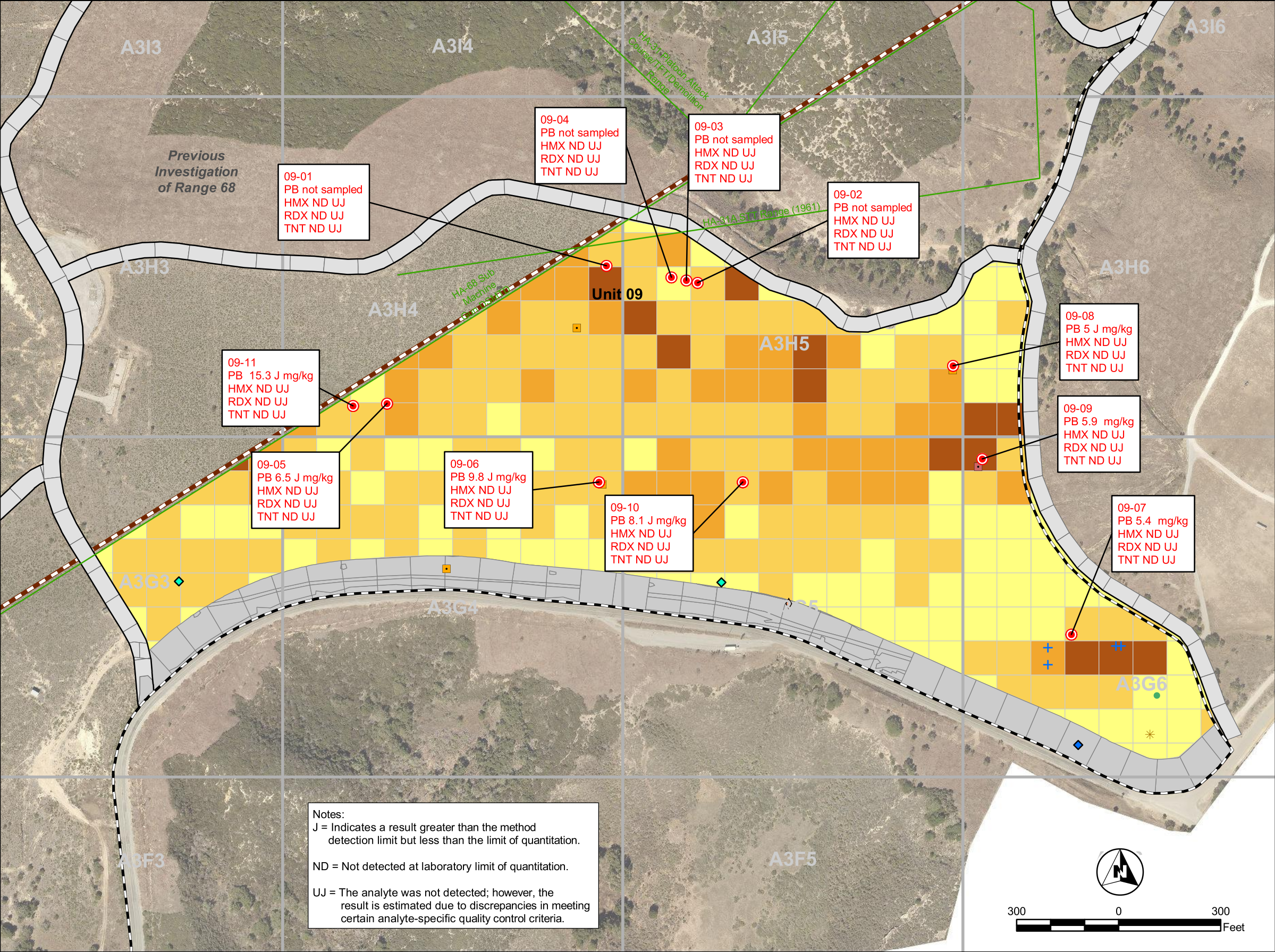
A.26.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

KEMRON, 2017, *Draft Final, MRS-BLM Units 5a and 9, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0908A)

KEMRON, 2018. *Final Sampling Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 5A and 9, Former Fort Ord, Monterey County, California*. (AR# BW-2835B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



A.27 HA-211, UNIT 7, 10 AND 33

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLSOIVES, RECOMMEND LIMITED REMEDIATION FOR LEAD

LOCATION: SOUTHWEST PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-26, 27, 27A, 28, 54, 56, 58, 60, 63, 64, 65, 66, 68, AND AUSTIN ANTI TANK RANGES

A.27.1 SITE DESCRIPTION AND BACKGROUND

Site HA-211, also known as Unit 7,10, and 33, is located on the southwest portion of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-211 is a subarea of Site 39 and part of the Combined Units defined in the *Sampling Results Technical Memorandum Sites 39 Units 1,2,3,7, 10, 33, and WGBA North and South* (KEMRON 2020). HA-26, 27, 27A, 28, 54, 56, 58, 60, 63, 64, 65, 66, 68, and the Austin Antitank ranges are located within HA-211 (PLATE 1.2).

Twelve former ranges/historical areas extend into HA-211. Below is a table listing the former ranges that extend into HA-211.

Historical Areas Associated with HA-211

Historical Area	Military History and Training Activities
HA-26	Machine Gun Transition, Machine Gun Field Fire, Machine gun, Table II, Austin Antitank Range
HA-27	Fire Movement Course, Close Combat Course
HA-27A	10m Machine Gun/25m Rifle Range
HA-28	Technique of Fire Range, Rifle Squad Tactical Range, Automatic Rifle and ARTEP Range
HA-54	Mortar Range No. 2
HA-56	Rifle Transition Course, Combat in Cities No. 1
HA-58	MG Table 2, Weapons Demonstration Range
HA-60	Squad Problems Range
HA-63	Small Arms Firing Course, Rifle Night
HA-64	Rifle Night Firing
HA-65	Carbine Table X
HA-66	Carbine Table XI
HA-68	Sub Mach Gun DSMTD

Further information on each individual HA within HA-211 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

HA-211 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern.

Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.27.2 PREVIOUS SITE CHARACTERIZATION

Explosive ordnance target areas within the Impact Area MRA were also sampled for explosives and metals as part of the Site 39 Remedial Investigation (RI) and results are presented in the *Final, Basewide Remedial Investigation/Feasibility Study, Former Fort Ord, California* (HLA 1995). Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-211 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012). Tactic training and various weapons including rifles, automatic weapons, and explosive projectiles were used throughout HA-211.

A.27.3 COMPLETED MUNITIONS RESPONSE

Technology-aided MEC removal was completed from June 2012 to June 2014. A total of 357 MEC items were found, one MEC item was classified as discarded military munitions (DMM) and the remaining were classified as unexploded ordnance (UXO). A digital geophysical mapping (DGM) survey was completed from January 2013 to September 2014. Further detailed information can be found in the *Draft Final, MRS-BLM Units 6,7,10, and 33, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2015).

A.27.4 RECONNAISSANCE

Upon completion of MEC removal, the BRA evaluation is implemented to identify whether elevated concentrations of Contaminates of Concern (COCs; metals and explosive residues) are still present. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil (KEMRON 2020). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.27.5 SITE CHARACTERIZATION

Soil sampling was performed during February and March 2016 with follow-up work conducted in September and November 2016, and February and December 2018. Sample analytical data were evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (KEMRON 2020).

A.27.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampling using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2020). Additional deeper samples and step-out samples were collected if COCs were found to exceed the concentration thresholds specified in the Site 39 ROD Amendment (Army 2009). The following samples were collected from each Unit within HA-211:

- Unit 7: 20 sample locations were collected, 14 sample locations for lead, 1 sample location for explosives, and 5 sample locations for both lead and explosives.
- Unit 10: 27 sample locations were collected, 25 sample locations for lead and 2 sample locations for both lead and explosives.
- Unit 33: 13 sample locations were collected for lead analysis. Due to elevated lead concentrations, a deeper sample and step-out samples were collected to further identify the lateral and vertical extent of affected soil.

Sample locations can be found on Figures 5 through 7 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2020).

A.27.5.2 SITE CHARACTERIZATION RESULTS

Explosive residues were not detected in any samples. The following lead concentrations were found:

- Unit 7: Lead was detected at concentrations ranging from 1.8 milligram per kilogram (mg/kg) to 136 mg/kg below the ecological cleanup level of 225 mg/kg.
- Unit 10: Lead was detected at concentrations ranging from 2.8 mg/kg to 146 mg/kg below the ecological cleanup level of 225 mg/kg.
- Unit 33: Initial lead samples were detected at concentrations ranging from 2.3 mg/kg to 566 mg/kg which exceeded the ecological cleanup level of 225 mg/kg. Additional step-out samples had concentrations up to 932 mg/kg. An area-weighted-average concentration was calculated at 329.87 mg/kg which still exceeds the 225 mg/kg cleanup level.

Soil sample results, including the elevated lead areas, are displayed on Figures 5 through 7 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2020).

A.27.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-211. Lead concentrations within a portion of Range 27 in Unit 33 did exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). Unit 33 is comprised of “Very High” quality habitat. Limited remediation of soils is recommended in the Range 27 area to bring the area-weighted-average lead concentrations below the criteria threshold and maintain the habitat (KEMRON 2020). The remaining areas of Unit 33 is not anticipated to require further BRA investigation. No further BRA evaluation is recommended for Units 7 and 10.

A.27.7 REFERENCES

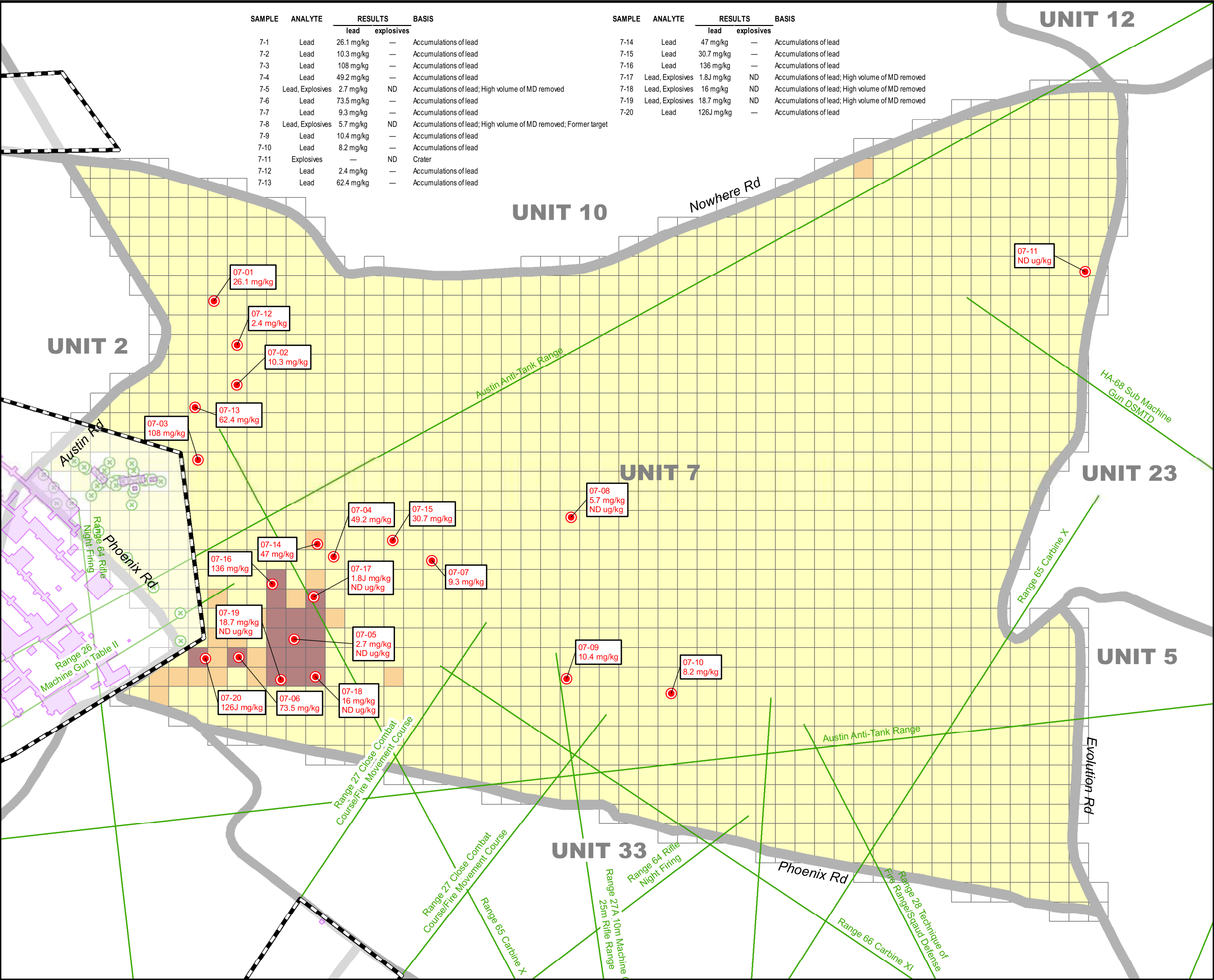
Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

Harding Lawson Associates (HLA), 1995. *Basewide Remedial Investigation/Feasibility Study, Fort Ord, California*. (AR# BW-1283A)

KEMRON, 2015. *Draft Final, MRS-BLM Units 6,7,10, and 33, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0867)

KEMRON, 2020. *Final, Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 1, 2, 3, 7, 10, 33, and Watkins Gate Burn Area North and South, Former Fort Ord, Monterey County, California*. (AR# BW-2831B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed

Previous Sample Location

MD Weight Removed

< 50 Lbs MD

50 - 100 Lbs MD

> 100 Lbs MD

Range Fan

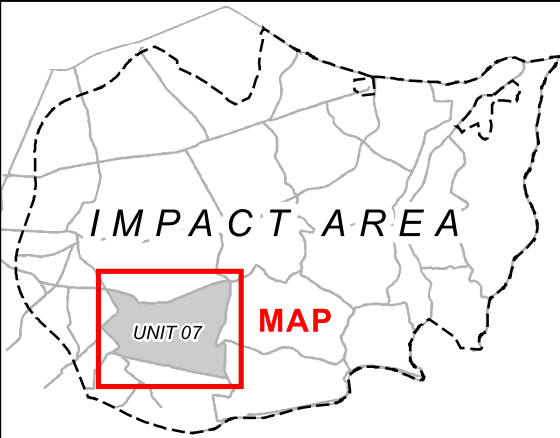
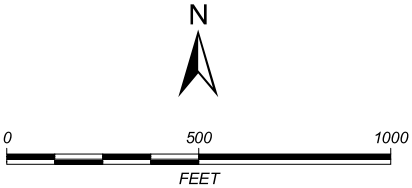
Previous Remediation Area

Area of Previously Completed Remediation or Characterization (not included in this evaluation)

Permanent Fuel Break

Note:
Samples not displaying results for explosives were analyzed for lead only.

* The suspect feature evaluated was an explosion crater, therefore only explosives residues were proposed for analyses



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FIGURE
NUMBER
5

FORMER FORT ORD
Unit 7 Soil Analytical Results

Gilbane

KEMRON



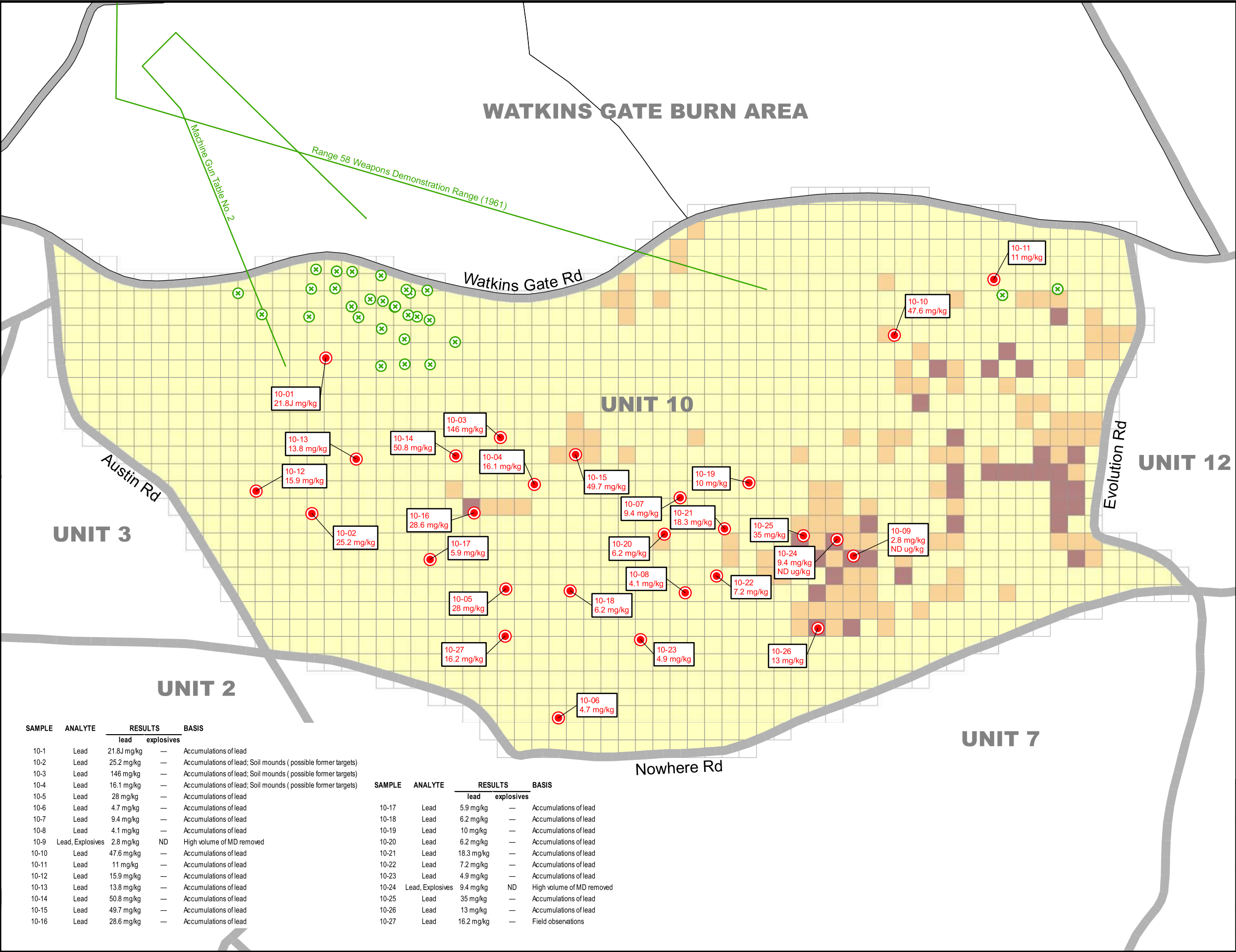
DATE

PROJECT NUMBER

FILE NAME

2/1/2017

See Footer



Sample Location with Lead Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed

Previous Sample Location

MD Weight Removed

< 50 Lbs MD

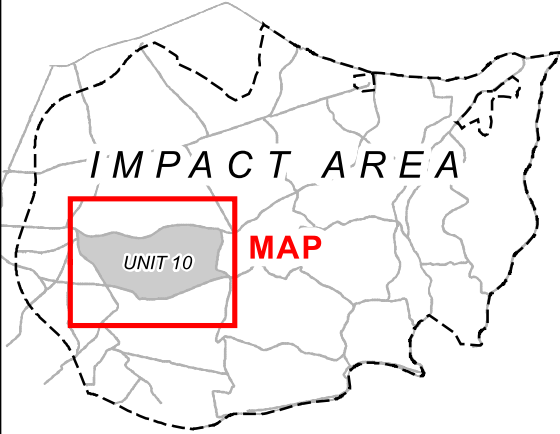
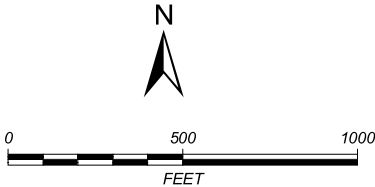
50 - 100 Lbs MD

> 100 Lbs MD

Range Fan

Permanent Fuel Break

Note:
Samples not displaying results for explosives were analyzed for lead only.



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FIGURE NUMBER 6	FORMER FORT ORD Unit 10 Soil Analytical Results	
DATE	PROJECT NUMBER	FILE NAME
2/1/2017		See Footer

SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
10-1	Lead	21.8J mg/kg	—	Accumulations of lead
10-2	Lead	25.2 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
10-3	Lead	146 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
10-4	Lead	16.1 mg/kg	—	Accumulations of lead; Soil mounds (possible former targets)
10-5	Lead	28 mg/kg	—	Accumulations of lead
10-6	Lead	4.7 mg/kg	—	Accumulations of lead
10-7	Lead	9.4 mg/kg	—	Accumulations of lead
10-8	Lead	4.1 mg/kg	—	Accumulations of lead
10-9	Lead, Explosives	2.8 mg/kg	ND	High volume of MD removed
10-10	Lead	47.6 mg/kg	—	Accumulations of lead
10-11	Lead	11 mg/kg	—	Accumulations of lead
10-12	Lead	15.9 mg/kg	—	Accumulations of lead
10-13	Lead	13.8 mg/kg	—	Accumulations of lead
10-14	Lead	50.8 mg/kg	—	Accumulations of lead
10-15	Lead	49.7 mg/kg	—	Accumulations of lead
10-16	Lead	28.6 mg/kg	—	Accumulations of lead

SAMPLE	ANALYTE	RESULTS		BASIS
		lead	explosives	
10-17	Lead	5.9 mg/kg	—	Accumulations of lead
10-18	Lead	6.2 mg/kg	—	Accumulations of lead
10-19	Lead	10 mg/kg	—	Accumulations of lead
10-20	Lead	6.2 mg/kg	—	Accumulations of lead
10-21	Lead	18.3 mg/kg	—	Accumulations of lead
10-22	Lead	7.2 mg/kg	—	Accumulations of lead
10-23	Lead	4.9 mg/kg	—	Accumulations of lead
10-24	Lead, Explosives	9.4 mg/kg	ND	High volume of MD removed
10-25	Lead	35 mg/kg	—	Accumulations of lead
10-26	Lead	13 mg/kg	—	Accumulations of lead
10-27	Lead	16.2 mg/kg	—	Field observations

A.28 HA-212, UNIT 23

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES; NO FURTHER BRA ACTION.

LOCATION: SOUTHWEST AREA OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-29, 30, 30A, 65, 66, 68 AND AUSTIN ANTI TANK RANGE

A.28.1 SITE DESCRIPTION AND BACKGROUND

Site HA-212, also known as Unit 23, is located in the southwest area of the Impact Area encompassing part of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-212 is a subarea of Site 39 and part of the ongoing Basewide Range Assessment (BRA) investigation defined in the *Final, Sampling Results Technical Memorandum, BRA Investigation, Site 39 Unit 23, Former Fort Ord, Monterey County, California* (KEMRON 2018). Range use within HA-212 included artillery projectiles and rifle-launched projectiles.

Seven former ranges/historical areas extend into HA-212. Below is a table listing the former ranges that extend into HA-212.

Historical Areas Associated with HA-212

Historical Area	Military History and Training Activities
HA-29	Machine Gun Assault Range, Squad Battle Drill and Assault Range, 10m Machine Gun, 25 m Zero, M-3 Machine Gun
HA-30/30A	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP
HA-65	Carbine
HA-66	Carbine
HA-68	Sub Mach Gun DSMTD

Further information on each individual HA within HA-212 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-212 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.28.2 PREVIOUS SITE CHARACTERIZATION

Prior site characterization of contaminants of concern (COCs) were not performed at the site. Further information on work performed at each individual HA prior to 2012 within HA-212 is provided in Appendix A in the *Comprehensive BRA Report* (Shaw 2012).

A.28.3 COMPLETED MUNITIONS RESPONSE

187 MEC items were encountered and previously removed from Unit 23. Remedial Action in approximately 20 acres within Unit 23 was completed in November 2011 to support planned prescribed burns in Units 11 and 12 in 2011. The northern portion of work is addressed in the *MRS-BLM Units 4, 11, and 12 MEC Remedial Action Report, Former Fort Ord, California* (ITSI Gilbane 2013) and the western portion is addressed in the *MRS-BLM Units 7, 10, and 33 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (Gilbane 2014). Technology-aided surface MEC removal began in July 2015 and was completed in July 2016. Additionally, a digital geophysical mapping (DGM) survey was completed in the rest of Unit 23 from November 2015 until October 2016. Subsurface removal in Unit 23 included 1-ft removal on two temporary access routes, and a subsurface removal operation in 2017 targeting large projectiles at shallow depths. A total of 1,603 MEC items were found and removed during surface MEC removal operations, and 20 MEC items were removed as part of subsurface MEC removal operations (KEMRON 2020). An estimated 206,245 pounds of MD, 89,006 pounds of range-related debris (RRD) and other debris were removed as part of MEC remediation activities (KEMRON 2020). 1603 MEC items were recovered during surface removal and an additional 20 MEC items were recovered during subsurface removal to a 1-ft depth along temporary vehicle access routes. Further detailed information can be found in *MRS-BLM Unit 23, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2020).

A.28.4 RECONNAISSANCE

Following MEC removal, the BRA evaluation is implemented to identify whether elevated concentrations of COCs (metals and explosive residues) are still present. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil (KEMRON 2018). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.28.5 SITE CHARACTERIZATION

Soil sampling was performed from May 2017 through June 2017. Sample analytical data was evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (KEMRON 2020).

A.28.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampling using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2018). Additional deeper samples and step-out samples were collected if COCs were found to exceed the concentration thresholds specified in the *Site*

39 ROD Amendment (Army 2009). 20 sample locations were collected at HA-212, 12 sample locations for lead and 19 sample locations for explosive residues (KEMRON 2018).

Sample locations can be found on Figure 2 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2018).

A.28.5.2 SITE CHARACTERIZATION RESULTS

Explosives were not detected in any samples. Lead was detected in samples from all analyzed locations at concentrations ranging from 9.8 milligram per kilogram (mg/kg) to 23.7 mg/kg which are below the ecological cleanup level of 225 mg/kg (KEMRON 2018). Soil sample results are displayed on Figure 2 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2018).

A.28.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-212. Additionally, soil affected by lead is limited and area-weighted lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-212.

A.28.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

Gilbane, 2014, *MRS-BLM Units 7, 10, and 33 MEC Remedial Action Technical Memorandum, Former Fort Ord, California*. (AR# OE-0842)

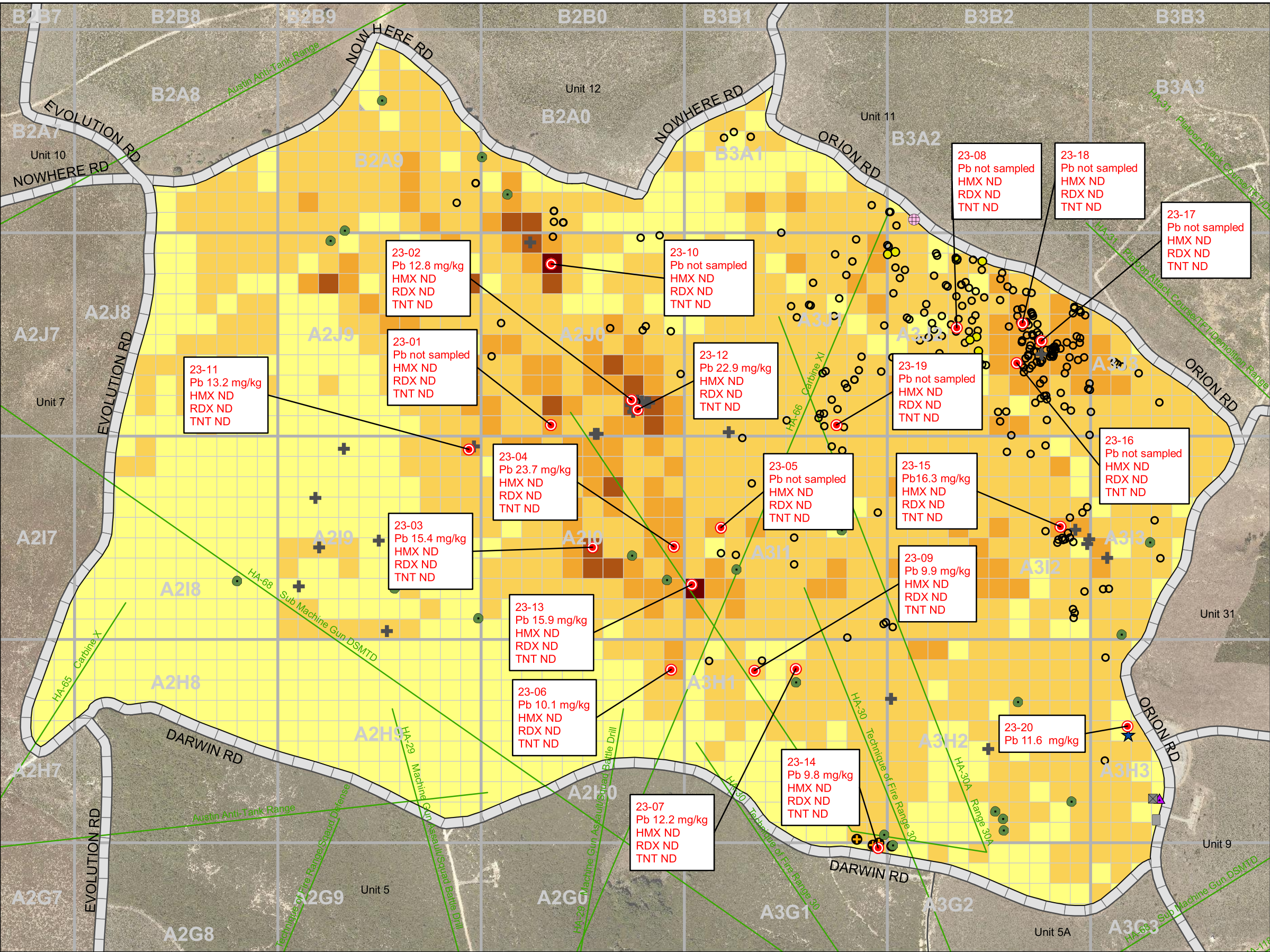
ITSI Gilbane, 2013. *MRS-BLM Units 4, 11, and 12 MEC Remedial Action Report, Former Fort Ord, California* (AR# OE-0799B)

KEMRON, 2017. *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0893A)

KEMRON, 2018. *Final Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 23, Former Fort Ord, Monterey County, California*. (AR# BW-2842A)

KEMRON, 2020. *MRS-BLM Unit 23, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0979A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



Legend

Sample Location with Lead (Pb) Results in milligrams per kilogram (mg/kg) and Explosives Results in micrograms per kilogram (ug/kg) where analyzed

- Crater
- Soil Mound
- ✚ Target
- Non-MD Debris
- ✚ Firing Point
- ⊗ 55 Gallon drum parts
- ★ Machine Gun Links
- Paved Parking Area
- ▲ Slabs
- Structure/Bunker

Weight of MD Removed

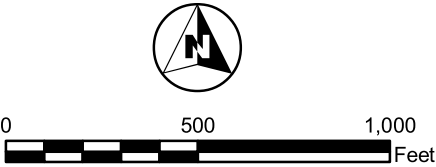
- 0 - 5 lbs MD (39%)
- 51 - 200 lbs MD (51%)
- 201 - 500 lbs MD (9%)
- 501 - 1,000 lbs MD (1%)
- 1,001 - 1,311 lbs MD (0.1%)

Range Fan

Unit 23

Other Unit

Fuel Break/Road



Sampling Results Technical Memorandum
Basewide Range Assessment Investigation Unit 23
Former Fort Ord, California

Figure 2
Unit 23 Soil Analytical Results

A.29 HA-213, UNIT 25

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES; NO FURTHER BRA ACTION

LOCATION: SOUTHEASTERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-68 AND 70

A.29.1 SITE DESCRIPTION AND BACKGROUND

Site HA-213, also known as Unit 25, is located on the southeastern edge of the Impact Area Munition Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-213 is a subarea of Site 39 and part of the ongoing Basewide Range Assessment (BRA) investigation as defined in the *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 25 and 28, Former Fort Ord, Monterey County, California* (KEMRON 2019a). Range use within HA-213 included rifle grenades, projectiles, rockets, and pyrotechnics.

Two former ranges/historical areas extend into HA-213. Below is a table listing the former ranges that extend into HA-213.

Historical Areas Associated with HA-213

Historical Area	Military History and Training Activities
HA-68	Sub Mach Gun
HA-70	Small Arms Firing Course

Further information on each individual HA within HA-213 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-213 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.29.2 PREVIOUS SITE CHARACTERIZATION

Prior site reconnaissance for contaminants of concern (COCs) was conducted for HA-70. Further information on work performed at each individual HA prior to 2012 within HA-213 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.29.3 COMPLETED MUNITIONS RESPONSE

119 MEC items were encountered and removed from Unit 25 prior to the remedial action. Technology-aided surface MEC removal in the western portion of Unit 25 began in July 2015 and was completed in October 2015. Approximately nine acres of Unit 25 were inaccessible to surface MEC removal due to extreme terrain. The remainder of Unit 25 was restarted in July 2016 and was completed in July 2017. 324 MEC items were recovered from the site (KEMRON 2018). Additionally, a digital geophysical mapping (DGM) survey started in the western portion of the site in November 2015 and the rest of the area was completed in August 2017. An estimated 58,091 pounds of MD, 34,842 pounds of range-related debris (RDD) and other debris were removed as part of remediation activities (KEMRON 2018). Further detailed information can be found in *Final, MRS-BLM Unit 25, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2019b).

A.29.4 RECONNAISSANCE

Upon completion of MEC removal in each range, the BRA evaluation is implemented to identify whether elevated concentrations of Contaminates of Concern (COCs; metals and explosive residues) are present. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil (KEMRON 2019a). Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.29.5 SITE CHARACTERIZATION

Soil sampling was performed in April 2018. Sample analytical data was evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.29.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampling using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, one foot below ground surface (bgs), and 2 feet bgs (KEMRON 2018). Additional deeper samples and step-out samples were collected if COCs were found to exceed their respective ecological cleanup levels specified in the *Site 39 ROD Amendment* (Army 2009). 12 sample locations were collected, 5 sample locations for lead and 12 sample location for explosive residues.

Sample locations can be found on Figure 2 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2019a).

A.29.5.2 SITE CHARACTERIZATION RESULTS

Explosives were not detected in any of the samples analyzed for explosives residues. Lead was detected in all locations at concentrations ranging from 7.0 milligrams per kilogram (mg/kg) to 16.3 mg/kg which are below the ecological cleanup of 225 mg/kg (KEMRON 2019a). Soil sample results are displayed on Figure 2 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2019a).

A.29.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-213. Additionally, lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-213.

A.29.7 REFERENCES

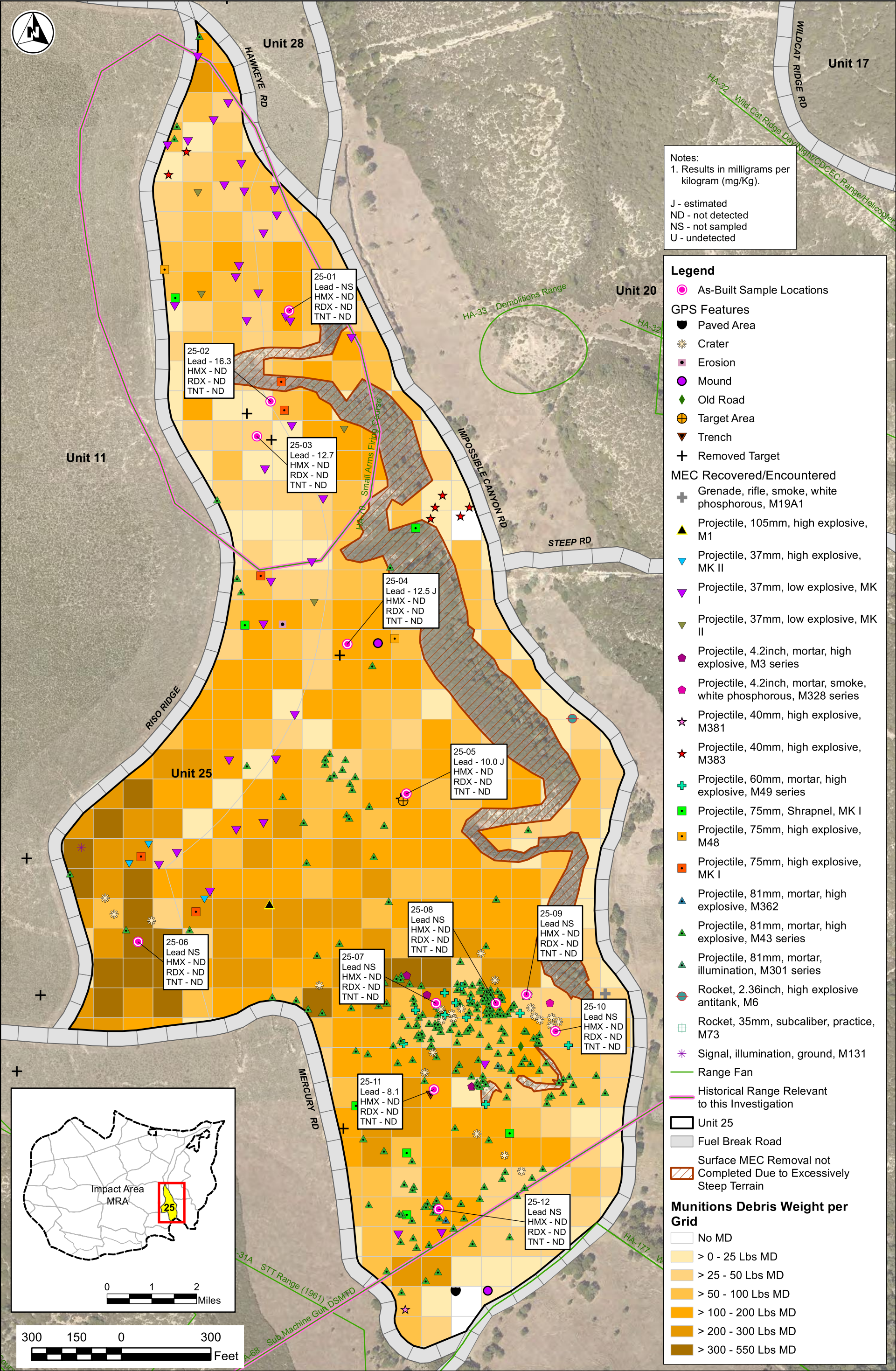
Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

KEMRON, 2018. *MRS-BLM Unit 25 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0915A)

KEMRON, 2019a. *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 25 and 28, Former Fort Ord, Monterey County, California*. (AR# BW-2855B)

KEMRON, 2019b. *Final, MRS-BLM Unit 25, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0940B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



Sampling Results Technical Memorandum
Basewide Range Assessment Investigation
Units 25 and 28
Former Fort Ord, California

Figure 2
Unit 25 Soil Analytical Results



A.30 HA-214, UNIT 28

STATUS: RECONNAISSANCE AND SAMPLING COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHEAST PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-36, COMBAT CITIES, AND RIFLE GRENADE RANGE

A.30.1 SITE DESCRIPTION AND BACKGROUND

Site HA-214, also known as Unit 28, is located in the northeastern portion of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-214 is a subarea of Site 39 and part of the ongoing Basewide Range Assessment (BRA) investigation as defined in the *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 25 and 28, Former Fort Ord, Monterey County, California* (KEMRON 2019a).

Three former ranges/historical areas extend into HA-214. Below is a table listing the former ranges that extend into HA-214.

Historical Areas Associated with HA-213

Historical Area	Military History and Training Activities
HA-36	Machine Gun Assault Range, Squad Battle Drill and Assault Range, 10m Machine Gun, 25 m Zero, M-3 Machine Gun

Further information on each individual HA within HA-214 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-214 was evaluated as part of the BRA following munitions cleanup. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further evaluation of the entire area.

A.30.2 PREVIOUS SITE CHARACTERIZATION

Prior to the BRA, HA-36 was characterized for both metals and explosives. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-214 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.30.3 COMPLETED MUNITIONS RESPONSE

Seven MEC items were previously recovered from 1993 through 2012. Technology-aided surface MEC removal in the southern portion of Unit 28 began in September 2015 and was completed in October 2015. The remaining area of Unit 28 was cleared for MEC in April 2016 and was completed in May 2017. Approximately 12 acres of Unit 28 was determined to be inaccessible to surface MEC removal due to extreme terrain. A total of 225 MEC items were found and removed during vegetation clearance and surface MEC removal operations (KEMRON 2018). Additionally, a digital geophysical mapping (DGM) survey was conducted in November 2015 and was completed in June 2017. An estimated 24,583 pounds of MD, 34,780 pounds of range-related debris (RDD) and other debris were removed as part of MEC activities. Further detailed information can be found in *MRS-BLM Unit 28, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (KEMRON 2018). In 2018-2019, subsurface removal was conducted within the area planned for future re-route of Impossible Canyon Road. No MEC was recovered. Further information can be found in *Draft Final Volume 1, Technical Information Paper, Fuel Breaks, Impact Area Munitions Response Area, Former Fort Ord, California* (KEMRON 2021).

A.30.4 RECONNAISSANCE

Following MEC removal, the BRA evaluation is implemented to identify whether elevated concentrations of contaminants of concern (COCs; metals and explosive residues) are present. A complete unit reconnaissance and field evaluation was performed on this area for lead and explosives (HMX, RDX, and TNT) in soil. Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs.

A.30.5 SITE CHARACTERIZATION

Soil sampling was performed in April 2018. Sample analytical data was evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.30.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampling using a seven-point wheel pattern where six increments were collected from a circular area approximately 4 feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2019). Additional deeper samples and step-out samples were collected if COCs were found to exceed their respective ecological cleanup levels specified in the *Site 39 ROD Amendment* (Army 2009). Nine sample locations were collected at HA-214, five sample locations for lead and nine sample location for explosive residues (KEMRON 2019).

Sample locations can be found on Figure 3 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2019).

A.30.5.2 SITE CHARACTERIZATION RESULTS

Explosives were not detected in any of the samples analyzed for explosives residues. Lead was detected in all locations at concentrations ranging from 8.7 milligram per kilogram (mg/kg) to 128.0 mg/kg which are below the ecological cleanup level of 225 mg/kg (KEMRON 2019). Soil sample results are displayed on Figure 3 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2019a).

A.30.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in HA-214. Additionally, lead concentrations do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). No further BRA action is warranted regarding explosive residues and metals in soil at HA-214.

A.30.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

KEMRON, 2018. *MRS-BLM Unit 28, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0928A)

KEMRON, 2019. *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Units 25 and 28, Former Fort Ord, Monterey County, California*. (AR# 2855B)

KEMRON, 2021. *Draft Final Volume 1, Technical Information Paper, Fuel Breaks, Impact Area Munitions Response Area, Former Fort Ord, California*. (AR# OE-0985B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.31 HA-215, UNIT 31

STATUS: RECOMMEND RECONNAISSANCE FOR LEAD AND EXPLOSIVES, RECOMMEND FURTHER BRA ACTION

LOCATION: SOUTHEASTERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-31, 31A, AND 68

A.31.1 SITE DESCRIPTION AND BACKGROUND

Site HA-215, also known as Unit 31, is located on the southeastern edge of the Impact Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-215 is a subarea of Site 39 and part of the ongoing Basewide Range Assessment (BRA) defined in the *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase 1, Former Fort Ord, Monterey County, California* (KEMRON 2019). Range use within HA-215 included use of small arms, automatic weapons, and projectiles.

Three former ranges/historical areas extend into HA-215. Below is a table listing the former ranges that extend into HA-215.

Historical Areas Associated with HA-215

Historical Area	Military History and Training Activities
HA-31	Platoon Attack Course, Demolition Range
HA-31A	STT Range 23
HA-68	Sub Machine Gun

Further information on each individual HA within HA-215 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-215 is comprised of an area of approximately 103 acres of rolling terrain. In 2019 (the year of Phase I BRA reconnaissance), an area of masticated vegetation approximately 200 to 400 feet wide (approximately 57 total acres) was present around the perimeter of HA-215 adjacent to access roads for the purpose of prescribed burn containment (KEMRON 2020). The portion of HA-215 where surface MEC removal had been conducted was evaluated as part of Phase I. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further investigation of the entire area.

A.31.2 PREVIOUS SITE CHARACTERIZATION

Prior to the BRA, each individual HA was characterized for both explosives and metals. Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-215 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.31.3 COMPLETED MUNITIONS RESPONSE

Vegetation clearance only occurred in the fuel break areas of HA-215 in June 2015 and July 2016. Technology-aided surface MEC removal was conducted in the northern portion of HA-215 in July 2015 and was completed in November 2015. Additionally, technology-aided surface MEC removal in the remainder of the fuel-break area started in June 2016 and was completed in September 2016. 79 MEC items were recovered from the fuel-break perimeter area of HA-215. A digital geophysical mapping (DGM) survey was also performed in the northern portion and in the fuel-break area in October 2015 and August 2017, respectively. MEC removal was completed in all grids within the primary burn fuel-break area in HA-215. Completion of the remaining MEC removal is pending a prescribed burn. In summary, of total the 103-acres, MEC removal was completed in the 57-acre perimeter fuel-break area via technology-aided surface removal and 54-acres received DGM survey. MEC removal has not been completed in the remaining acres of Unit 31 due to dense vegetation. Further detailed information can be found in *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California* (KEMRON 2020). The BRA investigation was initiated before MEC removal operations in the remaining areas of HA-215 due to elevated concentrations of chemicals of concern (COCs) that could, if confirmed, affect subsequent site management decisions regarding potential vegetation reduction processes and MEC removal logistics (KEMRON 2019).

A.31.4 RECONNAISSANCE

Reconnaissance and field evaluation was performed on the fuel break area of HA-215 for lead and explosives (HMX, RDX, and TNT) in soil. Sample locations were chosen based upon representing the potential worst-case scenario as most likely to contain elevated concentrations of COCs. Site reconnaissance and field evaluation was performed in January 2017 and February 2017.

A.31.5 SITE CHARACTERIZATION

Soil sampling was performed in April 2018. Sample analytical data was evaluated and compared to the concentration thresholds specified in the *Site 39 Record of Decision (ROD) Amendment* for protection of human health and the environment (Army 2009).

A.31.5.1 APPROACH

Samples were collected using seven-point incremental sampling. Each location was sampling using a seven-point wheel pattern where six increments were collected from a circular area approximately four feet in diameter and one soil increment was collected from the center. All seven increments were then combined into a single bulk sample for analysis. Soil samples were collected from the surface, 1 foot below ground surface (bgs), and 2 feet bgs (KEMRON 2019). Additional deeper samples and step-out samples were collected if COCs were found to exceed their respective ecological cleanup levels specified in the *Site 39 ROD Amendment* (Army 2009). 43 sample locations were collected at HA-215, 37 sample locations for lead and 18 sample locations for explosive residues (KEMRON 2019).

Sample locations can be found on Figure 2 pulled from the *Sampling Results Technical Memorandum* (KEMRON 2019).

A.31.5.2 SITE CHARACTERIZATION RESULTS

Explosives were not detected in any of the samples analyzed for explosives residues. Lead was detected at concentrations ranging from 1.6 milligrams per kilogram (mg/kg) to 6,690 mg/kg (KEMRON 2019). Soil sample results are displayed on Figure 2 pulled from *Sampling Results Technical Memorandum* (KEMRON 2019). Elevated lead concentrations were found in three general areas at former Range 31 (HA-31) and Range 31A (HA-31A) areas exceeding the 225 mg/kg ecological cleanup level in the Site 39 ROD amendment (KEMRON 2019). The three general areas of concern are near two targets and 3 acres surrounding impact berms and multiple targets.

A.31.6 RECOMMENDATION

Evaluation of analytical results for soil samples indicates that explosive residues do not appear to be present in the accessible areas of HA-215 which include the 57-acre perimeter fuel break. However, additional locations may be present in densely vegetated areas that were not accessible at the time of the 2017 reconnaissance. Elevated lead concentrations were found in multiple locations, and it is recommended to conduct limited remediation in these areas. Elevated lead concentrations at the two target areas should be further characterized by performing step-out sampling and confirmation sampling should be conducted during excavation operations. Additionally, many areas were inaccessible due to dense vegetation that need to be further characterized following vegetation removal. Following additional vegetation reduction, an additional BRA evaluation should be performed which includes additional sampling for explosive residues and lead (KEMRON 2019).

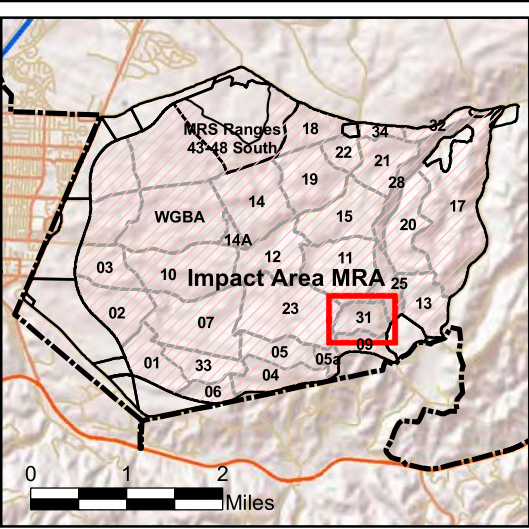
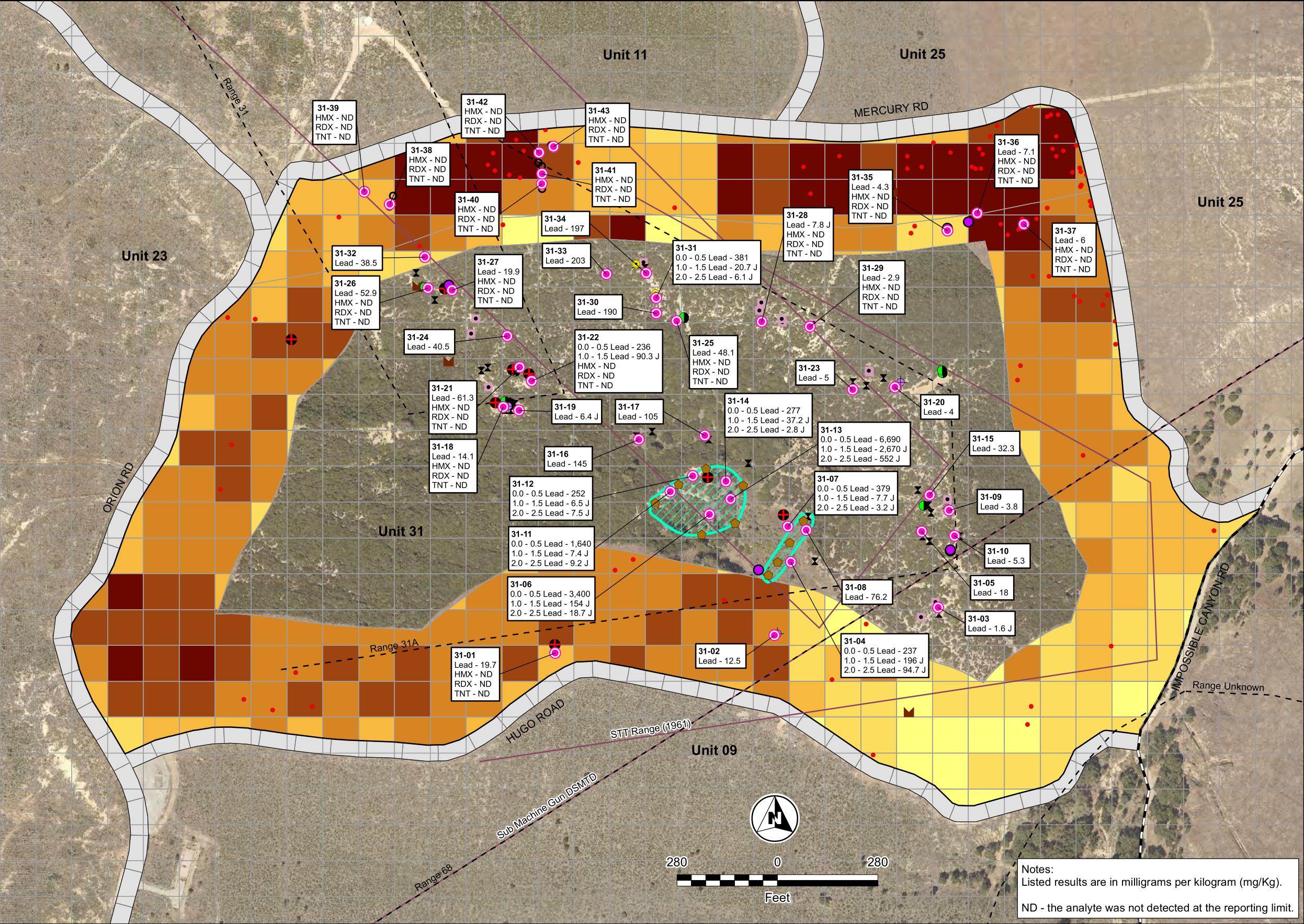
A.31.7 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

KEMRON, 2019. *Sampling Result Technical Memorandum, Basewide Range Assessment Investigation, Site 39 Unit 31 Phase I, Former Fort Ord, Monterey County, California*. (AR# BW-2856A)

KEMRON, 2020. *MRS-BLM Unit 31 MEC Remedial Action Technical Information Paper, Former Fort Ord, California*. (AR# OE-0975A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



- Legend**
- Sample Location and Results for Surface Samples
- GPS Features**
- Berm
 - Crater
 - Firing Point
 - Lead Accumulation
 - MD
 - Mound
 - Small Arms Casing or Bullets
 - Target
 - Trench
 - Wood Debris
 - Prior Location of UXO with Sensitive Fuze
 - Other MEC
 - Historical Range Fan/Area
 - Historical Area (HA)
 - Berm
 - Fuel Break
 - Impact Area MRA
- Weight of MD/Lead**
- 0 - 5 lbs MD
 - 5 - 25 lbs MD
 - 25 - 50 lbs MD
 - 50 - 100 lbs MD
 - 100 - 150 lbs MD
 - 150 - 340 lbs MD

Notes:
Listed results are in milligrams per kilogram (mg/Kg).
ND - the analyte was not detected at the reporting limit.



KEMRON
ENVIRONMENTAL SERVICES

Gilbane

Sampling Results Technical Memorandum
Basewide Range Assessment Investigation
Unit 31
Former Fort Ord, California

Figure 2
Unit 31 Soil Analytical Results

A.32 HA-216, UNIT 6

STATUS: REMEDIATION COMPLETE FOR LEAD, RECONNAISSANCE COMPLETE FOR LEAD AND EXPLOSIVES, RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHWESTERN CORNER OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-27A

A.32.1 SITE DESCRIPTION AND BACKGROUND

Site HA-216, also known as Unit 6, is located on the southwestern corner of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-216 is a subarea of Site 39 and part of the ongoing Basewide Range Assessment (BRA) defined in the *Sampling Results Technical Memorandum, Basewide Range Assessment Investigation, Unit 6, Former Fort Ord, California* (Gilbane 2015). HA-27A was used for small arms training which included M-60 machine guns, M-14 and M-16 rifles and 38-caliber and 45-caliber pistols.

One former range/historical area extend into HA-216. Below is a table listing the former range that extends into HA-216.

Historical Areas Associated with HA-216

Historical Area	Military History and Training Activities
HA-27A	10m Machine Gun/25m Rifle Range

Further information on HA-27A is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

HA-216 was evaluated as part of the BRA. Background data for each unit were compiled to provide the historical context of site use and to identify areas of potential concern. Compiled data included historical documentation, data generated during removal operations associated with munitions and explosives of concern (MEC) and results of previous field reconnaissance and investigations within each unit or area. This data was then used to help aid in further investigation of the entire area.

A.32.2 COMPLETED MUNITIONS RESPONSE

One MEC item was recovered in HA-216 during previous sampling and investigation activities. Following vegetation removal, MEC removal and digital geophysical mapping (DGM) surveys commenced. Surface MEC removal work occurred in August 2012 and was completed in September 2013. No MEC items were recovered during surface MEC removal activities. Additionally, no MEC items were encountered and removed as part of subsurface MEC remediation activities in the Unit 6 100-foot buffer. A DGM survey was conducted in January 2013 and was completed in November 2013 (ITSI Gilbane 2014). Further detailed information can be found in *Draft Final, MRS-BLM Units 6, 7, 10, and 33, Munitions and Explosives of Concern, Remedial Action Report* (KEMRON 2015).

A.32.3 RECONNAISSANCE

Following MEC removal, BRA reconnaissance was implemented to identify whether elevated concentrations of Contaminates of Concern (COCs; metals and explosives) were present. Based upon a complete comprehensive analysis of all collected data to date, further site characterization was not recommended (Gilbane 2015).

A.32.4 PREVIOUS SITE CHARACTERIZATION RESULTS

Areas with elevated lead concentrations were already previously identified in soil at HA-27A and was removed to a range wide weighted cleanup level of 225 mg/kg as described in the *Final Technical Memorandum, Summary of Remedial Action Completion at Historical Areas 18, 19, 22, 23, 26, 27, 27a, 28, 29, 33, 36, 39/40/40A, 43, 44, and 48 (MRS-BLM), Former Fort Ord, California, Revision 0* (Shaw 2011). Physical features typically associated with elevated concentrations of COCs were not found in HA-216 outside the footprint of HA-27A (Gilbane 2015).

A.32.5 RECOMMENDATION

Evaluation of HA-216 indicates only one former range (HA-27A) was present within this area. Elevated lead concentrations within HA-27A have been remediated and do not exceed the protectiveness thresholds specified in the *Site 39 ROD Amendment* (Army 2009). Additionally, only one MEC item was found in all of HA-216 and no evidence of former ranges are indicative of potential elevated COCs outside HA-27A. Based on the completed Range 27A remediation and conditions in the remaining area of Unit 6 for which Basewide Range Assessment Work Plan (BRAWP) decision criteria specify that no further investigation is needed (Gilbane 2015). No further BRA is warranted for HA-216.

A.32.6 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

Gilbane, 2015. *Final Technical Memorandum Basewide Range Assessment Investigation, Unit 6, Former Fort Ord, California*. (AR# BW-2719B)

ITSI Gilbane, 2014. *MRS-BLM Unit 6 MEC Remedial Action Technical Memorandum, Former Fort Ord, California*. (AR# OE-0811A)

KEMRON, 2015. *Draft Final, MRS-BLM Units 6, 7, 10, and 33, Munitions and Explosives of Concern, Remedial Action Report*. (AR# OE-0867)

Shaw, 2011. *Final Technical Memorandum, Summary of Remedial Action Completion at Historical Areas 18, 19, 22, 23, 26, 27, 27a, 28, 29, 33, 36, 39/40/40A, 43, 44, and 48 (MRS-BLM), Former Fort Ord, California, Revision 0*. (AR# RI-045A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.33 HA-217, MRS-RANGES 43-48 SOUTH

STATUS: NO FURTHER BRA ACTION WARRANTED

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-42, 43 AND 48H

A.33.1 SITE DESCRIPTION AND BACKGROUND

Site HA-217, also known as MRS-Ranges 43-48 South, is located on the northern edge of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-217 is a subarea of Site 39. Military munitions used on site included artillery and mortar projectiles, rockets and guided missiles, rifle and hand grenades, practice land mines, pyrotechnics, bombs, and demolition materials (KEMRON 2020).

Three former ranges/historical areas extend into HA-217. Below is a table listing the former ranges that extend into HA-217.

Historical Areas Associated with HA-217

Historical Area	Military History and Training Activities
HA-42	Mortar Range (Long Range)
HA-43	Platoon Size Live Fire Course, Mortar Range
HA-48H	14.5mm Artillery and Mortar Subcaliber Range, Light Antitank Weapons Range, Sniper Training

Further information on each individual HA within HA-217 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.33.2 PREVIOUS SITE CHARACTERIZATION

Initial characterization was conducted within each individual HA. This led to remediation actions to reduce contaminants of concern (COCs) in HA-43 and HA-48H. Those remedial actions were completed (Gilbane 2014). Revision 2 recommended no further BRA action for these HAs (Shaw 2012). The BRA in 2005 recommended additional evaluation of HA-42 after MEC remediation (Shaw 2012). Further information about previous characterization and remediation can be found in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.33.3 COMPLETED MUNITIONS RESPONSE

Several munitions response actions have been conducted within MRS-Ranges 43-48 South. The site is part of the Ranges 43-48 Interim Action site where surface removal, and subsurface removal in portions of the area, were conducted in 2003-2005 (Parsons 2007). These activities resulted in the recovery of 1798 UXO items, 50 DMM items, and 21 ISD items. Additional MEC removal activities occurred in portions of the site, including a surface removal in an accidental fire area, near-surface removals in the 11-acre Field Study Area and the 31-acre Additional Work Area, and subsurface removal in Broadway Bypass and soil remediation areas. These activities removed additional 554 MEC items. Further details

are reported in *Draft Final MRS-Ranges 43-48 South Munitions and Explosives of Concern Remedial Action Report, Former Fort Ord, California* (KEMRON 2020a). Additionally, surface removal areas have been subjected to annual surface monitoring, most recently in 2021 (KEMRON 2022).

A.33.4 RECONNAISSANCE

MEC remedial action has been conducted in Ranges 43-48 as an interim action. During the interim action in 2003-2005, surface removal, and subsurface removal in portions of the area, were conducted (Parsons 2007). This information was available at the time of the development of *Site 39 Feasibility Study Addendum* and *Site 39 ROD Amendment*, and no additional BRA action or soil remediation was identified within Ranges 43-48 other than the specific areas listed in those documents. After the Track 3 ROD was signed in 2008 (Army 2008), additional work was conducted in portions of the site. Procedures used during work in the 11-acre Field Study Area of Range 48 included that field crews would document features that relate to BRA (KEMRON 2017), and no such finding was reported in the Field Study Report (KEMRON 2020b). During the near-surface MEC removals conducted in the Range 48 Additional Work Area (31 acres) in 2019, field personnel were trained to recognize and report evidence of potential soil contamination. No such evidence was noted (KEMRON 2019). No further BRA action is warranted for HA-217.

A.33.5 RECOMMENDATION

Based on previous investigations, no further BRA action is warranted for HA-217.

A.33.6 REFERENCES

Gilbane, 2014. *Final Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California*. (AR# RI-047C)

KEMRON, 2017. *Final, Work Plan, Munitions with Sensitive Fuzes Field Study, Former Fort Ord, California*. (AR# OE-0888B)

KEMRON, 2019. *Technical Memorandum, MEC Remedial Action, Track 3 Impact Area MRA, MRS Ranges 43-48 South, Former Fort Ord, California*. (AR# OE-0949A)

KEMRON, 2020a. *MRS-Ranges 43-48 South Munitions and Explosives of Concern Remedial Action Report, Former Fort Ord, California*. (AR# OE 0984A)

KEMRON, 2020b. *Final Field Study Report, Munitions with Sensitive Fuzes Field Study, Impact Area Munitions Response Area, Former Fort Ord, California*. (AR# OE-0960A)

KEMRON, 2022. *2021 Track 3 Annual Surface Monitoring Report, Former Fort Ord, California*. (AR# OE-0847L)

Parsons, 2007. *MRS-Ranges 43-48, Interim Action, Technical Information Paper, Volume 1*. (AR# OE-0590L)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

United States Department of the Army (Army), 2008. *Final Record of Decision, Impact Area Munitions Response Area, Track 3 Munitions Response Site, Former Fort Ord, California*. (AR# OE-0647)

A.34 HA-218, ESCA INTERIM ACTION RANGES

STATUS: RECOMMEND NO FURTHER BRA EVALUATION

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-43, 44, 45, 46H, AND 47

A.34.1 SITE DESCRIPTION AND BACKGROUND

Site HA-218, also known as the Environmental Services Cooperative Agreement (ESCA) Interim Action Ranges Munitions Response Area, is located in the northern portion of the historical impact area north of MRS Ranges 43-48 South (HA-217) (PLATE 3.1). Military munitions on site included mortars, small arms, grenades, and pistol firing (Army 2016).

Four former ranges/historical areas extend into HA-218. Below is a table listing the former ranges that extend into HA-218.

Historical Areas Associated with HA-218

Historical Area	Military History and Training Activities
HA-43	Platoon Size Live Fire Course, Mortar Range
HA-44	Antitank Weapons Range
HA-45	Grenade Launcher Range
HA-46H	Pistol Range, MP/CID Qualification Course, Night Record Fire, 10m MG
HA-47	M79 Grenade Launcher

Further information on each individual HA within HA-218 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.34.2 PREVIOUS SITE CHARACTERIZATION

Each individual HA was characterized for both explosives and metals. Initial characterization was conducted within each individual HA. This led to remediation actions to reduce contaminants of concern (COCs) in several former ranges. Those remedial actions were completed (ITSI Gilbane 2014). Revision 2 recommended no further BRA action for these HAs, with the exception of a recommendation for reconnaissance in HA-42 after MEC removal (Shaw 2012). Further information on remedial and sampling activities in each HA prior to 2012 within HA-218 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.34.3 COMPLETED MUNITIONS RESPONSE

Several munitions response actions have been conducted within the ESCA Interim Action Ranges MRA. The site is part of the Ranges 43-48 Interim Action site where surface removal, and subsurface removal in portions of the area, were conducted in 2003-2005 (Parsons 2007). Subsurface removal was also conducted in soil remediation areas in HA-43 and -44 in 2010, HA-45 in 2004 and HA-46H in 2004 (ITSI Gilbane 2014).

As part of the Environmental Services Cooperative Agreement (ESCA), the Fort Ord Reuse Authority conducted additional munitions response actions in portions of the site. As described in the ESCA Interim Action Ranges MRA ROD (Army 2016), those actions included a design study in several ranges and subsurface removal including excavation and sifting in Range 47.

Based on the work performed, the final selected remedy is land use controls (Army 2016).

A.34.4 RECONNAISSANCE

As described in the ESCA Interim Action Ranges ROD, soil remedial actions have been completed by the Army at the Site 39 Inland Ranges and results of the remedial actions meet the remedial action objectives (RAOs) established for the Site 39 Inland Ranges for removal of soil contaminated with lead and/or explosives constituents (Army 2016).

A.34.5 RECOMMENDATION

Soil remedial actions have been completed by the Army at the Site 39 Inland Ranges at the ESCA Interim Action Ranges MRA. Based on the evaluations, no further BRA action is warranted for HA-218.

A.34.6 REFERENCES

ITSI Gilbane, 2014. Final, Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California. (RI-047C)

Parsons, 2007. *Final, MRS-Ranges 43-48, Interim Action, Technical Information Paper, Volume 1*. (AR# OE-0590L)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

United States Department of the Army (Army), 2016. *Record of Decision, Interim Action Ranges Munitions Response Area, Former Fort Ord, California*. (ESCA-0331)

A.35 HA-219, BLM Area B Sub-Areas B-2A and B-3

STATUS: RECOMMEND RECONNAISSANCE FOR LEAD AND EXPLSOVES IN UNIT A SUB-AREA B-3,
RECOMMEND NO FURTHER BRA IN OTHER UNITS

LOCATION: NORTH OF THE IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-97, 121, 139, 170, 178, 183H, 184H, 186, 188, AND 201

A.35.1 SITE DESCRIPTION AND BACKGROUND

Site HA-219, also known as Bureau of Land Management (BLM) Area B sub-areas B-2A and B-3, is located north outside the Impact Area Munitions Response Area (MRA) (PLATE 3.1). Military munitions used on site included machine guns, rifle grenades, smoke grenades, and shoulder-launched projectiles (Gilbane 2015).

Twelve former ranges/historical ranges extend into HA-219. Below is a table listing the former ranges that extend into HA-219.

Historical Areas Associated with HA-219

Historical Area	Military History and Training Activities
HA-97	MBA Training Area
HA-121	Rifle Grenade Range
HA-139	Training Site 7, Training Area (Bivouac)
HA-170	Parker Flats Gas House
HA-178	Former Dummy Grenade
HA-183H	Shoulder-Launched Projectile Area
HA-184H	Canyon Target Area
HA-186	Hayrake Area
HA-188	Unnamed, coordinates only
HA-201	Closed Combat Range

Further information on each individual HA within HA-219 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.35.2 PREVIOUS SITE CHARACTERIZATION

Prior to the BRA, each individual HA was characterized for both explosives and metals. Revision 2 recommended no further BRA action for these HAs (Shaw 2012). Further information on remedial and sampling activities in each individual HA prior to 2012 within HA-219 is provided in Appendix A in the *2012 Comprehensive BRA Report* (Shaw 2012).

A.35.3 COMPLETED MUNITIONS RESPONSE

Portions of BLM Area B were investigated over the course of several munitions responses prior to 2017. Based on a comprehensive evaluation conducted in the RI/FS, the 2017 Record of Decision (Army 2017) required additional MEC remediation in sub-areas B-2A (74 acres) and B-3 (718 acres). These remedial actions were implemented in 2017-2019, with the exception of Unit A, as described in Draft Final BLM Area B Remedial Action Report (2017-2019), Former Fort Ord, California (KEMRON 2020). Prior to the remedial action, 247 MEC items had been recovered in the site. Technology-aided surface MEC removal and digital geophysical mapping (DGM) survey were conducted in sub-areas B-2A and B-3, excluding Unit A. Subsurface removal was conducted in portions of the site such as roads and trails. A total of 450 MEC items were removed, 200 MEC items (183 DMM items and 117 UXO items) were removed during surface MEC removal and a total of 150 MEC items (112 DMM items and 38 UXO items) were removed during subsurface MEC removal. Approximately 38,619 pounds of munition debris (MD) was removed during all remedial actions. The completion of the remaining remedial action within Unit A is pending a prescribed burn during a future burn season. Further detailed information can be found in *BLM Area B, Remedial Action Report (2017-2019), Former Fort Ord California, Draft Final* (KEMRON 2020).

A.35.4 RECONNAISSANCE

Following the munitions cleanup, the BRA evaluation was implemented to identify whether elevated concentrations of contaminants of concern (COCs; metals and explosive residues) are still present. Site reconnaissance was conducted throughout HA-219 in December 2018. No significant accumulations of live small arms, bullet fragments, or other material or physical features that indicate potentially elevated metals COCs were identified. Unit A in sub-area B-3 was not accessible for BRA site reconnaissance (KEMRON 2019). Reconnaissance areas can be found on Figure 8 from the *Site Evaluation Results, Basewide Range Assessment Investigation, BLM Area B – Sub-Areas B-2A and B-3, Units A, B, B-2A, B-3E, B-3W, and C, Former Fort Ord, Monterey County, California* (KEMRON 2019).

A.35.5 SITE CHARACTERIZATION

Based on the review of historical documentation, results of surface MEC removal and BRA site reconnaissance, soil sampling and analysis for lead and explosives were not recommended in sub-area B-3 and B-2A. (KEMRON 2019).

A.35.6 RECOMMENDATION

No further BRA action is warranted for lead and explosives in soil in all of HA-219 except for Unit A. Further BRA action is recommended for Unit A located in sub-area B-3.

A.35.7 REFERENCES

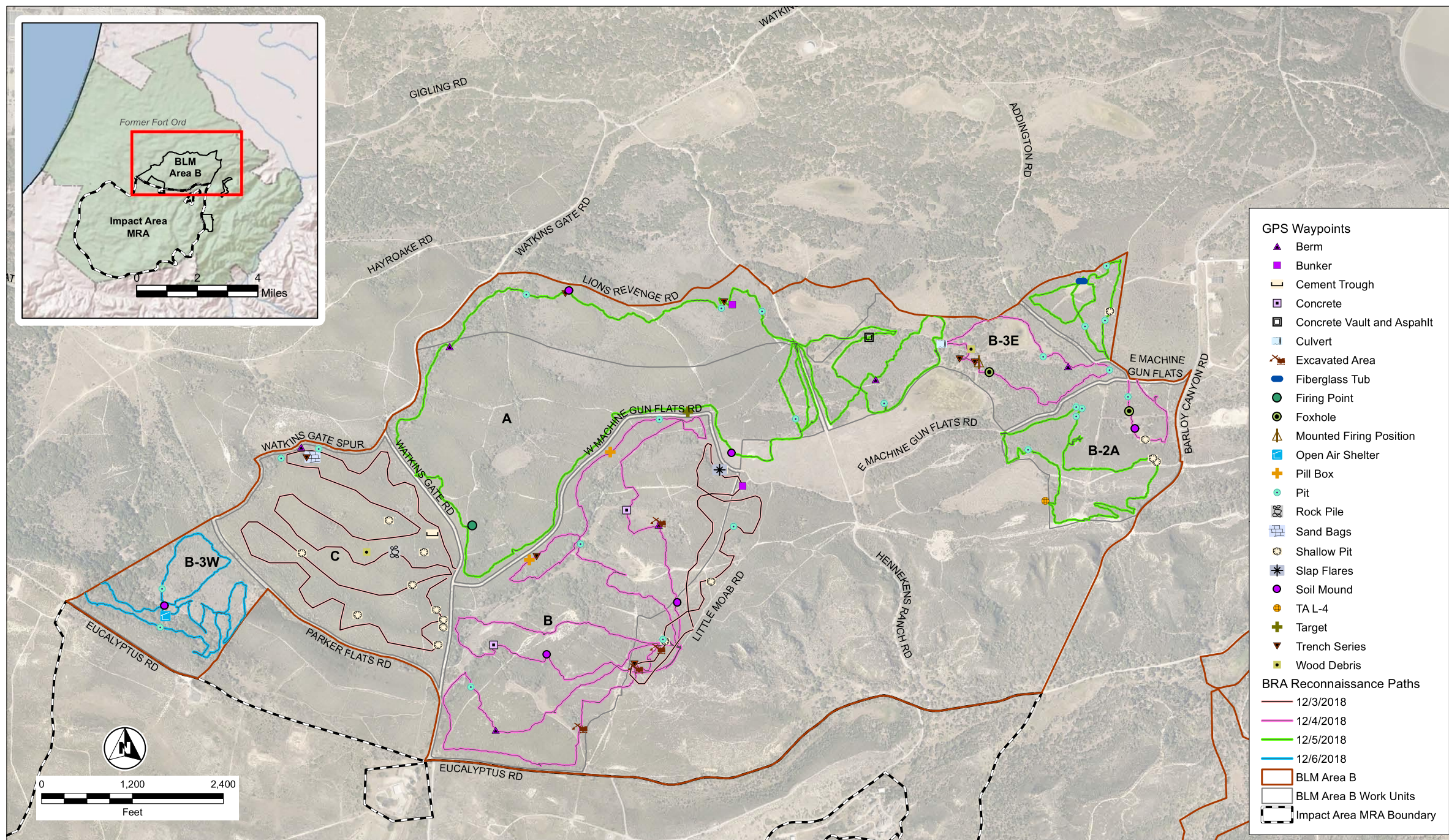
United States Department of the Army (Army), 2017. *Final Record of Decision Track 2 Bureau of Land Management Area B and Munitions Response Site 16 Former Fort Ord, California*. (AR# OE-0897)

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

KEMRON, 2019. *Site Evaluation Results, Basewide Range Assessment Investigation, BLM Area B – Sub-Areas B-2A and B-3, Units A, B, B-2A, B-3E, B-3W, and C, Former Fort Ord, Monterey County, California*. (AR# BW-2872B)

KEMRON, 2020. *BLM Area B, Remedial Action Report (2017-2019), Former Fort Ord California, Draft Final*. (AR# OE-0982A)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)



- GPS Waypoints**
- ▲ Berm
 - Bunker
 - ▭ Cement Trough
 - ▭ Concrete
 - ▭ Concrete Vault and Asphalt
 - ▭ Culvert
 - ▭ Excavated Area
 - Fiberglass Tub
 - Firing Point
 - Foxhole
 - ▲ Mounted Firing Position
 - ▭ Open Air Shelter
 - ✚ Pill Box
 - Pit
 - ▭ Rock Pile
 - ▭ Sand Bags
 - Shallow Pit
 - ★ Slap Flares
 - Soil Mound
 - ✚ TA L-4
 - ✚ Target
 - ▼ Trench Series
 - ▭ Wood Debris
- BRA Reconnaissance Paths**
- 12/3/2018
 - 12/4/2018
 - 12/5/2018
 - 12/6/2018
 - ▭ BLM Area B
 - ▭ BLM Area B Work Units
 - ▭ Impact Area MRA Boundary

Figure 8
BRA Site Reconnaissance
Path and Site Features

**Site Evaluation Results and Basewide Range
Assessment Investigation for
Units A, B, B-2A, B-3E, B-3W, and C in BLM Area B
Former Fort Ord, California**



KEMRON
ENVIRONMENTAL SERVICES

Gilbane

A.36 HA-221/HA-222, Units 22/18

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: NORTHERN EDGE OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-38, 39, 40, 40A, 41, 42, 73 AND 74

A.36.1 SITE DESCRIPTION AND BACKGROUND

Sites HA-221 and -222, also known as Units 22 and 18, respectively, are located on the northern edge of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1). HA-221 and -222 is a subarea of Site 39.

Seven former ranges/historical areas extend into HA-221 and HA-222. Below is a table listing the former ranges that extend into HA-221 and HA-222.

Historical Areas Associated with HA-221 and -222

Historical Area	Military History and Training Activities
HA-38	Zero Range, 25 M-2 Submachine Gun Shotgun
HA-39	Bench Rest Rifle Range
HA-40/40A/74	Infiltration Course, 10-m and 25m Machine gun and rifle range/Field Flame Expendiency Training
HA-41	Sub-Caliber Moving Target/Mortar
HA-42	Mortar Range (Long Range)
HA-73	Grant Close Combat Course

Further information on each individual HA within HA-221 and -222 is provided in Appendix A in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012).

A.36.2 PREVIOUS SITE CHARACTERIZATION

Previous site characterization was conducted in HAs within HA-221 and HA-222 as described in the *2012 Comprehensive Basewide Range Assessment (BRA) Report* (Shaw 2012) and *Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California* (Shaw 2008). The Site 39 Feasibility Study Addendum identified certain HAs for soil remediation which included HA-39 and -40. Following the execution of *Site 39 Record of Decision (ROD) Amendment* (Army 2009), soil remediation in HA-39 and -40 were completed (Gilbane 2014). Reconnaissance after MEC remediation had been recommended in 2005 for HA-41, -42, and -73.

A.36.3 COMPLETED MUNITIONS RESPONSE

Following prescribed burn in 2008, MEC remedial actions were completed in Units 22 and 18 in 2009. Technology-aided surface MEC removal was conducted across all grids within Units 22 and 18. Eight UXO items and 14 discarded military munition (DMM) items were recovered during the surface removal event. Following surface removal, analog subsurface MEC removal was conducted in portions of the units, and one UXO item and one DMM item were recovered. During DGM-based subsurface removal in portions of the units, one DMM item was recovered. Further detailed information can be found in the *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California* (Shaw 2011).

A.36.4 RECONNAISSANCE

Reconnaissance was conducted in conjunction with the MEC removal operations. Field personnel were trained to recognize and report evidence of potential soil contamination during MEC remedial action work. No such evidence was noted within HA-221 and HA-222 in areas other than those already known and characterized for soil remediation, as reported in *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California* (Shaw 2009).

A.36.5 RECOMMENDATION

Based on previous investigations, soil sampling is not warranted, and no further BRA action is recommended for HA-221 and HA-222, including HA-41, -42 and -73.

A.36.6 REFERENCES

Army, 2009. *Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# RI-041E)

Gilbane, 2014. *Final, Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California*. (AR# RI-047C)

Shaw, 2008. *Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California*. (AR# BW-2423F)

Shaw, 2009. *MRS-BLM Units 18 and 22, Technical Memorandum, Former Fort Ord, California*. (AR# OE-0704)

Shaw, 2011. *Final, MRS-BLM Units 18 and 22, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California*. (AR# OE-0721B)

Shaw, 2012. *Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2*. (AR# BW-2300L)

A.37 HA-223, Unit 5

STATUS: RECOMMEND NO FURTHER BRA ACTION

LOCATION: SOUTHERN PORTION OF IMPACT AREA

HISTORICAL AREAS (HAs) INCLUDED WITHIN: HA-28, 29, 30, 30A, 66, AND 68

A.37.1 SITE DESCRIPTION AND BACKGROUND

Site HA-223, also known as Unit 5, is located on the southern portion of the Impact Area Munitions Response Area (MRA) and part of the habitat portion of the site (PLATE 3.1).

HA-223 is a subarea of Site 39. Portions of several former ranges/historical areas extend into HA-223.

Historical Areas Associated with HA-223

Historical Area	Military History and Training Activities
HA-28	Technique of Fire Range, Rifle Squad Tactical Range, Automatic Rifle and ARTEP Range
HA-29	Machine Gun Assault Range, Squad Battle Drill and Assault Range, 10m Machine Gun, 25m Zero, M-3 Machine Gun
HA-30/30A	Rifle Squad Tactical Ranges, Technique of Fire Ranges, Squad Defense, ARTEP Range
HA-66	Carbine Table XI
HA-68	Sub Machine Gun Dismounted

A.37.2 PREVIOUS SITE CHARACTERIZATION

Previous site characterization was conducted in HAs within HA-223 as described in the 2012 Comprehensive Basewide Range Assessment (BRA) Report (Shaw 2012) and Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California (Shaw 2008). The Site 39 Feasibility Study Addendum identified certain HAs for soil remediation which included HA-28 and HA-29. Following the execution of Site 39 Record of Decision (ROD) Amendment (Army 2009), soil remediation in HA-28 and HA-29 were completed (Gilbane 2014). No further BRA action was required for HA-66 and HA-68 based on reconnaissance and sampling conducted. For HA-30, reconnaissance in the area within Unit 5 was pending completion of MEC remedial action.

A.37.3 COMPLETED MUNITIONS RESPONSE

Technology-aided surface MEC removal was conducted in Unit 5 in 2022. Other munitions responses included technology-aided surface MEC removal in the southwestern portion of Unit 5 (2013) and subsurface removal in portions of the unit. A total of 31 MEC items have been removed from Unit 5 from various actions. Draft Final, MRS-BLM Unit 5, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California (KEMRON 2025).

A.37.4 RECONNAISSANCE

After the completion of surface MEC removal, site reconnaissance took place on October 5, 2022, in accordance with the BRA program protocols. The reconnaissance path was developed through the evaluation of historical documentation, MEC removal data, encountered site features with the potential for soil contamination, and prior site investigation data. The reconnaissance team evaluated features such as target boxes, disturbed soil, tank defilade position, and soil mounds. The reconnaissance team did not encounter any evidence of lead or explosive material during the investigation to identify indicators of potential soil contamination, such as berms, targets, soil mounds, craters, potential firing locations, bullet accumulation areas, and other suspect physical characteristics.

As reported in Site Evaluation Results, Basewide Range Assessment Investigation, Unit 5 (KEMRON, 2023) soil sampling and analyses for lead and explosive compounds were not recommended in Unit 5.

A.37.5 RECOMMENDATION

No further BRA action is recommended for HA-223.

A.37.6 REFERENCES

Army, 2009. Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California. (RI-041E)

Gilbane, 2014. Final, Remedial Action Completion Report, Site 39 Inland Ranges Habitat Reserve, Former Fort Ord, California. (RI-047C)

KEMRON, 2023. Site Evaluation Results, Basewide Range Assessment Investigation, Unit 5. (BW-2929A)

KEMRON, 2025. Draft Final, MRS-BLM Unit 5, Munitions and Explosives of Concern, Remedial Action Report, Former Fort Ord, California. (OE-1036A)

Shaw, 2008. Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California. (BW-2423F)

Shaw, 2012. Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2. (BW-2300L)

APPENDIX B – Responses to Comments

Responses to Comments on the Draft Report submitted by the U.S. Environmental Protection Agency (USEPA)¹

GENERAL COMMENTS

GENERAL COMMENT 1. All acronyms should be defined when first used in the text, but a number of acronyms are not defined in the text, including but not limited to:

- a) **Executive Summary, Page 2:** The acronyms “ROD” and “HMP” should be defined on first use.
- b) **Section 2.2.4, Previous Investigations of Other Military Munitions Training Areas, Page 9:** The acronym “PA/SI” is not defined in the Report and should be defined on first use.
- c) **Section 2.4.1, Literature Review, Page 11:** The acronym “GIS” is not defined in the Report and should be defined on first use.
- d) **Section 2.4.1, Literature Review, Page 11:** The acronym “BRAWP” is not defined in the Report until Section A.32.5, Recommendations, but should be defined on first use.
- e) **Section 2.4.3.3, Soil Sampling Approach, Discrete (Biased) Sampling, Page 14:** The acronym “HMX” is not defined in the Report until Section A.10.5.2, Site Characterization Results, but should be defined on first use.
- f) **Section 2.4.3.3, Soil Sampling Approach, Seven-Point Incremental Sampling, Page 14:** The acronym “bgs” is not defined until Section A.8.3, Completed Munitions Response, but should be defined on first use.
- g) **Section 2.5, Additional Work Completed at Fort Ord, Page 16:** Under the second bullet point, the acronym “HTW” is not defined in the Report but should be defined on first use.
- h) **Section 2.5, Additional Work Completed at Fort Ord, Page 17:** Under the first bullet point on the page, the acronym “RACR” is not defined in the Report until Section A.10.1, Site Description and Background. The term “Remedial Action Completion Report” is first used in the Executive Summary and the acronym is used in Section 2.5.

Please revise the text to define all acronyms on first use.

RESPONSE TO GENERAL COMMENT 1: *Concur. Acronyms amended as recommended. Acronyms were not inserted into document titles. Please note, acronyms were included on the Acronym list before the Executive Summary.*

SPECIFIC COMMENTS

SPECIFIC COMMENT 1: Acronyms, Pages iv-v: The following acronyms are not used in the Report, Tables, Plates, or Appendices and should be removed: AOC, ASR, BHHRA, C4, Cal/EPA, CCR, CDQMP, COPEC, CRREL, DPR, FFA, FOSTA, FFS, HE, HHRA, ISM, LAW, LUC, mm, MM CX, MMRP, NEBA, NPL, OESS, OU 2, PRHRA, PRG, RAR, RPD, RWQCB, TCC, µg/dL, and WERS. Please revise the acronym list.

¹ In a letter dated February 7, 2023 (see Fort Ord Document No. BW-2300M.2). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

RESPONSE TO SPECIFIC COMMENT 1: *Concur. Unused acronyms removed from acronym list.*

SPECIFIC COMMENT 2: Section 2.4.3, Hand Grenade Ranges, Page 10: This section does not include a numbered example range, while the previous sections (2.3.1 and 2.3.2) list a specific numbered range as an example of the type of range described in the text. Numbered hand grenade ranges should be illustrated on Plate 1.1. Please revise the text to list an example numbered hand grenade range.

RESPONSE TO SPECIFIC COMMENT 2: *The hand grenade ranges fall within mixed use ranges. Ranges that are historically identified as hand grenade ranges are HA-36, HA-53, MRS-24B (practice), and MRS-24C. Live grenade training was not confirmed in MRS-24B or MRS-24C based on munitions response investigations. A sentence has been added to Section 2.3.4 to state “Examples of this type of range include HA-36 and HA-53.” Plate 1.1 displays all HAs, and the range types are listed in Table 1.1.*

SPECIFIC COMMENT 3: Section 2.3.5, Military Munitions Training Outside the Impact Area, Page 10: This section does not include a numbered example training area, while the Sections 2.3.1 and 2.3.2 list specific numbered ranges as examples. A numbered example training area and a description of the activities that occurred should be provided in this section. In addition, Numbered training areas should be included on Plate 1.1. Please revise the text in Section 2.3.5 to include an example numbered range that was used as a training area and include all training areas on Plate 1.1.

RESPONSE TO SPECIFIC COMMENT 3: *The subsection addresses the munitions response sites (MRSs) located outside the historical Impact Area (unless already identified as HAs). These sites typically served as maneuver, instruction, and bivouac areas, and are displayed in green outlines in Plate 1.1. Examples include HA-133 through 157 corresponding to Training Sites 1 through 25 (listed in Table 1.1). Another example is MRS-14D, which was evaluated as HA-108 as part of the BRA (listed in Table 1.1). A sentence was added to Section 2.3.5 to state “Training sites include HA-133 through HA-157.”*

SPECIFIC COMMENT 4: Section 2.4.3, Site Inspection and Site Characterization Sampling, Page 12: The acronym, “WP,” which is used in this section, is not defined in the list of acronyms. Please revise the acronym list to include “WP.”

RESPONSE TO SPECIFIC COMMENT 4: *Concur. The acronym “WP” appeared as part of the document title. It has been removed.*

SPECIFIC COMMENT 5: Section 2.4.3.1, Soil Sampling Methods, Page 12: The discussion on soil sampling does not specify whether discrete, composite, or incremental sampling methods were used. Please revise the text to clarify how the samples were collected.

RESPONSE TO SPECIFIC COMMENT 5: *The Soil Sampling approach is described in detail in Section 2.4.3.3 Soil Sampling Approach. Both discrete and incremental sampling methods*

were used in different areas. As described in the section, the seven-point incremental sampling combines the increments into a combined sample prior to analysis.

Discrete sampling was performed at the following sites.

- HA-34 – Machine Gun Assault Course/Close Combat Course;
- HA-37 – Night Firing Record Range;
- HA-38 – Zero Range/Submachine Gun Shotgun

Seven-point incremental sampling was performed at the following sites:

- HA-202 – Watkins Gate Burn Area North
- HA- 207 – Units 1/2/3
- HA-210 – Units 5A/9
- HA-211 – Units 7/10/33
- HA-212 – Unit 23
- HA-213 – Unit 25
- HA-214 – Unit 28
- HA-215 – Unit 31

SPECIFIC COMMENT 6: Section 2.4.3.3, Soil Sampling Approach, Seven-Point Incremental Sampling, Page 14: This section describes surface soil samples as being collected from a depth of 0.5 foot below ground surface (bgs); however, previous discussions of surface soil samples in Sections 2.4.3.1 and 2.4.3.3 do not specify that the 0.5-foot bgs interval was sampled. When surface soil samples were discussed in Sections 2.2.1, and 2.3.3, the sample depth (0-12 inches) was specified each time. Because of the various sample depths that are considered a “surface sample,” the specific sampling depth should be included in each instance. Please revise the text accordingly.

RESPONSE TO SPECIFIC COMMENT 6: *Text has been revised to reflect sample intervals as 0-0.5 feet, 0.5-1 foot and 1.5-2 feet below ground surface.*

SPECIFIC COMMENT 7: Section 3.2.1, HAs with Updated Recommendations, Page 21: The fourth paragraph states that “Three of the seven HAs were deemed...”; however, this should read “Three of the **six** HAs were deemed...”. Please revise the text accordingly.

RESPONSE TO SPECIFIC COMMENT 7: *Since the submittal of the draft report, BRA evaluation of HA-30 has been completed. The text will be updated to “Three of the seven HAs were deemed....”*

SPECIFIC COMMENT 8: Section 3.2.1, HAs with Updated Recommendations, Pages 21 and 22: The fourth paragraph states that “six HAs (HA-41, -42, -70, -73, -153, and -204) are deemed for “No further BRA action;” however, first paragraph on page 22, which discusses HA-153, does not include any justification for this recommendation and it is unclear if further action is needed for HA-153. Please revise the text to explain the basis for the recommendation of “No

further BRA action” or delete HA-153 from this recommendation and explain whether additional action is needed for this HA.

RESPONSE TO SPECIFIC COMMENT 8:

HA-153 indicates Munitions Response Site (MRS) 27U, one of the former training sites. The 2012 Comprehensive BRA Report Revision 2 recommended reconnaissance for evaluation for spent small arms ammunition related to possible training for firing tank mounted .30 caliber and/or .50 caliber machine guns. Munitions response investigation that included the area of MRS-27U was completed in late 2012 (*Track 1 Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California* [Fort Ord Document No. OE-0780]). The site is adjacent to MRS-32A, MRS-32B and MRS-32C, all of which were evaluated for the potential for munitions related to the Tank Gunnery Range identified in a 1956 training map. Sampling and site walks for munitions have been conducted in the area. The Track 1 evaluations (for munitions) have concluded “the range safety distance requirements needed for firing of tank projectiles are not met by the dimensions of the range safety fan depicted on the 1950s era facilities training map. Based on this information, it is unlikely that the range was used for firing of projectiles. The likely explanation for the presence of the tank gunnery range is that it was used for firing tank-mounted .30 caliber and/or .50 caliber machine guns rather than tank guns; however, no accumulations of spent ammunition of this type has been discovered in the area.” In addition, MRS-27U is located at a border of the range fan depicted in the training maps, and is unlikely to have contained target locations for the Tank Gunnery Range if the range was actually used. Because the area of MRS-27U is not a target area for the suspected tank-mounted .30 caliber and/or .50 caliber machine guns, no further BRA evaluation is warranted. A sentence was added to Section 3.2.1 at the end of the HA-153 discussion stating “The munitions response evaluation concluded that the area of HA-153 was not a target area for the suspected tank-mounted .30 caliber and/or .50 caliber machine guns (*Track 1 Plug-In Approval Memorandum, BLM Area A, Former Fort Ord, California* (Army 2012a). Therefore, no additional BRA investigation is warranted for HA-153. Please see Appendix A for further information on HA-153.”

SPECIFIC COMMENT 9: Plate 3.1, Characterization of Historical Areas by

Recommendation (Revision 3): Based on Section A.3.7 (Recommendations), HA-27 should not be designated with a light green color that indicates “remediation complete” because limited remediation is recommended for this area. Note #1 of Plate 3.1 indicates that limited remediation is needed for HA-211; however, HA-27 has a similar recommendation and is not included in a note. Please utilize a different color for HA-27 and add a note that designated the limited remediation recommendation for HA-27 on Plate 3.1.

RESPONSE TO SPECIFIC COMMENT 9: A note has been added to Plate 3.1 indicating “HA-211: Limited remediation recommended for elevated lead in a portion of Range 27 within Unit 33.” and the color and legend have been revised as requested.

Responses to Comments on the Draft Report submitted by the Department of Toxic Substances Control (DTSC)¹

GENERAL COMMENTS

GENERAL COMMENT 1. For clarification, please indicate if the use of an area-weighted average concentration, rather than the 95 percent upper confidence limit (% UCL), for developing ecological cleanup levels was approved by the Department of Fish and Wildlife or by DTSC.

RESPONSE TO GENERAL COMMENT 1: *The ecological cleanup levels were developed through the Feasibility Study Addendum, Site 39 Inland Ranges, Former Fort Ord, California (Fort Ord Document No. BW-2423F) prior to being finalized in Final Record of Decision Amendment, Site 39 Inland Ranges, Former Fort Ord, California (RI-041E). California Department of Fish and Wildlife (at the time, California Department of Fish and Game) participated in the review of and provided comments on the Feasibility Study Addendum.*

SPECIFIC COMMENTS

SPECIFIC COMMENT 1: Section 2.2: This section indicates that four areas were identified but Section 2.1 identifies three primary areas. Please clarify.

RESPONSE TO SPECIFIC COMMENT 1: *Three primary areas of investigation (Impact Area, East Garrison and Beach Ranges) were identified in Section 2.1 of the report. Additionally, several areas outside of the designated range areas were also identified as known or suspected munitions response sites. The four areas refers to the three primary areas and the other areas outside of the designated range areas (see Section 2.2.4). The text in section 2.2 has been amended to provide additional clarification as follows: "Each of the three primary areas and other areas outside of the designated range areas have undergone some level of investigation. The investigations are summarized below for each group."*

SPECIFIC COMMENT 2: Section 2.2.1: Please clarify if the health-based level of concern for lead at 1,860 milligrams per kilogram (mg/kg) that was developed for habitat reuse is based on ecological health-rather than human health. Note that the DTSC human health screening level for lead is 80 mg/kg for a residential scenario and 500 mg/kg for a commercial/industrial scenario.

RESPONSE TO SPECIFIC COMMENT 2: *As noted in the 2009 Site 39 Record of Decision Amendment (RI-041E), 1,860 mg/kg is the human health-based level of concern. DTSC's comment regarding their screening levels is noted.*

Section 2.2.1 describes the earlier soil investigations in the Impact Area. It should be noted that much of Site 39 is designated as habitat reserve, in which soil remediation is being conducted

¹ In a letter dated February 17, 2023 (see Fort Ord Document No. BW-2300M.4). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

according to the 2009 Site 39 Record of Decision Amendment (RI-041E) incorporating ecological cleanup levels. Soil remediation in future development areas included post-remediation risk assessment incorporating U.S. Environmental Protection Agency (EPA) residential Preliminary Remediation Goal (PRG) of 400 mg/kg for lead. Subsequently, lead-impacted sites in future development areas were re-evaluated using the 80 mg/kg as a screening level as described in the 2019 report Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California (BW-2674C). In 2025, EPA issued the revised regional screening level (RSL) of 200 mg/kg for lead in residential soil in EPA Office of Land and Emergency Management Directive SUBJECT: Residential Lead Directive for CERCLA Sites and RCRA Hazardous Waste Cleanup Program Facilities, dated October 16, 2025 (EPA, 2025).

SPECIFIC COMMENT 3: Section 3.2.1 HAs with Updated Recommendations: The fourth paragraph of this section states, *“Of the twelve HAs with a recommendation of “reconnaissance/sampling pending vegetation and/or munitions removal” relating to the unit-wide BRA evaluation, six HAs (HA-41, -42, -70, -73, -153, and -204) are deemed for “No further BRA action.” Three of the seven HAs were deemed for “No Further Action”.*

The fourth paragraph identifies three HAs, namely, HA-41, 42, and 73, as HAs deemed for “No Further Action.” These HAs are three of the six, not seven, HAs that had been deemed for “No further BRA action.” Please clarify.

RESPONSE TO SPECIFIC COMMENT 3: *Since the submittal of the draft report, BRA evaluation of HA-30 has been completed. The text will be updated to “Three of the seven HAs were deemed....*

SPECIFIC COMMENT 4: Appendix A, Tables 1 and 2: Tables 1 and 2 highlight the decision units in HA 23D that exceeded the evaluation criteria. HERO recommends that the evaluation criteria be identified in the Notes to the tables.

RESPONSE TO SPECIFIC COMMENT 4: *These tables were directly pulled from the existing report “Lead Re-Evaluation Technical Memorandum” (Fort Ord Document No. BW-2674C) and were put in the appendix as reference without modification. The evaluation criteria is defined in the top row of the tables as being between “80 mg/kg to 400 mg/kg.”*

SPECIFIC COMMENT 5: Appendix A, Section A.1.3, Lead Re-Evaluation in HA-18D:

The updated screening level for lead in a commercial/industrial scenario is 500 mg/kg. Please replace the 320 mg/kg indicated in the text with 500 mg/kg [https://dtsc.ca.gov/wpcontent/uploads/sites/31/2022/02/LeadSpread9-FREQUENTLY-ASKED-QUESTIONS](https://dtsc.ca.gov/wpcontent/uploads/sites/31/2022/02/LeadSpread9-FREQUENTLY-ASKED-QUESTIONSMarch-2022-A.pdf)March-2022-A.pdf).

The 95% upper confidence limit (UCL) of lead at HA-18D exceeds the DTSC screening level of 80 mg/kg. The Army is reportedly working with DTSC and the Environmental Protection Agency (EPA) to develop an appropriate site-specific lead remediation goal.

RESPONSE TO SPECIFIC COMMENT 5: *For development areas of Site 39 such as HA-18D, the 2019 report Revised Final Technical Memorandum, Evaluation of Lead Concentrations at Selected Sites, Former Fort Ord, Monterey County, California (BW-2674C) used a cleanup level of 400 mg/kg based on EPA guidance for residential uses, and 80 mg/kg was used as the screening level. The statement in Section A1.3 will be revised to “HA-18D was one of the many sites re-evaluated for protectiveness with the new screening level of 80 mg/kg (KEMRON 2019). DTSC’s comment regarding a residential screening level of 80 mg/kg is noted.*

SPECIFIC COMMENT 6: Appendix A, Section A.22.4: Section A.22.2 indicates that lead exceeded the screening level of 225 mg/kg in 16 samples from HA-37 and HA-38. Please explain the basis of the screening level of 225 mg/kg.

Section A.22.4 states that remedial actions were conducted in HA-37 and HA-38 but does not state the results of the confirmation samples. Please indicate the residual lead concentrations at HA-37 and HA-38 that support the recommendation of no further investigation.

RESPONSE TO SPECIFIC COMMENT 6: *As noted in the 2009 Site 39 Record of Decision Amendment (RI-041E), 225 mg/kg is the ecological cleanup level applicable to HA-27 and HA-38.*

The results of the confirmation sampling for the remediation of HA-37 and HA-38 are described in Appendix A, Section A.9 for HA-37 and Section A.10 for HA-38. For clarification, Section A.22.4 has been reworded to “CBRA Revision 2 recommended no further BRA action for HA-205 except on HA-37 and HA-38. Remedial actions in HA-37 and HA-38 have now been completed and the results are described in A.09 and A.10, respectively, of Revision 3.”

Responses to Comments on the Draft Report submitted by the Fort Ord Community Advisory Group (FOCAG)¹

COMMENT 1. Page 8, 2.2.3 Previous Investigations of the Beach Trainfire Ranges. The last sentence states, “Additional Investigation at Site 3 is not required as stated in the 2005 Track 1 ROD (Army 2005). The Army turned Site 3, the Beach Ranges, over to CA State Parks. The FOCAG objected because there were still lead fragments and lead dust in the selected areas the Army contractors sifted. Other areas were deemed ok. However, afternoon winds uncover caches of spent lead bullets, and fragments. The California DTSC required an annual report from State Parks whereby they have requirements to inspect the Beaches at times during every year and file an annual report with DTSC, by March, as to their findings. Piles of lead bullets get picked up and properly disposed of by the Army BRAC remaining at former Fort Ord. This property transfer Condition of Approval has not been working well as State Parks says it does not have the manpower to conduct the searches as outlined. And, the Annual Reports are not forthcoming on time, or not made available to the public when asked. Dr. Min Wu of DTSC was doing his best to enforce compliance. We understand Min has retired. We have not seen a completed report for calendar year 2022 as yet. We understand another cache of bullets was discovered and reported and picked up by Army representatives this past year, but protocol was not followed. This issue is extremely important for the following reasons. California Proposition 65 requires businesses, by law, to notify the public of hazardous substances. But, little known, the government is exempt from this Statewide law. The public, that includes residents of Marina, tourists, students from nearby CSUMB, and the homeless are regularly on and about on these beach ranges with NO posted signage or notification as to the dangers of lead. Parents with young children frolic on these beaches!

RESPONSE TO COMMENT 1: *The section summarizes the soil remedial action that was conducted at Site 3 based on Interim Record of Decision, Site 3 Beach Trainfire Ranges, Fort Ord, California (Fort Ord Document No. SITE3-070) signed in 1997. The results of the soil remedial action were reported in Remedial Action Confirmation Report, Site 3 Remedial Action, Basewide Remediation Sites, Former Fort Ord, California (Fort Ord Document No. BW-2035). The Army conducted additional evaluations including the post-remediation ecological risk assessment. The Site 3 Interim ROD was subsequently finalized as part of the Track 1 ROD (Fort Ord Document No. OE-0526). The Track 1 ROD determined that no further action was necessary, and ecological monitoring will be conducted to confirm the results of the ecological risk assessments and evaluations. The required ecological monitoring was completed in 2016. The area of former Site 3 is now the Fort Ord Dunes State Park. The Army has agreed that, provided the California State Parks and Recreation staff collect spent bullets and notify the Army, the Army would either recycle the material or properly dispose of it through the Army’s hazardous waste disposal process. Regarding the memorandum of agreement between California State Parks and California Department of Toxic Substances Control for Site 3 mentioned in the*

¹ In a letter dated January 31, 2023 (see Fort Ord Document No. BW-2300M.3). The comments are reproduced here as provided to the Army and there have been no changes to spelling, grammar, or punctuation.

comment, the Army is not a party to the agreement. No changes were made to the document as a result of this comment.

COMMENT 2: Page 12, 2.4.3.1 Soil Sampling Methods - The FOCAG has long expressed concerns regarding the "sample of a sample" methodology whereby a square in a grid is selected as the sample square, then a section of this sample is selected as a sample in which to excavate a small test pit. If nothing is found the entire area can be considered cleared. Similarly, especially involving lead, an "average" is used, to cover an area. It is cleared if below the statistical representation.

RESPONSE TO COMMENT 2: *The section summarizes the soil sampling procedures for metals and explosives, which are described in more detail in Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix B, Soil Sampling, Basewide Range Assessment (Fort Ord Document No. BW-2767B). The sampling method used is a standard environmental sampling practice that is widely utilized across industries for the target contaminants in soil, and are consistent with the analytical methods described in Section 2.4.3.2. Section 2.4.3.3 described that soil sampling locations would be selected to represent the portions of each unit, depending on the goals of the investigation. No changes were made to the document based on this comment.*

COMMENT 3: Plate 3.1 Characterization of Historical Areas by Recommendation (Revision3) The Plate depicts the impact area circled by the numbered training rectangles all of which were firing toward the center. Not found is the fact that this Site 39, perhaps the largest Infantry Training Area in the United States lies directly over the Seaside Groundwater Basin! The Seaside Groundwater Basin provides the potable drinking water for nearby cities. Poisonous chemicals including pesticides and herbicides used by the Army to keep down the grass (for fires) and pesticides (to kill the Ground Squirrels) are migrating downwards through the sandy loam soils to the drinking water. The FOCAG has expressed alarm. To date there hasn't been much acknowledgement from regulatory agencies regarding this danger.

RESPONSE TO COMMENT 3: *As noted in the Final Site 39 Record of Decision Amendment; Site 39 Inland Ranges (Fort Ord Document No. RI-041E), the primary chemicals of concern for the inland ranges were determined to be associated with small arms munitions and military munitions. The potential presence of pesticides on the former Fort has been thoroughly investigated as part of the Army's interim action and basewide remedial investigation activities. Based on the remedial investigation, pesticides were not identified as a contaminant of concern for Site 39. The Army has previously responded to FOCAG regarding similar comments and has provided references for additional information. There is not a complete exposure pathway from soil to groundwater for any contaminants of concern in the Site 39 soils. No changes were made to the document as a result of this comment.*

COMMENT 4: This Superfund Site is better for the work of the Army and the Regulatory Agencies since about 1992, however, it remains a dangerous place. We may have missed a discussion and analysis of PFOS and PFAS in this document. It should be a huge issue given the number of wildland range fires on this Base throughout the decades. A non-thorough initial investigation was/is not satisfactory. The fact that this Fort Ord Army Base was the Western USA Region of CDEC Headquarters adds to the concern.

RESPONSE TO COMMENT 4: *This report presents an update on the Basewide Range Assessment which evaluates the potential presence of chemicals of concern at known or suspected small arms ranges, multi-use ranges, and military munitions training areas within the former Fort Ord.*

The Fort Ord training ranges are not currently recommended for PFAS investigation. Per the Army guidance for addressing releases of PFAS, the primary mechanism for releases of PFAS at Army installations is through the historical use (post-1972) of aqueous film-forming foam (AFFF). Please refer to the Preliminary Assessment Narrative Report; Per- and Polyfluoroalkyl Substances (Fort Ord Document No. BW-2904B), specifically Section 4.7 Large Fires and Other Unplanned Releases. The section includes an evaluation of the potential for PFOA and PFOS in Site 39. Fire retardants that have been used in wildland fire suppression at Fort Ord were Class A foams or retardants designated for use on combustible materials, such as wood, and not PFAS-containing AFFF, which is a Class B foam designed for use on flammable liquids. In the 1950's the CDEC was headquartered at Fort Ord, however, its field experiments were carried out on the Fort Hunter Liggett. No changes were made to the document as a result of this comment.