FINAL
REMEDIAL INVESTIGATION REPORT

MMRP MUNITIONS RESPONSE SERVICES
NATIONAL GUARD BUREAU

LEONA HEIGHTS RIFLE RANGE (CAHQ-013-R-01)
ALAMEDA COUNTY, CALIFORNIA

CONTRACT NO.: W912DR-09-D-0006
DELIVERY ORDER NO. 0011
MODIFICATION #3

Prepared For:

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LIST OF ACRONYMS AND ABBREVIATIONS

ºF	Degrees Fahrenheit
ACSO	Alameda County Sheriff's Office
AE	Ammunition and Explosives
AEDB-R	Army Environmental Database- Restoration
ARAR	Applicable or Relevant and Appropriate Requirements
Army	United States Army
ARNG	Army National Guard Directorate
ASTM	American Society for Testing and Materials
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BEM	Buried Explosion Module
bgs	Below Ground Surface
BOD	Board of Directors
CAARNG	California Army National Guard
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CESPK	United States Army Corps of Engineers, Sacramento District
CFR	Code of Federal Regulations
CHE	Chemical Warfare Material Hazard Evaluation
CRP	Community Relations Plan
CSM	Conceptual Site Model
CWM	Chemical Warfare Material
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DO	Delivery Order
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
DPW	Directorate of Public Works
DQO	Data Quality Objective
DTSC	California Department of Toxic Substances Control
EBRPD	East Bay Regional Parks District
EHE	Explosive Hazard Evaluation
Em	Electromagnetometer
EM	Engineering Manual
EOD	Explosive Ordnance Disposal

LIST OF ACRONYMS AND ABBREVIATIONS (CONT.)

ESP	Explosives Site Plan
ESQD	Explosive Safety Quantity Distance
EZ	Exclusion Zone
GIS	Geographical Information System
GPS	Global Positioning System
HHE	Health Hazard Evaluation
HOA	Home Owners Association
HRR	Historical Records Review
IA	Institutional Analysis
ISO	Industry Standard Object
ITS	Instrument Test Strip
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LUC	Land Use Control
MC	Munitions Constituents
MD	Munitions Debris
MDAS	Material Documented As Safe
MEC HA	Munitions and Explosives of Concern Hazard Assessment
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
MMRP	Military Munitions Response Program
Mod.	Modification
MPPEH	Material Potentially Presenting an Explosive Hazard
MQO	Measurement Quality Objective
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS	Matrix Spike
MSD	Minimum Separation Distance
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDNODS	Non-Department of Defense, Non-Operational Defense Site
NFA	No Further Action
NMD	Non-Munitions Debris
OESS	Ordnance and Explosives Safety Specialist
PA	Preliminary Assessment
PM	Project Manager

LIST OF ACRONYMS AND ABBREVIATIONS (CONT.)

PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RAB	Restoration Advisory Board
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROSP	Regional Open Space Preserve
RPD	Relative Percent Difference
SAA	Small Arms Ammunition
SARA	Superfund Amendments and Reauthorization Act
SDG	Sample Delivery Group
SI	Site Inspection
SOP	Standard Operating Procedure
SUXOS	Senior Unexploded Ordnance Supervisor
TBC	To Be Considered
TM	Technical Manual
TP	Technical Paper
TPP	Technical Project Planning
U.S.	United States
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE	United States Army Corps of Engineers
USC	United States Code
USEPA	United States Environmental Protection Agency
USNPS	United States National Parks Service
UXO	Unexploded Ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
WESTON	Weston Solutions, Inc.
WRCC	Western Region Climate Center

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EXECUTIVE SUMMARY

This Remedial Investigation (RI) Report was prepared for the United States (U.S.) Army Corps of Engineers (USACE), Sacramento District (CESPK) under Multiple Award Military Munitions Services Contract No. W912DR-09-D-0006, Delivery Order (DO) No. 0011 Modification (Mod.) #3 as funded by the Army National Guard Directorate (ARNG). This Munitions Response Site (MRS) project is overseen by the ARNG with consultation with CESPK and support from the prime contractor Weston Solutions, Inc. (WESTON).

As a result of the Preliminary Assessment (PA) and Site Inspection (SI) completed under the Non-Department of Defense, Non-Operational Defense Sites (NDNODS) at the Leona Heights Rifle Range MRS Army Environmental Database – Restoration (AEDB-R) number CAHQ-013-R-01, it was determined that an RI be performed for munitions and explosives of concern (MEC) at the MRS. In addition to the identification of a small arms impact area and related small arms debris, the SI resulted in the discovery of a 3-inch Stokes Mortar on the surface identified as munitions debris (MD). Concomitant investigation by WESTON detected subsurface anomalies near the location of the mortar that were consistent with that type of munition. Surface soil samples were collected at various locations throughout the MRS, analyzed for explosives and metals (antimony, copper, lead and zinc) and were found to be below the SI screening levels. The SI recommended further investigation for MEC and No Further Action (NFA) for munitions constituents (MC).

The objective of the RI was to determine the nature and extent of MEC that may remain from historic activities conducted at the Leona Heights Rifle Range MRS and that may pose a threat to human health and/or the environment. After community relations processes began in April 2016, field mobilization was executed in June 2016 and was completed over the course of 11 days. A geophysical investigation was carried out consisting of analog transect surveys to detect potential MEC in surface and subsurface within accessible areas followed by intrusive investigations along transects at anomaly locations to determine the nature, type, and distribution of MEC, and MD. Three hundred fifty-one (351) subsurface anomalies were flagged for intrusive investigation. Qualified unexploded ordnance (UXO) personnel used hand tools to excavate and identify the 351 anomalies identified during the anomaly survey. Anomalies included zero MEC, four MD, 245 small arms ammunition (SAA), and 102 non-munitions debris (NMD). Additionally, four quality control (QC) items were flagged, excavated, and identified. The four MD items were identified as practice 3-inch Stokes Mortars. Although five MD items (practice 3-inch Stokes Mortars) were identified during the SI and RI, no frag was encountered that would indicate the use of high explosive mortar training.

During the SI nine surface soil samples and one field duplicate were collected based on field observations at the impact berm, protective berm, hillside backstop, the area adjacent to and down gradient from the 3” practice Stokes Mortar (MD) and down gradient of drainage features. Stakeholders discussed the SI sampling locations, results, representativeness and data limitations during the TPP process where they concurred with the NFA for MC recommendation of the SI. At the completion of the RI fieldwork there was no evidence to support additional MC sampling and analytical results from the pre- and post-detonation samples were flagged (U), not detected above the laboratory detection limit.

A MEC hazard assessment (MEC HA) was completed using information gathered during the SI and RI to establish baseline conditions representing the current land-use activities resulting in a score of 870 (hazard level category of 1). Future land-use is assumed to remain unchanged in the foreseeable future so a separate score was not generated. The Munitions Response Site Prioritization Protocol (MRSPP) priority is 6 (8 being the lowest), based on the explosive hazard evaluation (EHE) module.

The characterization of MEC and MC at the Leona Heights Rifle Range MRS has been achieved through execution of the approved RI Work Plan which included incorporation of the SI data to meet the project Data Quality Objectives (DQOs). Although MEC was not encountered during the SI or RI; utilizing the most conservative assumptions, there is a potentially complete pathway for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the southwest portions of the Leona Canyon ROSP. Subsequently if MEC is present, migration to the toe of the slope may be possible through a significant erosional event. Analytical data collected during the SI and RI does not indicate MC poses a risk to human health or the environment within the MRS. Therefore, a Feasibility Study is recommended to address potential MEC within the 31.73 acre Leona Canyon ROSP portion of the MRS. Additionally an alternative to perform a removal action to create a 100 foot buffer along the southwest boundary (3.13 acres) should be evaluated. The remaining 49.60 acres of the MRS is recommended for NFA as there is no indication of MEC or MC. **Figure ES-1** presents the remedial investigation recommendations.

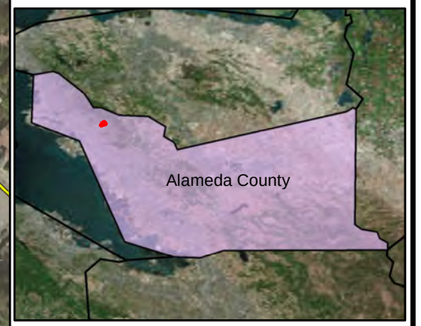
The general goal of MEC RAOs is to reduce the potential explosive hazard to ensure the protection of human health, and the environment. The recommended MEC RAOs for the Leona Heights Rifle Range MRS are to: Minimize human exposure to MEC while maintaining the current land use.

AEDB-R ID CAHQ-013-R-01
31.73 acres

Potential RA Area
3.13 acres

AEDB-R ID CAHQ-013-R-02
49.60 acres

Pinecrest Dr.
Hansom Dr.
Surrey Ln.
Campus Dr.
Canyon Oaks Dr.
Keller Ave.



Legend

- MD
- NMD
- SAA
- Mini-grid
- Transects
- Road
- Evacuation Work Area Boundary - 225'
- Potential RA Area (3.13 acres)
- Leona Heights Rifle Range MRS
- Potential FS Area (31.73 ac.) AEDB-R ID CAHQ-013-R-01
- Recommended for NFA (49.60 ac.) AEDB-R ID CAHQ-013-R-02

MD - Munitions Debris
NMD - Non-Munitions Debris
SAA - Small Arms Ammunition
FS - Feasibility Study
NFA - No Further Action
RA - Remedial Action

N W E S

0 175 350 Feet

1 in = 275 feet

Remedial Investigation Recommendation

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **ES-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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1.0 INTRODUCTION

WESTON was contracted to prepare this RI Report under the United States (U.S.) Army Corps of Engineers (USACE), Sacramento District (CESPK) and Multiple Award Military Munitions Services Contract No. W912DR-09-D-0006, Delivery Order (DO) No. 0011 Mod. #3, as funded by the Army National Guard – Directorate (ARNG). The objective of this DO is to perform an Remedial Investigation (RI) at the Leona Heights Rifle Range Munitions Response Site (MRS) Army Environmental Database – Restoration (AEDB-R) number CAHQ-013-R-01, located in Alameda County, California (**Figure 1-1**). The Leona Heights Rifle Range MRS (CAHQ-013-R-01) will be referenced as the Leona Heights Rifle Range MRS, or the MRS throughout the remainder of this document.

1.1 PROJECT AUTHORIZATION

The ARNG is statutorily responsible for the MRS and will centrally manage all work performed during the RI. The ARNG is the lead agency and will consult with CESPK for investigating, reporting, and decision making regarding the RI. Additional Army stakeholders for this MRS include the California Army National Guard (CAARNG). The California Department of Toxic Substances Control (DTSC) is the lead regulatory agency.

The U.S. Congress established the Military Munitions response Program (MMRP) to address former defense sites where Unexploded Ordnance (UXO), discarded military munitions (DMM), and Munitions Constituents (MC) may be present as a result of past training activities. Non-Department of Defense, Non-Operational Defense Sites (NDNODS), defined as those defense sites that were exclusively used by the ARNG and were never owned, leased, or otherwise possessed or used by the Army or other Department of Defense (DoD) component, are a subcategory of MMRP. Response actions under the MMRP typically follows the process presented in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

Several investigation phases of the CERCLA process have already been completed at the Leona Heights Rifle Range MRS under the MMRP, including a PA and SI. As a result of the SI findings, it was recommended that an RI be performed for Munitions and Explosives of Concern (MEC).

1.2 PURPOSE

Pursuant to CERCLA and the NCP, the purpose of the RI at the Leona Heights Rifle Range MRS is to collect and analyze the data necessary to conduct site characterization (nature and extent) and to develop a baseline risk assessment (U.S. Environmental Protection Agency [USEPA], 1988). The RI data will be used to assist in determining what remediation alternatives, if any, are necessary at the MRS consistent with the current and anticipated future land use.

1.3 PROPERTY DESCRIPTION AND PROBLEM IDENTIFICATION

The following sections describe the location and history for the NDNODS Leona Heights Rifle Range MRS. RI figures are presented in **Appendix A**.

1.3.1 Property Location

The Leona Heights Rifle Range MRS is located along Keller Avenue and Campus Drive in Sequoyah, approximately seven miles southeast of Downtown Oakland, Alameda County, California (**Figure 1-1**). The MRS encompasses a portion (33.04 acres) of the public 290 acre East Bay Regional Parks District (EBRPD) Leona Canyon ROSP and two residential areas (48.29 acres) consisting of condominium and townhouse complexes and single family residences.

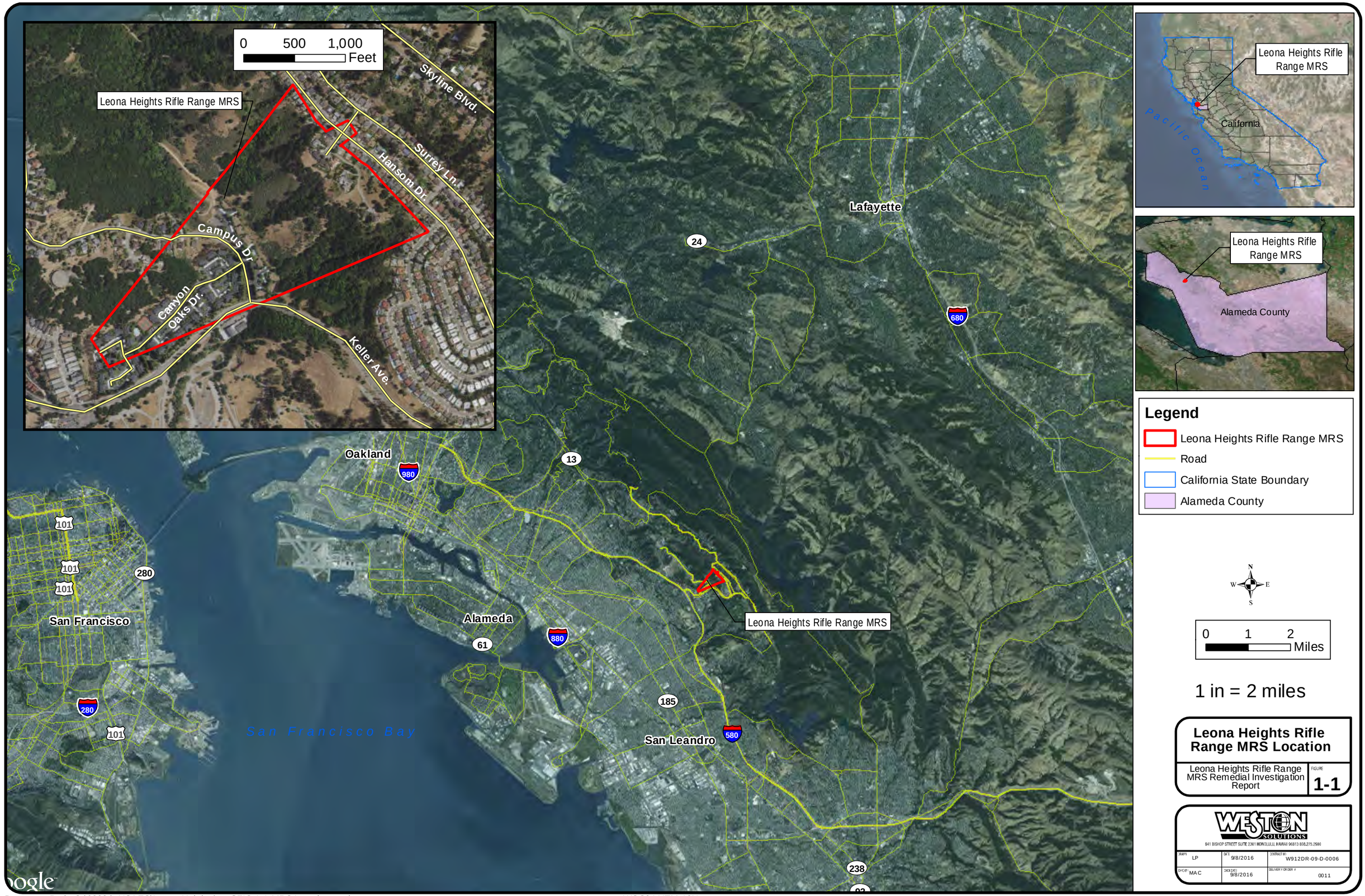
1.3.2 Project Property History

The Leona Heights Rifle Range MRS (approximately 81.33 acres based on Geographical Information Systems [GIS] measurements) was used for artillery and mortar practice, and small arms training by multiple CAARNG units from 1913 until the mid to late 1930s. Beginning in 1913, the range was first used for artillery practice, with the small arms range being constructed in 1920. The range consisted of as many as five target berms at varying distances extending out to 1,000 yards.

1.4 PREVIOUS INVESTIGATIONS AND HISTORICAL MUNITIONS RESPONSE ACTIVITIES

Research conducted in support of the September 2011 California Final Historical Records Review (HRR)/SI Work Plan identified an excerpt from a letter dated October 22, 1917, from Brigadier General J.J. Borree that expressed appreciation to the California State Railroad Commission for assisting the National Guard in completing the Leona Heights Rifle Range in 1917. In addition, articles were located that indicated the range was used by high school cadets in 1920 and by the Rifle and Pistol Club of the California State Railroad Commission in 1922.

The SI was conducted on 3 October 2011 and 4 October 2011. During the SI, approximately 11 line miles of visual survey transects were conducted within the MRS aided by hand-held metal detectors (**Figure 1-2**). A small arms impact area was identified towards the top of the steep hillside adjacent to the northeastern most target area. The target area contained the remains of a pop-up targeting system located in a dugout trench with a protective berm area in front of the targets and a natural backstop hillside behind them. Small arms debris consisting of .30 caliber projectiles was identified on the surface of the earthen berm in front of and on the slope behind the target system. A 3-inch Stokes Mortar was discovered at the surface on the western side of the Leona Canyon ROSP. The mortar was identified as MEC by the field team and was transported and disposed of by the Alameda County Sheriff's Office (ACSO) Explosive Ordnance Disposal (EOD) Squad. Although the field team identified the mortar as MEC, the responding ACSO EOD officer, following inspection, determined that it did not pose an explosive hazard.



Legend

- Leona Heights Rifle Range MRS
- Road
- California State Boundary
- Alameda County

N
W E
S

0 1 2
Miles

1 in = 2 miles

Leona Heights Rifle Range MRS Location

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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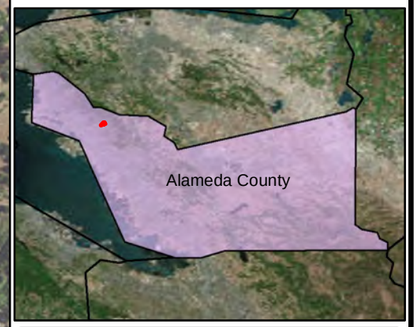

Legend

- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- Road
- SI Visual Instrument Aided Survey Transects
- Firing Line
- Leona Heights Rifle Range MRS
- Target Area
- Target System Trench

SI - Site Investigation 2012

N W E S

0 175 350 Feet

1 in = 350 feet

SI Visual Instrument Aided Survey

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-2**

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The mortar was taken to the ACSO EOD range for final disposition. Subsurface anomalies were detected a short distance below the mortar that were consistent with that type of munition (WESTON, 2012). Based on the SI, the MRS was recommended for further investigation for MEC.

Nine surface soil samples and one field duplicate were collected at various locations throughout the MRS (**Figure 1-3**). SI sampling rationale is presented in **Table 1-1** and the sample locations are presented on **Figure 1-3**. The samples were analyzed for explosives via USEPA method 8330A and metals (antimony, copper, lead, and zinc) via USEPA method 6010C and were compared to the USEPA Regional Screening Levels (RSL) and the California Human Health Screening Levels (CHHSLs). All results were well below both screening levels. Therefore, the Leona Heights Rifle Range MRS was recommended for NFA for MC.

Table 1-1
SI MC Sampling Rationale

Sample Designation	Sample Type	Rationale
CAHQ-013-SO-001	ITRC Grid Composite	Sample collected from location that appeared to be the highest impact area behind the target system
CAHQ-013-SO-002	ITRC Grid Composite	Sample collected from location that appeared to be the highest impact area behind the target system
CAHQ-013-SO-003	Spoke and Hub Composite	Taken from protective berm area below the target system Center location most likely to have MC. Projectile (.30 caliber) found near sample location.
CAHQ-013-SO-004	Spoke and Hub Composite	Collected as field duplicate sample of CAHQ-013-SO-003
CAHQ-013-SO-005	Spoke and Hub Composite	Taken from hillside in front of the target system in location believed to most likely have MC and having metal detections.
CAHQ-013-SO-006	Discrete	Taken from accessible location in the dry drainage feature (ravine) which drains the middle portion of the steep hillside or target area
CAHQ-013-SO-007	Discrete	Taken just down gradient and adjacent to 3- inch Stokes mortar.
CAHQ-013-SO-008	Discrete	Taken from low lying area in the drainage feature on the north end of the eastern portion of the MRS
CAHQ-013-SO-009	Discrete	Taken from low lying area in the drainage feature on the south end of the eastern portion of the MRS
CAHQ-013-SO-010	Discrete	Taken from low lying drainage feature at base of steep hillside on the south west corner of the MRS

Notes:
ITRC – Interstate Technology & Regulatory Council

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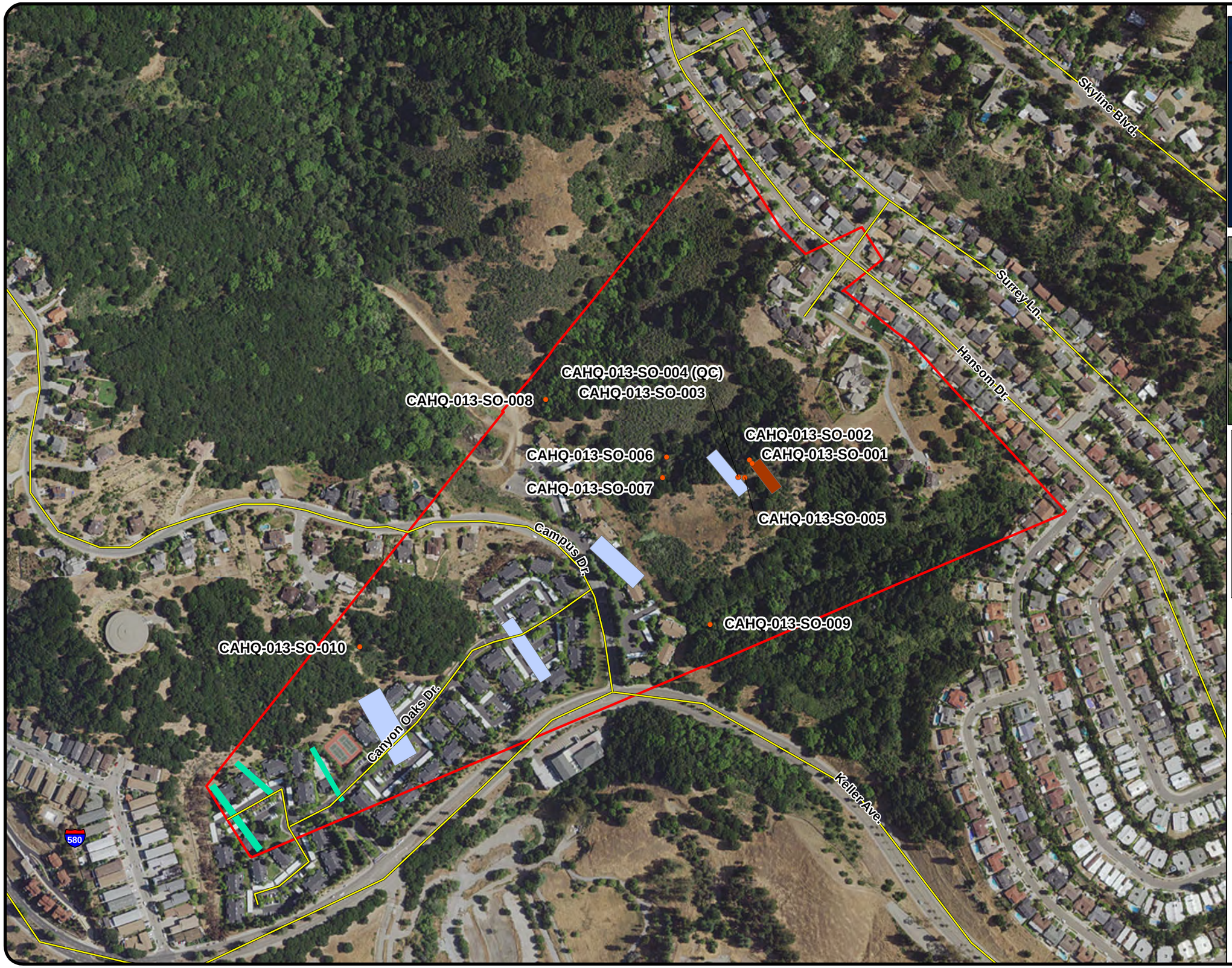

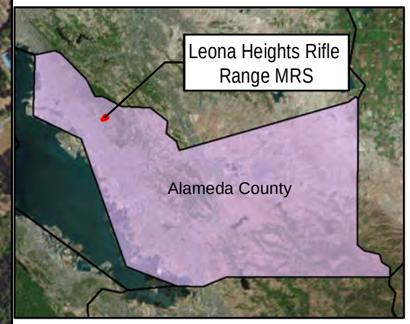

Legend

- Sample Location
- Road
- Firing Line
- Leona Heights Rifle Range MRS
- Target Area
- Target System Trench

SI - Site Investigation 2012

N W E S

0 175 350 Feet

1 in = 350 feet

SI MC Sample Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-3**

WESTON SOLUTIONS
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2.0 PROJECT REMEDIAL RESPONSE OBJECTIVES

The remedial objectives and approach were defined through the Technical Project Planning (TPP) process and incorporated input from all project stakeholders. Project stakeholders included the ARNG, CAARNG, USACE, and DTSC. The objective of the RI was to determine the nature and extent of MEC that may remain from historical activities conducted at the Leona Heights Rifle Range MRS and that may pose a threat to human health and/or the environment.

During the TPP process, stakeholders agreed that the RI would focus on the Leona Canyon ROSP. The following site characterization goals were developed as part of the approved RI Work Plan (WESTON, 2016a) and executed during fieldwork at MRS:

- Determine nature and extent of MEC (type, depth, density, distribution).
- Determine if MC poses a risk where a release is suspected due to field observations e.g. burial sites, low-ordered or damaged MEC, and MC associated soil staining (specific chemicals of concern, distribution, and concentration based on media).
- Evaluate the hazard and potential risk posed to human health and the environment by MEC and MC (if required).

2.1 PRELIMINARY CONCEPTUAL SITE MODEL AND PROJECT APPROACH

The environmental profile for the Leona heights Rifle Range MRS is based upon currently available information from historical documents, previous investigations, and various sources regarding environmental conditions at or near the site. A Conceptual Site model (CSM) is used to summarize information from available resources and provides a planning tool to evaluate the information with respect to project objectives and data needs, and respond through an iterative process for further data collection or action. The CSM development should be viewed as a process that reflects the progress of activities at a site from initial assessment through site closeout. Information typically presented in a CSM includes the following:

- Facility Profile – Describes man-made features at or near the site.
- Physical Profile – Describes factors that may affect release, fate, and transport.
- Ecological Profile – Describes the physical relationship between developed and undeveloped portions of the site, use of the undeveloped portions, and ecological use.
- Land Use and Exposure Profile – Provides information used to identify and evaluate the applicable exposure scenarios and receptor locations.
- Munitions Response Profile – Summarizes the types of munitions potentially present or identified, their characteristics, release mechanisms, and exposure pathway analysis.

The preliminary CSM information for the MRS is presented in **Table 2-1** which outlines the profile characteristics over the MRS and the surrounding area. The information was compiled from the Final Site Inspection Report (WESTON, 2012) for the Leona Heights Rifle Range MRS. Verification and modification of previously provided information to support the planned RI activities was performed through a review of current federal and state sources including: data

from the U.S. Fish and Wildlife Service (USFWS, 2015); U.S. National Parks Service (USNPS, 2015), U.S. Department of Agriculture (USDA, 2015) and the State of California Geoportal (CA.gov, 2015). Site features are presented in **Figure 2-1**.

The information summarized in **Table 2-1**, was used to generate the exposure risk CSM for both MC and MEC during the SI. The MEC CSM in **Figure 2-2** illustrates potentially complete exposure pathways for the MRS. MC results from the SI did not indicate concentrations above the screening level therefore, the pathway for human receptors to contact MC is considered incomplete.

2.1.1 Current and Future Land Use

Currently the MRS land use is residential, approximately 48.29 acres, and recreational, approximately 33.04 acres (**Figure 2-3**). Thirty-two acres of the Leona Canyon ROSP (approximately 290 acres total) are within the MRS and approximately 76 residences within the MRS are adjacent to the Leona Canyon ROSP. The residences are privately owned property and access is granted to invited guests only. While the portion of the Leona Canyon ROSP within the MRS is public property, much of the space has limited access due to steep topography (**Figure 2-3**) and dense vegetation.

2.1.2 Right-of-Entry, and Site Accessibility

Right-of-Entry (ROE) agreements have been signed with the East Bay Regional Park District for parcels 037A-3152-013-03; and 037A-3152-019-03 (ROE # DAC05-8-15-0094), and Alameda County Flood Control parcel 037A-3152-019-05 (ROE # "DACA05-8-15-0093"). There are no foreseeable obstructions that would limit access to the Leona Canyon ROSP area. However within the Leona Canyon ROSP topography (**Figure 2-4**) and dense vegetation limited access where investigation activities could be performed safely. The ROE agreements are presented in **Appendix B**. Additional ROEs were not required as the portions of the MRS that have been developed were not investigated.

2.2 PRELIMINARY REMEDIATION GOALS AND REMEDIAL ACTION OBJECTIVES

A set of preliminary remediation goals (PRGs) were established for use in determining if further actions would be recommended as a result of the RI.

2.2.1 Assessment of Land Use

The Leona Heights Rifle Range MRS is located on a portion (31.73 acres) of the public 290 acre Leona Canyon ROSP and two residential areas (49.60 acres) consisting of condominium and townhouse complexes and single family residences. The Leona Canyon ROSP is used for recreation, including hiking and riding horses and has unrestricted access. However, the approximate 31.73 acre portion within the MRS is limited due to the steep topography and dense vegetation. There is no evidence of human use within in this portion of the MRS.

Table 2-1
Preliminary CSM Information for the Leona Heights Rifle Range MRS

Profile Type	Site Characterization
Facility Profile	Location and Area: ▪ Leona Heights Rifle Range MRS is located in Oakland, Alameda County, California ▪ Site is located at 37° 46' 30.04" N, 122° 8' 39.59" W ▪ Consists of approximately 81.33 acres ▪ The range was used for artillery practice, mortar practice, and small arms training ▪ The majority of the site has been redeveloped into a light- to medium-density residential area
	Structures: ▪ The MRS is located in a residential neighborhood
	Security: ▪ The MRS is privately and publicly owned by the East Bay Regional Park District and has unrestricted public access
	Boundaries: ▪ The MRS is located along, and bounded to the southeast, by Keller Avenue, to the northeast by Hansom Drive, and Rilea Way to the west.
	Utilities: ▪ Electric, water, and sewer
Physical Profile	Climate: ▪ Mean monthly temperatures range from 48.0 °F to 63.8 °F, with an average annual temperature of 57.1 °F ▪ Average annual precipitation of 22.6 inches
	Geology: ▪ The MRS contains two underlying geologic formations: o Tertiary intrusive rocks, mostly shallow plugs and dikes that include some Mesozoic rocks from the Jurassic age o Cretaceous marine rocks, which contain undivided Cretaceous sandstone, shale, and conglomerate; with minor nonmarine rocks in Peninsular Ranges from the early to late Cretaceous age
	Topography: ▪ Rolling to very steep terrain at eastern boundary of site ▪ Ground surface elevations across the site range from 400 to 800 feet above sea level
	Soil: ▪ Maymen loam soils, on 30 to 75% slopes, are found in the western half of the MRS. They are derived from residuum weathered from sedimentary rock, are somewhat excessively drained, and are found on backslopes. ▪ Millsholm silt loams, on 30 to 75% slopes, are found in the middle to eastern half of the MRS. These soils are derived from residuum weathered from sedimentary rock, are well drained, and are found on hills and backslopes.
	Hydrogeology: ▪ The MRS is located in the California Coastal Basin national aquifer ▪ A well is located 2.9 miles southwest of the MRS. It had a depth-to- water measurement of 40.8 feet bgs in December 1999
	Hydrology: ▪ Rifle Range Creek flows from north to south across the MRS and eventually drains to the west
	Vegetation: ▪ Vegetation at the MRS consists of barren to low grass, Live oak, buckwheat, and blackberry brambles
	Wetlands: ▪ No wetlands are known to exist within the MRS

Table 2-1
Preliminary CSM Information for the Leona Heights Rifle Range MRS
(Continued)

Profile Type	Site Characterization
Land Use and Exposure Profile	Beneficial Resources: ▪ There are no beneficial resources located within the MRS
	Current Land Use: ▪ Residential housing
	Current Human Receptors: ▪ Site Worker/Land Owner/Resident (adult/child) • Recreational User/Site Visitor/Trespasser (adult/child)
	Potential Future Land Use: ▪ No expected change in current land use
	Potential Future Human Receptors: ▪ No anticipated change in human receptors
	Cultural, Archaeological, and Historical Resources: ▪ No information was located for potential cultural, archaeological, or historical resources for the MRS
	Demographics: ▪ According to the 2010 census, Alameda County, California has a population of 1,510,271, with 2,044 people per square mile ▪ According to the 2010 census, Oakland, California, has a population of 390,724, with 7,004 people per square mile
	Zoning/Land Use Restrictions: ▪ The site is located in a residential neighborhood; as such, access to vehicle or pedestrian traffic is restricted by buildings, fencing, and curbs to walkways and paved roads. However, there is partial public access to the site. ▪ Adjacent areas are also residential
Ecological Profile	Habitat Type: ▪ Landscaped
	Ecological Receptors: ▪ No federal or state threatened or endangered species are known to exist on the MRS. ▪ Alameda County, California, contains the following categories of threatened or endangered species: o Amphibians o Birds o Fish o Reptiles
	Degree of Disturbance: ▪ High degree of disturbance to western third of MRS is likely because of construction of roads, buildings, utilities, and overall development of area ▪ Eastern hillside of MRS has remained undeveloped because of its steep topography
Munitions/ Release Profile	Munitions Types: ▪ Small arms (.30 caliber) ▪ Mortars (3-inch Stokes)
	Release Mechanisms: ▪ Intentional munitions firing ▪ Discarded or malfunctioned rounds
	Maximum Probable Penetration Depth: ▪ An estimated penetration depth of one foot could be expected for small arms ▪ An estimated penetration depth of 2.8 feet bgs could be expected for 3- inch Stokes mortars (assumes similar soil type and scenario as above)

Table 2-1
Preliminary CSM Information for the Leona Heights Rifle Range MRS
(Continued)

Profile Type	Site Characterization
	MEC Density: ▪ No MEC was observed during field activities; therefore, the MEC density is considered low or insignificant.
	Munitions Debris: ▪ One MD item (Practice 3-inch Stokes mortar) was observed during the field activities on the eastern slope of the MRS in an area covered in dense vegetation that was not easily accessible. Additional MD items could be present in this relatively inaccessible steep hillside area. Other than this area, the density is considered low. ▪ No MD was observed during the field activities ▪ Small arms debris (consisting of .30-caliber projectiles) was identified on the surface of the earthen berm in front of the target system and on the slope behind the target area ▪ A number of sub-surface anomalies were detected a short distance below the Stokes mortar that were consistent with that type of munitions
	Associated Munitions Constituents: ▪ No MC concentrations were reported to exceed the screening criteria in any of the samples collected from this MRS ▪ Lead is the primary MC anticipated at this site from small arms ▪ Based on historical records potential MC from high explosive 3-inch Stokes mortars may include nitrocellulose , nitroglycerin (NG), and TNT.
	Transport Mechanisms/Migration Routes: ▪ Although no MC was reported to exceed the screening criteria in the samples collected from this MRS, the following transport mechanisms would be relevant if MC was present above the screening criteria: o Heavy rains; precipitation and runoff may accelerate transport and migration of MC into groundwater o Construction of roads, sidewalks, and houses could have caused soil to be transported off-site or MC to be disturbed in soil
	Pathway Analysis: ▪ One MD item was observed at this site during the field activities. In addition, several subsurface anomalies were identified just downhill from the MD item. Due to the MD found on the surface the pathway for MEC is considered potentially complete. No MC was reported to exceed the screening criteria in the samples collected from this MRS; therefore, the pathway for human receptors to contact MC is considered incomplete.

Notes:
Sources: (Weston, 2012), (USFWS, 2015), (USNPS, 2015), (USDA, 2015), and (CA.gov, 2015)

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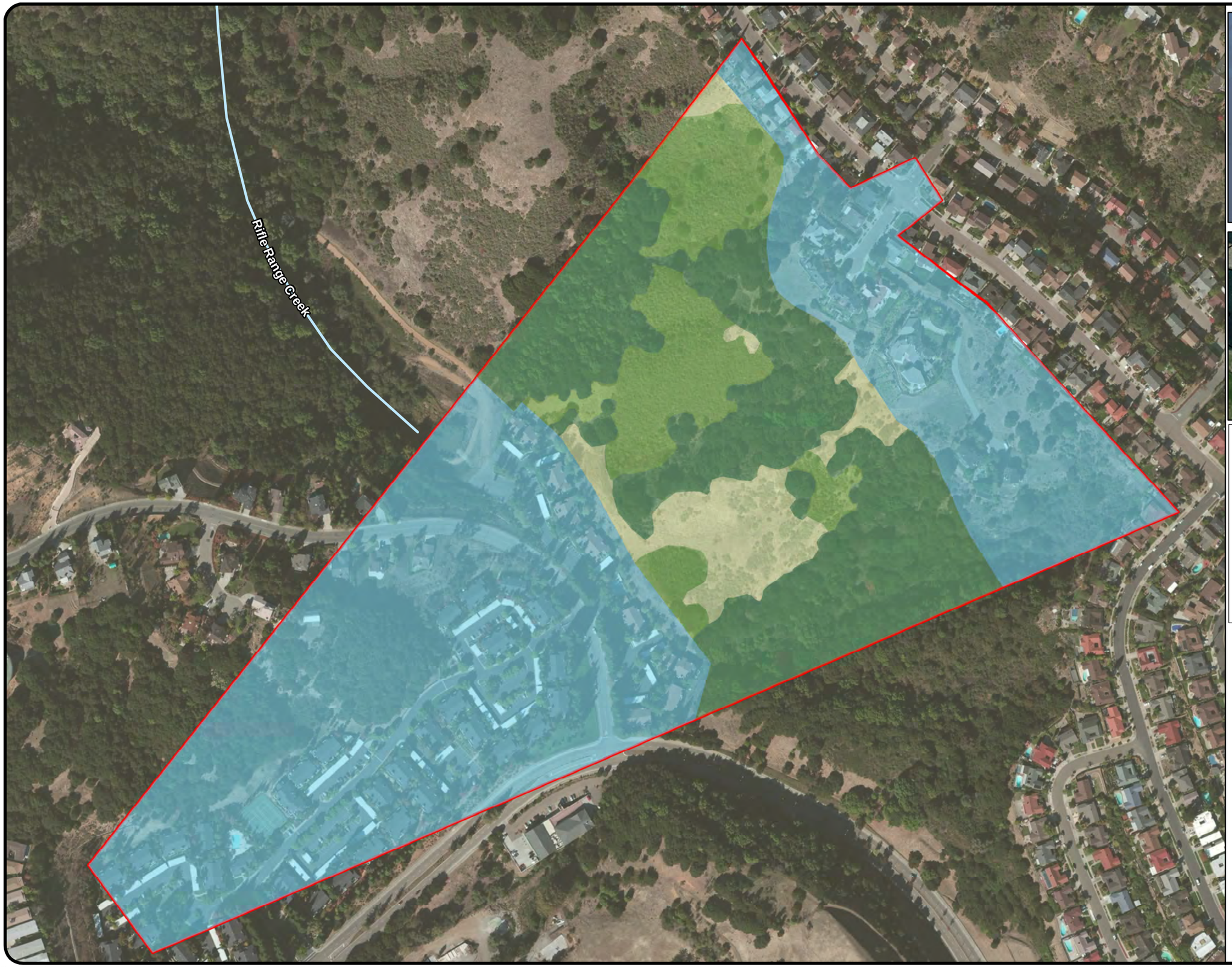

Legend

Site Features

- Grass (slender oat, etc.)
- Shrubs (blackberry, buckwheat, etc.)
- Trees (live oak, etc.)
- Hardscape
- Rifle Range Creek
- Leona Heights Rifle Range MRS

N
W E
S

0 175 350 Feet

1 in = 275 feet

MRS Features

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **2-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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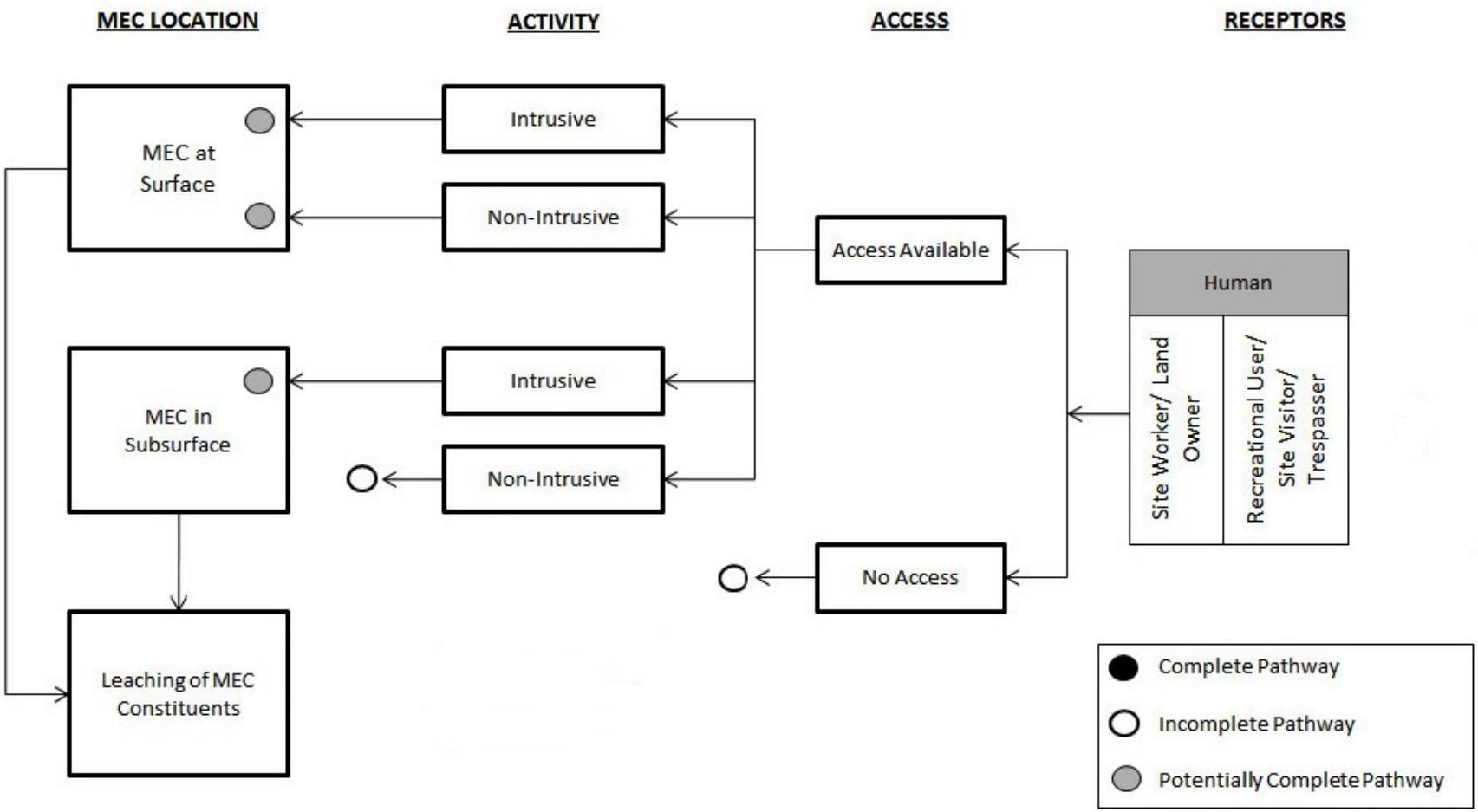
Figure 2-2
Initial Conceptual Site Model



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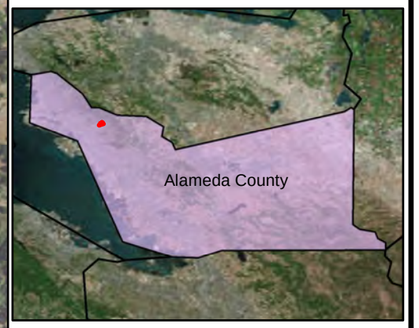

Legend

- Road
- Leona Heights Rifle Range MRS
- Recreational Land Use (Leona Canyon Regional Open Space Preserve)
- Residential Land Use

N
W E
S

0 175 350 Feet

1 in = 350 feet

Current and Future Land Use

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **2-3**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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WGS84 UTM 10N

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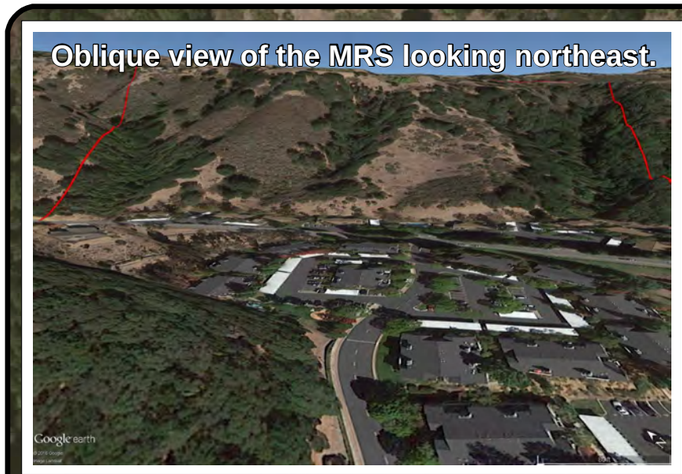


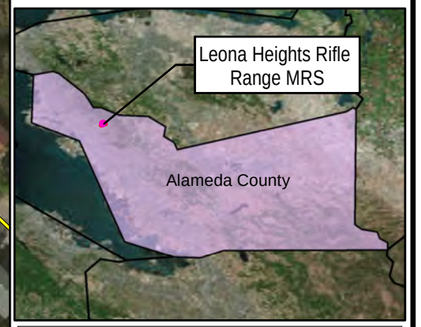
Surrey Ln.

Pinecrest Dr.

Hansom Dr.

Campus Dr.

Canyon Oaks Dr.



Legend

- Road
- Leona Heights Rifle Range MRS

Slope

- 20 - 30 Degree Slope
- > 30 Degree Slope

N
W E
S

0 100 200 Feet

1 in = 200 feet

MRS Topography

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE 2-4

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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2.2.2 Preliminary Remediation Goals for Munitions and Explosives of Concern

There are no established PRGs for MEC, particularly UXO and DMM (U.S. Army, 2009). In general, the remediation goals for MEC focus on removing or limiting the exposure pathways. Two (2) types of PRGs were applicable to MEC during the RI:

Determine nature and extent of MEC (type, depth, density, distribution).

Determine if MC poses a risk where a release is suspected due to field indications such as a damaged or broken item with leaking fluids or associated soil staining (specific chemicals of concern, distribution, and concentration based on media).

Evaluate the hazard and potential risk posed to human health and the environment by MEC and MC (if required).

The basis for the PRGs was the current and anticipated land use and associated receptors at the MRS, based upon the preliminary CSM (Section 2.1). Data obtained by fulfillment of the PRGs, specifically the presence or absence of MEC, will drive future munitions responses.

2.2.3 Preliminary Remediation Goals for Munitions Constituents

The PRGs for MC were developed in Worksheet #15 of the Uniform Federal Policy for Quality Assurance Project Plan (UFP-QAPP) (Appendix F of the RI Work Plan, WESTON, 2015a). A set of project action limits for MC in soil were based upon USEPA residential RSLs for human health.

2.3 PRELIMINARY IDENTIFICATION OF APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS AND "TO BE CONSIDERED" INFORMATION

The requirements for identifying applicable or relevant and appropriate requirements (ARARs) is established in Section 121 (d)(2)(A) of CERCLA of 1980, which states:

With respect to any hazardous substance, pollutant or contaminant that will remain on-site, if (i) any standard requirement, criteria, or limitation under any Federal environmental law; or (ii) any promulgated standard, requirement, or limitation under a state environmental or sitting law that is more stringent than any Federal standard, requirement, criteria, or limitation, and that has been identified in a timely manner, is legally applicable to the hazardous substance or pollutant or contaminant concerned or is relevant and appropriate under the circumstances of the release or threatened of such hazardous substance or pollutant or contaminant, the remedial action selected shall require, at the completion of the remedial action, a level or standard of control for such hazardous substance or pollutant or contaminant which at least attains such legally applicable or relevant or appropriate standard, requirement, criteria, or limitation.

This section of CERCLA describes the process and standards to be used for selecting actions at sites subject to CERCLA. Substantive requirements are either directly applicable or pulled from other regulatory programs where they may be relevant to the site circumstances.

ARARs are those substantive requirements that pertain directly to actions or conditions at the site. A requirement is applicable if the specific requirement directly addresses the circumstances at a site. A requirement may be relevant and appropriate if circumstances at the site are similar to the problems or situations intended to be addressed by the requirement.

The NCP provides an organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants. It defines ARARs as follows:

- Applicable Requirements – Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.
- Relevant and Appropriate Requirements – Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility citing laws that, while not "applicable" to the hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to a particular site.

According to the NCP, ARARs fall into three categories: chemical-specific, action-specific, and location-specific:

- Chemical-specific ARARs are typically health- or risk-based numerical values or methodologies which, when applied to site-specific conditions, are expressed as numerical values that represent cleanup standards (i.e., the acceptable concentration of a chemical at the site).
- Location-specific ARARs are restrictions on the concentration of hazardous substances or the conduct of activities in environmentally sensitive areas, such as floodplains, wetlands, historic places, and sensitive ecosystems or habitats.
- Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions or conditions taken with respect to specific hazardous substances.

To be considered (TBC) requirements are used when there are no ARARs, or when ARARs alone may not adequately protect human health and the environment. TBC requirements are meant to complement the use of ARARs, not to compete with or replace them. Because TBCs are not ARARs, their identification and use are not mandatory under CERCLA. The preliminary ARARs and TBCs for the Leona Heights Rifle Range MRS are summarized in **Table 2-2**. No chemical- nor location-specific ARARs were identified as applicable to the MRS; hence, **Table 2-2** only presents action-specific ARARs and TBCs.

Table 2-2
Preliminary ARARs and TBCs

Requirement	Citation	Description	ARAR/TBC Determination	Comments
Chemical Specific				
None				
Location Specific				
None				
Action Specific				
Standards for owners and operators of hazardous waste treatment, storage, and disposal facilities; miscellaneous units	40 CFR 264 Subpart X	A miscellaneous unit must be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment.	TBC	Applies to treatment (detonation) of MEC/MPPEH that requires technologies defined as "miscellaneous units" in Subpart X. Subpart X specifies an environmental performance standard that must be met through conformance with appropriate design, operating, and monitoring requirements.
Ammunition and Explosives Safety Standards	Department of the Army Pamphlet 385–64	Set explosives safety standards to protect human health and the environment.	TBC	This pamphlet explains the Army's safety criteria and standards for operations involving ammunition and explosives (AE) (also referred to as Military Munitions) prescribed by AR 385–10, DOD Directive (DODD) 6055.9E, and DODM 6055.09–M for the U.S. Army, and Government-owned, contractor-operated facilities and property. Specific requirements for safe removal and management of MEC.

Table 2-2
Preliminary ARARs and TBCs
(Continued)

Requirement	Citation	Description	ARAR/TBC Determination	Comments
Intentional Detonations	HNC-ED-CS-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions"	Identifies specific criteria for the use of sandbag mitigation during intentional detonations of MEC.	TBC	If sandbag mitigation is deemed appropriate during MEC disposal, the specific requirements contained herein must be adhered to.
Intentional Detonations	Tamping and the Buried Explosion Module (BEM)	Identifies specific criteria for tamping and the use of the BEM during intentional detonation of MEC.	TBC	If tamping and the BEM are deemed appropriate during MEC disposal, the specific requirements contained herein must be adhered to.
Material Potentially Presenting an Explosives Hazard (MPPEH)	DoD Instruction 4140.62, "Management and Disposition of MPPEH"	Identifies procedures for inspecting and certifying the safety status of material potentially presenting an explosive hazard	TBC	MPPEH generated during the remedial action will be managed in accordance with the procedures identified herein.

2.4 SUMMARY OF INSTITUTIONAL ANALYSIS

Typical strategies for addressing the presence of MEC on a site are physical removals and land use controls (LUCs). Although physical removals may be conducted to reduce the amount of MEC at a site, current technologies are not adequate to provide for the detection and removal of all MEC items. Therefore, even in the event that physical removals are performed, LUCs are implemented to manage any residual MEC risk at a site. LUCs are also sometimes put into place as a stand-alone response without a physical removal. Landowners provide critical input into the development of a viable LUC program at a site located on their property. If a LUC program is selected for a site on a property not under the control of the DoD, it is the property owner and/or appropriate state and local governments that have the authority to maintain compliance with the provisions of the LUCs and maintain the effectiveness of the LUCs.

LUCs consist of various legal mechanisms, educational and engineering control measures, and construction support used to minimize the potential for hazards to human receptors from a property impacted with MEC or other hazards. Types of LUCs are described in more detail in **Appendix C**. Instead of direct elimination of MEC, LUC components to remedial actions rely on behavior modification and access control strategies to reduce or eliminate risk. The objectives of an institutional analysis (IA) are to illustrate the opportunities that exist to implement a LUC program at a specific site; identify landowners and government agencies having jurisdiction over the site; and assess the appropriateness, capability and willingness of landowners and government agencies to assert their control over the site. An IA Report (**Appendix** C) was prepared that identifies government agencies having jurisdiction over MEC-contaminated lands at the MRS, and to assess their appropriateness, capability and willingness to assert this control. The government agencies/institutions evaluated include:

- CAARNG
- ARNG
- USACE
- CA DTSC
- USEPA
- EBRPD

Private property owners were not included in the IA. Private properties were identified as hardscape areas, discussed during the Technical Project Planning (TPP) meetings (**Appendix D**), which had gone through significant development where the majority is covered by houses, buildings, roads, parking lots, and sidewalk. The developed area assessment is presented in **Section 3.6**.

2.4.1 EVALUATION OF EXISTING CONTROLS

No LUCs are currently implemented at the Leona Heights Rifle Range MRS.

2.4.2 RECOMMENDATIONS FOR ADDITIONAL CONTROLS

Recommended institutional control alternatives to be evaluated during the FS include:

- Engineering Controls
  - Warning Signs
  - Fencing
- Educational Controls
  - Public Notices
  - Community Awareness Meetings
  - Letter Notifications, Informal Pamphlets, and Fact Sheets
  - Websites

Warning signs would serve as both engineering and educational controls for educating the public of the potential MEC hazards at the Leona Heights Rifle Range MRS. Other educational controls include maintaining a public website for distribution of project information. Informational pamphlets and fact sheets are recommended for distribution at key times during any MRS remediation activities. In addition, fact sheets and pamphlets are recommended for distribution to public officials, emergency management agencies, and the EBRPD office notifying recreation users of potential MEC.

The roles, responsibilities, and authorities that each organization would have in implementing, maintaining, monitoring, and enforcing institutional controls are provided in **Table 4-1**. Long-term implementation of institutional controls would be the responsibility of the CAARNG/ARNG or USACE.

2.5 DATA NEEDS AND DATA QUALITY OBJECTIVES

An important element inherent to developing an appropriate RI investigation strategy is to define the criteria for Data Quality Objectives (DQOs). The overall project DQOs were developed using the USEPA Quality Assurance (QA)/G-4 guidance (USEPA, 2006). The DQOs are qualitative and quantitative statements that define the type, quantity, and quality of data necessary to support the decision-making process during the RI. The DQOs were developed using a seven-step process that included the following:

1. **State the problem**: Define the problem that necessitates the study and identify the planning team; examine the budget and schedule.
2. **Identify the goals of the study**: State how environmental data will be used in meeting objectives and solving the problem, identify study questions, and define alternative outcomes.
3. **Identify information inputs**: Identify data and information needed to answer study questions.
4. **Define the boundaries of the study**: Specify the target population and characteristics of interest and define spatial and temporal limits, and scale of interface.

5. **Develop the analytic approach**: Define the parameter of interest, specify the type of interference, and develop the logic for drawing conclusions from findings.
6. **Specify performance or acceptance criteria**: For decision making (hypothesis testing), specific probability limits for false rejection and false acceptance decision errors, and for estimation and other analytic approaches, develop performance criteria for new data being collected or acceptable criteria for existing data being considered for use.
7. **Develop the plan for obtaining data**: Select the resource-effective sampling and analysis plan that meets the performance criteria.

The DQO's for the Leona Heights Rifle Range MRS are provided in **Table 2-3**.

Table 2-3
Leona Heights Rifle Range MRS DQOs

Step	Description
1 – State the Problem	▪ The nature and extent of MEC at the Leona Heights Rifle Range MRS related to historical training is unknown. An MMRP RI, as recommended by the SI, will be performed to meet Army obligations under CERCLA and the NCP to address potential residual hazards and risks to human health, and the environment. ▪ The CSM developed based on data and information collected through the SI indicates that potentially complete exposure pathways for MEC exist related to former munitions use and small arms training conducted by CAARNG. ▪ The SI documented the use of small arms, .30 caliber, at the firing ranges. One MD item, a 3-inch Stokes Mortar, was observed during the SI.
2 – Identify the Goals of the Study	▪ Determine the nature and extent of MEC within the undeveloped accessible areas of the MRS. ▪ Update the MRSPP. ▪ Perform a MEC HA, if required.
3 – Identify Information Inputs	▪ Survey results from the August 2012 SI. ▪ Planned analog survey with subsequent intrusive investigation to detect and identify surface and subsurface anomalies. ▪ Visual assessment of the topography and range features will be made during the investigation. ▪ GIS maps with SI and RI results; including, distribution, and types of MEC and MD identified within the MRS, both surface and subsurface.
4 – Define the Boundaries of the Study	▪ The MRS encompasses approximately 81.33 acres. ▪ The RI will be focused in the accessible (topography and vegetation) area within the approximate 31.73 acres of the Leona Heights ROSP (developed areas within the MRS will not be investigated). ▪ The SI data will be used to evaluate the southwestern portion of the MRS while the RI will focus on the Leona Canyon ROSP. ▪ All survey and intrusive investigation results collected within the MRS will be used to assess MEC hazards for the MRS.
5 – Develop the Analytic Approach	▪ If MEC is recovered during the investigation, then a MEC HA is required. ▪ If no MEC is recovered during the investigation, yet sufficient MD is found, a MEC HA may be required. ▪ If no MEC and/or sufficient MD is recovered during the investigation, then the MRS does not pose a MEC hazard, a MEC HA is not needed, and the MRS will be recommended for NFA with regards to MEC.

Table 2-4
Leona Heights Rifle Range MRS DQOs
(Continued)

Step	Description
5 – Develop the Analytic Approach	▪ If the MC sample results are above screening levels, additional samples will be collected to define the extent. ▪ If MEC is recovered during the investigation, then a MEC HA is required. ▪ If no MEC is recovered during the investigation, yet sufficient MD is found, a MEC HA may be required. ▪ If no MEC and/or sufficient MD is recovered during the investigation, then the MRS does not pose a MEC hazard, a MEC HA is not needed, and the MRS will be recommended for NFA with regards to MEC. ▪ If a release of MC is suspected due to field observations, samples will be collected (SI recommended NFA for MC). ▪ If the MC sample results are above screening levels, additional samples will be collected to define the extent.
6 – Specify Performance or Acceptance Criteria	▪ If the geophysical equipment is verified to be functioning correctly as outlined in the Measurement Quality Objectives (MQOs) (Section 3.1.3.3), then the analog geophysical survey is assumed to be valid.
7 – Develop the Plan for Obtaining Data	▪ An analog transect survey approach will be developed based on accessibility within the Leona Canyon ROSP, subsurface anomalies identified during the SI, and potential transport of MEC through natural processes. Transects will be placed at: • Two transects spaced 15 feet between centerlines at the base of the hillside adjacent to the Ridgemont condominiums extending 30 feet towards the northeast resulting in 2,700 feet of coverage; • One transect in the center gully where the MD was found during the SI (orientated northeast – southwest), extending the furthest accessible point, approximately 319 feet of coverage; • One transect in the upper portion of the open area on the west of the MRS (orientated northwest – southeast), approximately 174 feet of coverage; and • Three transects spaced at 200 feet between centerlines across the open area to the southeast of the Leona Canyon ROSP, extending the furthest accessible points (orientated northwest – southeast), approximately 778 feet of coverage. • The RI survey and intrusive investigation results and the SI survey will be used to assess MEC hazards. ▪ MPPEH will be subject to a dual inspection and verification on site to identify suspected munitions and any associated hazard to determine proper handling and disposal requirements. This process will be completed by two UXO-Qualified personnel performing independent inspections. ▪ In areas where an MC release is suspected due to field indications such as a damaged or broken item with leaking fluids or associated soil staining and demo locations, discrete samples will be collected from biased locations most likely to be impacted by MC and used to confirm the presence of MC. Additional discrete sampling will be employed to delineate MC if significant risk to receptors is identified. ▪ MC parameters (i.e., explosives) have been selected based on suspected munitions. Verification and validation of analytical MC data will be performed in accordance with DoD Quality System Manual and federal guidelines and communicated to USACE, ARNG, CAARNG, and DTSC prior to data incorporation into data evaluation/risk screening activities to make project decisions.

3.0 CHARACTERIZATION OF MUNITIONS AND EXPLOSIVES OF CONCERN AND MUNITIONS CONSTITUENTS

The approach to meet the DQOs was developed as part of the TPP process (TPP#2) including the approach used to develop investigation area coverage, operating procedures, and QC protocols, as well as identifying the appropriate equipment that was used for the investigations performed during the RI. The overall RI approach and DQOs are presented in **Sections 2.0**. The MEC characterization approach at the Leona Heights Rifle Range MRS included the following primary elements:

- Analog transect surveys to detect potential MEC in the surface and subsurface within accessible areas.
- Intrusive investigations along transects at anomaly locations to determine the nature, type, and distribution of MEC and MD.

This section presents the data results from the RI field work that are used to define the nature and extent of hazards at the Leona Heights Rifle Range MRS. **Table 3-1** defines the timeline of work conducted at the Leona Heights Rifle Range MRS including the start date, end date, and task.

Table 3-1
Leona Heights Rifle Range MRS RI Fieldwork Timeline Summary

Task	Start Date	End Date
Community Relations	4/8/2016	6/17/2016
Mobilization & Instrument Test Strip Installation	6/6/2016	
Vegetation Clearance	6/7/2016	
Proposed Transect & Mini-Grid Layout	6/7/2016	6/8/2016
Analog Survey	6/8/2016	6/10/2016
Anomaly Location Data Collection		
Temporary Evacuations[1]	6/13/2016	6/15/2016
Intrusive Investigation	6/10/2016	6/15/2016
Additional Transect & Mini-Grid Layout, Anomaly Location Data Collection & Intrusive Investigation	6/15/2016	
Intentional Detonations[2]	6/17/2016	
Pre- & Post-Detonation Sampling		
MDAS Inspection		
Demobilization		

Notes:
[1] – Temporary evacuation from 0900-1600 only.
[2] – No evacuations, Leona Trail trailhead closure from 0800-1000 during intentional detonation.

3.1 COMMUNITY RELATIONS PLANNING

Community relations included engaging interested community members throughout the RI process by involving them in activities and decisions related to the MRS while following the CERCLA process. This promoted two-way communication between the interested community members and the Army. The framework on how information, decisions, and community concerns would be exchanged was presented in the Community Relations Plan (CRP) (WESTON, 2016b).

As part of and in addition to the CRP, a public notice was placed in the Oakland Tribune on 8 April 2016 soliciting community feedback, gauging Restoration Advisory Board (RAB) interest and identifying the Administrative Record and Information Repository locations. During work plan development, EBRPD, Leona Trail users, and the adjacent condominium residents were identified as being potentially affected during fieldwork. The EBRPD information supervisor, police department and fire department were notified of fieldwork via community interviews as part of the CRP process. As part of the interview process, a teleconference was scheduled on 13 April 2016 with the adjacent HOA board of directors (BOD) through the property manager to inform them of the upcoming fieldwork and address any questions. Following the teleconference, an open forum was scheduled on 28 April 2016 to present the project the HOA and EBRPD. The open forum was held from the time of 1930 to 2100 to accommodate the HOA. During the open forum, the Army introduced key personnel, presented the history of the Leona Heights Rifle Range MRS, discussed the proposed fieldwork including temporary evacuations and trailhead closure during intrusive work, and answered questions.

3.1.1 Leona Trail Trailhead Closure

The Leona Trail trailhead at Canyon Oaks Drive was closed on Monday (6/13/16) from 0900 to 1600 during intrusive investigation of the western portions of transects T01-T03. Closure signs were posted 72 hours prior at the Canyon Oaks and Merit College Leona Trail trailheads and at the Pyrite Trail trailhead notifying users of the Canyon Oaks Drive closure. The remaining portions of the Leona Trail were open for use. During the analog survey frequent trail users were provided the project fact sheet (April, 2016) and verbally notified of the trailhead closure. The EBRPD information supervisor and the Leona Canyon park supervisor were also notified of the closures.

3.1.2 Temporary Evacuation

In accordance with the ESP (Appendix F of the RI Work Plan, WESTON, 2015a), the minimum separation distance (MSD) for all nonessential personnel during intrusive work was 225 feet. Therefore, all nonessential personnel were temporarily evacuated from the 225-foot exclusion zone (EZ) prior to intrusive activities. Due to the distance from the investigation area (Leona Canyon ROSP) to residential properties to the southwest, temporary evacuations were required during intrusive investigation in accordance with the ESP. Temporary evacuations were between 0900 and 1600 only on days when intrusive activities were taking place. Evacuations were timed to minimize disruption and provide maximum advanced notice to residents.

The temporary evacuation zone was measured in a radial pattern from the outermost boundary of the intrusive investigation area, extending to the limit of the MSD (225 feet). The interior of the resulting buffer constituted a controlled and restricted area in which non-essential personnel were not present. Any occupied buildings or public roadways in the MSD area were evacuated and/or roadways blocked to prevent non-essential personnel from entering during the intrusive activity.

Approximately 70 homes were within the 225-foot MSD of the Leona Heights Rifle Range MRS boundary. Therefore, intrusive activities were not conducted within the Evacuation Work Area when residents were within their homes that lie within the 225-foot arc of the area under investigation (**Figure 3-1**).

RI Notices, which included an overview of the Leona Heights Rifle Range MRS, planned site activities, importance for temporary evacuation, and ARNG point-of-contact information were delivered to potentially affected community residents. The notices were posted on the front door or in the entry way in an obvious location at each residence 30 days, two weeks, 72 hours and 24 hours prior to intrusive work. A copy of the notices was also posted at the HOA information bulletin board along with the RI Fact Sheet. A copy of the RI notices and Fact Sheet are presented in **Appendix E**.

Due to the distance from transects T01-T05 and mini-grids MG01 and MG03-MG05 to residential properties to the southwest, temporary evacuations were required during intrusive investigation in accordance with the ESP. Evacuations were timed to minimize disruption, and provide maximum advance notice to residents. Residents were asked to temporarily evacuate from 0900 to 1600 on Monday (6/13/16), Tuesday (6/14/16) and Wednesday (6/15/16). An evacuation coordination station was set up daily at the entrance/exit to the condominiums to coordinate evacuation times, answer questions, and collect contact information for notification of early return.

Prior to intrusive work within the Evacuation Work Area (**Figure 3-1**), WESTON personnel went door-to-door each morning to verify residents (non-essential personnel) had evacuated. Verification included knocking on the door and waiting up to a minute for a response from a resident. If there was no response, the residence was assumed to be vacant and intrusive work could begin. If a resident answered the door, WESTON personnel would coordinate with them a time when they would temporarily evacuate to allow fieldwork.

3.2 MUNITIONS AND EXPLOSIVES OF CONCERN CHARACTERIZATION

Digital Geophysical Mapping (DGM) surveys were not planned to be performed as part of this RI due to the steep topography and dense vegetation. Analog handheld White's MXT all-metal detectors with an effective detection depth of 24 inches, were used during the RI transect survey and subsequent intrusive investigation. Each anomaly detected was physically marked (flagged) in the field and the location recorded with a Global Positioning System (GPS) for subsequent intrusive investigation. Therefore, all anomalies were positively identified, providing a higher confidence in characterization. Anomaly locations, features and other points of interest were recorded with a Trimble Geo 7X GPS .

3.2.1 Vegetation Trimming

Minimal vegetation trimming of tall grasses along transects was performed at the Leona Heights Rifle Range MRS on 7 June 2016. Qualified UXO personnel used STIHL FS 130 trimmers with polycut heads to trim tall grasses to a width of between five and six feet along the length of each transect and to within four and six inches of the ground surface. Trimming of the tall grasses was necessary for unimpeded analog survey and intrusive investigation within transects. Cut grass was left in place and did not need to be removed from transects. Daily Reports including photo documentation of site activities for the duration of the fieldwork are provided i**n Appendix E.**

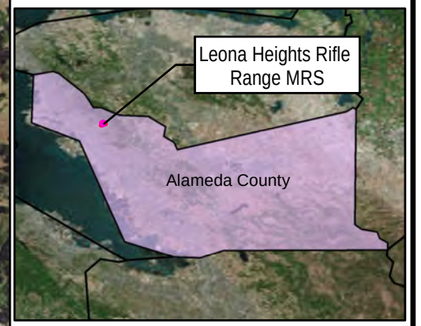
3.2.2 Analog Geophysical Activities

Qualified UXO personnel began layout of the proposed transects (T01-T08) using a Trimble Geo 7X GPS on 7 June 2016. Transects followed the proposed locations, approved in the RI Work Plan, to the extent possible due to the dense vegetation within the MRS. Due to dense vegetation and topography transects T02 and T03 are not continuous but, rather, segmented within accessible portions of the planned transect. Furthermore, a deer fence ran along the toe of the slope, which resulted in transects being shifted slightly. Once transects were laid out, the vegetation was cut as described in the previous section. The start and end of each transect or transect segment were staked with three-foot wood stakes and labeled for easy identification.

Using a Geo 7X, qualified UXO personnel navigated to the subsurface anomaly and MD locations identified during the SI to layout mini-grids MG01 (subsurface anomaly) and MG02 (MD, Practice 3-inch Stokes Mortar). The mini-grids were located in dense vegetation which dictated the layout. Mini-grid layout consisted of centering on the location and orientating the grid longitudinally (15 feet) allowing for the most coverage possible. The mini-grid corners were staked at five feet from the centerline resulting in dimensions of 15 feet by 10 feet. Additional wood stakes were used to direct personnel to transect locations as required. Transects were labeled one through eight beginning at the southwest corner of the Leona Canyon ROSP sequentially moving towards the northeast.

Additional transects (T09-T11) and mini-grids (MG03-MG05) were added after intrusive investigation along the proposed transects and mini-grids. In accordance with the approved RI Work Plan (WESTON, 2015a), the additional transects and mini-grids were placed in accessible areas to delineate the MD (intrusive results discussed in the following subsections). Transect and mini-grid locations and orientations are shown on **Figure 3-2**.

The centerline of each transect was painted to dictate the path during the analog survey and to allow for QC verification by the Unexploded Ordnance Quality Control Specialist (UXOQCS). Transect locations were recorded with a Trimble Geo 7X GPS. Qualified UXO personnel used White's MXT all metals detectors to survey and flag anomalies along transects. Analog survey included walking the centerline of transects while swinging the White's MXT perpendicular to the direction of the transect, resulting in an effective width of five feet based on the instrument handle and operator swing arc. During the analog survey, if the MTX indicated an anomaly (audible tone) the operator moved any vegetation or rocks to expose the ground surface.



Legend

- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- Road
- Proposed Transect (3971 ft)
- 225 ft Hazard Fragment Distance
- Leona Canyon Regional Open Space Preserve Boundary
- Leona Heights Rifle Range MRS
- 225 ft Evacuation Work Area

N W E S

0 175 350 Feet

1 in = 350 feet

Exclusion Zone & Evacuation Work Area

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-1**

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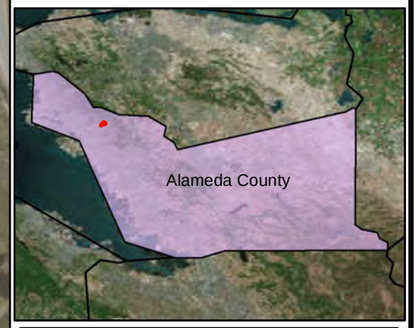

Legend

- Evacuation Work Area Boundary - 225'
- Actual Transects & Mini-Grids
- Proposed Transects and Mini-Grids
- Additional Transects and Mini-Grids
- Leona Heights Rifle Range MRS

RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N
W E
S

0 75 150 Feet

1 in = 125 feet

Proposed and Actual Transects and Mini-Grids

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-2**

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If the anomaly was located on the surface, it was inspected and determined to be munitions-related (MPPEH/MEC/MD) or NMD. Any NMD was removed from transects and disposed of as municipal waste per the RI Work Plan (WESTON, 2015a). Only NMD was found on the ground surface during the RI fieldwork. If the anomaly was subsurface, a polyvinyl chloride-(PVC) staffed pin flag was labeled with a unique anomaly identifier and placed off to the side to mark the location.

Following the analog survey, the location of each anomaly was recorded using a Trimble Geo 7X GPS by the unique anomaly identifier. 351 subsurface anomalies were flagged for intrusive investigation (plus four QC items). Anomaly locations are presented on **Figure 3-3** and the anomaly count per transect and mini-grid is presented in **Table 3-2**.

Table 3-2
Anomaly Count Per Transect and Mini-Grid

Transect ID	Subsurface Anomaly Count	Transect/Mini-Grid ID	Subsurface Anomaly Count
T01	12	T09	22
T02	134	T10	9
T03	84	T11	5
T04	14	MG01	1
T05	11	MG02	1
T06	18	MG03	6
T07	14	MG04	2
T08	22	MG05	0

Notes:
T Transect
MG Mini-Grid

3.2.3 Intrusive Investigation

Intrusive investigation began on 10 June 2016 and concluded on 15 June 2016. Qualified UXO personnel used hand tools to excavate and identify the 351 anomalies identified during the anomaly survey. Additionally, four QC items were identified. Anomalies were categorized as MD, MPPEH, SAA, or NMD. Munitions-related anomalies included:

- MD – T02-023, 3-inch Stokes Mortar
- MPPEH – T03-016, T03-034, and T03-035, 3-inch Stokes Mortars

No munitions related "frag" (MD) was identified and the remaining anomalies were either SAA or NMD. The intrusive results summary is presented in **Table 3-4** and the anomaly types and locations are presented on **Figure 3-4**. The complete Leona Heights Rifle Range MRS dig list is presented in **Appendix H**.

Table 3-3
Leona Heights RI Intrusive Summary

Item	Count	%
MD	1	0.3%
MPPEH	3	0.9%
SAA	245	69.8%
NMD	102	29.1%
Total	351	100.0%

Notes:
MD Munitions Debris
MPPEH Material Potentially Posing an Explosive Hazard
SAA Small-Arms Ammunitions
NMD Non-Munitions Debris

3.3 GEOPHYSICAL DATA QUALITY ASSESSMENT

Data quality assessment for the geophysical investigation included utilization of an ITS and a blind QC seed program. Analytical data quality was assessed through review by a third party data validator.

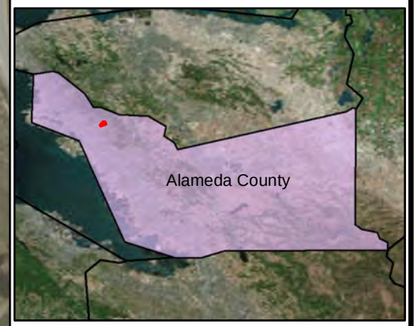
3.3.1 Geophysical System Verification

3.3.1.1 Instrument Test Strip

Data quality assessment for the geophysical investigation included utilization of an instrument test strip (ITS) and a blind QC seed program. UXO technicians adhered to the ITS procedures described in the RI Work Plan (WESTON, 2016a). The sensitivity of each magnetometer instrument (Whites MXT all metals detector) was adjusted at the beginning of each day using the ITS, which was located adjacent to the Leona Trail trailhead parking lot in an area that was consistent with the geophysical conditions of the MRS and free of anomalies. Medium Industry Standard Objects (ISOs) were chosen for their similarity to a 3-inch Stokes Mortar. The medium ISOs, were 2-inch (nominal) by 8-inch (length) pipe nipples consistent with American Society for Testing and Materials (ASTM) specifications A35 (standard specification for pipe) and A773 (standard method for dc magnetic properties). The ITS was seeded with three medium ISOs at depths of 4, 8, and 12 inches to test the response of the instrument and operator. ISOs were spaced five feet apart to prevent interference with other ISOs. The location and layout of the ITS is presented on **Figure 3-5**.

3.3.1.2 QC Seeds

Numbered QC seeds were placed in transects and mini-grids in order to assess the quality of the geophysical investigation, including equipment and operator effectiveness. The UXOQCS placed QC seeds (**Figure 3-4**) such that one seed item was encountered per day per dig team. The ID, GPS location, and depth were recorded during placement. Upon discovery of a QC seed, the dig team notified the UXOQCS, whereupon the UXOQCS compared the ID and position of the recovered item with the recorded data.



Legend

- RI Subsurface Anomaly Location (n = 351)
- Evacuation Work Area Boundary - 225'
- Transects
- Proposed Transects and Mini-Grids
- Additional Transects and Mini-Grids

RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N
W E
S

0 75 150 Feet

1 in = 125 feet

Anomaly Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-3**

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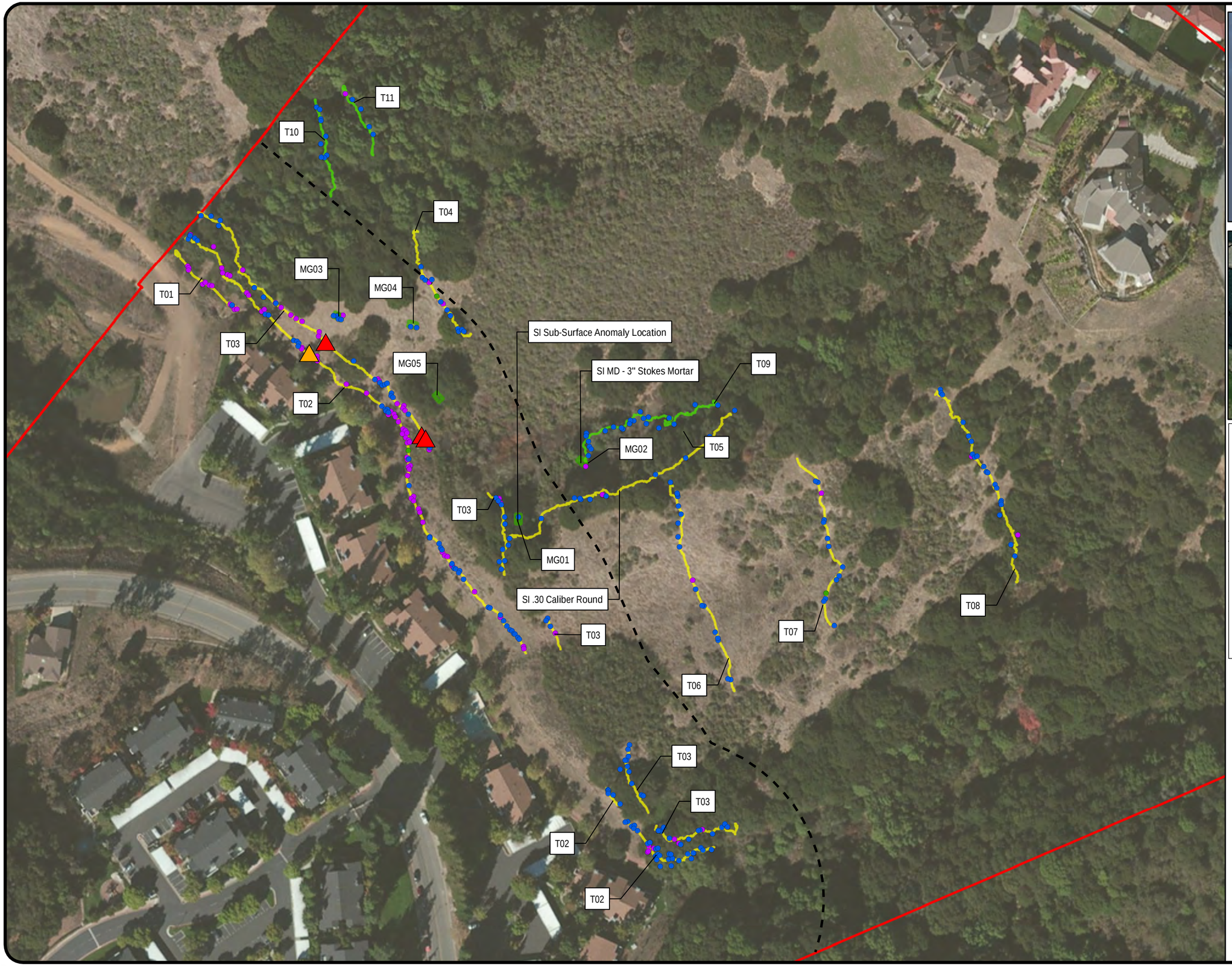

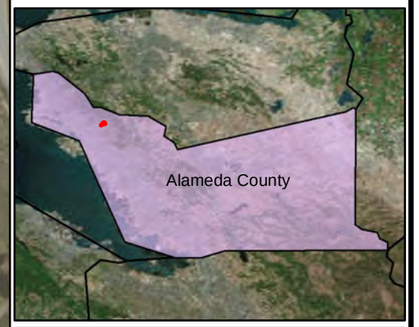

Legend

- MD (n=1)
- MPPEH (n=3)
- NMD (n=102)
- SAA (n=245)
- QC SEED (n=4)
- Evacuation Work Area Boundary - 225'
- Transects
- Additional Transects and Mini-Grids
- Leona Heights Rifle Range MRS

MD-Munitions Debris
MPPEH - Material Potentially Posing an Explosive Hazard
SAA-Small Arms Ammunition
NMD-Non-Munitions Debris

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N W E S

0 75 150 Feet

1 in = 125 feet

Anomaly Identification

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE 3-4

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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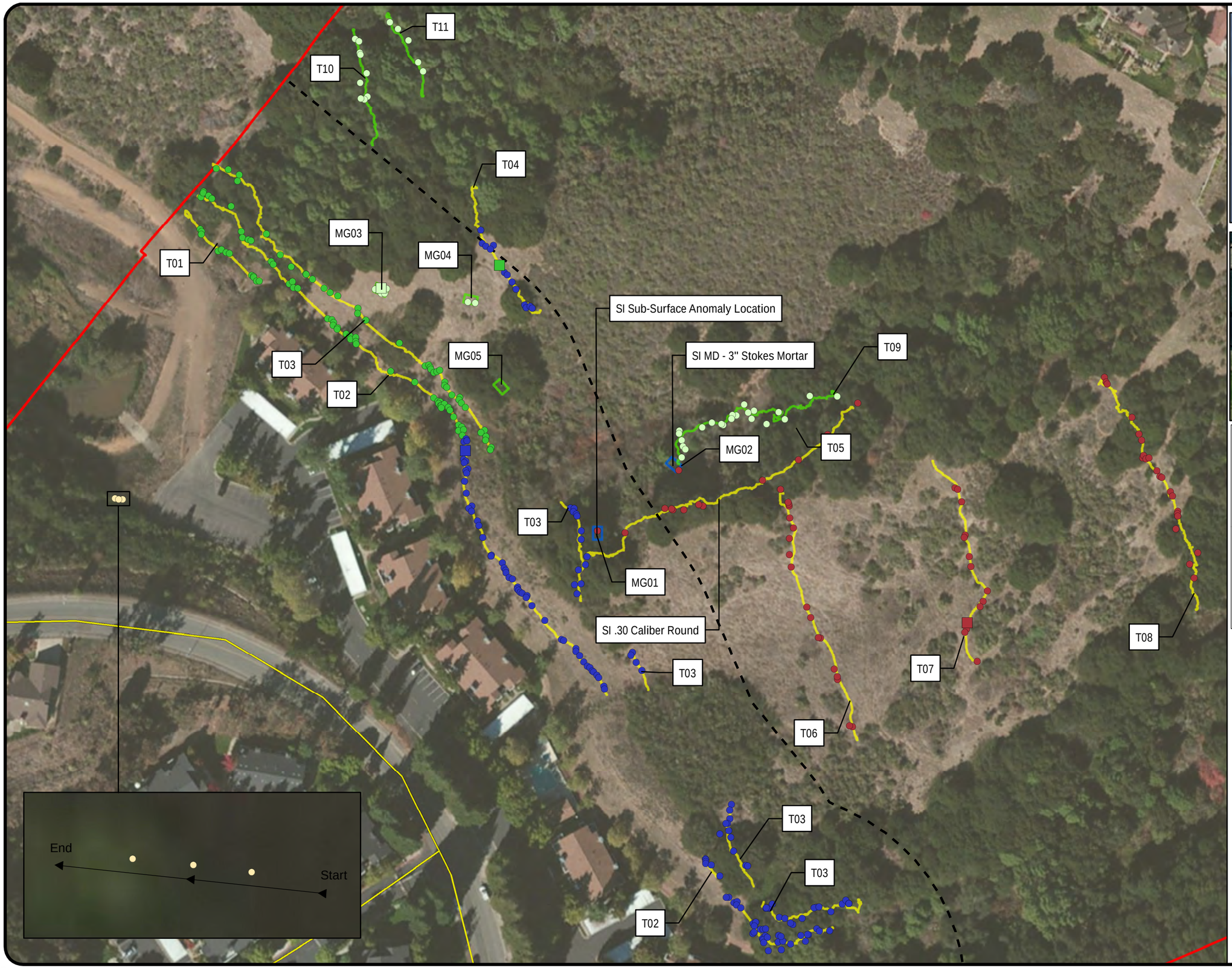

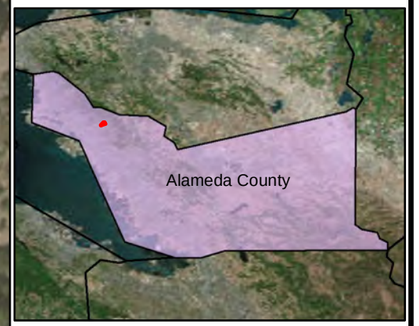

Legend

QC Seed Locations

- 6/10/2016
- 6/13/2016
- 6/14/2016
- 6/15/2016

Anomaly by Dig Date

- 6/10/2016
- 6/13/2016
- 6/14/2016
- 6/15/2016

ITS Locations

Evacuation Work Area Boundary - 225'

Transects

Additional Transects and Mini-Grids

Leona Heights Rifle Range MRS

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N W E S

0 50 100 Feet

1 in = 104 feet

ITS and QC Seed Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-5**

WESTON SOLUTIONS

841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-5 ITS and QC Seed Locations.mxd

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On 16 June 2016 the UXOQCS performed, a 10% re-inspection of all transects and Mini-Grids to meet the QC requirements of the RI Work Plan. No rework was necessary. Results of the QC seed program and re-inspection were recorded in the daily QC Surveillance Reports (**Appendix E**). All QC seeds were recovered during the RI field effort, recorded on the dig sheets and included in the dig list (**Appendix H**).

3.4 INTENTIONAL DETONATIONS

Intentional detonation of MPPEH was performed in accordance with the USACE approved Explosives Site Plan (ESP), the Explosives Management Plan and Demolition Operating Procedures (**Section 3** and **Appendix H** of the RI Work Plan). The intentional detonations followed the requirements of Technical Manual (TM) 60A-1-1-31 (Army, 1994), Engineering Manual 385-1-97 (USACE, 2013), applicable Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) requirements, and applicable federal, state, and local regulations. The inspection/certification of MPPEH was conducted in accordance with Department of Defense Instruction (DoDI) 4140.62 (DoD, 2015) and Engineering Manual 200-1-15 (USACE, 2015).

The three MPPEH 3-inch Stokes Mortars found in transect T03 were determined safe to move by the Senior Unexploded Ordnance Supervisor (SUXOS) and UXOSO and relocated to an area on the western end of transect T02. The MPPEH items were secured in a double locked job box by the SUXOS who controlled access. The items were guarded 24 hours a day (visual surveillance) from the time of discovery to intentional detonation. During the hours from 0600 to 1600 onsite WESTON personnel guarded access to the MPPEH, and during the hours of 1600 to 0600 (overnight) security was contracted to guard the items. Security was instructed to visually surveil the area where the MPPEH was secured. Due to the proximity of the condominiums and the Leona Trail trailhead, the MPPEH items were guarded until the intrusive investigation was complete to minimize disruptions to residents and park users.

WESTON coordinated demolition operations with the USACE Project Manager (PM), USACE Ordnance and Explosives Safety Specialist (OESS), ARNG, EBRPD-Police and Fire, and condominium residents beginning on 15 June 2016. A 24 hour notice was posted on the front door or in the entry way in an obvious location at each residence and on the home owners associations (HOA) information bulletin board on 16 June 2016. The notices informed residents of the scheduled detonations and that there was no need for evacuations; however, there would be a few loud bangs.

Intentional detonation of the three MPPEH 3-inch Stokes Mortars, was performed on 17 June 2016 using the BEM per DDESB Technical Paper 16 Revision 3 (DDESB, 2009). In preparation, the felled vegetation (leaves, sticks, etc.) around and leading to the demolition area were removed within a 50-foot radius and the EBRPD-Fire was contacted for standby support. They dispatched a brush truck and four-person crew which remained on-site for the duration of the detonations. Donor explosives, the estimated amount needed to complete the day's demolition operations, were delivered on 17 June 2016 by Alpha Explosives and were accounted for by the demolition team at all times. Donor explosives included 19.5-gram jet perforators (shape charges), 100-grain-per-foot detonation cord, 40-millisecond detonators, and lead line (shock tube). The exclusion zone for demolitions operations was maintained at all times

utilizing personnel posted 300 feet down the Leona Trail, at the top of the hillside, and in the parking lot during demolitions operations. Personnel were in constant contact via handheld radios. The MPPEH staging and demolitions areas are presented on **Figure 3-6**.

Each MPPEH item was prepped with two perforators, and 10 feet of detonation cord. Per the BEM requirements, a hole was dug to approximately two feet bgs, the prepped MPPEH item was placed in the hole, the hole was backfilled, and approximately two feet of sandbags were placed on the hole. Each shot was dual primed with two 40-millisecond delay detonators and two lengths of lead line which ran to the firing point. The UXOSO and SUXOS ensured that the area was clear of unauthorized personnel prior to permitting attachment of the lead line to the detonators and prior to detonation. When the exclusion zone was secure, the lead line was initiated with a mushroom-style lead line initiator detonating the MPPEH item. After each detonation, the item was excavated and inspected by the SUXOS and verified by the UXOQCS to ensure that no explosive or fire hazards remained. Following excavation and inspection, the process was repeated for the remaining MPPEH items. All three items contained no high explosives with no high order detonation, and were therefore classified as vented MD and identified as MD on the dig list (**Appendix H**). The demolition area remained secured until the SUXOS, in conjunction with the UXOSO, gave the "all clear".

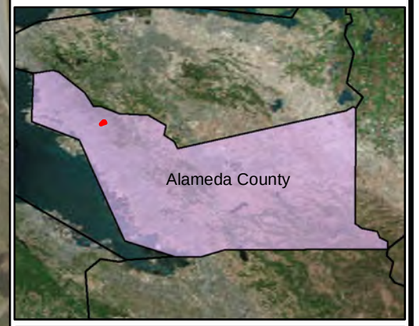
The MD was dual-inspected by the SUXOS and UXOQCS, certified as material documented as safe (MDAS) and locked in the job box for transportation and MDAS processing via smelting. The demolition shot record, accountability form, and MDAS certification form (DD1348-1A) are presented in **Appendix I**.

3.5 MUNITIONS CONSTITUENTS CHARACTERIZATION

At the completion of the SI, it was determined that the Leona Heights Rifle Range MRS did not require additional MC sampling and was recommended for NFA regarding MC. MC samples would have been be collected if an MC release was suspected due to field observations e.g. burial sites, low-ordered or damaged MEC, and MC associated soil staining. Additionally, biased discrete samples were collected prior to and following intentional detonation of MEC/MPPEH. These discrete samples were collected from locations most likely to be impacted by MC and used to confirm the presence of MC.

The UFP-QAPP (Appendix C of the RI Work Plan, WESTON, 2016a) provides full details regarding field and analytical sample planning. Specifically, see Worksheet 17 in the UFP-QAPP for sampling plan rationale and design details, with references to additional UFP-QAPP worksheets for details regarding: sample containers, preservation, and holding times; sample ID/nomenclature; sampling and analytical Standard Operating Procedures (SOPs); analytical measurement, performance, and quantitation limits; analytical data processing, reporting, verification, and validation.

Field QC samples (duplicate) were collected during the RI as needed. Worksheet 20 in the UFP-QAPP (Appendix C of the RI Work Plan, WESTON, 2016a) identifies the types and frequency of field QC samples.



Legend

- Demolition Area
- MPPEH Staging Area
- Exclusion Zone Personnel
- Evacuation Work Area Boundary - 225'
- Leona Heights Rifle Range MRS

EBRPD - East Bay Regional Parks District
MPPEH - Material Potentially Presenting an Explosive Hazard
RI - Remedial Investigation June 2016

N W E S

0 75 150 Feet

1 in = 125 feet

MPPEH Staging and Demolition Areas

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-6**

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3.5.1 Munitions Constituents Results

The SI recommended NFA regarding MC and during the RI fieldwork there was no evidence of damaged, leaking or soil staining, criteria for additional MC sampling; therefore, additional MC samples were not collected. However, pre- and post-intentional detonation samples were collected on 17 June 2016 from the demolition area. Both the pre- and post-detonation samples were collected from the bottom of the BEM hole prior to and following detonation. The pre-detonation sample was labeled LHRR.01.160617 and the post-detonation samples, normal and duplicate, were labeled LHRR.02.160617 and LHRR.03.160617 respectively. The samples were collected, prepared, shipped and analyzed for explosives (nitroaromatics and nitromines) via USEPA Method 8330B (Appendix C of the RI Work Plan, WESTON, 2016a). Analytical results did not indicate concentrations above the laboratory detection limit for any of the three samples, i.e. non-detect. **Table 3-4** presents the results from the pre- and post-detonations samples.

3.5.2 Pre- and Post-Detonation Samples

All laboratory analytical data was validated by a third party subcontractor. The validator performed 100% Level IV validation of the sample delivery group (SDG) received for each analytical parameter from Test America, Inc. This full validation included a review of the raw data and logbook sheets and recalculation of at least 10% of the sample and QC sample results.

Data qualifiers assigned by the laboratory based on their data quality review were evaluated for appropriateness in the context of the data quality objectives outlined in the UFP-QAPP (WESTON, 2015a). Sample condition, holding times, laboratory control samples (LCS), laboratory control sample duplicates (LCSD), matrix spikes (MS), matrix spike duplicates, surrogate recoveries (if applicable), and field duplicate results (relative percent difference [RPD]) were evaluated to assess the overall precision, accuracy, and completeness of the data. Qualifiers assigned to the data are shown in **Table 3-4**.

Forty-eight results from three samples, pre-detonation, post-detonation and duplicate post-detonation, were evaluated for data quality. All analytical results were qualified "U", not detected and reported as less than the LOD.

Data were evaluated with regards to the PARCCS parameters (Precision, Accuracy, Representativeness, Completeness, Comparability, and Sensitivity) and qualified as appropriate based on that evaluation. The overall quality of the data was acceptable, and these data are considered usable for decision-making purposes. The laboratory analytical results and data validation reports are presented in **Appendix J**.

Table 3-4
Pre- and Post-Detonation Sample Results

Sample ID			LHRR.01.160617				
Sample Location			Bottom of BEM Hole (two feet bgs)				
Sample Date			6/17/2016				
Compound	EPA RSL1	Units	Result	Q	LOQ	LOD	DL
Explosives (8330)							
1,3,5-Trinitrobenzene	2200	mg/kg	0.098	U	0.25	0.098	0.039
1,3-Dinitrobenzene	6.3	mg/kg	0.098	U	0.25	0.098	0.049
2,4,6-Trinitrotoluene	21	mg/kg	0.098	U	0.25	0.098	0.039
2,4-Dinitrotoluene	1.7	mg/kg	0.098	U	0.25	0.098	0.039
2,6-Dinitrotoluene	0.36	mg/kg	0.098	U	0.25	0.098	0.029
2-Amino-4,6-dinitrotoluene	150	mg/kg	0.2	U	0.25	0.2	0.098
2-Nitrotoluene	3.2	mg/kg	0.2	U	0.25	0.2	0.078
3-Nitrotoluene	6.3	mg/kg	0.2	U	0.25	0.2	0.069
4-Amino-2,6-dinitrotoluene	150	mg/kg	0.098	U	0.25	0.098	0.039
4-Nitrotoluene	34	mg/kg	0.2	U	0.25	0.2	0.078
HMX	3900	mg/kg	0.098	U	0.25	0.098	0.029
Nitrobenzene	5.1	mg/kg	0.098	U	0.25	0.098	0.049
Nitroglycerin	6.3	mg/kg	0.39	U	0.49	0.39	0.13
PETN	130	mg/kg	0.39	U	0.49	0.39	0.16
RDX	6.1	mg/kg	0.098	U	0.25	0.098	0.039
Tetryl	160	mg/kg	0.098	U	0.25	0.098	0.049

Sample ID			LHRR.02.160617					LHRR.03.160617 (Duplicate of LHRR.02.160617)				
Sample Location			Bottom of BEM Hole (two feet bgs)					Bottom of BEM Hole (two feet bgs)				
Sample Date			6/17/2016					6/17/2016				
Compound	EPA RSL1	Units	Result	Q	LOQ	LOD	DL	Result	Q	LOQ	LOD	DL
Explosives (8330)												
1,3,5-Trinitrobenzene	2200	mg/kg	0.097	U	0.24	0.097	0.039	0.097	U	0.24	0.097	0.039
1,3-Dinitrobenzene	6.3	mg/kg	0.097	U	0.24	0.097	0.048	0.097	U	0.24	0.097	0.049
2,4,6-Trinitrotoluene	21	mg/kg	0.097	U	0.24	0.097	0.039	0.097	U	0.24	0.097	0.039
2,4-Dinitrotoluene	1.7	mg/kg	0.097	U	0.24	0.097	0.039	0.097	U	0.24	0.097	0.039
2,6-Dinitrotoluene	0.36	mg/kg	0.097	U	0.24	0.097	0.029	0.097	U	0.24	0.097	0.029
2-Amino-4,6-dinitrotoluene	150	mg/kg	0.19	U	0.24	0.19	0.097	0.19	U	0.24	0.19	0.097
2-Nitrotoluene	3.2	mg/kg	0.19	U	0.24	0.19	0.077	0.19	U	0.24	0.19	0.078
3-Nitrotoluene	6.3	mg/kg	0.19	U	0.24	0.19	0.068	0.19	U	0.24	0.19	0.068
4-Amino-2,6-dinitrotoluene	150	mg/kg	0.097	U	0.24	0.097	0.039	0.097	U	0.24	0.097	0.039
4-Nitrotoluene	34	mg/kg	0.19	U	0.24	0.19	0.077	0.19	U	0.24	0.19	0.078
HMX	3900	mg/kg	0.097	U	0.24	0.097	0.029	0.097	U	0.24	0.097	0.029
Nitrobenzene	5.1	mg/kg	0.097	U	0.24	0.097	0.048	0.097	U	0.24	0.097	0.049
Nitroglycerin	6.3	mg/kg	0.39	U	0.48	0.39	0.13	0.39	U	0.49	0.39	0.13
PETN	130	mg/kg	0.39	U	0.48	0.39	0.15	0.39	U	0.49	0.39	0.16
RDX	6.1	mg/kg	0.097	U	0.24	0.097	0.039	0.097	U	0.24	0.097	0.039
Tetryl	160	mg/kg	0.097	U	0.24	0.097	0.048	0.097	U	0.24	0.097	0.049

Notes:

[1] May 2016 US EPA Regional Screening Level (RSL) for Residential Soil, Target Risk = 1E-06, Target Hazard Quotient = 1

ft bgs	feet below ground surface	LOD	Limit of Detection
BEM	Buried Explosion Module version 6.3.3 dated April 2014	mg/kg	milligram per kilogram
DL	Detection Limit	Q	Data Qualifier
LOQ	Limit of Quantitation	U	Analyte was not detected and is reported as less than the LOD

3.6 DEVELOPED AREA ASSESSMENT

The developed areas within the MRS makeup approximately 48.29 acres, 32.29 to the southwest of the Leona Canyon ROSP and 16 to the northeast (**Figure 2-2**). Both of these areas have had significant earthwork performed as part of the residential development. The greater majority of these developed areas are hardscape including residences, condominiums, parking lots, roads, sidewalks, and recreational areas (tennis courts and pools).

There is a small area in the southwest portion of the MRS which has most likely has been disturbed, however is not hardscape. During the SI approximately 3 miles of visual survey transects aided by hand-held metal detectors were conducted within the southwest portion of the MRS **(Figure 1-2**). At the completion of the survey in this portion no MD or MEC was identified. Furthermore, there was no evidence of the historical target areas or training. This lack of evidence is attributed to the substantial development within the MRS.

During the TPP process, discussion was held regarding the developed areas of the MRS. All parties agreed that they will not be investigated further due to the substantial development and extensive coverage during the SI.

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4.0 REVISED CONCEPTUAL SITE MODEL AND REMEDIAL INVESTIGATION RESULTS

4.1 REVISED CONCEPTUAL SITE MODEL

4.1.1 MEC Exposure

MEC was not encountered during the SI or the RI; however five practice 3-inch Stokes Mortars (**Figure 3-4**) were identified, one during the SI and four during the RI. Utilizing the most conservative assumptions there is a potentially complete pathway for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the Leona Canyon ROSP portion of the MRS. Therefore, the CSM remains unchanged and is presented on **Figure 2-1**.

4.1.2 MC Exposure

The pathway for MC is incomplete based on the SI sample results, RI field observations and the pre- and post-detonations sample results.

4.2 MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

The MRSPP reflects the statement in 10 United States Code (USC) §2710(b)(2) that the priority assigned should be based on the overall conditions at each location, taking into consideration various factors relating to safety and environmental hazard potential. As required under 10 USC §2710(b)(1), the priority assigned to each munitions response site will be included with the inventory information made publicly available. The requirement for an inventory of munitions response sites known or suspected of containing UXO, DMM, or MC is found at 10 USC §2710(a). The assigned priority will be updated annually to reflect new information that becomes available. In compliance with Code of Federal Regulations (CFR) §179.5, the MRSPP scores are considered interim pending stakeholder input.

The MRSPP evaluates the following potential explosive safety and environmental hazards:

- Explosive hazards posed by UXO and DMM;
- Hazards associated with the effects of chemical warfare material (CWM); and,
- The chronic health and environmental hazards posed by MC or other chemical constituents.

The DoD recognizes the different hazards inherent to each class of materials. To address these differences, the MRSPP has three hazard evaluation modules, each of which is specific to one type of hazard, specifically:

- Explosive hazards are evaluated using the EHE module. The EHE module provides a media rating (A is the highest; G is the lowest) based on a module score of 0 through 100.
- CWM-related hazards are evaluated using the Chemical Warfare Material Hazard Evaluation (CHE) module.

- Health and environmental hazards posed by MC are evaluated using the Health Hazard Evaluation (HHE) module. The HHE module provides a media rating (A is the highest; G is the lowest) based on a combination of factor values (contaminant hazard, migratory pathway, and receptors) for each medium source present (i.e., groundwater, surface water, sediment, surface water, surface soil, etc.).

When insufficient data is available to address all three modules, priority of the modules is determined on data availability. MRS priority can be changed as additional data becomes available and the modules are reevaluated. An MRS assigned Priority 1 has the highest relative priority (most concern for risk) and is reserved for MRSs with CWM; an MRS assigned Priority 8 has the lowest relative priority (least concern for risk).

The following sections discuss the MRSPP for the Leona Heights Rifle Range MRS.

4.2.1 Explosive Hazard Evaluation

The EHE module rating for the Leona Heights Rifle Range MRS is E, based on a score of 55 out of 100. The score is based on the explosive hazard factor, accessibility factor and receptor factor, which are discussed below.

The explosive hazard factor takes into account munitions type and source hazard. Based on the practice 3-inch Stokes Mortar MD items found during the SI and RI, the munitions type is considered practice, which is given a score of 5 out of 30. Conservatively, the most accurate physical description of the MRS is a former range, which is given a score of 10 out of 10; however, site features, such as impact or target areas, have not been identified.

The accessibility factor includes location of munitions, ease of access, and status of property. MD was encountered on the surface and in the subsurface, which is given a score of 10 out of 25. There are no physical barriers that prevent access to any part of the MRS except for steep topography and dense vegetation. A score of 10 out of 10 was assigned for ease of access. The MRS land use includes privately owned property where access is granted to invited guests only and the public Leona Canyon ROSP which has limited access due to steep topography and dense vegetation. Since the property is not controlled by the DoD, a score of 5 out of 5 was assigned to status of property.

The receptor factor depends on population density, population near hazard, types of activities/structures, and ecological and/or cultural resources. The MRS is located within an area that has a population of greater than 500 persons per square mile. A score of 5 out of 5 was assigned for population density. There are 26 or more inhabited structures and residential structures within two miles of the MRS boundary; therefore, the score for population near hazard and structure types is 5 out of 5 for both. Cultural and/or ecological resources were not observed at the MRS; therefore, a score of 0 out of 5 was given.

4.2.2 Chemical Warfare Material Hazard Evaluation

There is no current or historical evidence that CWM exists on this MRS. A rating of "no known or suspected CWM hazard" was given for this module.

4.2.3 Health Hazard Evaluation

Based on the SI sample results, RI field observations, and the pre- and post-detonations sample results, a rating of "no known or suspected MC hazard" was given for this module.

4.2.4 MRSPP Results Summary

The rating for the EHE module is E, which is equivalent to priority 6 (8 being the lowest); the CHE module was rated as "no known or suspected CWM hazard;" and the HHE module was rated as "no known or suspected MC hazard". The MRS priority is equal to the highest priority of the three modules, which is priority 6. **Table 4-1** summarizes the MRSPP scores and the complete MRSPP worksheets are presented in **Appendix K**.

Table 4-1
Summary of MRSPP Results

MRSPP Inputs	Score
Explosive Hazard Evaluation Elements	
Munitions Type (30)	5
Source of Hazard (10)	10
Location of Munitions (25)	10
Ease of Access (10)	10
Status of Property (5)	5
Population Density (5)	5
Population Near Hazard (5)	5
Types of Activities/Structures (5)	5
Ecological and/or Cultural Resources (5)	0
EHE Module Total:	55
EHE Module Rating:	E
EHE Priority:	6
Chemical Hazard Evaluation Elements	
No Known or Suspected CWM Hazard	
Health Hazard Evaluation Elements	
No Known or Suspected MC Hazard	
MRS Priority	**6**

Note:
Values provided in parentheses represent the maximum points available per category for the explosive hazard evaluation.

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5.0 FATE AND TRANSPORT

This section describes the fate of contaminants, potential MEC/MPPEH and MC, in the environment and the potential transport mechanisms at the Leona Heights Rifle Range MRS. Contaminant fate refers to the expected final state that a potential MEC/MPPEH item or MC, will achieve following release to the environment. Contaminant transport refers to migration mechanisms away from the source area. Mechanisms for MEC/MPPEH releases included firing and deliberate or unintentional detonation of mortars, and small arms. The RI intrusive activities identified the potential types of MEC present (**Section 3.2.3** and **Appendix H**).

5.1 MATERIAL POTENTIALLY PRESENTING AN EXPLOSIVE HAZARD

In general MEC/MPPEH is mainly comprised of metals that are generally resistant to physical or chemical breakdown. Although MC may degrade at variable rates, casings, fuzes, or undefined MD may remain for long periods of time in relatively unaltered states at the surface. Burial of MEC/MPPEH may cause enhanced chemical weathering due to the interaction with moisture and minerals in soil.

The influence of the natural factors such as erosion (including mass wasting) and runoff (surface water) transport at the MRS may also contribute to transport due to the topography and location of MEC/MPPEH at the surface and in the subsurface.

The RI included transects along the toe of the slope, in the low spot in the center gully and mini-grids around the SI anomalies and MD items. Areas not investigated during the RI included areas of dense vegetation, steep topography, and the developed areas. Based on the locations of the MD identified during the RI, there is a potential for MEC to be present in the subsurface of the slope. Although only MD was found during the SI and RI, there is a chance that MEC items could be present. Subsequently, if MEC is present, transport to the toe of the slope may be possible through a significant erosional event.

5.2 MUNITIONS CONSTITUENTS

Potential sources of MC are MEC/MPPEH and the residue of munitions and their filler materials remaining in the environment as a result of firing and detonation. The SI recommended NFA regarding MC and during the RI fieldwork there was no evidence of damaged, leaking or soil staining, criteria for additional MC sampling. Explosive analytical results for both pre- and post-detonation samples were non-detect. Therefore MC does not present a risk to human health or the environment.

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6.0 BASELINE RISK ASSESSMENT

A screening level/baseline risk assessment is prepared as part of the RI to provide an evaluation of risks associated with exposure of possible human receptors to environmental media impacted by MC through complete or potentially complete exposure pathways under the "baseline" or "no action" condition. The purpose of the human health risk assessment (HHRA) is to evaluate the potential current and future health effects of receptors from exposure to MC in soil from historical site activities at the Leona Heights Rifle Range MRS.

6.1 HUMAN HEALTH RISK ASSESSMENT

During the SI nine surface soil samples and one field duplicate were collected at various locations throughout the MRS. The sample locations were based on field observations in areas most likely to indicate the presence of MC (**Table 1-1** and **Figure 1-3**). Four of the samples and the duplicate were collected at the impact berm, protective berm and the hillside backstop of the upper most target area, four samples were collected down gradient of drainage features which capture a large area of the MRS and one sample adjacent to and down gradient from the 3" practice Stokes Mortar (MD). All of the analytical results (USEPA 8330A and 6010C) were below the USEPA RSLs and CHHSLs screening levels.

During the TPP process stakeholders discussed the SI sampling locations, results, representativeness and data limitations. Stakeholders concurred with the NFA for MC recommendation of the SI. However, if field observations indicate burial sites, low-ordered or damaged MEC, and MC associated soil staining discrete samples would be collected.

At the completion of the RI fieldwork there were no field observations to warrant additional MC sampling. Analytical results from the pre- and post-detonation samples were flagged (U), not detected above the laboratory detection limit. Therefore, a risk assessment for MC was not required as there is no potential risk to human health from MC at the Leona Heights Rifle Range MRS.

6.2 ECOLOGICAL RISK ASSESSMENT

No critical or endangered species are known to be present at the Leona Heights Rifle Range MRS (CA.gov, 2015) and no sensitive ecological habitat was observed during the SI and/or RI activities. Therefore, potential ecological exposure pathways are incomplete.

6.3 MEC HAZARD ASSESSMENT

A MEC HA was completed using information gathered during the SI and RI to establish baseline conditions representing the current land-use activities resulting in a score of 870 (hazard level category of 1). Future land-use is assumed to remain unchanged in the foreseeable future so a separate score was not generated. The scores are summarized in **Table 6-1**. The complete MEC HA worksheet is included as **Appendix M**.

Table 6-1
MEC Hazard Assessment Summary

Input Factor	Baseline Score	Comments
Energetic Material Type	100	Based on fragmenting rounds.
Location of Additional Human Receptors	30	There are no future plans to develop undeveloped areas due to the steep topography of the site. However, development may occur within the Explosives Safety Quantity Distance (ESQD) arc buffer.
Site Accessibility	55	Site access is moderate due to the topography and dense vegetation and will remain unchanged.
Potential Contact Hours	15	Potential contact hours are very low and are not expected to change in the foreseeable future.
Amount of MEC	180	Based on a Target Area
Minimum MEC Depth Relative to Maximum Intrusive Depth	240	During the SI a practice 3-inch Stokes Mortar (MD) was found on the surface.
Migration Potential	30	Migration is possible in the Leona Canyon ROSP portion of the MRS.
MEC Classification	180	Practice 3-inch Stokes Mortars may be present in the surface and subsurface. Frag was not identified during the SI or RI.
MEC Size	40	The MEC size factor is small.
Total Score	870	Baseline score.
Hazard Level Category	1	Category 1 represents the highest possible hazard in the MEC HA.

Notes:
MEC Munitions and Explosives of Concern

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 CONCLUSIONS

Analog survey and subsequent intrusive investigation around the subsurface SI anomalies and the expected migration paths (low spots) in the accessible areas within the Leona Canyon ROSP were completed as part of the RI. The RI identified 351 anomalies including; zero MEC, four MD, 245 SAA, and 102 NMD (additionally, four QC items were identified). The four MD items from the RI were located in the southwest portion of the Leona Canyon ROSP ranging in depth from two inches to 24 inches bgs (**Figure 3-4**). The single MD item identified during the SI was located on the surface at the south end of the center gully. Although five MD items (practice 3-inch Stokes Mortars) were identified during the SI and RI, no frag was encountered that would indicate the use of high explosive mortar training.

During the TPP process, the substantial hardscape and extensive coverage of the SI in the developed areas was discussed along with the SI sampling locations, results and representativeness and data limitations. All stakeholders agreed that the developed areas and MC were adequately characterized. Furthermore observations during the RI fieldwork, and the pre- and post-detonation sample results do not indicate MC poses a risk within the MRS. The characterization of MEC and MC at the Leona Heights Rifle Range MRS has been achieved through execution of the approved RI Work Plan which included incorporations of the SI data to meet the project DQOs.

7.2 RECOMMENDATIONS

Although MEC was not encountered during the SI or RI; utilizing the most conservative assumptions, there is a potentially complete pathway for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the southwest portion of the Leona Canyon ROSP. If MEC is present, migration to the toe of the slope may be possible through a significant erosional event. Analytical data collected during the SI and RI does not indicate MC poses a risk to human health or the environment within the MRS. Therefore, a Feasibility Study is recommended to address potential MEC within the approximately 31.73 acre Leona Canyon ROSP portion of the MRS. Additionally an alternative to perform a removal action to create a 100 foot buffer along the southwest boundary (3.13 acres) should be evaluated. The remaining approximately 49.60 acres of the MRS is recommended for NFA as there is no indication of a MEC or MC hazard. **Figure 7-1** presents the remedial investigation recommendations.

A comparison of the MRSPP scores for the Feasibility Study area and the NFA area are presented in **Table 7-1**. The complete MRSPP worksheets for both areas are presented in **Appendix K**.

Table 7-1
MRSPP Score Comparison

MRSPP Inputs	Feasibility Study Area Score	NFA Area Score
Explosive Hazard Evaluation Elements		
Munitions Type (30)	5	0
Source of Hazard (10)	10	0
Location of Munitions (25)	10	0
Ease of Access (10)	10	8
Status of Property (5)	5	5
Population Density (5)	5	5
Population Near Hazard (5)	5	5
Types of Activities/Structures (5)	5	5
Ecological and/or Cultural Resources (5)	0	0
EHE Module Total:	55	28
EHE Module Rating:	E	No Known or Suspected Explosive Hazard
EHE Priority:	6	
Chemical Hazard Evaluation Elements		
No Known or Suspected CWM Hazard		
Health Hazard Evaluation Elements		
No Known or Suspected MC Hazard		
MRS Priority	**6**	**No Known or Suspected Hazard**

7.3 RECOMMENDED REMEDIAL ACTION OBJECTIVES

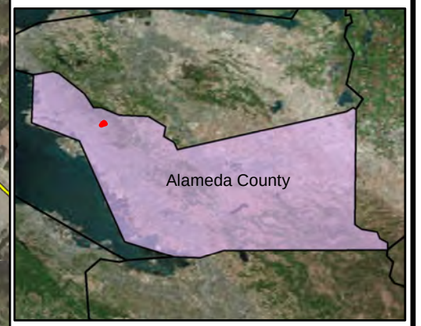
Remedial Action Objectives (RAOs) consist of goals for protecting human health and the environment which is achieved by either removing the contaminant or reducing exposure. RAOs drive the design and development of response actions. The general goal of MEC RAOs is to reduce the potential explosive hazard to ensure the protection of human health, and the environment. The recommended RAO for the Leona Heights Rifle Range MRS is to: Minimize human exposure to potential MEC while maintaining the current land use.

AEDB-R ID CAHQ-013-R-01
31.73 acres

Potential RA Area
3.13 acres

AEDB-R ID CAHQ-013-R-02
49.60 acres

Pinecrest Dr.
Hansom Dr.
Surrey Ln.
Campus Dr.
Canyon Oaks Dr.
Keller Ave.



Legend

- MD
- NMD
- SAA
- Mini-grid
- Transects
- Road
- Evacuation Work Area Boundary - 225'
- Potential RA Area (3.13 acres)
- Leona Heights Rifle Range MRS
- Potential FS Area (31.73 ac.) AEDB-R ID CAHQ-013-R-01
- Recommended for NFA (49.60 ac.) AEDB-R ID CAHQ-013-R-02

MD - Munitions Debris
NMD - Non-Munitions Debris
SAA - Small Arms Ammunition
FS - Feasibility Study
NFA - No Further Action
RA - Remedial Action

N W E S

0 175 350 Feet

1 in = 275 feet

Remedial Investigation Recommendation

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **7-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN BY	DATE	CONTRACT NO
LP	1/17/2017	W912DR-09-D-0006
CHKD BY	CHKD DATE	DELIVERY ORDER #
MAC	1/17/2017	0011

Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 7-1 Remedial Investigation Recommendation.mxd

WGS84 UTM 10N

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APPENDIX A

SITE MAPS

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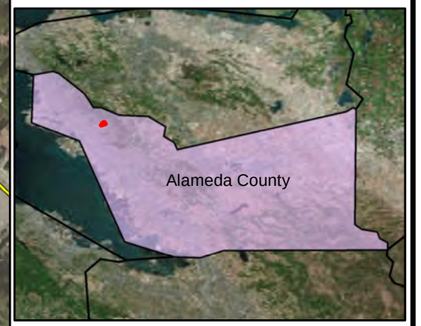
AEDB-R ID CAHQ-013-R-01
31.73 acres

Potential RA Area
3.13 acres

AEDB-R ID CAHQ-013-R-02
49.60 acres

Pinecrest Dr.
Hansom Dr.
Surrey Ln.
Campus Dr.
Canyon Oaks Dr.
Keller Ave.



Legend

- MD
- NMD
- SAA
- Mini-grid
- Transects
- Road
- Evacuation Work Area Boundary - 225'
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- Leona Heights Rifle Range MRS
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- Recommended for NFA (49.60 ac.) AEDB-R ID CAHQ-013-R-02

MD - Munitions Debris
NMD - Non-Munitions Debris
SAA - Small Arms Ammunition
FS - Feasibility Study
NFA - No Further Action
RA - Remedial Action

N W E S

0 175 350 Feet

1 in = 275 feet

Remedial Investigation Recommendation

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **ES-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN BY	DATE	CONTRACT NO
LP	1/17/2017	W912DR-09-D-0006
EDITED BY	CHECKED	DELIVERY ORDER #
MAC	1/17/2017	0011

Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig ES-1 Remedial Investigation Recommendation.mxd

WGS84 UTM 10N

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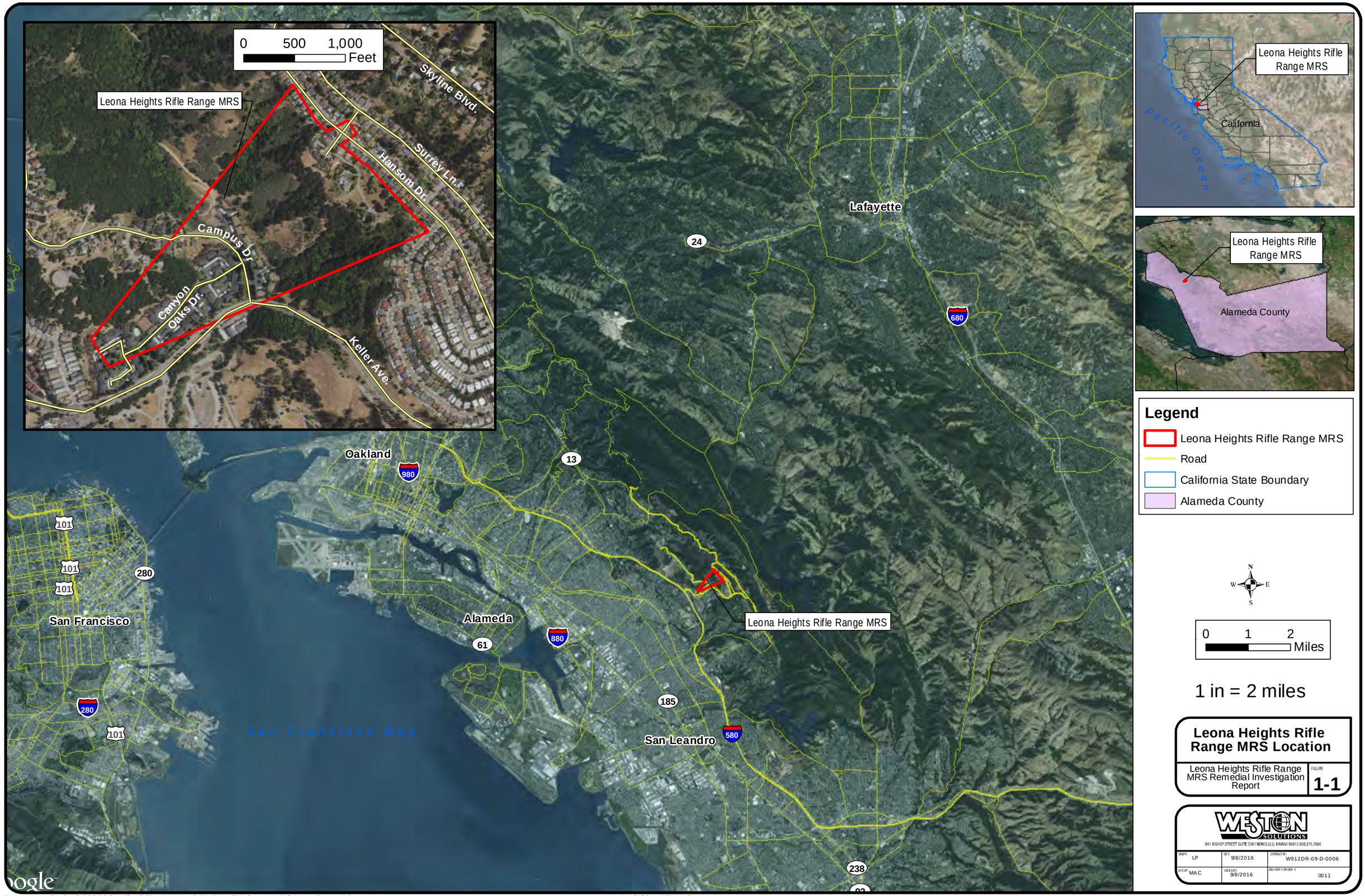

Legend

- Leona Heights Rifle Range MRS
- Road
- California State Boundary
- Alameda County

N
W E
S

0 1 2
Miles

1 in = 2 miles

Leona Heights Rifle Range MRS Location

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN: LP	DATE: 9/8/2016	CONTRACT NO: W912DR-09-D-0006
CHECKED: MAC	CHECKED: 9/8/2016	DELIVERY ORDER #: 0011

Document Path: Q:\03886_USAEC\Leona Heights\mxd\FIG 1-1 MRS Location.mxd

WGS84 UTM 10N

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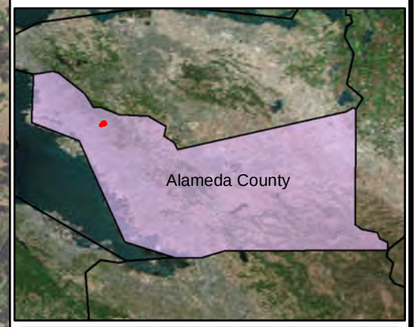

Legend

- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- Road
- SI Visual Instrument Aided Survey Transects
- Firing Line
- Leona Heights Rifle Range MRS
- Target Area
- Target System Trench

SI - Site Investigation 2012

N W E S

0 175 350 Feet

1 in = 350 feet

SI Visual Instrument Aided Survey

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-2**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN: LP	DATE: 11/10/2016	CONTRACT NO: W912DR-09-D-0006
D-CHK: MAC	CHK DATE: 11/10/2016	DELIVERY ORDER #: 0011

Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 1-2 SI Visual Instrument Aided Survey Transects.mxd

WGS84 UTM 10N

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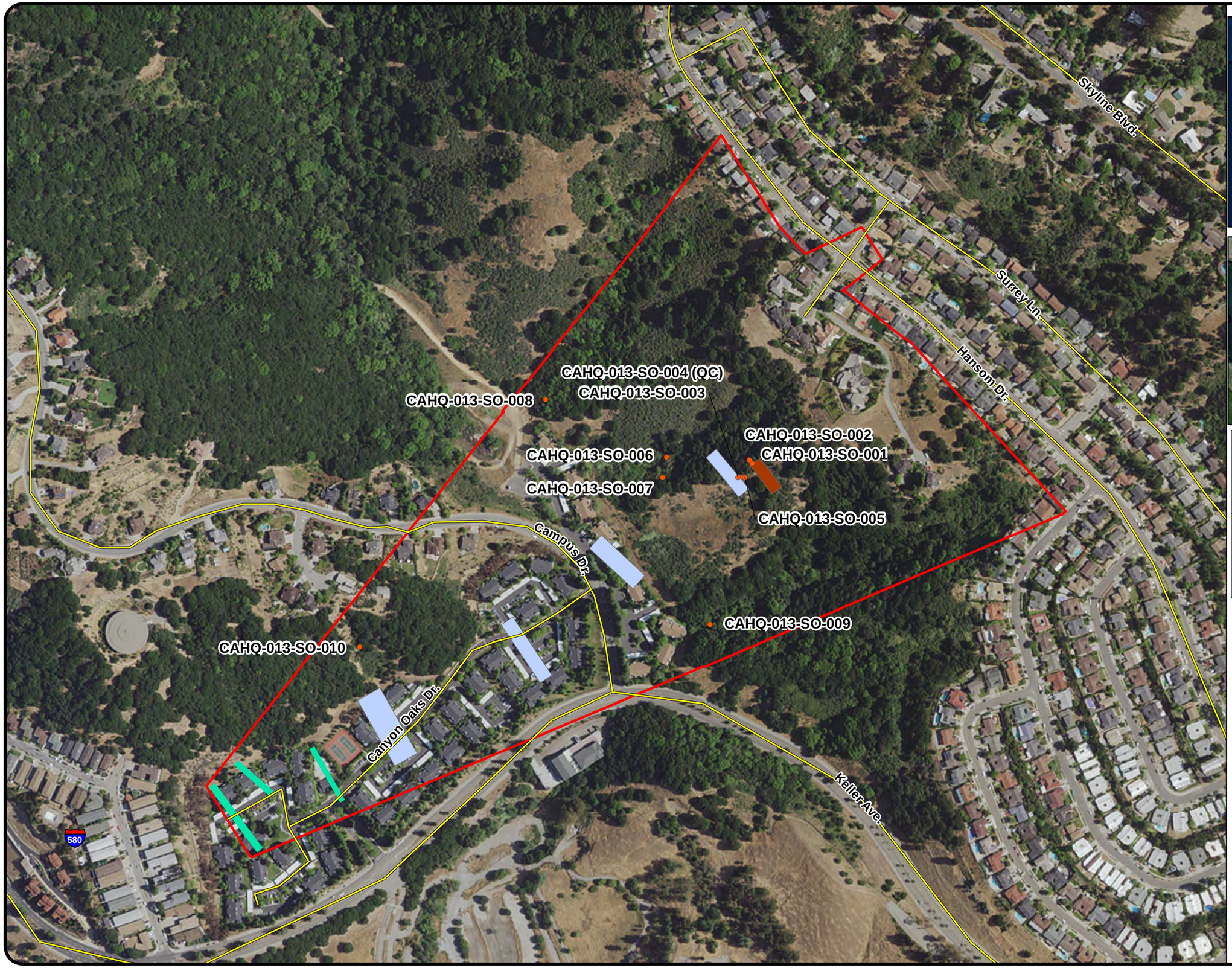

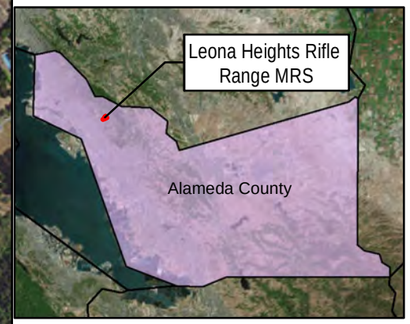

Legend

- Sample Location
- Road
- Firing Line
- Leona Heights Rifle Range MRS
- Target Area
- Target System Trench

SI - Site Investigation 2012

N W E S

0 175 350 Feet

1 in = 350 feet

SI MC Sample Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **1-3**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAFT:	DATE:	CONTRACT NO:
AD	11/10/2016	W912DR-09-D-0006
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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 1-3 SI MC Sample Locations.mxd

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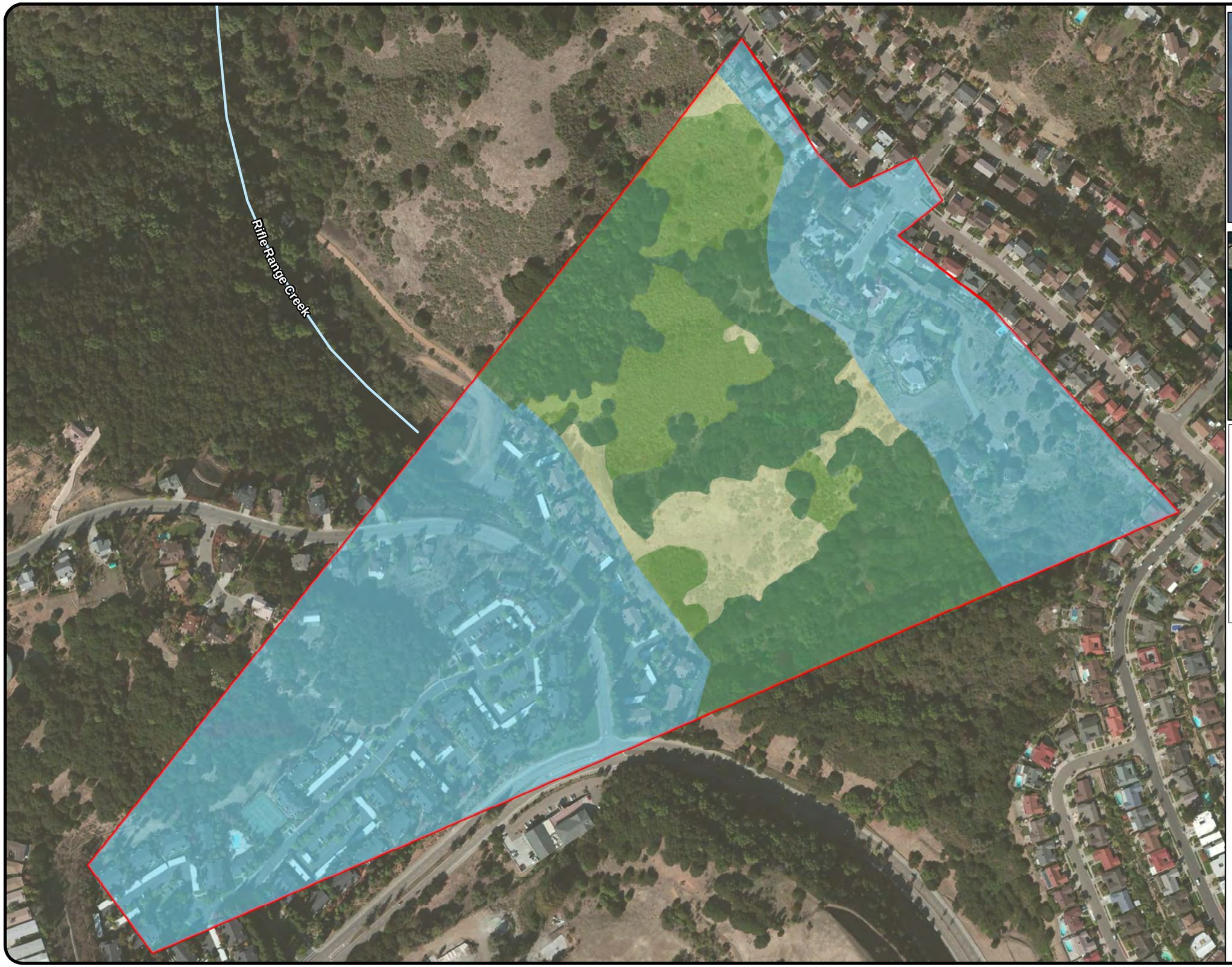

Legend

Site Features

- Grass (slender oat, etc.)
- Shrubs (blackberry, buckwheat, etc.)
- Trees (live oak, etc.)
- Hardscape
- Rifle Range Creek
- Leona Heights Rifle Range MRS

N
W E
S

0 175 350 Feet

1 in = 275 feet

MRS Features

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **2-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN: LP	DATE: 12/16/2016	CONTRACT NO: W912DR-09-D-0006
CHECKED: MAC	CHECK DATE: 12/16/2016	DELIVERY ORDER #: 0011

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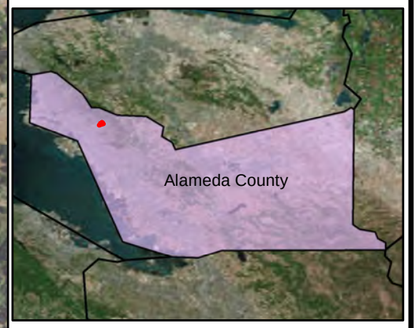

Legend

- Road
- Leona Heights Rifle Range MRS
- Recreational Land Use (Leona Canyon Regional Open Space Preserve)
- Residential Land Use

N
W E
S

0 175 350 Feet

1 in = 350 feet

Current and Future Land Use

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **2-3**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN BY:	DATE:	CONTRACT NO:
LP	12/16/2016	W912DR-09-D-0006
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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 2-3 Current and Future Land Use.mxd

WGS84 UTM 10N

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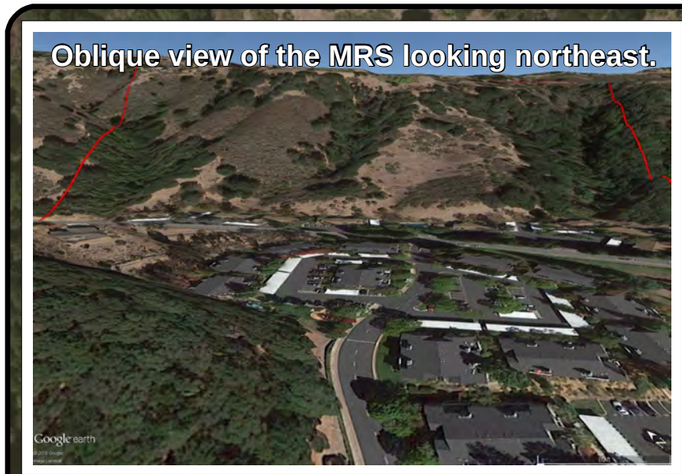


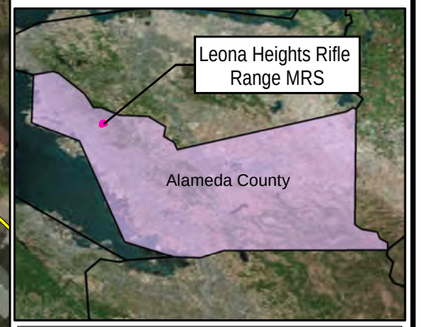
Surrey Ln.

Pinecrest Dr.

Hansom Dr.

Campus Dr.

Canyon Oaks Dr.



Legend

- Road
- Leona Heights Rifle Range MRS

Slope

- 20 - 30 Degree Slope
- > 30 Degree Slope

N
W E
S

0 100 200 Feet

1 in = 200 feet

MRS Topography

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE 2-4

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN:	DATE:	CONTRACT #:
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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 2-4 MRS Topography.mxd

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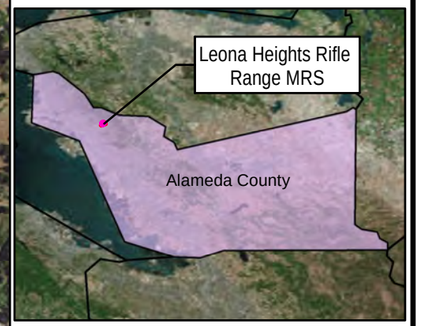

Legend

- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- Road
- Proposed Transect (3971 ft)
- 225 ft Hazard Fragment Distance
- Leona Canyon Regional Open Space Preserve Boundary
- Leona Heights Rifle Range MRS
- 225 ft Evacuation Work Area

N W E S

0 175 350 Feet

1 in = 350 feet

Exclusion Zone & Evacuation Work Area

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-1**

WESTON SOLUTIONS

841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

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LP	12/2/2016	W912DR-09-D-0006
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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-1 Exclusion Zone & Evacuation Work Area.mxd

WGS84 UTM 10N

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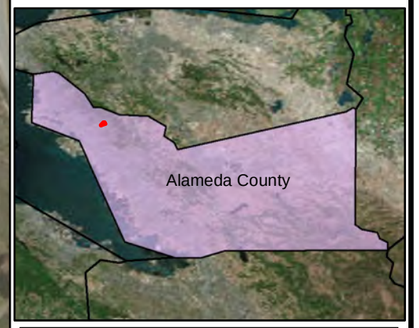

Legend

- Evacuation Work Area Boundary - 225'
- Actual Transects & Mini-Grids
- Proposed Transects and Mini-Grids
- Additional Transects and Mini-Grids
- Leona Heights Rifle Range MRS

RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N
W E
S

0 75 150 Feet

1 in = 125 feet

Proposed and Actual Transects and Mini-Grids

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-2**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

AUTH: LP	DCT: 11/15/2016	CONTRACT NO: W912DR-09-D-0006
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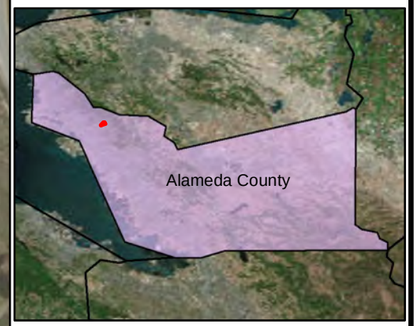

Legend

- RI Subsurface Anomaly Location (n = 351)
- Evacuation Work Area Boundary - 225'
- Transects
- Proposed Transects and Mini-Grids
- Additional Transects and Mini-Grids

RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N
W E
S

0 75 150 Feet

1 in = 125 feet

Anomaly Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-3**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-3 Anomaly Locations.mxd

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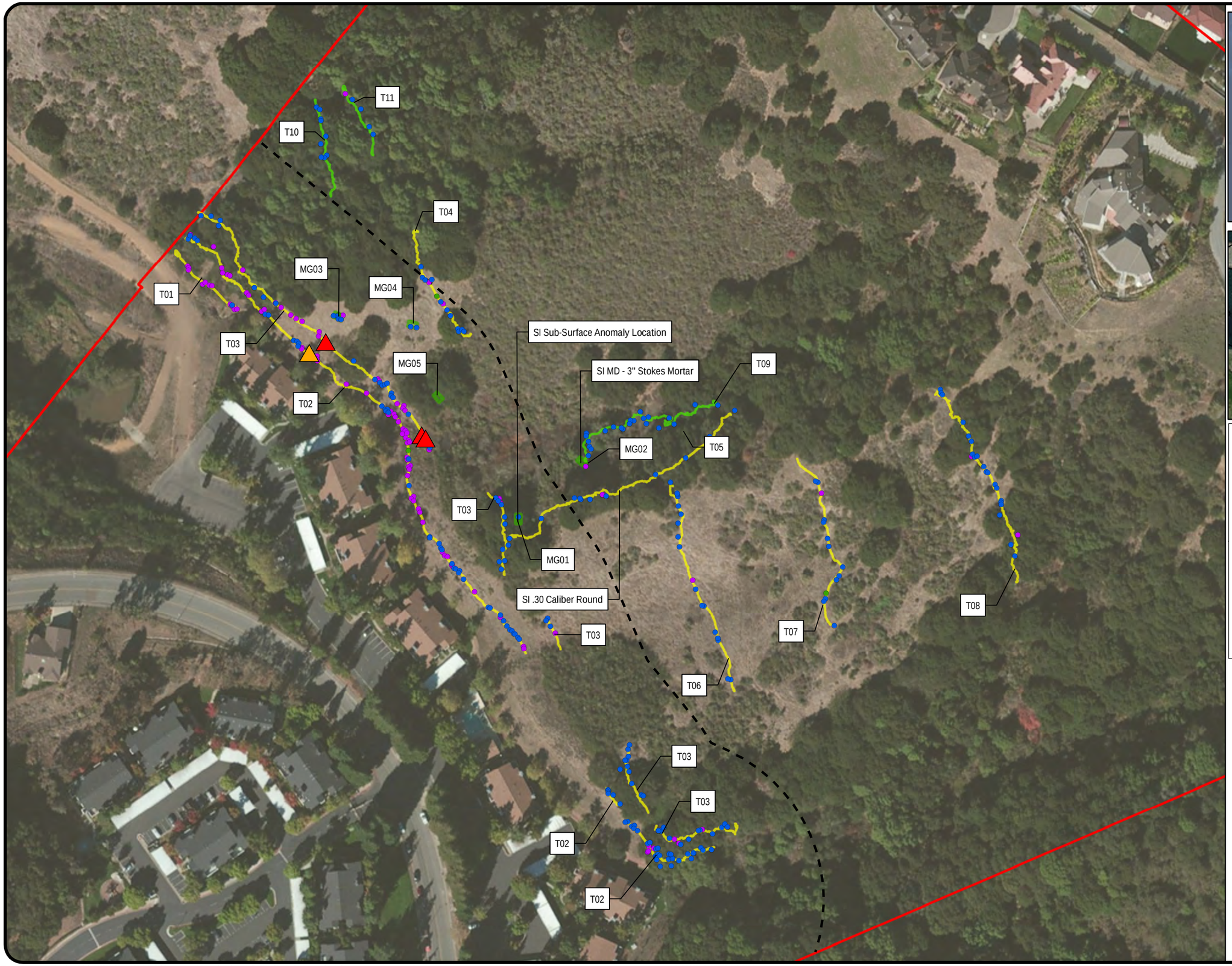

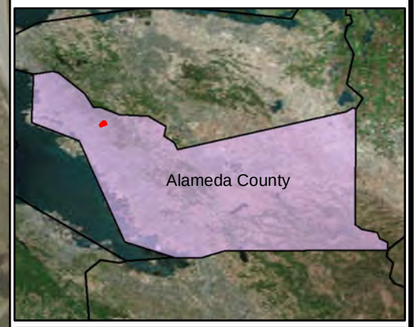

Legend

- MD (n=1)
- MPPEH (n=3)
- NMD (n=102)
- SAA (n=245)
- QC SEED (n=4)
- Evacuation Work Area Boundary - 225'
- Transects
- Additional Transects and Mini-Grids
- Leona Heights Rifle Range MRS

MD-Munitions Debris
MPPEH - Material Potentially Posing an Explosive Hazard
SAA-Small Arms Ammunition
NMD-Non-Munitions Debris

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N W E S

0 75 150 Feet

1 in = 125 feet

Anomaly Identification

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-4**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-4 Anomaly Identification.mxd

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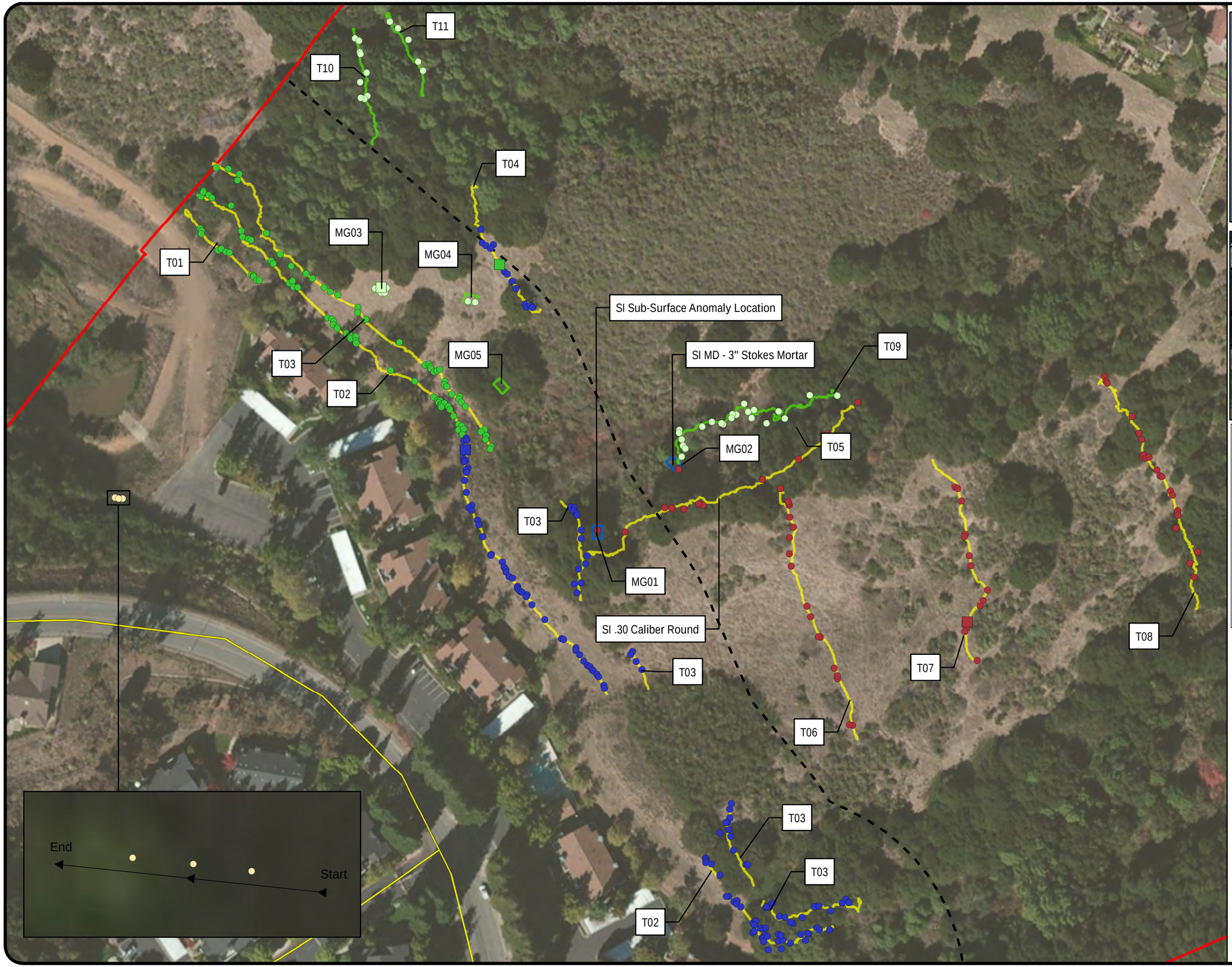

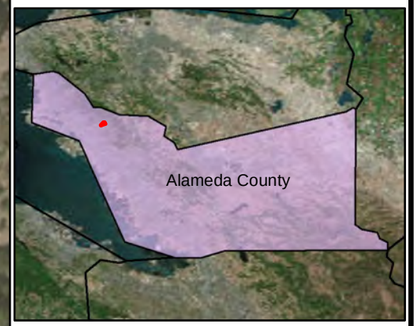

Legend

QC Seed Locations
- 6/10/2016
- 6/13/2016
- 6/14/2016
- 6/15/2016

Anomaly by Dig Date
- 6/10/2016
- 6/13/2016
- 6/14/2016
- 6/15/2016

ITS Locations

Evacuation Work Area Boundary - 225'

Transects

Additional Transects and Mini-Grids

Leona Heights Rifle Range MRS

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

N W E S

0 50 100 Feet

1 in = 104 feet

ITS and QC Seed Locations

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-5**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN BY: LP	DATE: 11/15/2016	CONTRACT NO: W912DR-09-D-0006	
QA/QC: MAC	CHECKED: 11/15/2016	DELIVERY ORDER #: 0011	

Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-5 ITS and QC Seed Locations.mxd

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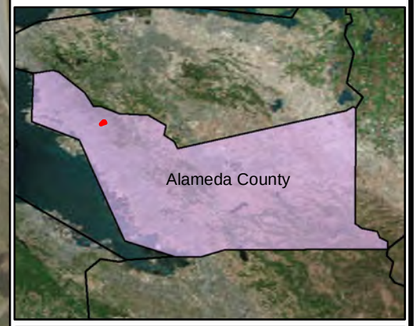

Legend

- Demolition Area
- MPPEH Staging Area
- Exclusion Zone Personnel
- Evacuation Work Area Boundary - 225'
- Leona Heights Rifle Range MRS

EBRPD - East Bay Regional Parks District
MPPEH - Material Potentially Presenting an Explosive Hazard
RI - Remedial Investigation June 2016

N W E S

0 75 150 Feet

1 in = 125 feet

MPPEH Staging and Demolition Areas

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **3-6**

WESTON SOLUTIONS
641 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN: LP	DATE: 11/15/2016	CONTRACT NO: W912DR-09-D-0006
CHECKED: MAC	CHECKED: 11/15/2016	DELIVERY ORDER #: 0011

Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 3-6 MPPEH Staging and Demolition Areas.mxd

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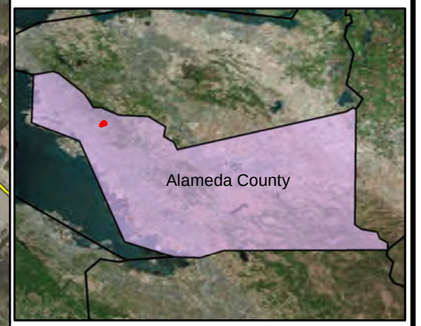
AEDB-R ID CAHQ-013-R-01
31.73 acres

Potential RA Area
3.13 acres

AEDB-R ID CAHQ-013-R-02
49.60 acres

Pinecrest Dr.
Hansom Dr.
Surrey Ln.
Campus Dr.
Canyon Oaks Dr.
Keller Ave.



Legend

- MD
- NMD
- SAA
- Mini-grid
- Transects
- Road
- Evacuation Work Area Boundary - 225'
- Potential RA Area (3.13 acres)
- Leona Heights Rifle Range MRS
- Potential FS Area (31.73 ac.) AEDB-R ID CAHQ-013-R-01
- Recommended for NFA (49.60 ac.) AEDB-R ID CAHQ-013-R-02

MD - Munitions Debris
NMD - Non-Munitions Debris
SAA - Small Arms Ammunition
FS - Feasibility Study
NFA - No Further Action
RA - Remedial Action

N W E S

0 175 350 Feet

1 in = 275 feet

Remedial Investigation Recommendation

Leona Heights Rifle Range MRS Remedial Investigation Report

FIGURE **7-1**

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2500

DRAWN BY	DATE	CONTRACT NO
LP	1/17/2017	W912DR-09-D-0006
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Document Path: Q:\03886_USAEC\Leona Heights\mxd\Fig 7-1 Remedial Investigation Recommendation.mxd

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APPENDIX B

RIGHT OF ENTRY DOCUMENTATION

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No. DACA05-8-15-0094

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY
FOR
Remedial Investigation
Military Munitions Response Program (MMRP)

Site-AEDB-R #: CAHQ-013-R-01
Project: Leona Heights Rifle Range MRS
Property I.D. #: Assessor Parcel Number (APN) 037A-3152-013-03 & 037A-3152-019-03

The undersigned, herein called the **"Owner"**, in consideration for the mutual benefits of the work described below, hereby grants the **UNITED STATES OF AMERICA**, hereinafter called the "Government", a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable and assignable right to enter in, on, over and across the land described below in APN(s) 037A-3152-013-03 & 037A-3152-019-03, ***for a period not to exceed twenty-four (24) months***, beginning with the date of the signing of this instrument, and terminating with the earlier of the completion of the inspection or the expiration of the term; for use by the United States, its representatives, agents, and contractors, and assigns, as a work area for MMRP Remedial Investigation; including the right to investigate and collect samples; and perform any other such work which may be necessary and incident to the Government's use for the investigation and response on said lands; to include the disposal of any explosive hazard indentified in accordance with Department of Defense policies and procedures.

2. The Owner also grants the right to enter and exit over and across any other lands of the Owner as necessary to use the described lands for the purposes listed above.

3. If any action of the Government's employees or agents in the exercise of this right-of-entry result in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the Owner. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any damages other than those provided for herein.

4. We will attempt to telephone you at least ten (10) days prior to commencing any activities at (_____)_____.

5. The land affected by this right-of-entry is located in Alameda County, California, and is described as follows: APN(s) 037A-3152-013-03 & 037A-3152-019-03, as shown on **EXHIBIT "A"** attached hereto.

Dated this 28 day of October, 20 15.

Owner:

(Owner's Name)

(Owner's Name)

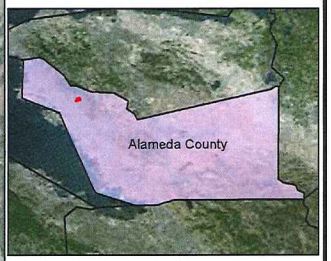
THE UNITED STATES OF AMERICA

By: _____
Stan Wallin
Real Estate Contracting Officer

Approved as to Form:

District Counsel, EBRPD

DACA05-8-0094 - EXHIBIT "A"



Legend

- Leona Heights Rifle Range MRS
- Road

Parcel Boundary

- Parcel 37A-3152-13-3

N
W E
S

0 175 350
Feet

1 in = 350 feet

Right of Entry
Parcel 37A-3152-13-3

Leona Heights Rifle Range MRS Community Relations Plan

FIGURE X

WESTON SOLUTIONS

841 BISHOP STREET SUITE 2260 HONOLULU, HAWAII 96813 808.275.2000

AUTH: AD	DATE: 7/15/2015	CONTRACT No.	W912DR-09-D-0006
DSGN: MAC	DRAWN: 7/15/2015	TASK / Delivery Order #	0011

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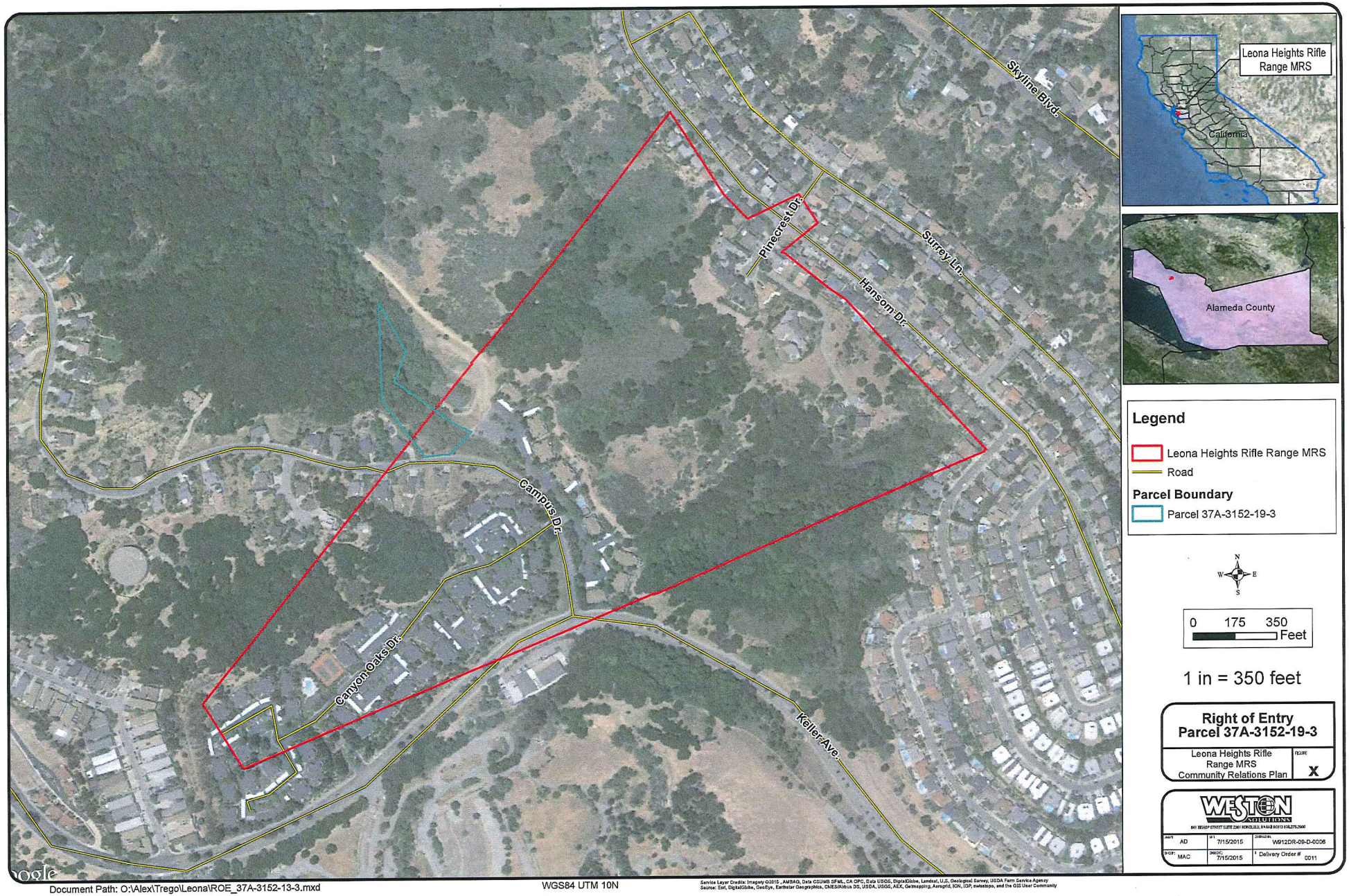
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DACA05-8-0094 - EXHIBIT "A"



Legend

- Leona Heights Rifle Range MRS
- Road

Parcel Boundary

- Parcel 37A-3152-19-3

N W E S

0 175 350 Feet

1 in = 350 feet

Right of Entry
Parcel 37A-3152-19-3

Leona Heights Rifle Range MRS Community Relations Plan

FIGURE X

WESTON SOLUTIONS

841 BISHOP STREET, SUITE 2261 HONOLULU, HAWAII 96813 808.275.2600

DRAFT: AD	DATE: 7/15/2015	CONTRACT: W912DR-09-D-0006
QC BY: MAC	DATE: 7/15/2015	TASK ORDER: Delivery Order # 0011

Document Path: O:\Alex\Trego\Leona\ROE_37A-3152-13-3.mxd

WGS84 UTM 10N

No. DACA05-8-15-0093

DEPARTMENT OF THE ARMY
RIGHT-OF-ENTRY
FOR
Remedial Investigation
Military Munitions Response Program (MMRP)

Site-AEDB-R #: CAHQ-013-R-01
Project: Leona Heights Rifle Range MRS
Property I.D. #: Assessor Parcel Number (APN) 037-3152-019-05

The undersigned, herein called the **"Owner"**, in consideration for the mutual benefits of the work described below, hereby grants the **UNITED STATES OF AMERICA**, hereinafter called the "Government", a right-of-entry upon the following terms and conditions:

1. The Owner hereby grants to the Government an irrevocable and assignable right to enter in, on, over and across the land described below in APN(s) 037-3152-019-05, ***for a period not to exceed twenty-four (24) months***, beginning with the date of the signing of this instrument, and terminating with the earlier of the completion of the inspection or the expiration of the term; for use by the United States, its representatives, agents, and contractors, and assigns, as a work area for MMRP Remedial Investigation; including the right to investigate and collect samples; and perform any other such work which may be necessary and incident to the Government's use for the investigation and response on said lands; to include the disposal of any explosive hazard indentified in accordance with Department of Defense policies and procedures.

2. The Owner also grants the right to enter and exit over and across any other lands of the Owner as necessary to use the described lands for the purposes listed above.

3. If any action of the Government's employees or agents in the exercise of this right-of-entry result in damage to the real property, the Government will, in its sole discretion, either repair such damage or make an appropriate settlement with the Owner. In no event shall such repair or settlement exceed the fair market value of the fee title to the real property at the time immediately preceding such damage. The Government's liability under this clause is subject to the availability of appropriations for such payment, and nothing contained in this agreement may be considered as implying that Congress will at a later date appropriate funds sufficient to meet deficiencies. The provisions of this clause are without prejudice to any rights the Owner may have to make a claim under applicable laws for any damages other than those provided for herein.

4. We will attempt to telephone you at least ten (10) days prior to commencing any activities at (510) 670 5465 . (Alex Madrid)

5. The land affected by this right-of-entry is located in Alameda County, California, and is described as follows: APN(s) 037-3152-019-05, as shown on **EXHIBIT "A"** attached hereto.

Dated this 1 ST day of December , 20 15 .

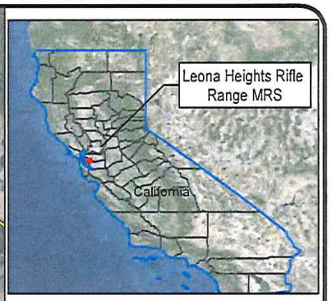
Owner:

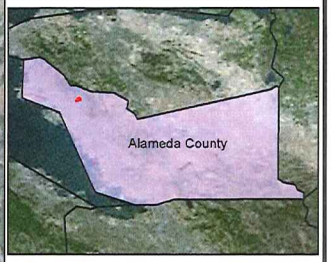
Beth Perrill
(Owner's Name)
Beth Perrill
(Owner's Name)
Alameda County
Public Works Agency
Right of Way Manager

THE UNITED STATES OF AMERICA

By: Diane Simpson
~~**Stan Wallin**~~ Diane Simpson
Real Estate Contracting Officer

DACA05-8-0093 - EXHIBIT "A"





Legend

- Leona Heights Rifle Range MRS
- Road

Parcel Boundary

- Parcel 37A-3152-19-5

N W E S

0 175 350 Feet

1 in = 350 feet

Right of Entry
Parcel 37A-3152-19-5

Leona Heights Rifle Range MRS Community Relations Plan	FIGURE X

WESTON SOLUTIONS

AD	7/15/2015	W912DR-09-D-0006
MAC	7/15/2015	Delivery Order # 0011

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APPENDIX C

INSTITUTIONAL ANALYSIS REPORT

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Final Institutional Analysis Report

MMRP Munitions Response Services
National Guard Bureau

Leona Heights Rifle Range (CAHQ-013-R-01)
Alameda County, California

Contract No.: W912DR-09-D-0006
Delivery Order No. 0011 Modification #3

Prepared For:

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May 2017

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Title **Page**

ACRONYMS AND ABBREVIATIONS

ARNG-D	Army National Guard Directorate
CA	California
CAARNG	California Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DTSC	Department of Toxic Substance Control
EBRPD	East Bay Regional Park District
EOD	Explosives and Ordnance Disposal
FS	Feasibility study
IA	Institutional analysis
LUC	Land use control
MC	Munitions Constituents
MEC	Munitions and explosives of concern
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDNODS	Non-Department of Defense Owned, Non-Operational Defense Sites
NFA	No Further Action
RI	Remedial Investigation
ROSP	Regional Open Space Preserve
ROSP	Regional Open Space Preserve
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
U.S.	United States
USACE	United States Army Corps of Engineers – Sacramento District
USC	United States Code
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded ordnance
WESTON	Weston Solutions, Inc.

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1.0 INTRODUCTION

This institutional analysis (IA) report was prepared by Weston Solutions, Inc. (WESTON) in support of the Remedial Investigation (RI) conducted at the Non-Department of Defense Owned, Non-Operational Defense Sites (NDNODS) Leona Heights Rifle Range (CAHQ-013-R-01) Munitions Response Site (MRS) in Alameda County, California (CA). This IA has been prepared in accordance with the *Military Munitions Response Program (MMRP) RI/Feasibility Study (FS) Guidance* (United States [U.S.] Army, 2009); Engineer Pamphlet 1110-1-24 (U.S. Army Corps of Engineers [USACE], 2000); the U.S. Environmental Protection Agency (USEPA) guidance EPA-540-R-09-001 *Institutional Controls: A Guide to Planning, Implementing, Maintaining, and Enforcing Institutional Controls at Contaminated Sites* (USEPA, 2012); and Data Item Description WERS-017.01 *Institutional Analysis and Institutional Control Plan* (USACE, 2010). This document is intended to be an appendix to the RI; please refer to the RI for additional background information.

1.1 STRATEGIES FOR ADDRESSING MUNITIONS AND EXPLOSIVES OF CONCERN

The typical strategies for addressing the presence of munitions and explosives of concern (MEC) on a site are physical removals and land use controls (LUCs). Although physical removals may be conducted to reduce the amount of MEC at a site, current technologies are not always adequate to provide for the detection and removal of all MEC items. Therefore, even in the event that physical removals are performed, LUCs are implemented to manage any potential residual MEC risk remaining at a site. LUCs are also sometimes put into place as a stand-alone response without a physical removal. Landowners provide critical input into the development of a viable LUC program at a site located on their property. If a LUC program is selected for a site on a property not under the control of the Department of Defense (DoD), it is the property owner and/or appropriate state and local governments that have the authority to maintain compliance with the provisions of the LUCs and maintain the effectiveness of the LUCs.

LUCs consist of various legal mechanisms, educational and engineering control measures, and construction support used to minimize the potential for hazards to human receptors from a property impacted with MEC or other hazards. Instead of direct elimination of MEC, the LUC remedial action relies on behavior modification and access control strategies to reduce or eliminate risk. There are four categories of LUCs, as described in USEPA EPA-540-R-09-001 (USEPA, 2012):

- Proprietary controls are generally created pursuant to state and tribal law to prohibit or restrict activities that may result in unacceptable risk to human health or the environment. These generally consist of easements and covenants.
- Governmental controls impose restrictions on land use or resource use, using the authority of a government entity. Typical examples of governmental controls include zoning, building codes, groundwater use regulations, commercial fishing bans, and sports/recreational fishing limits.

- Enforcement and permit tools with LUC components are legal tools, such as administrative orders, permits, Environmental Covenants, Federal Facility Agreements and Consent Decrees that limit certain site activities or require the performance of specific activities (e.g., to monitor and report on a LUC's effectiveness). They may be issued unilaterally or negotiated.
- Informational devices provide information or notification to local communities that residual or contained contamination remains on site. Typical informational devices include state registries of contaminated sites, notices in deeds, tracking systems, and fish advisories.

To effectively manage long-term residual risk at a MEC site, USACE seeks and encourages meaningful stakeholder involvement. Coordination with landowners and local, county, and state officials and other stakeholders is essential to identifying site-specific objectives for an effective LUC program. This coordination includes conducting an IA. The IA process provides the opportunity to obtain information from and coordinate with landowners and local, county, and state officials and other stakeholders in developing and implementing a site-specific LUC program. The objectives of an IA are to illustrate the opportunities that exist to implement a LUC program at a specific site; identify landowners and government agencies having jurisdiction over the site; and assess the appropriateness, capability and willingness of landowners and government agencies to assert their control over the site.

1.2 PURPOSE

The overall purpose of this IA is to provide information regarding the viability of government agencies or other non-government entities associated with the Leona Heights Rifle Range MRS to take part in implementing LUCs for the purpose of minimizing opportunities for exposure to MEC. The IA will aid in the evaluation of LUCs that are a component of alternatives in the FS. More specifically, the objectives of this analysis are to:

- Document which agencies or entities have jurisdiction over any lands at the Leona Heights Rifle Range MRS;
- Assess the authority, capability, and willingness of each agency or entity to assert control that would protect the community from MEC hazards;
- Document the obligations, if any, of each agency or entity to protect the surrounding community from associated risks under the law; and
- Document any existing LUCs currently in place at the Leona Heights Rifle Range MRS for the protection of human health from MEC hazards.

Local, state, and federal agencies and other non-government entities that will be required to support short- and long-term LUCs proposed for the MRS are described and evaluated in this IA.

1.3 HAZARD REVIEW

The Leona Heights Rifle Range MRS is an 81.33-acre site that was previously used for military training involving artillery and mortar practice and small arms training by multiple California

Army National Guard (CAARNG) units from 1913 until the mid to late 1930s. Beginning in 1913, the range was first used for artillery practice, with the small arms range being constructed in 1920. The range consisted of as many as five target berms at varying distances extending out to 1,000 yards. The MRS was identified in a Preliminary Assessment that recommended further investigation in a Site Inspection (SI). The SI resulted in the discovery of a small arms impact area, berms/natural backstops, small arms debris consisting of .30-caliber projectiles, and a 3-inch Stokes Mortar. Based on the SI, the MRS was recommended for further investigation for MEC. Although MEC was not encountered during the RI; utilizing the most conservative assumptions, there is a potentially complete pathway for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the southwest portions of the Leona Canyon Regional Open Space Preserve (ROSP) within the MRS. Therefore, it was recommended that the southern portion of the Leona Canyon ROSP portion of the MRS should continue in the CERCLA process for MEC.

Surface soil samples were collected and analyzed for explosives and metals (antimony, copper, lead, and zinc) and were found to be below the SI screening levels. Therefore, the Leona Heights Rifle Range MRS was recommended for No Further Action (NFA) for Munitions Constituents (MC).

1.4 REGULATORY BACKGROUND

A number of existing statutes, regulations, and guidance documents allow for and/or clarify the implementation of LUCs and the performance of an IA. The regulatory authorities governing the establishment and maintenance of LUCs during munitions response actions include: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA); National Oil and Hazardous Substances Pollution Contingency Plan (NCP); and Defense Environmental Restoration Program (DERP). These statutes, regulations, and resulting guidance documents are discussed below.

CERCLA (commonly known as Superfund) was enacted in 1980 to provide a legal framework to clean up sites contaminated with hazardous substances. CERCLA was enlarged and reauthorized by the Superfund Amendments and Reauthorization Act (SARA) in 1986. The SARA included aspects that directly apply to MEC-contaminated sites. SARA also included Section 211, the DERP statute. This portion of the statute amended Title 10 of the United States Code (USC) by adding Chapter 160 to Title 10, Environmental Restoration, thus establishing the DERP. The DERP created the authority of the DoD to undertake certain response actions and established the Defense Environmental Restoration Account (DERA). One of the goals of DERP is the correction of environmental damage (such as detection and disposal of munitions and munitions constituents) that creates an imminent and substantial endangerment to public health/welfare or to the environment. The DERP is required to undertake response actions at facilities or sites under the jurisdiction of the DoD and owned by, leased to, or otherwise possessed by the U.S. at the time of the actions leading to contamination. As a matter of DoD policy, munitions responses are conducted in accordance with CERCLA, as amended by the SARA, and the NCP.

The NCP was established by the Clean Water Act of 1972 and has been revised and broadened several times since then. The NCP is codified in 40 Code of Federal Regulations Part 300. The purpose of the NCP is to provide the organizational structure and procedures for developing, evaluating, and implementing response actions at a site. The March 1990 revision is the latest version of the NCP. Paragraph 300.120(c) identifies the DoD as the removal response authority with respect to incidents involving DoD military weapons and munitions.

The National Defense Authorization Act for fiscal year 2002 (Public Law 107-107) formally amended the DERP by establishing the MMRP. The MMRP is a program element of the DERP for the remediation of property known or suspected to contain MEC. Under the MMRP, the DoD conducts munitions responses per CERCLA, the NCP, and applicable federal and state laws. The DoD considers reasonably anticipated future land use in the design and implementation of response actions and provides, to the fullest extent practicable, the opportunity for meaningful involvement of state and local governments and members of the public in the munitions response process.

1.5 INSTITUTION SELECTION

Institutions were selected for this analysis based on an ability to have jurisdiction and authority over the MRS, and/or have a specific mission to protect the public from MEC hazards. The institutions selected for the Leona Heights Rifle Range MRS include the CAARNG, the USACE – Sacramento District, the USEPA, the California Department of Toxic Substances Control (DTSC), and the East Bay Regional Parks District (EBRPD). The Leona Heights Rifle Range MRS is used for residential and recreational purposes. The residences are on privately owned property and access is granted to invited guests only. While the Leona Canyon ROSP is public property, much of the space has limited access due to steep topography and heavy vegetation. Each institution identified is discussed below.

- **California Army National Guard:** CAARNG is headquartered in North Highlands, CA. The Department manages a joint federal-state program that keeps readiness trained and equipped military organizations for the Governor in the event of a state emergency and the President in the event of a national emergency. The mission of the CAARNG is a dual mission that encompasses support of the Nation and the State of CA as follows: 1) maintain properly trained and equipped units available for prompt mobilization for war, national emergency or as otherwise needed 2) and provide trained and disciplined forces for domestic emergencies or as otherwise required by state law (CA National Guard, 2016). Based on historical records, the CAARNG's official presence at the Leona Heights Rifle Range MRS was from 1913 to the late 1930s.
- **Army National Guard Directorate:** Headquartered in Arlington, VA, the Army National Guard – Directorate (ARNG-D) provides trained units to the states, territories and the District of Columbia and keeps itself equipped to protect life and property. The ARNG-D also provides trained units to the nation equipped and ready to defend the United States and its interests all over the globe (National Guard, 2016). The ARNG-D is statutorily responsible for the MRS and centrally managed all work performed during the

RI. The ARNG-D is the lead agency and consulted with USACE for investigating, reporting, and decision making regarding the MRS.

- **United States Army Corps of Engineers – Sacramento District:** The USACE was established in 1775 under the Continental Congress for military and civil works missions. The Sacramento District was formed in October 1929, prior to which it was part of the San Francisco District which formed in 1866. The USACE is a major Army command that provides engineering, design, and construction management services. The mission of the Sacramento District is to "provide innovative and enduring engineering solutions across the full spectrum of program/project delivery to provide value and quality, on-schedule, to their military/civilian customers and partners and support their federal/state partners by responding to national emergencies with leadership and technical expertise." (USACE 2015).
- **United States Environmental Protection Agency Region 9:** The USEPA was established in 1970 to consolidate a variety of federal research, monitoring, standard-setting and enforcement activities. The mission of the USEPA is to protect human health and the environment which they accomplish through development and enforcement of regulations (USEPA, 2015). USEPA Region 9 serves the states of Arizona, California, Hawaii, Nevada, Pacific Islands, and 148 Tribal Nations.
- **California Department of Toxic Substances Control:** The DTSC is headquartered in Sacramento, CA. Its mission is "to protect California's people and environment from harmful effects of toxic substances by restoring contaminated resources, enforcing hazardous waste laws, reducing hazardous waste generation, and encouraging the manufacture of chemically safer products." The DTSC takes enforcement action against violators; oversees cleanup of hazardous wastes on contaminated properties; makes decisions on permit applications from companies that want to store, treat or dispose of hazardous waste; and protects consumers against toxic ingredients in everyday products. (DTSC, 2016).
- **East Bay Regional Park District**: The EBRPD is a system of public parks and trails in Alameda and Contra Costa counties on the eastern side of San Francisco Bay. The mission of the EBRPD is to "acquire, develop, manage, and maintain a high quality, diverse system of interconnected parklands which balances public usage and education programs with protection and preservation of our natural and cultural resources" (EBRPD, 2016). The EBRPD manages the Leona Canyon ROSP that resides within the Leona Heights Rifle Range MRS.

1.6 INSTITUTIONAL ANALYSIS METHODOLOGY

As part of the IA, there are five elements that are considered when assessing the ability of a local, county, or state agency, or landowner to assist in the implementation or monitoring of a proposed LUC program. These five elements are:

- Jurisdiction – The jurisdiction is the territorial range of authority and is generally defined by geographic boundaries within the property, city, county, or state. Federal, state, and/or local government agencies may have jurisdiction within the area of a project site. The

laws governing the existence of the specific agency will convey this jurisdiction. In some areas, several agencies may be involved, depending on the type of LUC or what specific aspect of a LUC is being contemplated. Private agencies do not usually have any jurisdictional authority.

- Authority – The authority of an institution is considered to be the nature and extent of controls available to the institution and the legal ability to enforce these controls in a given jurisdiction. For instance, a local government would have the authority to restrict activities that occur on private land through zoning or permitting, but has no authority to direct a land-owner to construct a fence and restrict access to a property. Alternatively, a land-owner could construct a fence to restrict access, but would require the authority of local law officials to enforce trespassing regulations. Key questions that must be asked regarding the authority exercised by a government agency are listed below. Private agencies usually do not have any enforcement authority other than those provided by normal trespass laws.
  - What are the limits of the agency's authority?
  - What is the origin of the agency's authority?
  - How much control is exercised by the agency?
  - Does the agency have enforcement authority?
- Mission – The specific mission of the agency is critical to its ability to implement, enforce, or maintain an institutional control program.
- Capability – Even if an agency has the jurisdiction, authority, and mission to be involved in a LUC program, if it does not have the capability, it cannot be an effective partner. In the case of local government agencies, the capabilities may be unique and are often a reflection of the desires of the local community. The capabilities of a government or private agency can be augmented; however, this may require additional funding.
- Desire – The desire of a particular government or private agency to participate in a LUC program is absolutely critical to its success. The effectiveness of LUCs is increased when local officials are convinced that participation in a LUC program is in their best interests. Resources in the form of funding for the agency's implementation costs may overcome the initial hesitancy to become involved.

These five elements are considered for each identified stakeholder for the MRS in Section 3.0. A summary of LUC options that are available for the MRS are provided in Section 2.0.

2.0 LAND USE CONTROLS

This section provides a summary of LUC options that are available for the Leona Heights Rifle Range MRS. LUCs protect property owners and the public from potential hazards present at the MRS by warning of potential MEC hazard and/or limiting access to, or use of, the MRS. LUCs may include legal mechanisms, engineering controls, and educational controls. However, the effectiveness of LUCs depends on the support, involvement, and willingness of local agencies and landowners to enforce and maintain LUCs.

2.1 LEGAL MECHANISMS

Legal mechanisms limit or control the land use and/or activities that can occur on a property through actions such as deed restrictions, covenants, zoning, permits, and activity requirements/restrictions.

2.1.1 Deed Restriction (Public Benefit Conveyance)

A deed restriction is a type of LUC that may be used to restrict residential use, thereby preventing houses from being built at a site. Residents are thereby prevented from being exposed to contaminants deemed to be hazardous under the residential exposure scenario. A deed restriction is used on privately owned land. There are no known deed restrictions on the Leona Heights Rifle Range MRS. Private parties (primarily residential) and the EBRPD are the primary landowners within the project area. Specific land use activities are not expected to change. A summary of the primary land owners within the MRS and specific land use activities conducted on each parcel are as follows:

- **Private parties:** There two condominium complexes and multiple private residences within the MRS that comprise the residential land use portion of the MRS. These residences are on privately owned property and access is granted to invited guests only.

- **East Bay Regional Park District**: The EBRPD is a system of public parks and trails in Alameda and Contra Costa counties on the eastern side of San Francisco Bay. The EBRPD owns the Leona Canyon ROSP where a portion resides within the Leona Heights Rifle Range MRS. While the Leona Canyon ROSP is public property, limited public access exists due to steep topography and heavy vegetation.

2.1.2 Environmental Covenants

In 1987, DTSC developed policy recommending the use of Land Use Covenants (LUC Agreements) to protect the public from unsafe exposures to hazardous substances remaining in place on public or private property during or after completion of cleanup of contaminated sites. DTSC's use of LUC Agreements is based on statutory authority in the California Health and Safety Code (chapters 6.5, 6.8 and 6.85) and the California Civil Code, Section 1471, which allows a non-owner of property to enter into an environmental restriction (e.g., LUC Agreement) due to the presence of hazardous materials (DTSC, 2000).

An environmental covenant is typically best suited to situations where remediation system operations or environmental media monitoring are required, or for sites requiring LUCs that have multiple parties, none of which have governmental authority. At this time, there are no remediation system operations or environmental media monitoring at the MRS, and it is partially owned by entities that have governmental authority (EBRPD).

2.1.3 Zoning

Zoning consists of land use or activity restrictions within a specified area as established by a governmental entity (usually a local government such as a municipality or county). The zoning requirements can specify the type of land use (i.e., rural, residential, business, etc.) and can provide specific requirements such as building sizes, setbacks, and street and parking provisions. Alameda County has the authority to create and enforce zoning requirements through Title 17 of Alameda County, CA County Code.

2.1.4 Dig Permit System

A dig permit system may be established similar to that of a building permit. A dig permit system could be set up to document who is completing the work and the size and purpose of the digging activity. The permit may require that workers review and sign off on information provided to them (see Educational Controls) on potential explosive hazards and/or MEC avoidance and encounter protocols.

Implementation of a dig permit system would require establishing an authority to administer and enforce the permits. A dig permit system would also require establishing rules on what types and sizes of digging activities would necessitate obtaining a permit. Costs for the dig permit system would include initial program setup and then annual administration.

No dig permit system is currently established for the MRS. Establishment of such a system would require coordination with the EBRPD.

2.1.5 Contractor Control Policies

Contractor control policies are written procedures that dictate how contractors working at a site with LUCs will be trained and monitored. They are generally site-specific and tailored to the potential hazards, as well as the ability of the landowners/governing authorities to perform the monitoring.

At this time, there are no control policies in place to inform contractors working on the MRS of security procedures and protocols.

2.1.6 Construction Support

In the event that intrusive activities are planned, either on-site or on-call construction support may be provided. For sites where, based on a search of available historical records or on-site investigation data, it has been determined that there is a moderate to high probability that MEC is

present, on-site construction support by Explosives and Ordnance Disposal (EOD)- or unexploded ordnance (UXO)-qualified personnel is required. These personnel must attempt to identify and remove any explosive hazards in the construction footprint prior to any intrusive construction activities (DoD, 2010). On-call construction support is utilized for sites that have been determined to have a low probability of encountering MEC. On-call construction support does not require EOD- or UXO-qualified personnel to be present during intrusive activities, but rather the construction workers are provided recognition training for military munitions items and are to contact EOD- or UXO-qualified personnel in the event that a suspected MEC item is identified.

On-call construction support has not been utilized to date at the MRS. If an anomaly or potential munitions item is identified by the public or any workers on site, local law enforcement is notified who would then contact a responding EDO unit. These personnel are EOD- and/or UXO-qualified personnel and perform all activities required to manage and dispose of the item. Munitions-related support is expected to continue using the same process.

2.2 ENGINEERING CONTROLS

Engineering controls are physical structures to warn or prevent access to the site. The most probable structures for the MRS are fencing, signage, and land covers.

2.2.1 Fencing

Fences are used to restrict public access to a site that contains a potential public hazard. Fences are considered in areas where MEC is present and where public access would result in potential exposures. Fences require inspection maintenance and repair in order to remain effective.

There is currently fencing along the southwestern boundary of the Leona Canyon ROSP portion of the Leona Heights Rifle Range MRS. Additional fencing would reduce access to potential MEC; it is unlikely that the stakeholders or community would agree to additional fencing.

2.2.2 Warning Signs

Warning signs can be used to notify and inform the public of a potential hazard on a site. Such signs should state the nature of the MEC hazard, how to avoid the hazard, and who to contact for additional information. Warning signs may be mounted on existing fencing or posts, or may be used where fencing is not an option.

There are currently no signs located near the target area at the Leona Heights Rifle Range MRS warning the public of potential MEC hazards or buried explosives hazards and what to do if an item is encountered. It is recommended that signs be placed on the outer boundaries of the MRS and access points to the MRS to warn and remind the public of the potential dangers.

2.2.3 Physical Barriers to Access

Physical barriers, such as pavement, engineered covers, or other types of structures provide a layer of protection to minimize exposure to potential MEC.

Within the residential areas of the MRS, there are various roads, parking lots, and buildings; however, these structures are not intended to provide barriers for MEC exposure. No physical barriers are present within the Leona Canyon ROSP portion of the MRS that would minimize exposure to potential MEC. The steep topography at the MRS would make installation of physical barriers extremely difficult. Furthermore, it is unlikely that physical barriers would be well received by stakeholders or the public since the land is part of the Leona Canyon ROSP.

2.3 EDUCATIONAL CONTROLS

The use of educational programs is an effective means to reduce risk from public exposure to MEC. Education activities can be tailored to meet specific needs on the MRS. Examples of educational programs include public notices, management plans, and formal education sessions. Educating the local community is an important aspect of any institutional control program. Public awareness of the hazards associated with a site will encourage the public to take the necessary precautions to avoid exposure. Educational programs may be audience-specific and can be performed as often as necessary to educate those with the greatest risk for exposure to MEC (e.g., local homeowners, individuals, and users of a public area). Educational efforts can be a stand-alone institutional control, but can also improve the effectiveness of other controls.

2.3.1 Public Notices

The local community can be educated through implementation of a public-notice campaign that may include mailings of informational pamphlets, installation of display cases, public service announcements, or recurrent notices in local newspapers. These educational media can serve to educate the local community and visitors to the area. The following paragraphs provide details concerning various types of public notices that can be used to educate and inform local communities. Maintaining a website or telephone hotline would also be effective in public notification.

2.3.1.1 Management Plans

Management plans are intended to prevent inadvertent exposure of receptors by identifying how residual contamination should be handled. Management plan requirements may be recorded in a deed restriction if private property is involved. A separate type of plan would be required for application by the EBRPD as part of administration of public property.

2.3.1.2 Community Awareness Meetings

Community awareness meetings are normally held when significant site remediation documents are released to the public and provide information regarding:

- How this information was evaluated in the RI and FS reports;

- MEC previously recovered at the site;
- Options available to remove MEC (if required) and enhance public safety; and
- Recommendations being made to address a particular site.

2.3.1.3 Letter Notifications, Informational Pamphlets, and Fact Sheets

Letter notifications (U.S. certified mail) are an effective means of informing property owners of the results of the RI and FS investigations and the types of MEC that have been found. Letter notifications can be mailed to each landowner/resident within or adjacent to a MEC site to inform them of the investigation results and the proposed recommendations for the area. Informational pamphlets and fact sheets can be developed and distributed to support safety briefings and/or speaking engagements and can be effective as stand-alone educational materials. Informational pamphlets and fact sheets can warn the public of the hazards of MEC and provide information relating to the former military operations that occurred at a site. Informational pamphlets and fact sheets can be mailed to residents in the vicinity of a MEC site, or they can be distributed from central locations such as libraries, or posted at strategic locations (e.g., U.S. Post Office), or included at parking areas and access points to the MRS. Information pamphlets and fact sheets could be distributed from the local regional EBRPD office for recreational users. Effective pamphlets or fact sheets contain photographs and/or drawings of typical MEC items that the public might encounter and previously recovered MEC locations on a map, and the expected response/safety guidance. A telephone number for the appropriate local authority should be included in the informational pamphlet or fact sheet. Informational pamphlets could be revised and distributed on a regular basis.

2.3.1.4 Formal Education Sessions

Formal education sessions may include community education classes. The classes can be given to a variety of audiences including public forums, local government, emergency response personnel, property owners, developers and real estate agents, and children at the local schools. The training sessions can be tailored to meet the specific interests/concerns of the audience, and can be an effective method to communicate the nature and extent of the hazards associated with MEC and the precautions to be taken in the event a person comes into contact with MEC. The training sessions may either be provided live by personnel knowledgeable in the site-specific conditions or through the distribution of MEC safety awareness training pamphlets or videos to local organizations and public libraries. To be effective, educational sessions need to be recurrent (e.g., every six months) so the public does not become complacent about the hazards associated with MEC. Formal education sessions that are consistently performed are also successful in educating new homeowners and visitors to the area.

2.3.1.5 Website

A publicly accessible website could be developed and maintained to keep the public informed by providing general project information, activities, and progress updates. This website could include a schedule of activities, including when open houses will be held, notices of upcoming site activities, maps to inform the public of effected areas, copies of news releases, contact

information, and a page devoted to MEC safety which includes the DoD 3Rs concept (Recognize, Retreat, Report).

3.0 INSTITUTIONAL SUMMARIES

Each institution selected for analysis in Section 1.5 and its jurisdiction, authority, mission, and potential role in a LUC program is briefly discussed below. Specific information regarding each institution is provided in Tables 3-1 through 3-6.

3.1 CALIFORNIA ARMY NATIONAL GUARD

The CAARNG has no jurisdiction as the Leona Heights Rifle Range MRS is located on public land administered by EBRPD and private property. However, under the MMRP process, the Department of the Army would remain the responsible party for the LUCs and cleanup should the RI document a release that requires response actions.

The CAARNG's role in a LUC program would be, in conjunction and cooperation with ARNG-D, in choosing and funding LUCs on the MRS. Basic information for CAARNG is summarized in Table 3-1.

3.2 ARMY NATIONAL GUARD DIRECTORATE

The ARNG-D has no jurisdiction as the Leona Heights Rifle Range MRS is located on public land administered by EBRPD and private property. However, under the MMRP process, the Department of the Army would remain the responsible party for the LUCs and cleanup should the RI document a release that requires response actions.

The ARNG-D's role in a LUC program would be in choosing and funding LUCs on the MRS. Basic information for ARNG-D is summarized in **Table 3-2**.

3.3 UNITED STATES ARMY CORPS OF ENGINEERS – SACRAMENTO DISTRICT

The USACE has no jurisdiction, as the Leona Heights Rifle Range MRS is located on land owned either privately or publicly (administered by the EBRPD). However, the agency does have authority under DERP to implement response actions for releases of hazardous substances from facilities that are or were under the jurisdiction of the U.S. DoD. Basic information for the USACE is summarized in Table 3-3.

3.4 EAST BAY REGIONAL PARK DISTRICT

The EBRPD is the property owner of the 32-acre portion of the Leona Canyon ROSP that resides within the Leona Heights Rifle Range MRS, and therefore has jurisdiction and authority.

The EBRPD has developed a working relationship with the CAARNG/ARNG-D during the SI and RI phases of the project. Their role in the LUC program is anticipated to include instituting and enforcing controls for visitors after coordination with CAARNG/ARNG-D/USACE and thorough review of recommendations. Basic information for the EBRPD is summarized in Table 3-4.

3.5 CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

The DTSC does have jurisdiction in the state of CA regarding the authority to implement or enforce institutional controls related to protection of human health at the Leona Heights Rifle Range MRS. The DTSC enforces state and federal environmental quality rules and regulations. Basic information for the DTSC is summarized in Table 3-5.

3.6 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

The USEPA does not have authority to implement or enforce institutional control at the Leona Heights Rifle Range MRS. The USEPA regulates federal agencies and state and local governments and Indian tribes. Basic information for the USEPA is summarized in Table 3-6.

Table 3-1 California Army National Guard Institutional Analysis

Origin of Institution	CAARNG was established in 1903, although its predecessor, the state militia, dates back to 1849. The Department manages a joint federal-state program that keeps readiness trained and equipped military organizations for the Governor in the event of a state emergency and the President in the event of a national emergency (California National Guard, 2016).
Geographic Jurisdiction	The agency has no geographic jurisdiction: the Leona Heights Rifle Range MRS is located on private and public land.
Basis of Authority	**What are the limits of the agency's authority?** In cooperation with ARNG-D, implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD in accordance with DERP and CERCLA.
	Origin of authority: The U.S. Army is the origin of authority for the CAARNG; however the Leona Heights Rifle Range MRS is located in land owned by other agencies. Under the MMRP process, the Department of the Army would remain the responsible party for the cleanup should the RI document a release that requires cleanup in the future. DERP [USC. Section 2701 et seq.] Executive Order 12580 / Implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD, in accordance with DERP and consistent with CERCLA.
	How much control is exercised by the agency? CAARNG has minimal control relative to implementing, maintaining, monitoring, or enforcing institutional controls on privately owned property.
	Does the agency have enforcement authority? CAARNG does not have enforcement authority related to institutional controls at Leona Heights Rifle Range MRS.
Sunset Provisions	None.
Public Safety Function	CAARNG's mission is to provide trained and equipped soldiers and airmen to protect life and property, and to preserve peace, order and public safety when called upon by the Governor.
Land Use Control Function	The potential future land use would be consistent with current use for the MRS.
Financial Capability	The CAARNG is a fiscally responsible agency which receives Federal funding.
Desire to Participate	Yes. The CAARNG has the resolve to implement institutional controls as evidenced by this RI and related activities.
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

Table 3-2 Army National Guard Directorate Institutional Analysis

Origin of Institution	ARNG-D was established on 1903, although its predecessor, in the form of various state militias, dates back to the early 1600s. The National Guard is a unique element of the U.S. military that serves both community and country. The Guard responds to domestic emergencies, overseas combat missions, counterdrug efforts, reconstruction missions and more. (National Guard, 2016).
Geographic Jurisdiction	The agency has no geographic jurisdiction: the Leona Heights Rifle Range MRS is located on private and public land.
Basis of Authority	**What are the limits of the agency's authority?** Implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD in accordance with DERP and CERCLA.
	Origin of authority: The U.S. Army is the origin of authority for the ARNG-D; however the Leona Heights Rifle Range MRS is located in land owned by other agencies. Under the MMRP process, the Department of the Army would remain the responsible party for the cleanup should the RI document a release that requires cleanup in the future. DERP [USC. Section 2701 et seq.] Executive Order 12580 / Implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD, in accordance with DERP and consistent with CERCLA.
	How much control is exercised by the agency? ARNG-D has minimal control relative to implementing, maintaining, monitoring, or enforcing institutional controls on privately owned property.
	Does the agency have enforcement authority? ARNG-D does not have enforcement authority related to institutional controls at Leona Heights Rifle Range MRS.
Sunset Provisions	None.
Public Safety Function	ARNG-D's mission is to provide trained and equipped soldiers and airmen to protect life and property, and to preserve peace, order and public safety when called upon by the Governor.
Land Use Control Function	The potential future land use would be consistent with current use for the MRS.
Financial Capability	The ARNG-D is a fiscally responsible agency which receives Federal funding.
Desire to Participate	Yes. The ARNG-D has the resolve to implement institutional controls as evidenced by this RI and related activities.
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

Table 3-3 US Army Corps of Engineers – Sacramento District Institutional Analysis

Origin of Institution	The USACE was formed in October 1929, prior to which it was part of the San Francisco District, formed in 1866. Military construction responsibilities were added to the district in 1941 and again in 1943, the civil boundaries were expanded to include the area of the former Salt Lake City District. In 1968, the Sacramento District became the second largest in the contiguous United States when territory was transferred from the Los Angeles District. Added were all of Utah, except the southwest corner, Colorado from the Continental Divide west, the southwest corner of Wyoming, northeast corner of Arizona and the northwest corner of New Mexico for a total of 290,000 square miles (USACE, 2015).
Geographic Jurisdiction	The agency has no geographic jurisdiction: the Leona Heights Rifle Range MRS is located on private and public land.
Basis of Authority	**What are the limits of the agency's authority?** Implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD in accordance with DERP and CERCLA.
	Origin of authority: DERP [USC. Section 2701 et seq.] Executive Order 12580 / Implementing response actions for releases of hazardous substances from each facility that is, or was, under the jurisdiction of the DoD in accordance with DERP and consistent with CERCLA.
	How much control is exercised by the agency? USACE has minimal control relative to implementing, maintaining, monitoring, or enforcing institutional controls on privately owned property.
	Does the agency have enforcement authority? USACE does not have enforcement authority related to institutional controls at Leona Heights Rifle Range MRS.
Sunset Provisions	None.
Public Safety Function	Not Applicable
Land Use Controls	The potential future land use would be consistent with current use for the MRS.
Financial Capability	The USACE is a fiscally responsible agency which receives Federal funding.
Desire to Participate	Yes. The USACE has the resolve to implement institutional controls as evidenced by this RI and related activities.
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

Table 3-4 East Bay Regional Park District Institutional Analysis

Origin of Institution	On November 6, 1934, voters approved the East Bay Regional Park District by a margin of greater than two to one. The District's subsequent history has been one of increased land stewardship and programmatic responsibilities. The EBRPD is the result of decades of hard work by innumerable citizen activists, elected district directors, general managers, district employees, environmental organizations, public officials, volunteers, and taxpayers who have collaborated to ensure that residents in this region will have access to a system of magnificent regional parklands (EBRPD, 2016).
Basis of Authority	**What are the limits of the agency's authority?** EBRPD would default to the DTSC and USEPA for any issues relating to environmental regulatory enforcement authority.
	Origin of authority: Legislation authorizing the establishment of a regional park district and a governing board.
	How much control is exercised by the agency? The EBRPD has control relative to implementing, maintaining, and monitoring institutional controls on its property.
	Does the agency have enforcement authority? Yes
Sunset Provisions	None.
Geographic Jurisdiction	The MRS encompasses a portion (32 acres) of the public 290-acre EBRPD Leona Canyon ROSP.
Public Safety Function	The EBRPD has both a fire department and police department. (EBRPD, 2016).
Land Use Controls	The EBRPD manages the 32-acre portion of the Leona Heights Rifle Range MRS. The MRS is a popular recreation site with access to trail systems. The potential future land use would be consistent with current use.
Financial Capability	The EBRPD receives it funding through the Federal and state government from taxpayers.
Desire to Participate	It is anticipated that the EBRPD would be willing to implement proposed controls after coordination with the CAARNG/ARNG-D and proper review of the recommendations.
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

Table 3-5 California Department of Toxic Substance Control Institutional Analysis

Origin of Institution	In 1991, California's environmental authority was unified in a single Cabinet level agency called the California Environmental Protection Agency, which developed the DTSC to clean up hazardous waste sites to put them back into productive use and reduce blight and contamination to the neighborhoods and surrounding environments (DTSC, 2016).
Basis of Authority	**What are the limits of the agency's authority?** The DTSC has the authority under CA law to enforce environmental regulations.
	Origin of authority: California state code defines the agency's structure and purpose.
	How much control is exercised by the agency? The DTSC has control regarding implementing actions regarding public health on the Leona Heights Rifle Range MRS.
	Does the agency have enforcement authority? Yes
Sunset Provisions	None.
Geographic Jurisdiction	The DTSC has jurisdiction within the State of California.
Public Safety Function	DTSC enforces state and federal environmental quality rules and regulations.
Land Use Controls	Not Applicable
Financial Capability	Not Applicable
Desire to Participate	To be determined.
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

Table 3-6 United States Environmental Protection Agency

Origin of Institution	The USEPA was established in 1970 by the White House and Congress to protect human health and the environment.
Basis of Authority	**What are the limits of the agency's authority?** Protection of human health and the environment.
	Origin of authority: CERCLA. CFR40: "Protection of the Environment", Chapter I, Pars 1-799-Environmental Protection Agency.
	How much control is exercised by the agency? Control is a function of the Administrative Orders issued.
	Does the agency have enforcement authority? USEPA does not have enforcement authority related to institutional controls at Leona Heights Rifle Range MRS**.**
Sunset Provisions	None.
Geographic Jurisdiction	The USEPA Region 9 has jurisdiction within the states of Arizona, California, Hawaii, Nevada, Pacific Islands, and 148 Tribal Nations.
Public Safety Function	USEPA regulates other federal agencies, state and local governments, and Indian tribes. It develops and enforces regulations to protect human health and the environment under existing environmental laws.
Land Use Controls	Not Applicable
Financial Capability	Not Applicable
Desire to Participate	Not Applicable
Constraints to Institutional Effectiveness	The MRS is a public area used for a variety of recreational activities, such as hiking, and also private residential development.

4.0 EVALUATION OF EXISTING AND RECOMMENDATION FOR ADDITIONAL INSTITUTIONAL CONTROLS

The future land use of the MRS is not expected to change in the foreseeable future. Current land use for the MRS includes land owned by the EBRPD for recreation purposes. This section provides an evaluation of existing controls and recommendations for additional controls that would apply to current and future MRS land use (see Section 2.0) using the institutional information presented in Section 3.0.

4.1 EVALUATION OF EXISTING CONTROLS

No LUCs are currently implemented at the Leona Heights Rifle Range MRS.

4.2 RECOMMENDATIONS FOR ADDITIONAL CONTROLS

Recommended institutional control alternatives to be evaluated during the FS include:

- Engineering Controls
  - Warning Signs
  - Fencing
- Educational Controls
  - Public Notices
  - Community Awareness Meetings
  - Letter Notifications, Informal Pamphlets, and Fact Sheets
  - Websites

Warning signs would serve as both engineering and educational controls for educating the public of the potential MEC hazards at the Leona Heights Rifle Range MRS. Other educational controls include maintaining a public website for distribution of project information. Informational pamphlets and fact sheets are recommended for distribution at key times during any MRS remediation activities. In addition, fact sheets and pamphlets are recommended for distribution to public officials, emergency management agencies, and the EBRPD office notifying recreation users of potential MEC.

The roles, responsibilities, and authorities that each organization would have in implementing, maintaining, monitoring, and enforcing institutional controls are provided in Table 4-1. Long-term implementation of institutional controls would be the responsibility of the CAARNG/ARNG-D or USACE.

Table 4-1 Roles, Responsibilities and Authorities for Implementation of Institutional Controls

Agency	Role	Responsibility	Authority
CAARNG, ARNG-D, USACE	Represents federal government in execution, oversight, and procurement of munitions response actions at the Leona Heights Rifle Range MRS.	▪ Initiate memorandum of agreement, if necessary in the future. ▪ Inspect condition of signage. ▪ Report new discoveries of MEC to agency capable of appropriate management. ▪ Disseminate information and instructional pamphlets at meetings. ▪ Brief landowners on ongoing effectiveness of institutional controls.	▪ Fund MEC response actions. ▪ Perform MEC investigations and munitions response actions.
EBRPD	As a landowner of the Leona Canyon ROSP portion of the Leona Heights Rifle Range MRS, EBRPD represent issues related to site use, and the impacts of Institutional Controls on these uses.	▪ Allow installation of signage alerting recreational users and others of the MEC hazards at the site.	▪ Institute and enforce controls for visitors.
DTSC, USEPA	Represent respective State and Federal government agencies conducting regulatory oversight of munitions response actions at Leona Heights Rifle Range MRS.	▪ Permit, report, variance and application review ▪ Participate in public meetings ▪ Interact with landowner	▪ Approval authority on Decision Documents ▪ Enforcement of environmental laws.

5.0 REFERENCES

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APPENDIX D

TECHNICAL PROJECT PLANNING MEETING NOTES

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Military Munitions Response Services

Leona Heights Rifle Range (CAHQ-013-R-01)

Alameda County, California

Technical Project Planning

Meeting #2

22 March 2016

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Meeting Agenda

- Introductions and Organizational Chart
- Project Overview
- Leona Heights Rifle Range Military Munitions History and Previous Investigations
- Remedial Investigation Approach
- Project Schedule

Introductions

- **U.S. Army National Guard Directorate (ARNG)**
  - John Haines: Program Manager
  - Walt Gee: Lead Project Manager
- **California Army National Guard (CAARNG)**
  - Major Marc Anderson: Project Manager
- **U.S. Army Corps of Engineers (USACE)–Sacramento District**
  - Gary Krongard: Contracting Officers Representative
  - Jim Lukasko: Project Manager
  - John Jackson: Project Geophysicist
- **California Department of Toxic Substances Control (DTSC)**
  - Roman Racca: Munitions Response Coordinator
- **Weston Solutions, Inc.**
  - Mark Bell: Program Manager
  - Tim Trego: Project Manager

Leona Heights Rifle Range MRS Project Objectives

- Remedial Investigation (RI)
  - Conduct field investigations to characterize the MRS and determine type, density and distribution of munitions and explosives of concern (MEC).
- Feasibility Study (FS)
  - Identify applicable technologies for treatment of hazards posed by MEC.
- Proposed Plan (PP)
  - Present the chosen remedial action alternative to the public for review and comment.
- Decision Document (DD)
  - Document the final remedy selection.

Leona Heights Rifle Range MRS CERCLA Process

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Leona Heights Rifle Range MRS Project Overview

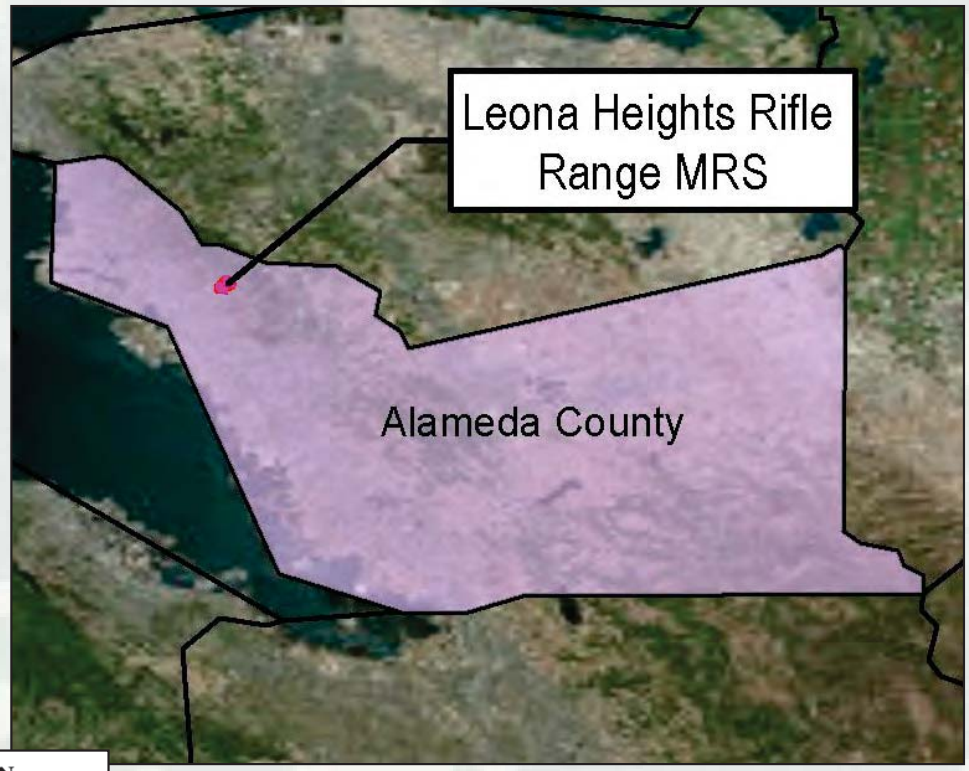
- Develop Planning Documents for Project Delivery Team (PDT) Review
  - Technical Project Planning (TPP) Meetings and Final TPP meeting minutes
  - Work Plan
    - Technical and Field Investigation Plans, Explosives Management Plan, Quality Control Plan, Environmental Protection Plan, Uniform Federal Policy for Quality Assurance Project Plan, Accident Prevention Plan / Site Safety and Health Plan
- Conduct Field Investigations
  - Collect data to define the nature and extent of MEC
  - Ensure sufficient data is collected to effectively evaluate alternatives in the FS

Leona Heights Rifle Range MRS Project Overview

- Prepare RI Report
  - Update Conceptual Site Models (CSMs), as required
  - Present findings
  - Assess potential explosive hazards and/or risks to human health, safety and the environment
- Update Munitions Response Site Prioritization Protocol (MRSPP)
- Future phases: Feasibility Study, Proposed Plan, Decision Document

Leona Heights Rifle Range MRS Location

- Located in Alameda County, California
  - Located along Keller Avenue and Campus Drive in the Sequoyah neighborhood, approximately 7 miles southeast of Downtown Oakland.



Leona Heights Rifle Range MRS
Land Use

- Land Use:
  - Residential – approximately 76 residences on private property. Access is for residents and invited guests only.
  - Recreational – approximately 32 acres of the Leona Canyon Regional Open Space Preserve (ROSP). Public property with limited access due to steep topography and heavy vegetation.

Leona Heights Rifle Range MRS
Right of Entry

- Right of Entry (ROE):
  - Alameda Flood Control ROE# DAC05-8-0093
    Parcel 037A-3152-019-05
  - East Bay Regional Park District ROE# DAC05-8-0094
    Parcels 037A-3152-13-3 & 037A-3152-19-3

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Leona Heights Rifle Range MRS
Land Use and Right of Entry

Legend

- Leona Heights Rifle Range MRS
- Road

Parcel Boundary

- Parcel Boundary
- ROE Parcel Boundary

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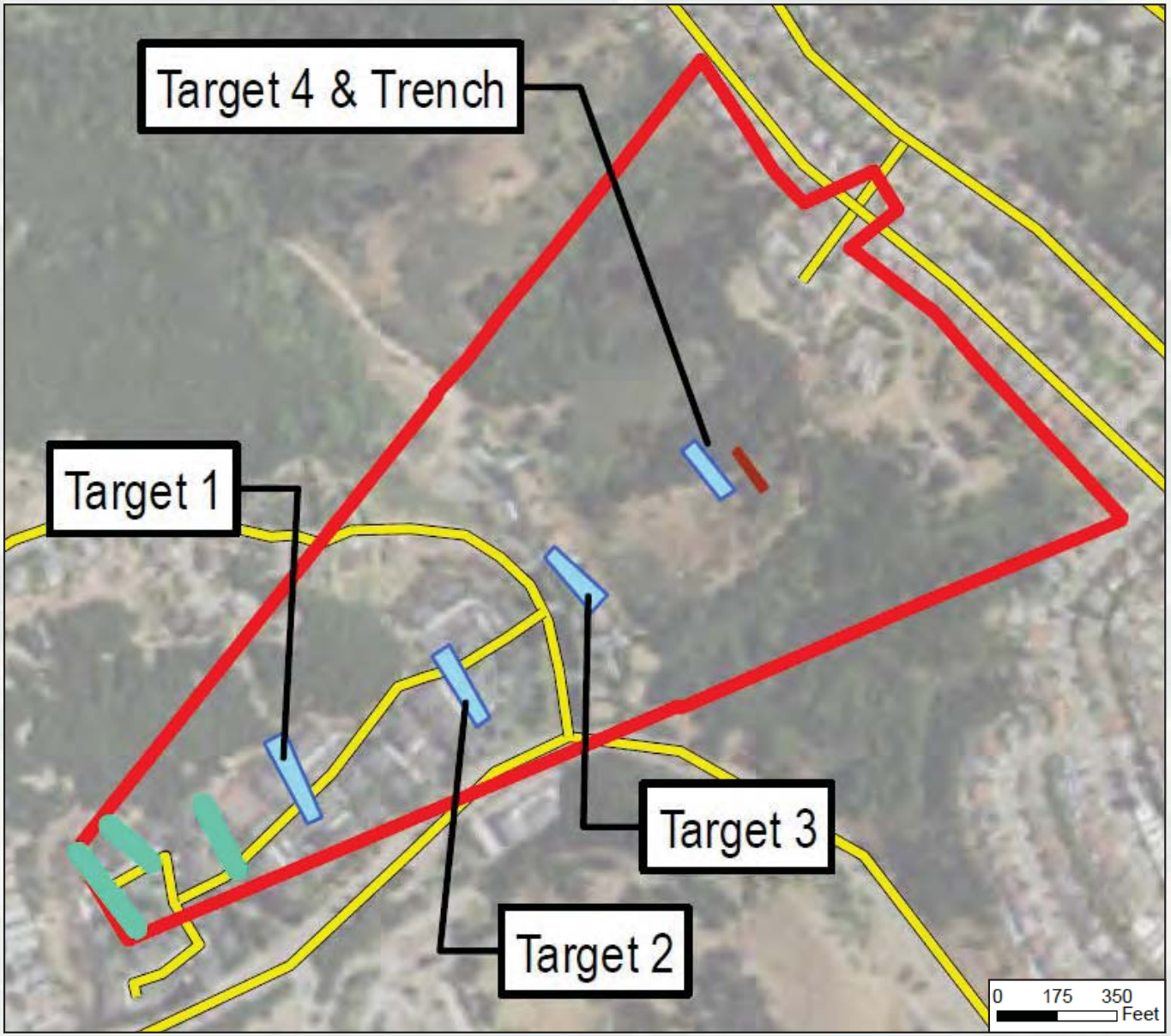
Leona Heights Rifle Range MRS Site Background

- Names and Size:
  - Leona Heights Rifle Range Munitions Response Site (MRS): 81.33 acres
  - Army Environmental Database – Restoration (AEDB-R) CAHQ-013-R-01
- Former Military Munitions Related Activities:
  - The MRS was used by CAARNG units for artillery and mortar practice from approximately 1913-1920.
  - The MRS was then used as a small arms range beginning in 1920.

Leona Heights Rifle Range MRS
Historic Layout



Legend

- Firing Line
- Target Area
- Target System Trench
- Road

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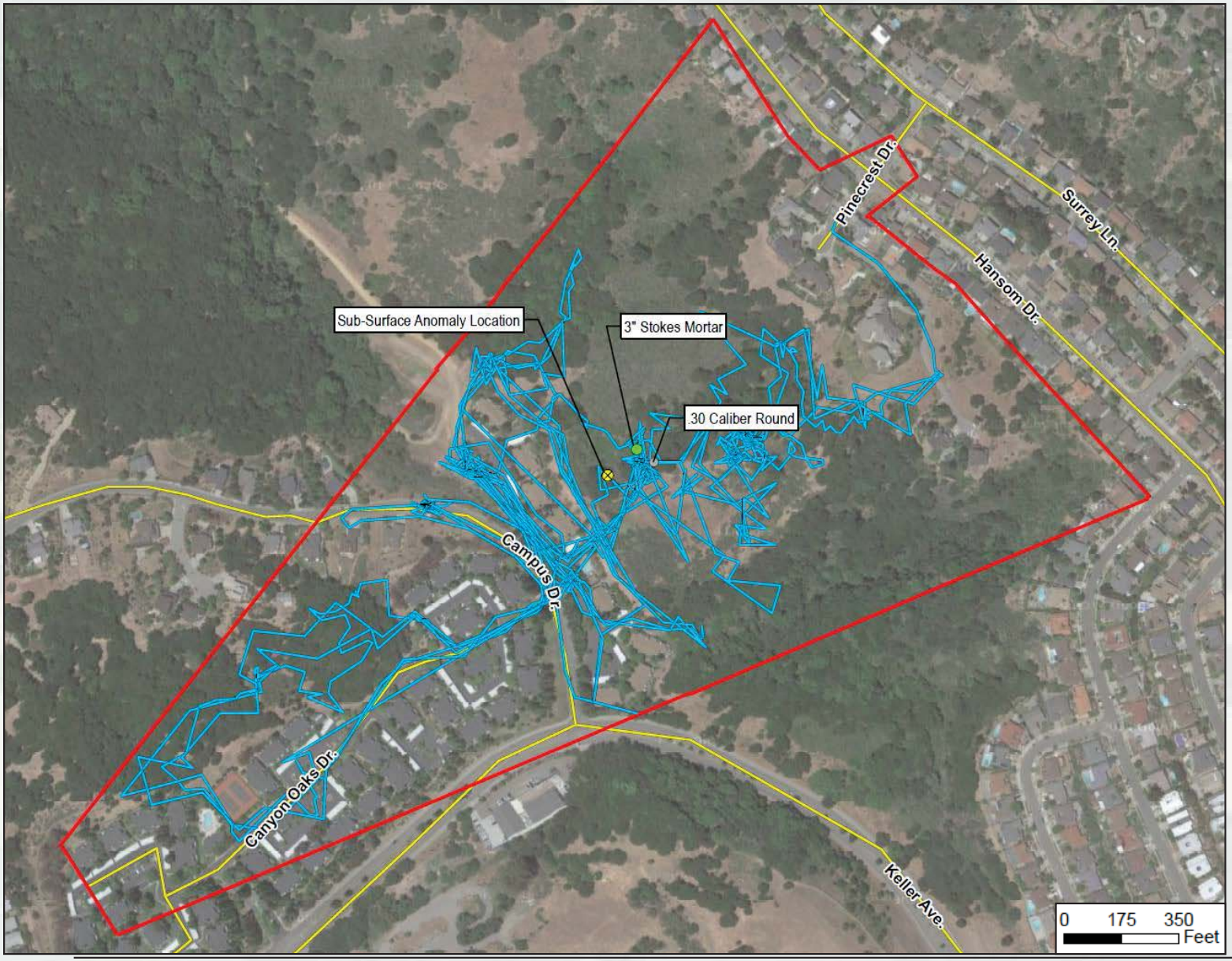
Leona Heights Rifle Range MRS
SI Findings

- Instrument Aided Visual Survey:
  - Meandering path 10.94 line miles total within the Leona Heights Rifle Range MRS
- Visual Finds:
  - No munitions of explosive concern (MEC)
  - Munitions debris (MD) – 3-inch Stokes Mortar
  - .30 Caliber projectile (1 found)
- Detected Anomalies:
  - Subsurface not intrusively investigated

Leona Heights Rifle Range MRS
SI Transects and Findings



Legend

- Leona Heights Rifle Range MRS
- Road
- SI Visual Instrument Aided Survey Transects
- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location

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Leona Heights Rifle Range MRS
SI Findings

- Munitions Constituent (MC) Sampling:
  - Ten samples (Discrete, Spoke & Hub and Grid Composite)
    - 9 normal and 1 duplicate
- MC Results:
  - Analysis for explosives (EPA SW-864 Method 8330B) and metals (EPA SW-864 Method 6010C)
  - Explosives were non-detect for all samples
  - Metals were not detected above reporting limits in all samples
  - MRS was designated No Further Action (NFA) for MC.

Leona Heights Rifle Range MRS
SI MC Results

All results reported in mg/kg			Field Sample Designation	CAHQ-013-SO-001	CAHQ-013-SO-002	CAHQ-013-SO-003	CAHQ-013-SO-004 (QC)	CAHQ-013-SO-005	CAHQ-013-SO-006	CAHQ-013-SO-007	CAHQ-013-SO-008	CAHQ-013-SO-009	CAHQ-013-SO-010
			Sample Date	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011
			Sample Type	ITRC Grid Composite	ITRC Grid Composite	Spoke & Hub Composite	Spoke & Hub Composite	Spoke & Hub Composite	Discrete	Discrete	Discrete	Discrete	Discrete
Analytical Method	Chemical Name	CA Screening Level[a]	USEPA Regional Screening Level										
6010C	Antimony	30	31	0.56 U	0.4 J	0.39 J	0.4 J	0.74 U	0.58 U	0.4 J	0.59 U	0.67 U	0.57 U
6010C	Copper	3000	3100	41	43	53	50	56	36	27	23	20	24
6010C	Lead	400	400	48	44	41	39	48	30	48	19	13	15
6010C	Zinc	23000	23000	100	100	99	99	110	75	78	58	50	60
8330A	1,3,5-Trinitrobenzene	2200	2200	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	1,3-Dinitrobenzene	6.1	6.1	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,4,6-Trinitrotoluene	19	19	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,4-Dinitrotoluene	1.6	1.6	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,6-Dinitrotoluene	61	61	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2-Amino-4,6-dinitrotoluene	150	150	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2-Nitrotoluene	2.9	2.9	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	3-Nitrotoluene	6.1	6.1	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	4-Amino-2,6-dinitrotoluene	150	150	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	4-Nitrotoluene	30	30	0.17 U	0.18 U	0.17 U	0.18 U	0.18 U	0.18 U	0.17 U	0.16 U	0.17 U	0.17 U
8330A	Cyclotrimethylenetrinitramine (RDX)	5.6	5.6	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	240	240	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Nitrobenzene	4.8	4.8	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Nitroglycerin	6.1	6.1	0.94 U	0.99 U	0.92 U	0.99 U	0.99 U	1 U	0.93 U	0.91 U	0.95 U	0.96 U
8330A	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3800	3800	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Pentaerythritol tetranitrate (PETN)	120	120	0.85 U	0.89 U	0.83 U	0.89 U	0.89 U	0.9 U	0.83 U	0.82 U	0.85 U	0.86 U

U – The analyte was not detected above the reporting limit.
J – Estimated Value

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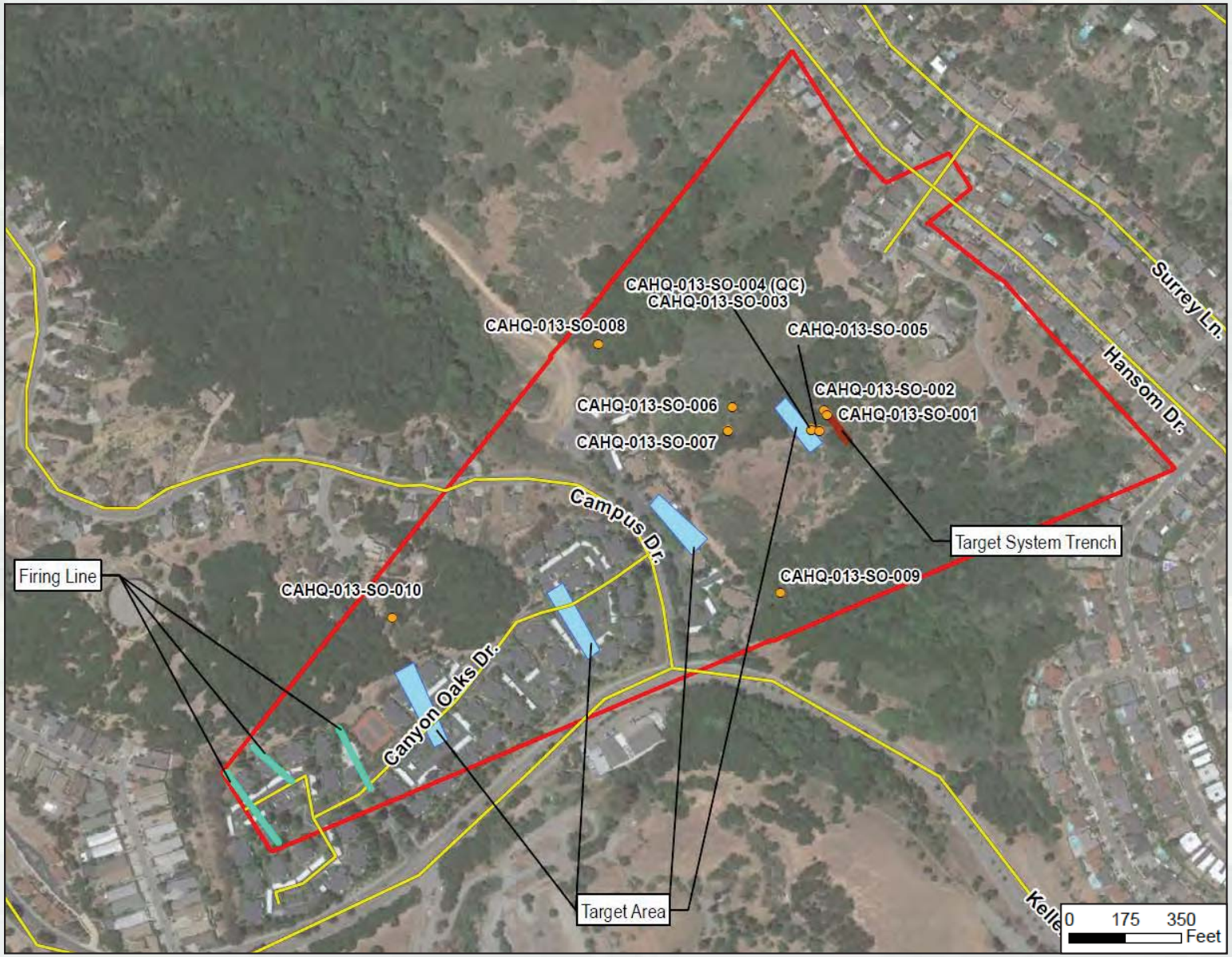
Leona Heights Rifle Range MRS
MC Sample Locations



Legend

- Leona Heights Rifle Range MRS
- Road
- SI Visual Instrument Aided Survey Transects
- MD - 3" Stokes Mortar
- Sub-Surface Anomaly Location

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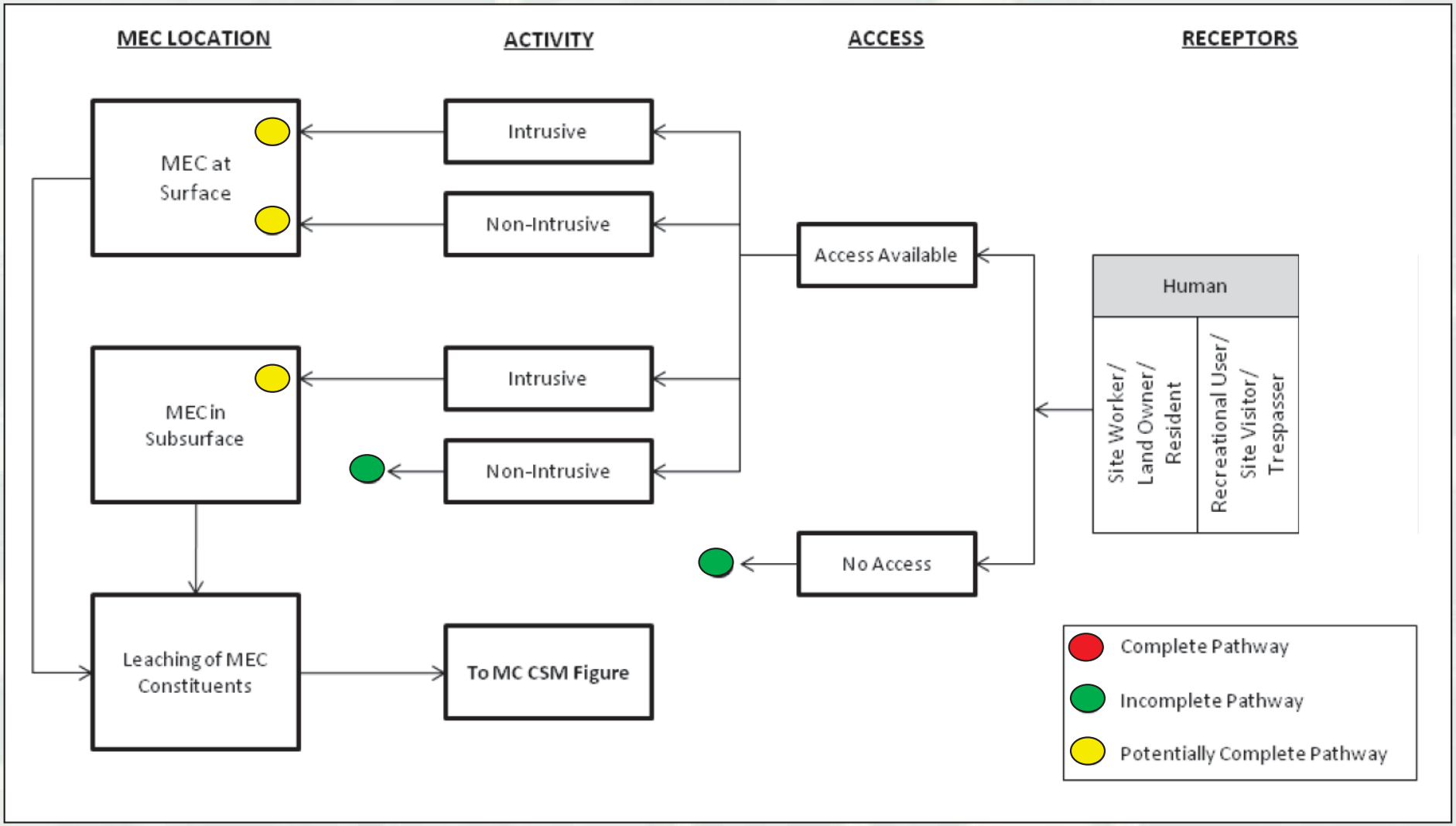
Leona Heights Rifle Range MRS Conceptual Site Model (CSM) for MEC



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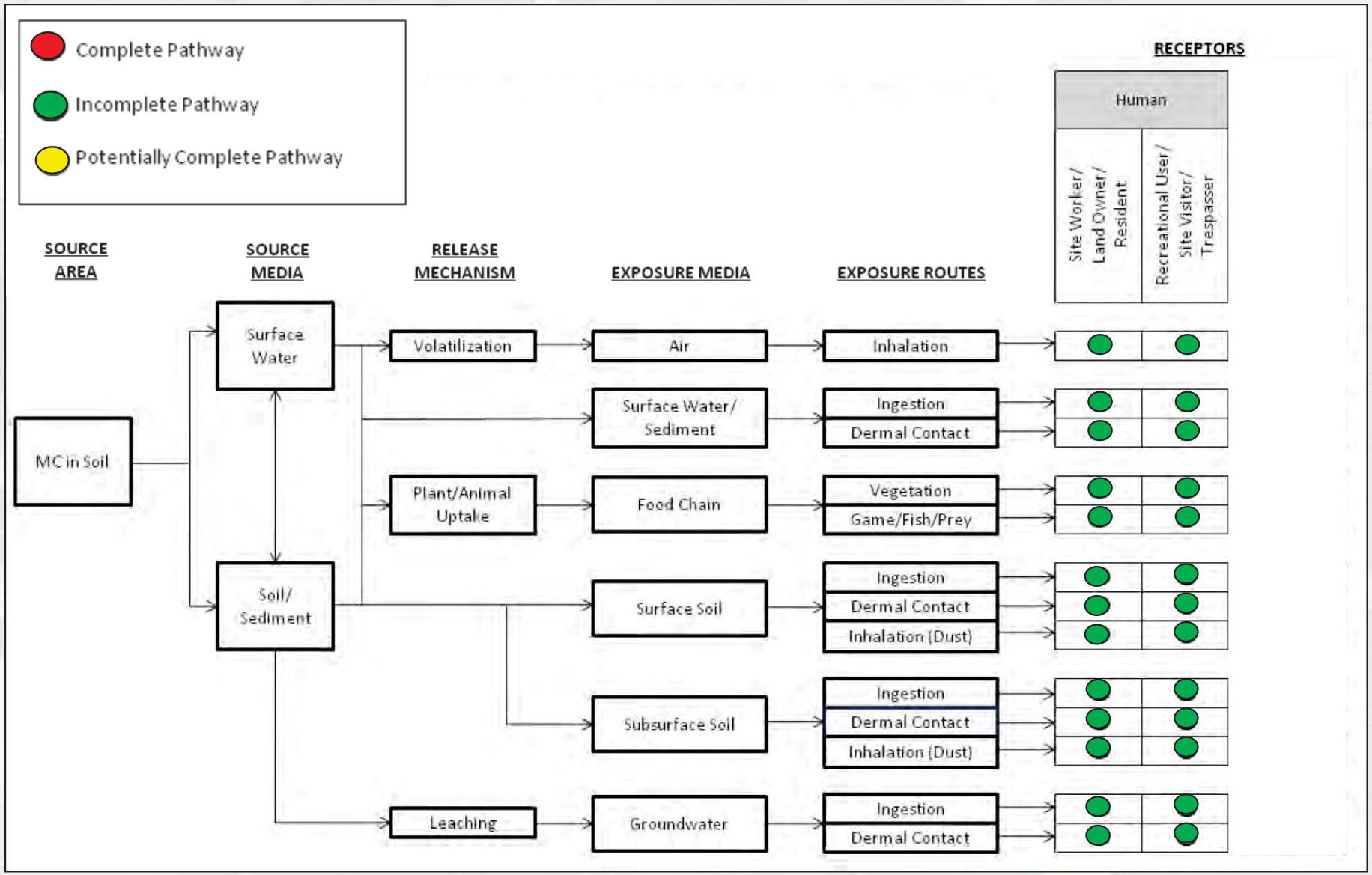
Leona Heights Rifle Range MRS Conceptual Site model (CSM) for MC



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Leona Heights Rifle Range MRS
RI Characterization Strategy

- Utilize existing SI data.
- Perform analog geophysical surveys.
- Intrusive investigation of all detected anomalies to determine nature and extent of MEC.
- Conduct MC sampling based on intrusive investigation results.

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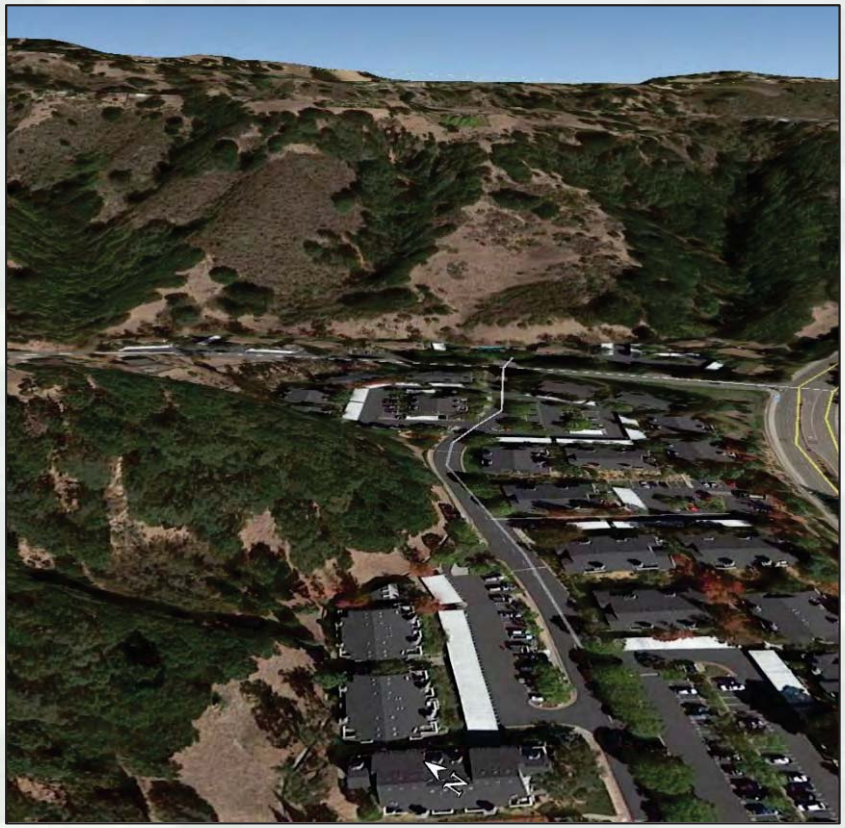
Leona Heights Rifle Range MRS
RI Characterization Strategy

- MEC Characterization – Survey Design
  - Analog geophysical surveys based on identified data gaps in the SI results.
  - Pre-designed transects based on potential transport of MEC through natural processes.
  - Additional transects determined by field observation (e.g. unnatural topography, previously unidentified range features).
  - Mini-grids (~5-feet x 15-feet) adjacent to anomalies as needed.



Leona Heights Rifle Range MRS
RI Characterization Strategy

Total Area = 81.33 acres (ac)
Investigation Area = 0.46 ac

Legend

- Leona Heights Rifle Range MRS
- 225 ft Hazard Fragment Distance
- Road
- Proposed Transect (3970.92 ft)
- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- 5 ' x 15' Mini Grid[1]

Notes:
1. Mini Grid quantity and placement will be a dynamic process based on lines of evidence determined by field observations.

Leona Heights Rifle Range MRS
RI Characterization Strategy

- MEC Characterization – Analog Geophysical Surveys
  - Use of handheld Electromagnetometer's geophysical survey utilizing White's all metals detectors or equivalent, due to steep topography (>30 degree slopes.)
  - Swath width of approximately 5 ft.
  - Record anomaly location using a handheld Global Positioning System (GPS) and mark with pin flags for subsequent intrusive investigation.

EM & Dig Surveys

Leona Heights Rifle Range MRS
RI Characterization Strategy

- Intrusive Anomaly Investigation
  - Anomalies detected during analog survey will be investigated to determine nature of item.
  - The location, size, depth, description and orientation of the items will be documented.
  - Intrusive activities will be conducted in accordance with project work/safety plans and the Department of Defense Explosives Safety Board (DDESB) - approved Explosives Site Plan (ESP)
  - The hazardous fragment distance (HFD) of 225 feet will be used to establish exclusion zones during intrusive activities.
  - Delivery of donor explosives will be supplied as needed.

Intrusive Work

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Leona Heights Rifle Range MRS
RI Characterization Strategy

- MC Sampling
  - MC samples may be collected if an MC release is suspected due to field indications such as a damaged or broken item with leaking fluids or associated soil staining
    - Sample collected in the immediate area (1-foot radius)
  - Pre and Post Blow-In-Place (BIP) locations (1-foot radius around detonation)

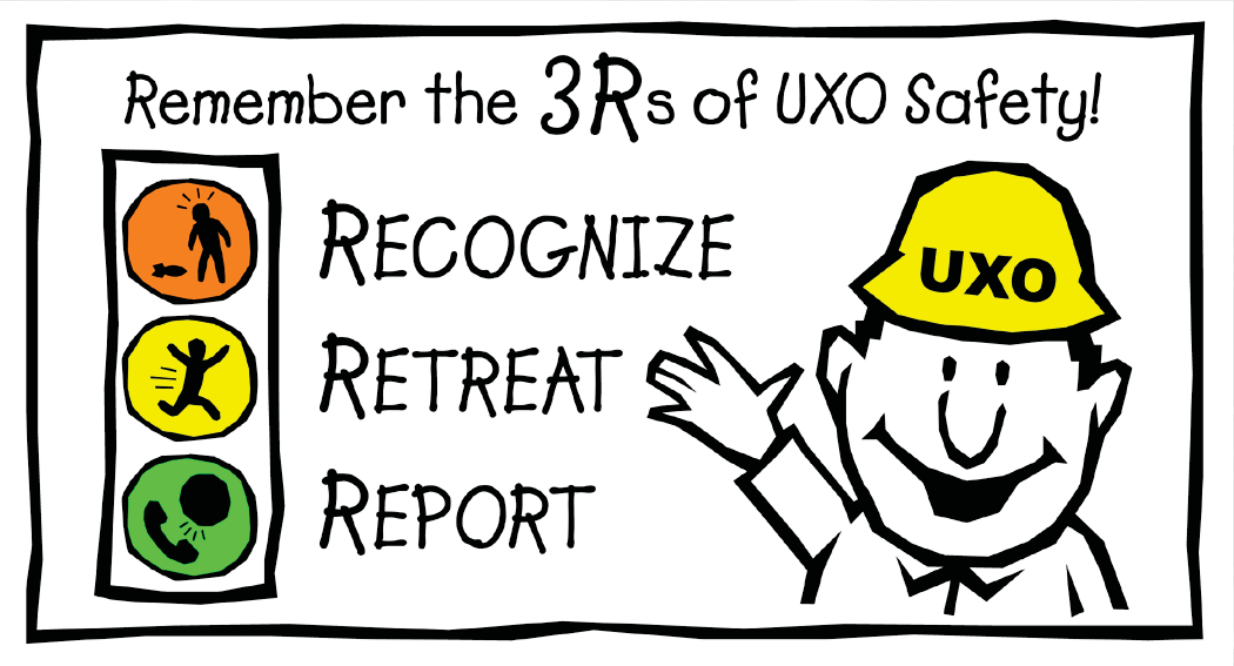
Leona Heights Rifle Range MRS
RI Potential Evacuations

- Evacuations will only be required during intrusive work within the 225ft HFD.
  - Community meeting, site interviews and contact information collection (April 2016).
  - Evacuation Plan as Appendix in Work Plan (stand alone document)
  - Information disseminated to residents within the exclusion zone (EZ) describing the planned temporary withdrawal, and soliciting questions.
    - Intervals at 6 weeks (initial), 30 days, 2 weeks, 3 days and evening before (final).
  - Timed to minimize disruptions and provide maximum advanced notice.
    - Intrusive work near housing scheduled together.
  - Evacuations expected to be from 0800 through 1700.

Leona Heights Rifle Range MRS Schedule

Activity/Deliverable	Date of Submittal	Status
TPP #1	10 August 2015	✓
Army Review Draft RI Work Plan (RIWP)	December 2015	✓
Army Review Draft Community Relations Plan (CRP)	February 2016	✓
Stakeholder Review Draft RIWP & Draft CRP	March 2016	
TPP# 2	22 March 2016	
Final RI Work Plan & Final CRP	May 2016	
Anticipated RI Fieldwork	June 2016	

Safety is our #1 Priority



Leona Heights Rifle Range MRS

QUESTIONS?

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Acronyms

ac	Acres
AEDB-R	Army Environmental Database – Restoration
ARNG	Army National Guard Directorate
BIP	Blow In Place
CAARNG	California Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CRP	Community Relations Plan
CSM	Conceptual Site Model
DD	Decision Document
DDESB	Department of Defense Explosives Safety Board
DTSC	California Department of Toxic Substances
EM	Electromagnetometer
EPA	United States Environmental Protection Agency
ESP	Explosives Site Plan
FS	Feasibility Study
GPS	Global Positioning System
HFD	Hazard Fragmentation Distance
MC	Munitions Constituent

Acronyms (Cont.)

MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NFA	No Further Action
PDT	Project Delivery Team
PP	Proposed Plan
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
ROE	Right of Entry
ROSP	Regional Open Space Preserve
TPP	Technical Project Planning
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance

Military Munitions Response Program
Remedial Investigation at
NDNODS Leona Heights Rifle Range MRS (CAHQ-013-R-01), California
Technical Project Planning (TPP) Meeting #2

Tuesday, 22 March 2016
1:00 PM PST

Printed Name	Signature	Phone	Email
Walt Gee		703-607-7990	Walter.f.gee.ctr@mail.mil
Shawn Macmillan		208-275-2901	shawn.macmillan@westonsolutions.com
Tim Tregoe		303-729-6107	TIM_TREGOE@WESTONSOLUTIONS.COM
John Jackson		916-557-6614	john.m.jackson6.civ@usace.army.mil
Ted Hestilow		916-557-6787	
Jim Lukaszko		916.557.7539	james.j.lukaszko@usace.army.mil
Maj Anderson	CA ARNG		phone
Ashley	WESTON		phone

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Military Munitions Response Services

Leona Heights Rifle Range (CAHQ-013-R-01)

Alameda County, California

Technical Project Planning

Meeting #1

10 August 2015

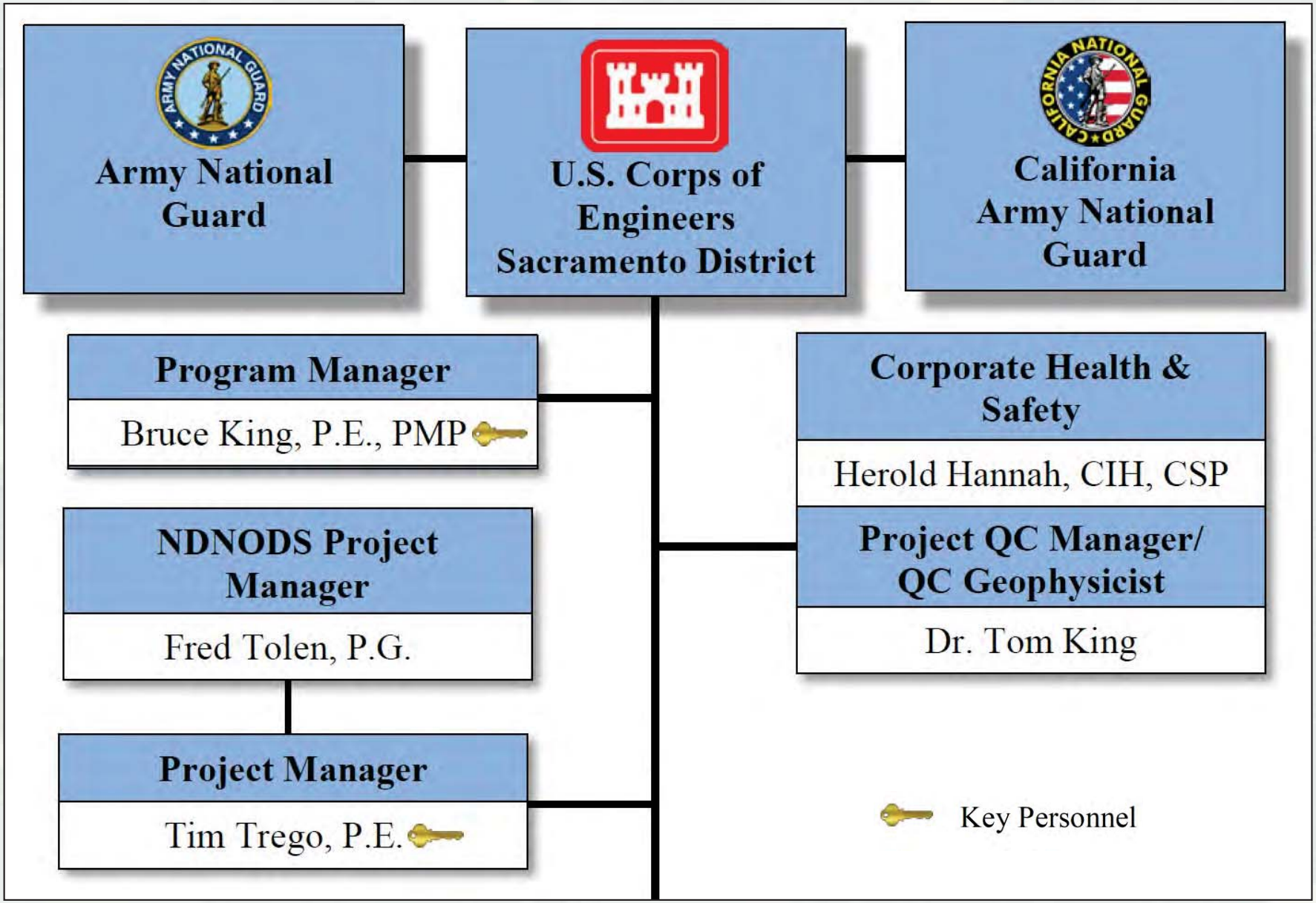
Meeting Agenda

- Introductions and Organizational Chart
- Project Overview
- Leona Heights Rifle Range Military Munitions History and Previous Investigations
- Remedial Investigation Approach
- Project Schedule

Introductions

- **U.S. Army National Guard Directorate (ARNG)**
  - John Haines: Program Manager
  - Walt Gee: Lead Project Manager
- **California Army National Guard (CAARNG)**
  - Major Marc Anderson: Project Manager
- **U.S. Army Corps of Engineers (USACE)–Sacramento District**
  - Gary Krongard: Contracting Officers Representative
  - Jim Lukasko: Project Manager
  - John Jackson: Project Geophysicist
- **California Department of Toxic Substances Control (DTSC)**
  - Roman Racca: Munitions Response Coordinator
- **Weston Solutions, Inc.**
  - Bruce King: Program Manager
  - Fred Tolen: NDNODS Principle Project Manager
  - Tim Trego: Project Manager (for California MRSs)

Weston Solutions, Inc.
Organization Chart



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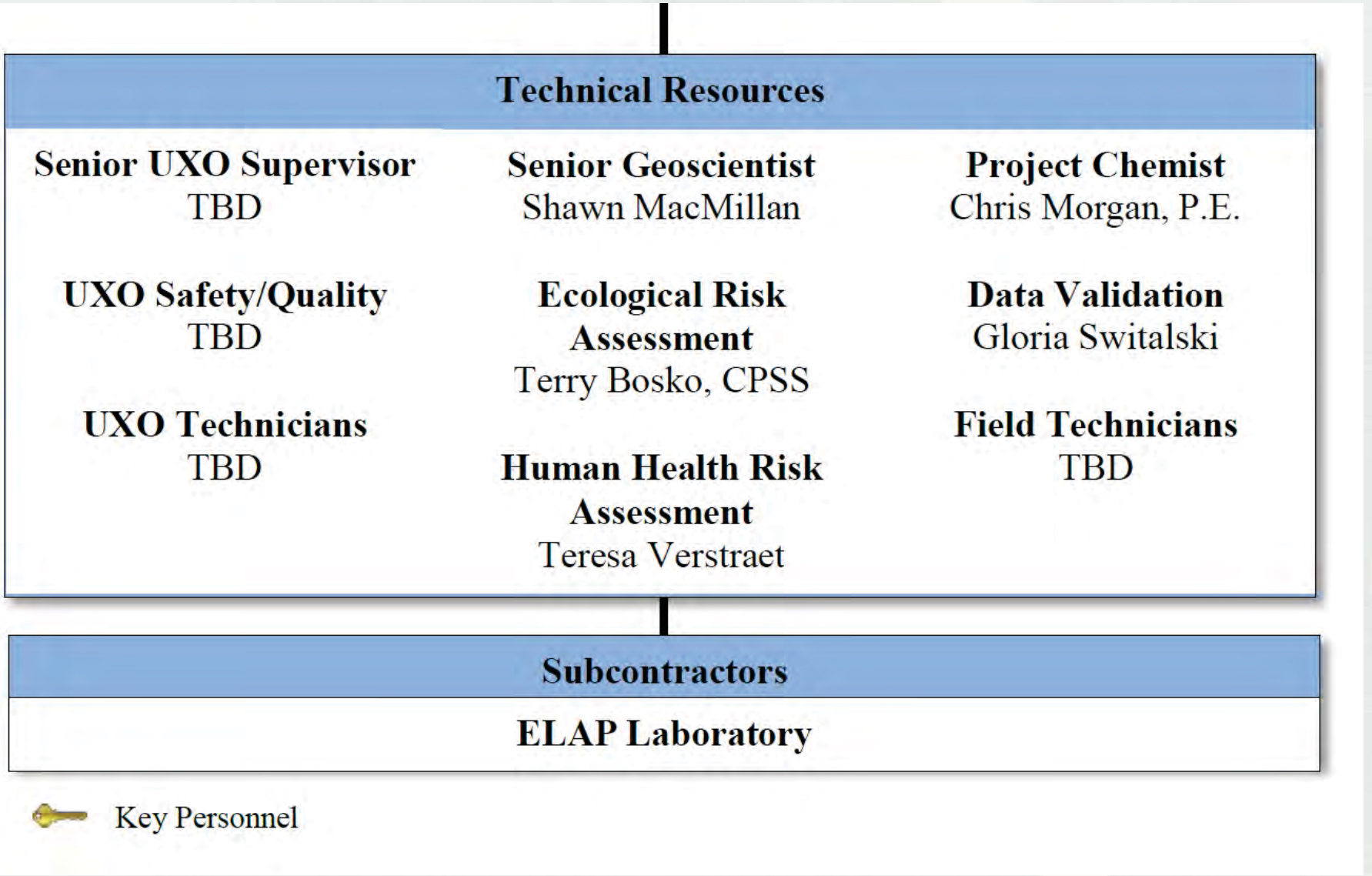
Weston Solutions, Inc.
Organization Chart (Cont.)



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Leona Heights Rifle Range MRS Project Objectives

- Remedial Investigation (RI)
  - Conduct field investigations to characterize the MRS and determine type, density and distribution of munitions and explosives of concern (MEC).
- Feasibility Study (FS)
  - Identify applicable technologies for treatment of hazards posed by MEC.
- Proposed Plan (PP)
  - Present the chosen remedial action alternative to the public for review and comment.
- Decision Document (DD)
  - Document the final remedy selection.

Leona Heights Rifle Range MRS CERCLA Process

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Leona Heights Rifle Range MRS Project Overview

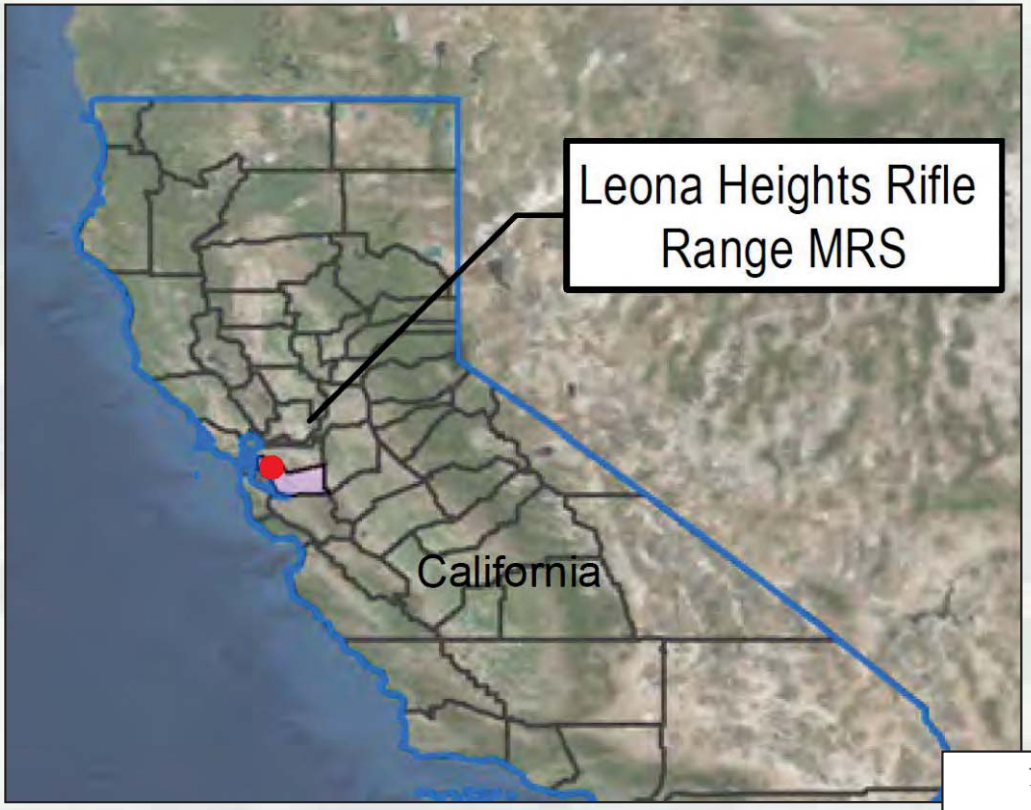
- Develop Planning Documents for Project Delivery Team (PDT) Review
  - Technical Project Planning (TPP) Meetings and Final TPP meeting minutes
  - Work Plan
    - Technical and Field Investigation Plans, Explosives Management Plan, Quality Control Plan, Environmental Protection Plan, Uniform Federal Policy for Quality Assurance Project Plan, Accident Prevention Plan /Site Safety and Health Plan
- Conduct Field Investigations
  - Collect data to define the nature and extent of MEC
  - Ensure sufficient data is collected to effectively evaluate alternatives in the FS

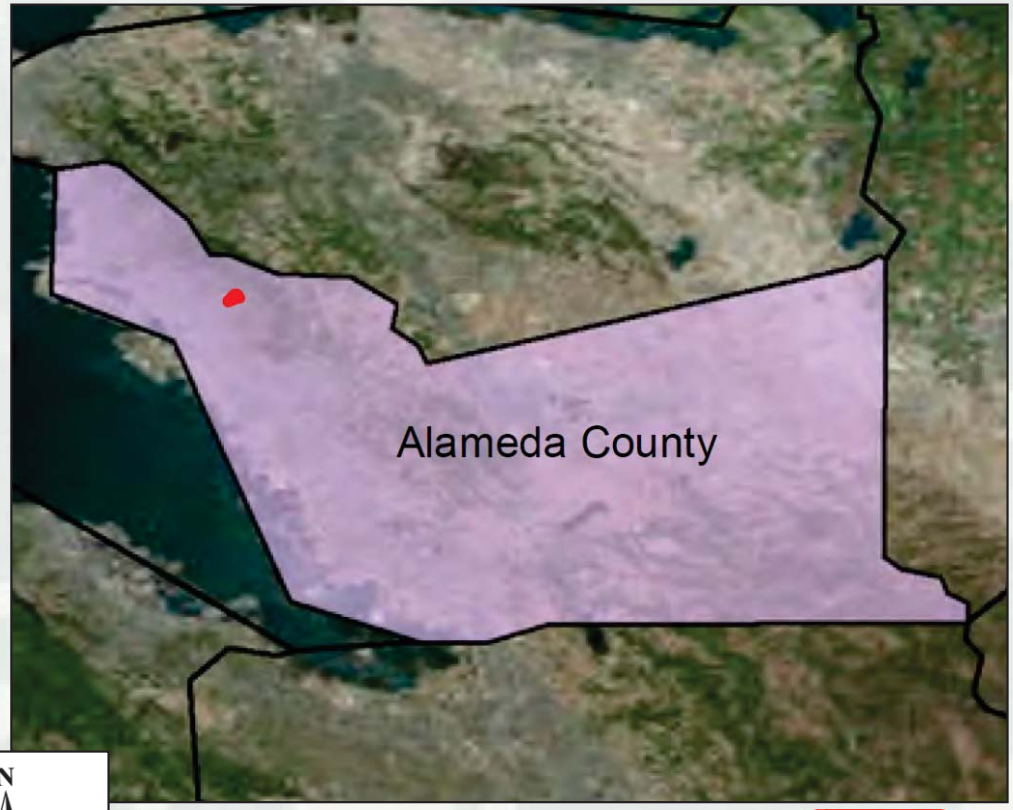
Leona Heights Rifle Range MRS Project Overview

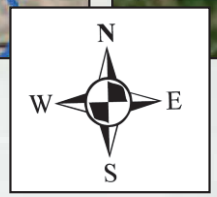
- Prepare RI Report
  - Update Conceptual Site Models (CSMs), as required
  - Present findings
  - Assess potential explosive hazards and/or risks to human health, safety and the environment
- Update Munitions Response Site Prioritization Protocol (MRSPP)
- Future phases: Feasibility Study, Proposed Plan, Decision Document

Leona Heights Rifle Range MRS Location

- Located in Alameda County, California
  - Located along Keller Avenue and Campus Drive in Leona Heights, approximately 7 miles southeast of Oakland.







Leona Heights Rifle Range MRS
Land Use

- Land Use:
  - Residential – approximately 76 residences on private property. Access is for residents and invited guests only.
  - Recreational – approximately 32 acres of the Leona Canyon Regional Open Space Preserve. Public property with limited access due to steep topography and heavy vegetation.

Leona Heights Rifle Range MRS
Right of Entry

- Right of Entry (ROE):

Public Property

- 037A-3152-13-3 & 037A-3152-19-3 – East Bay Regional Park District

Private Property

- 037A-3159-13-4
- 037A-3159-15
- 037A-3170-23
- 037A-3170-24
- 037A-3172-16
- 037A-3152-19-5

ROE agreements are being prepared and sent to property owners.

Leona Heights Rifle Range MRS
Land Use and Right of Entry

Legend

- Leona Heights Rifle Range MRS
- Road

Parcel Boundary

- Parcel Boundary

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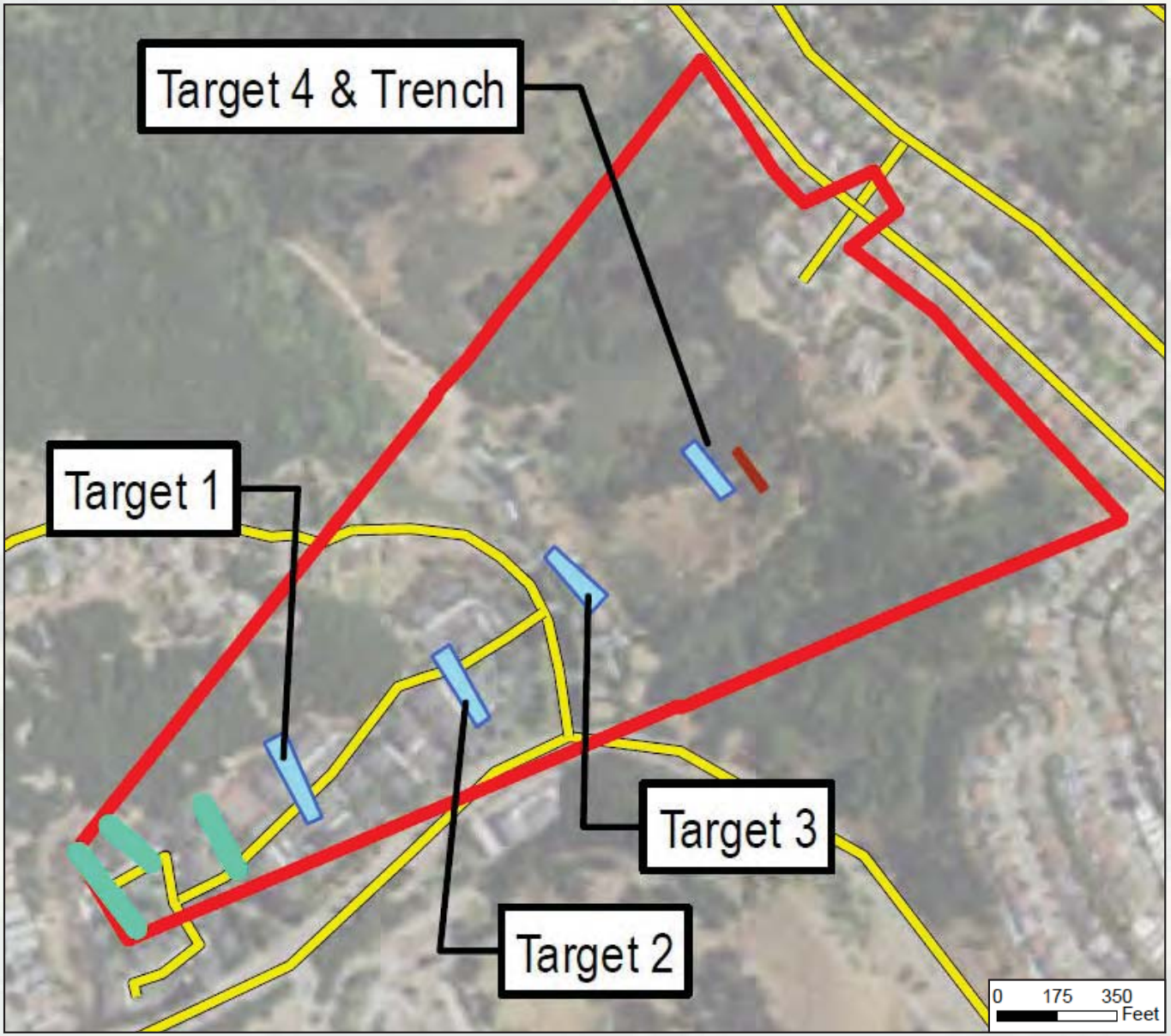
Leona Heights Rifle Range MRS Site Background

- Names and Size:
  - Leona Heights Rifle Range Munitions Response Site (MRS): 81.33 acres
  - Army Environmental Database – Restoration (AEDB-R) CAHQ-013-R-01
- Former Military Munitions Related Activities:
  - The MRS was used by CAARNG units for artillery and mortar practice from approximately 1913-1920.
  - The MRS was then used as a small arms range beginning in 1920.

Leona Heights Rifle Range MRS
Historic Layout



Legend

- Firing Line
- Target Area
- Target System Trench
- Road

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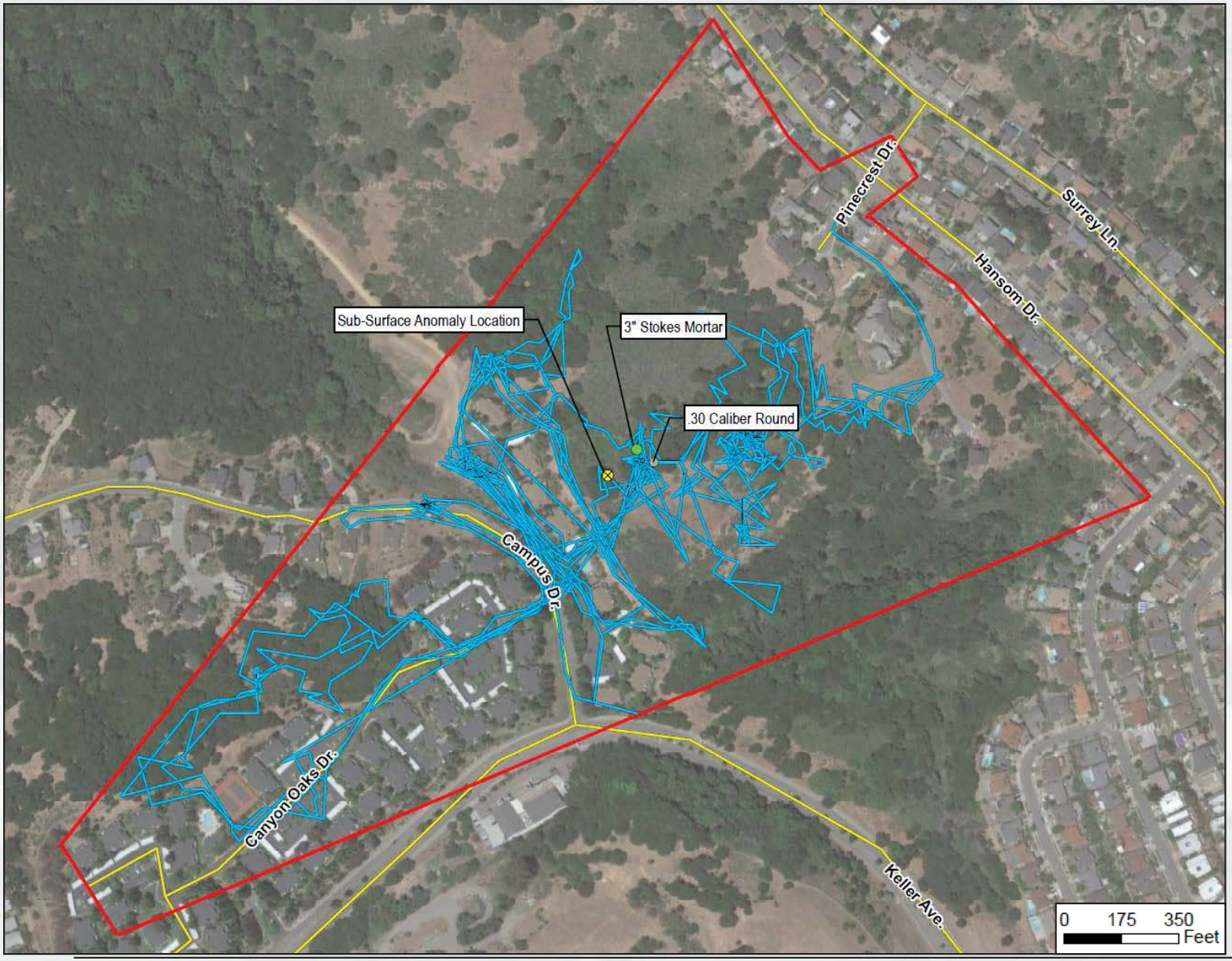
Leona Heights Rifle Range MRS
SI Findings

- Instrument Aided Visual Survey:
  - Meandering path 10.94 line miles total within the Leona Heights Rifle Range MRS
- Visual Finds:
  - No munitions of explosive concern (MEC)
  - Munitions debris (MD) – 3-inch Stokes Mortar
  - .30 Caliber projectile (1 found)
- Detected Anomalies:
  - One (not intrusively investigated)

Leona Heights Rifle Range MRS
SI Transects and Findings



Legend

- Leona Heights Rifle Range MRS
- Road
- SI Visual Instrument Aided Survey Transects
- MD - 3" Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location

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Leona Heights Rifle Range MRS
SI Findings

- Munitions Constituent (MC) Sampling:
  - Ten samples (Discrete, Spoke & Hub and Grid Composite)
    - 9 normal and 1 duplicate
- MC Results:
  - Analysis for explosives (EPA SW-864 Method 8330B) and metals (EPA SW-864 Method 6010C)
  - Explosives were non-detect for all samples
  - Metals were not detected above reporting limits in all samples
  - MRS was designated No Further Action (NFA) for MC.

Leona Heights Rifle Range MRS
SI MC Results

All results reported in mg/kg			Field Sample Designation	CAHQ-013-SO-001	CAHQ-013-SO-002	CAHQ-013-SO-003	CAHQ-013-SO-004 (QC)	CAHQ-013-SO-005	CAHQ-013-SO-006	CAHQ-013-SO-007	CAHQ-013-SO-008	CAHQ-013-SO-009	CAHQ-013-SO-010
			Sample Date	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011	10/3/2011
			Sample Type	ITRC Grid Composite	ITRC Grid Composite	Spoke & Hub Composite	Spoke & Hub Composite	Spoke & Hub Composite	Discrete	Discrete	Discrete	Discrete	Discrete
Analytical Method	Chemical Name	CA Screening Level[a]	USEPA Regional Screening Level										
6010C	Antimony	30	31	0.56 U	0.4 J	0.39 J	0.4 J	0.74 U	0.58 U	0.4 J	0.59 U	0.67 U	0.57 U
6010C	Copper	3000	3100	41	43	53	50	56	36	27	23	20	24
6010C	Lead	400	400	48	44	41	39	48	30	48	19	13	15
6010C	Zinc	23000	23000	100	100	99	99	110	75	78	58	50	60
8330A	1,3,5-Trinitrobenzene	2200	2200	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	1,3-Dinitrobenzene	6.1	6.1	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,4,6-Trinitrotoluene	19	19	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,4-Dinitrotoluene	1.6	1.6	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2,6-Dinitrotoluene	61	61	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2-Amino-4,6-dinitrotoluene	150	150	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	2-Nitrotoluene	2.9	2.9	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	3-Nitrotoluene	6.1	6.1	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	4-Amino-2,6-dinitrotoluene	150	150	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
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8330A	Cyclotrimethylenetrinitramine (RDX)	5.6	5.6	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	240	240	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Nitrobenzene	4.8	4.8	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Nitroglycerin	6.1	6.1	0.94 U	0.99 U	0.92 U	0.99 U	0.99 U	1 U	0.93 U	0.91 U	0.95 U	0.96 U
8330A	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	3800	3800	0.085 U	0.089 U	0.083 U	0.089 U	0.089 U	0.09 U	0.083 U	0.082 U	0.085 U	0.086 U
8330A	Pentaerythritol tetranitrate (PETN)	120	120	0.85 U	0.89 U	0.83 U	0.89 U	0.89 U	0.9 U	0.83 U	0.82 U	0.85 U	0.86 U

U – The analyte was not detected above the reporting limit.
J – Estimated Value

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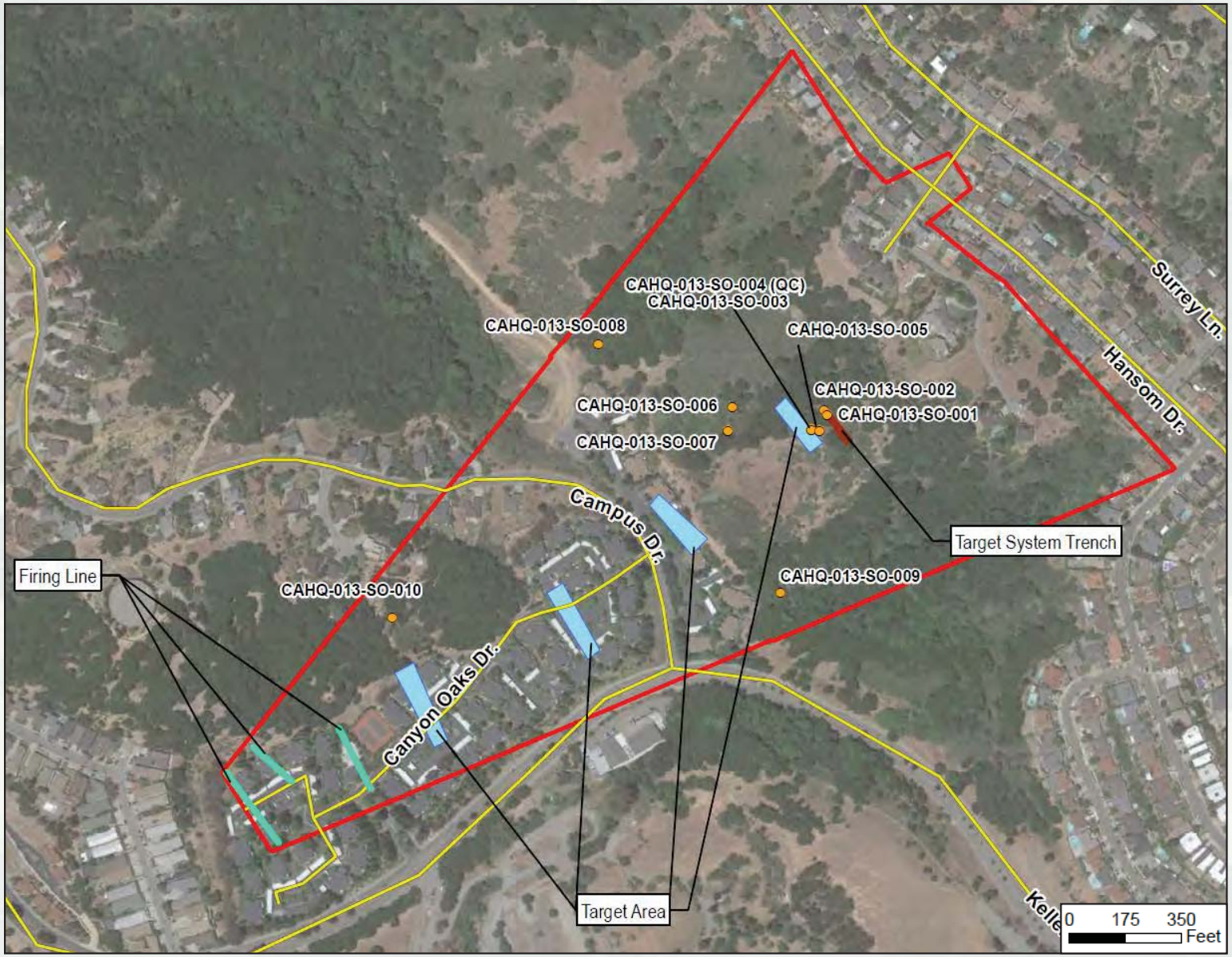
Leona Heights Rifle Range MRS
MC Sample Locations



Legend

- Leona Heights Rifle Range MRS
- Road
- SI Visual Instrument Aided Survey Transects
- MD - 3" Stokes Mortar
- Sub-Surface Anomaly Location

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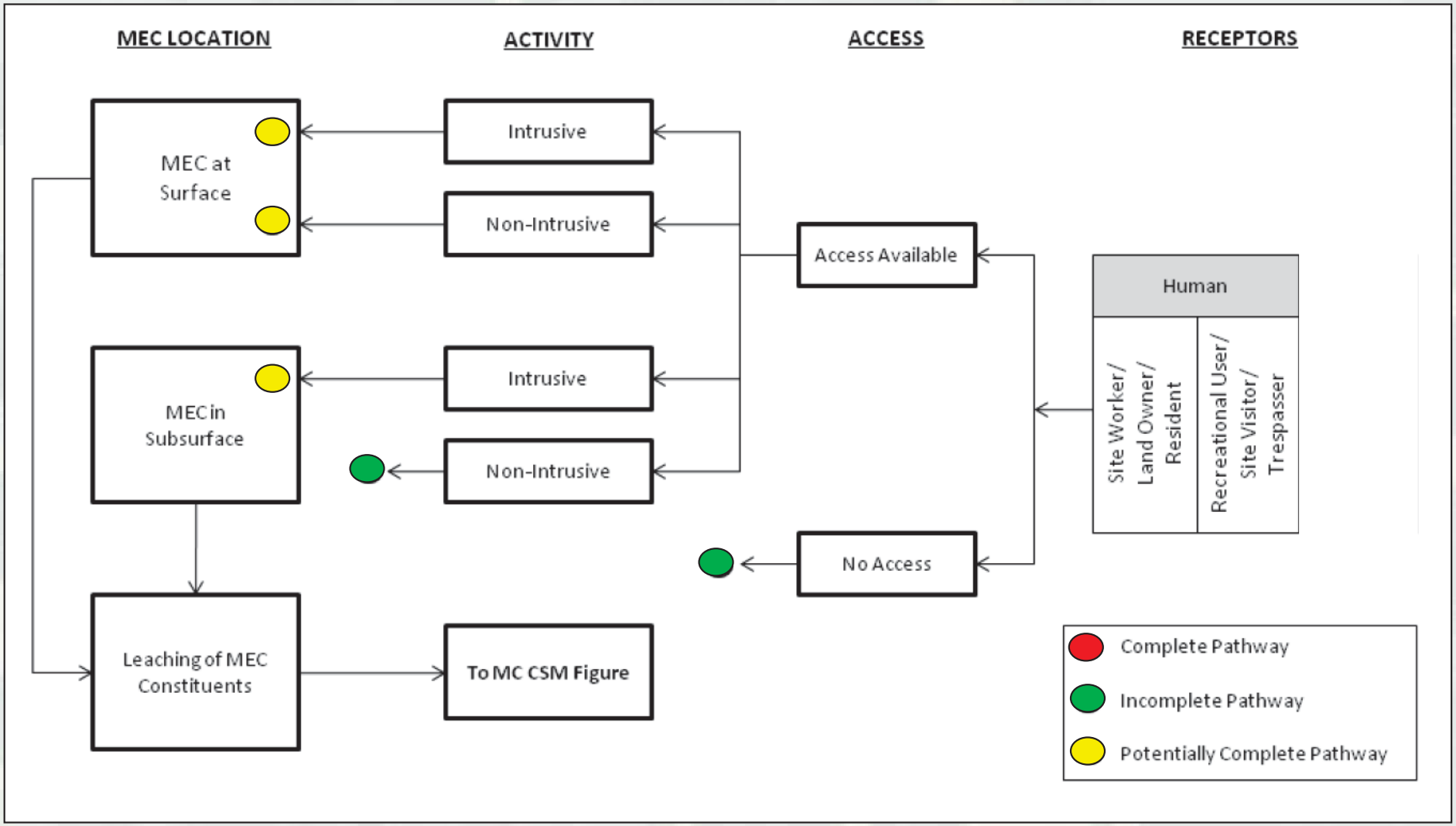
Leona Heights Rifle Range MRS Conceptual Site Model (CSM) for MEC



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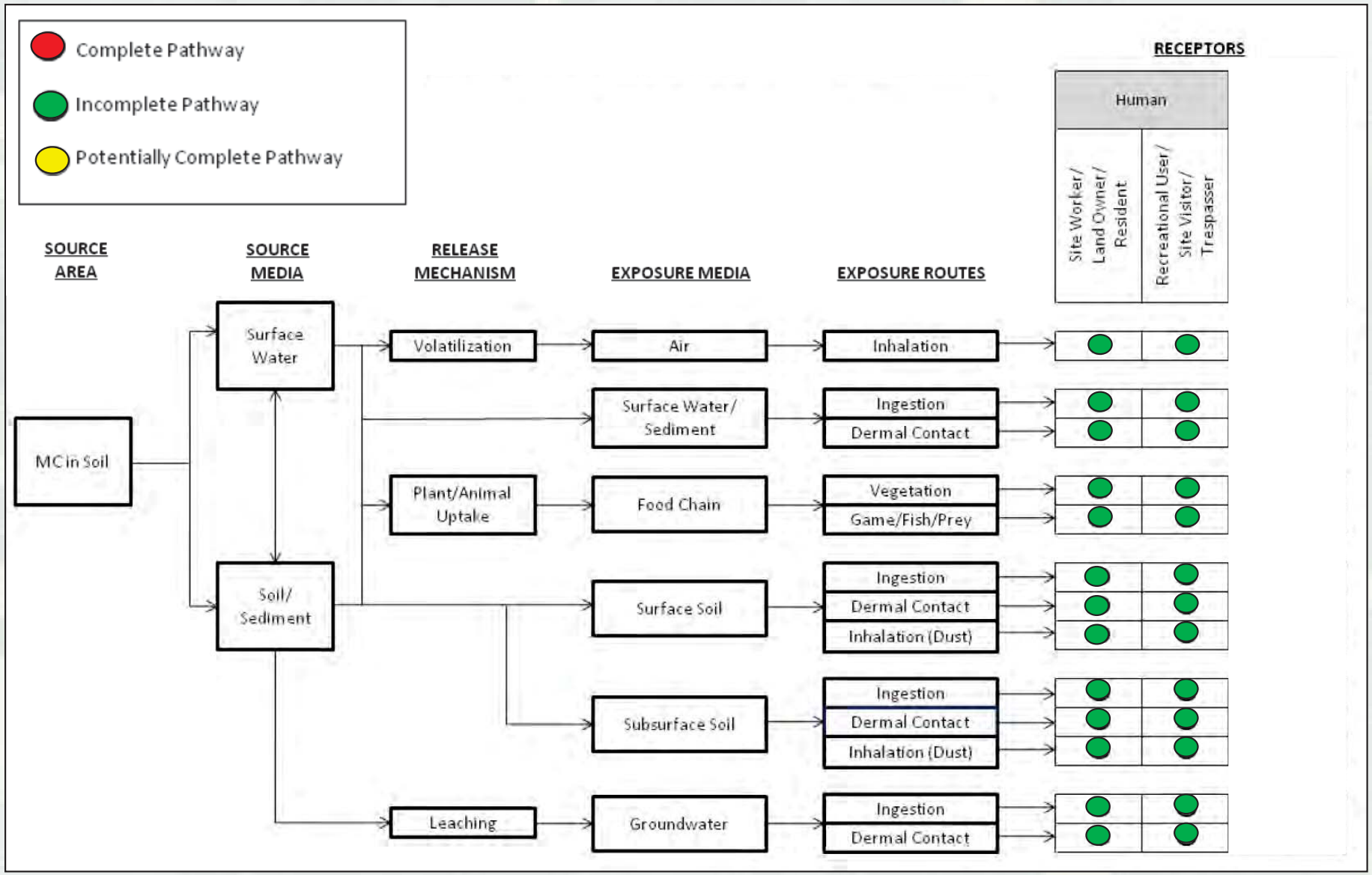
Leona Heights Rifle Range MRS Conceptual Site model (CSM) for MC



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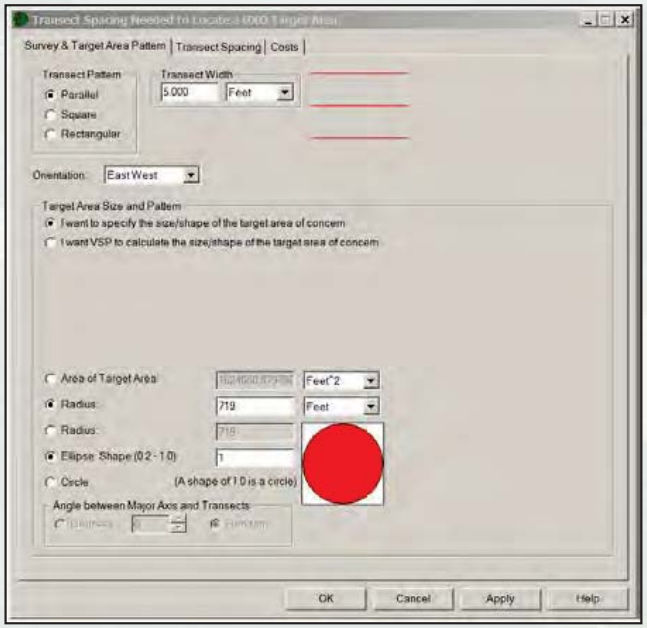
Leona Heights Rifle Range MRS
RI Characterization Strategy

- Utilize existing SI data.
- Use statistical tools to develop a characterization strategy based on the type and density of suspected MEC.
- Perform geophysical surveys and intrusive investigations to determine nature and extent of MEC.
- Conduct MC sampling based on intrusive investigation results.

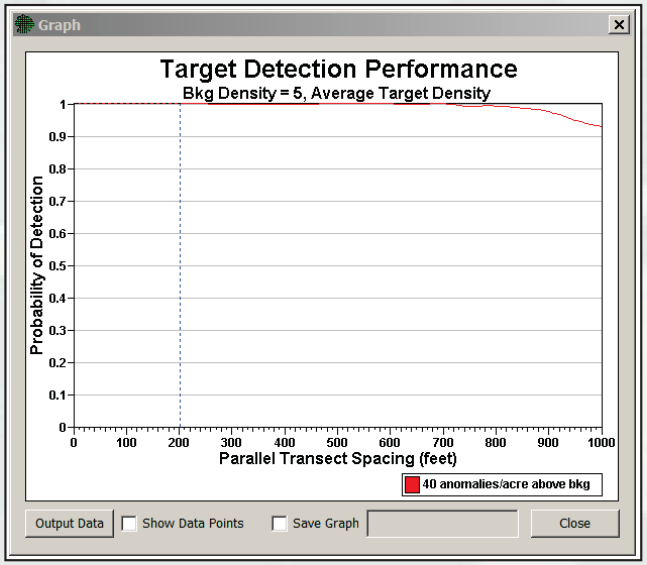
Leona Heights Rifle Range MRS
RI Characterization Strategy

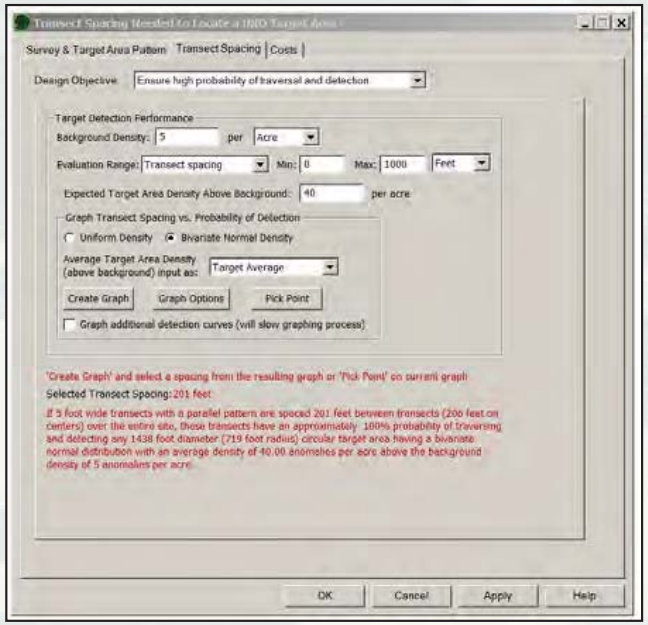
- MEC Characterization – Survey Design
  - The design objective is to ensure high probability of traversal and detection of target areas and delineate as appropriate.
  - A circular target area with a radius of 719 ft. was selected based on the fragmentation characteristics of a 3-inch High Explosive (HE) Stokes Mortar.
  - A geophysical transect spacing of >500 ft. ensures a 95% probability of traversing and detecting concentrated munitions use areas with a 719 ft. radius and density of 40 anomalies per acre above background.



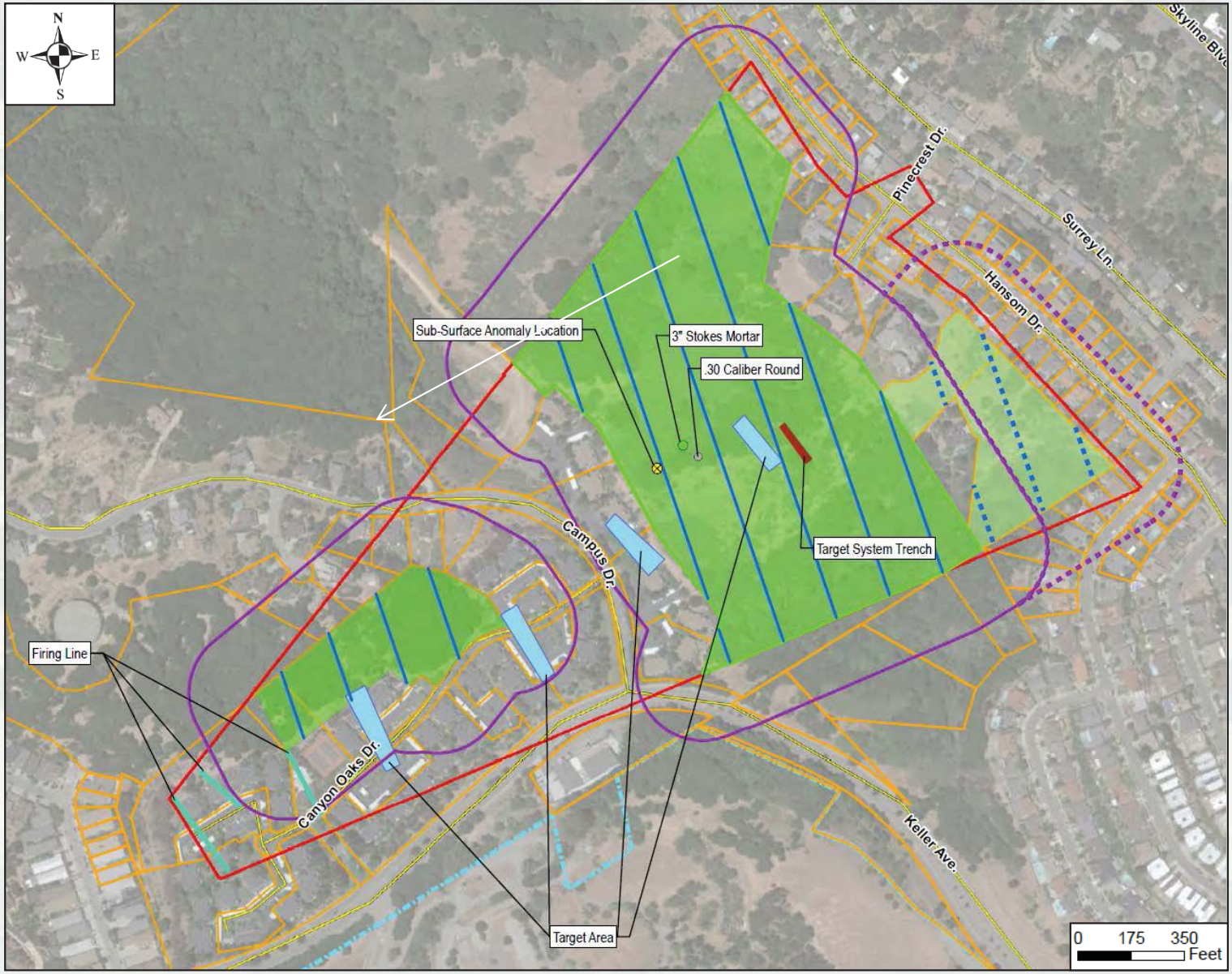
Leona Heights Rifle Range MRS RI Characterization Strategy

- MEC Characterization – Survey Design (cont.)
  - We have selected a transect spacing of 200ft to minimize uncertainty.
  - Approximately 1.5 miles of geophysical transects are planned across the MRS.
  - Due to potential obstacles associated with terrain and vegetation, VSP will be used to perform a post-survey assessment to evaluate actual transects versus planned transects and the probability that the specific target area is identified.





Leona Heights Rifle Range MRS
RI Characterization Strategy



Total Area = 81.33 acres (ac)
Investigation Area = 0.94 ac

Legend

- Proposed Transect (8168.59 ft, 0.94 acres)
- Additional Proposed Transect (1184.62 ft, 0.14 acres)
- Leona Heights Rifle Range MRS
- Oakland Knoll Naval Hospital
- Property Parcel Boundary
- Public Open Space
- Proposed RI Area (36.82 acres)
- Potential RI Area (5.78 acres)
- 225 ft Hazard Fragment Distance
- Firing Line
- Target Area
- Target System Trench
- MD - 3' Stokes Mortar
- .30 Caliber Round
- Sub-Surface Anomaly Location
- Road

Leona Heights Rifle Range MRS
RI Characterization Strategy

- MEC Characterization – Handheld Electromagnetic Sensor Surveys
  - Use of handheld Electromagnetometer's & Dig (EM & Dig) geophysical survey utilizing White's all metals detectors or equivalent, due to steep topography (>30 degree slopes.)
  - Identify munitions-related features (e.g. craters and structures associated with munitions use)
  - Follow pre-designed transects based on Visual Sample Plan (VSP) calculations
  - Swath width of approximately 5 ft
  - Actual transects and features logged using global positioning system (GPS)
  - Intrusively investigate all anomalies as Unexploded Ordnance (UXO) team advances.

EM & Dig Surveys

Leona Heights Rifle Range MRS
RI Characterization Strategy

- Intrusive Anomaly Investigation
  - Anomalies detected during EM & Dig survey will be investigated real-time to determine nature of item.
  - The location, size, depth, description and orientation of the items will be documented.
  - Intrusive activities will be conducted in accordance with project work safety plans and the Government-approved Explosives Site Plan (ESP)
  - The hazardous fragment distance (HFD) of 225 feet will be used to establish exclusion zones during intrusive activities.
  - The Alameda Sheriff's Office will be called for disposition of the first suspected MEC item, where additional suspected MEC item will be blown-in-place or consolidated if deemed acceptable to move.
  - Delivery of donor explosives will be supplied as needed.

Intrusive Work

Leona Heights Rifle Range MRS
RI Characterization Strategy

- MC Sampling
  - MC samples will be collected if high concentration (>10 items) of MEC/MD found.
    - Sample collected in the immediate area (1-foot radius)
  - Pre and Post Blow-In-Place (BIP) locations (1-foot radius around detonation)

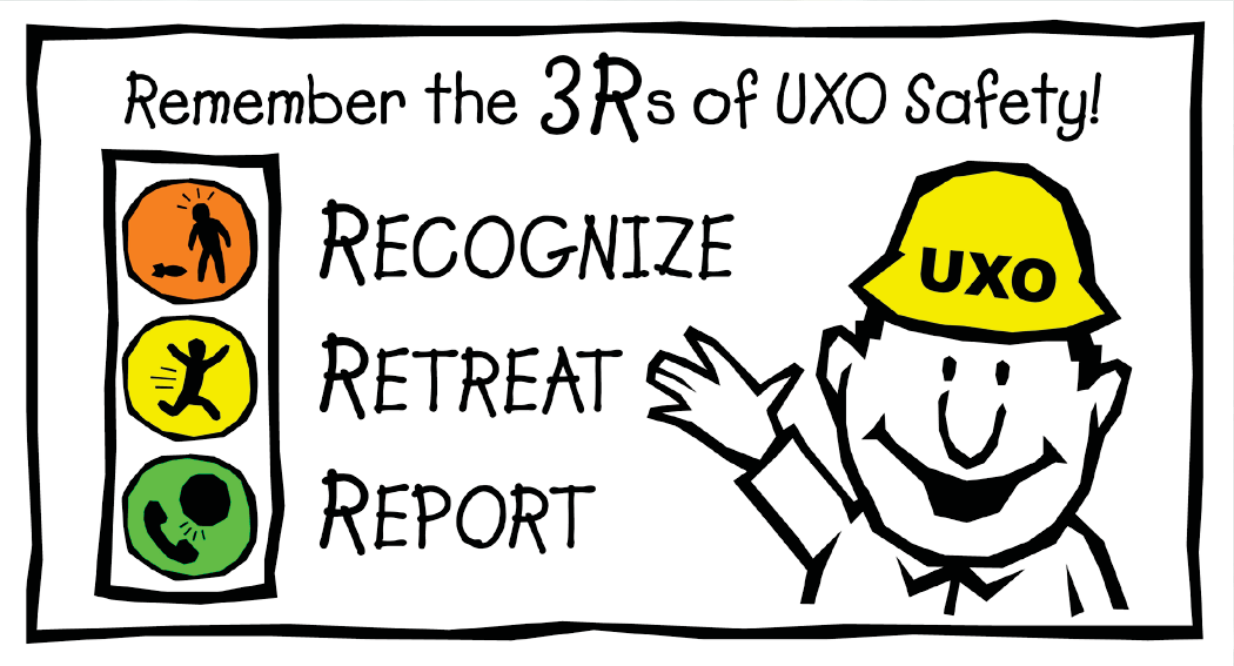
Leona Heights Rifle Range MRS
RI Potential Evacuations

- Evacuations will only be required during intrusive work within the 225ft HFD.
  - Site interviews and contact information collection (November 2015).
  - Notice to be disseminated to residents within the evacuation zone (EZ) describing the planned temporary withdrawal, and soliciting questions.
    - Intervals at 2 months (initial), 2 weeks 3 days and evening before (final).
  - Timed to minimize disruptions and provide maximum advanced notice.
    - Intrusive work near housing scheduled together.
  - Evacuations expected to be from 0800 through 1700.

Leona Heights Rifle Range MRS Schedule

Activity/Deliverable	Date of Submittal	Status
TPP #1	10 August 2015	✓
Army Review Draft Community Relations Plan (CRP)	Late August 2015	
Army Review Draft RI Work Plan (RIWP)	September 2015	
Stakeholder Review Draft CRP	October 2015	
Stakeholder Review Draft RIWP	Late October 2015	
TPP# 2 (Tentative)	06 November 2015	
Final RI Work Plan	December 2015	
Anticipated RI Fieldwork	29 February 2016	
Stakeholder Review Draft RI Report	June 2016	

Safety is our #1 Priority



Leona Heights Rifle Range MRS

QUESTIONS?

BUILDING STRONG®

Acronyms

ac	Acres
AEDB-R	Army Environmental Database – Restoration
ARNG	Army National Guard Directorate
BIP	Blow In Place
CAARNG	California Army National Guard
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMUA	Concentrated Munitions Use Area
CRP	Community Relations Plan
CSM	Conceptual Site Model
DD	Decision Document
DTSC	California Department of Toxic Substances
EM	Electromagnetometer
EPA	United States Environmental Protection Agency
ESP	Explosives Site Plan
FS	Feasibility Study
GPS	Global Positioning System
HE	High Explosive
HFD	Hazard Fragmentation Distance

Acronyms (Cont.)

MC	Munitions Constituent
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NFA	No Further Action
PDT	Project Delivery Team
PP	Proposed Plan
RI	Remedial Investigation
RIWP	Remedial Investigation Work Plan
ROE	Right of Entry
TPP	Technical Project Planning
USACE	United States Army Corps of Engineers
UXO	Unexploded Ordnance
VSP	Visual Sample Plan

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Military Munitions Response Program
Remedial Investigation at
NDNODS Leona Heights Rifle Range MRS (CAHQ-013-R-01), California
Technical Project Planning (TPP) Meeting #1

Monday, 10 August 2015
2:30 PM PST

Printed Name	Signature	Phone	Email
Ashley Stuart	Ashley Stuart	210-317-6015	Ashley.Stuart@westonsolutions.com
Tim Trego		210-606-7441	Tim.Trego@westonsolutions.com
Marc Anderson		916-987-1415	marc.l.anderson.mil@mail.mil
Shawn MacMillan		808-387-6186	shawn.macmillan@westonsolutions.com
James Lukaszka		916.557.5342	james.j.lukaszka@usace.army.mil
Roman Racca		916-203-6124	roman.racca@dtsc.ca.gov
Walt Gee		703-607-7980	Walter.F.gee.ctr@mail.mil

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APPENDIX E

DAILY REPORTS, RI NOTICES AND FACT SHEETS

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Monday, 6/6/2016 @1830

/WEATHER/TEMPERATURE: Overcast/Sunny, Low 59° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski (Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

UXO safety and operations brief and vehicle load out (safety gear). Instrument test strip (ITS) installation. Site walk to familiarize personnel with site conditions, answer questions and define features of work. Equipment identification and procurement.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Transect setup including visual survey, vegetation clearance, and centerline marking.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: **(6/7/2016)**

Transect setup including, vegetation clearance, centerline marking and GPS location collection.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

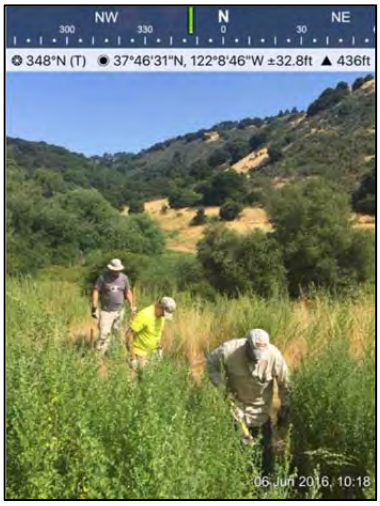


Photo 1 – Instrument test strip (ITS) reconnaissance.

Photo 2 – ITS installation.

Photo 3 – ITS seed #1 (Medium ISO, 2”x8” schedule 40) ~4” below ground surface (bgs) orientated perpendicular to travel path.

Photo 4 – ITS seed #2 (Medium ISO, 2”x8” schedule 40) ~8” below ground surface (bgs) orientated perpendicular to travel path.

Photo 5 – ITS seed #3 (Medium ISO, 2”x8” schedule 40) ~12” below ground surface (bgs) orientated perpendicular to travel path.

Photo 6 – Completed ITS.

PREPARED BY:

Shawn MacMillan

SIGNATURE:

Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Tuesday 6/7/2016 @1800

/WEATHER/TEMPERATURE: Overcast w/light rain/Sunny, Low 59° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski (Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

James Britt (USACE) OESS

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

All proposed transects marked and vegetation cut if required. See attached map of transect labels. A map with actual transect paths will be provided after analog survey, anomaly flagging and GPS data collection.

Two Ridgemont residents and one community member inquired about the project, specifically temporary evacuation and trailhead closure. A brief history of the site, reason for temporary evacuation and potential trail head closure and project goal was explained to them. All three appreciated the information and understood the need for the temporary evacuation and potential trailhead closure. A dog walker was told about the project and potential trailhead closure. He stated he would pass the word around the dog walking community.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Community member and resident temporary evacuation, potential trailhead closure and project information/outreach/education.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: **(6/8/2016)**

Analog survey, anomaly flagging and GPS data collection

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – UXO tech testing White's all metal detector across the instrument test strip (ITS).

Photo 2 – Installing the end point of transect one.

Photo 3 – Marking transect 1 from end point to start point for vegetation cutter.

Photo 4 – Locating starting point for transect 2.

Photo 5 – Flagging marking transect 2 starting point stake.

Photo 6 – Vegetation cutting in transect 1. Plastic cutting blades were used to mitigate the fire risk from sparks of a metal blade.

Photo 7 – Vegetation cutting in transect 2.

Photo 8 – Transect 2.

Photo 9 – Transect 1 start point stake.

Photo 10 – Transect 2 vegetation cutting.

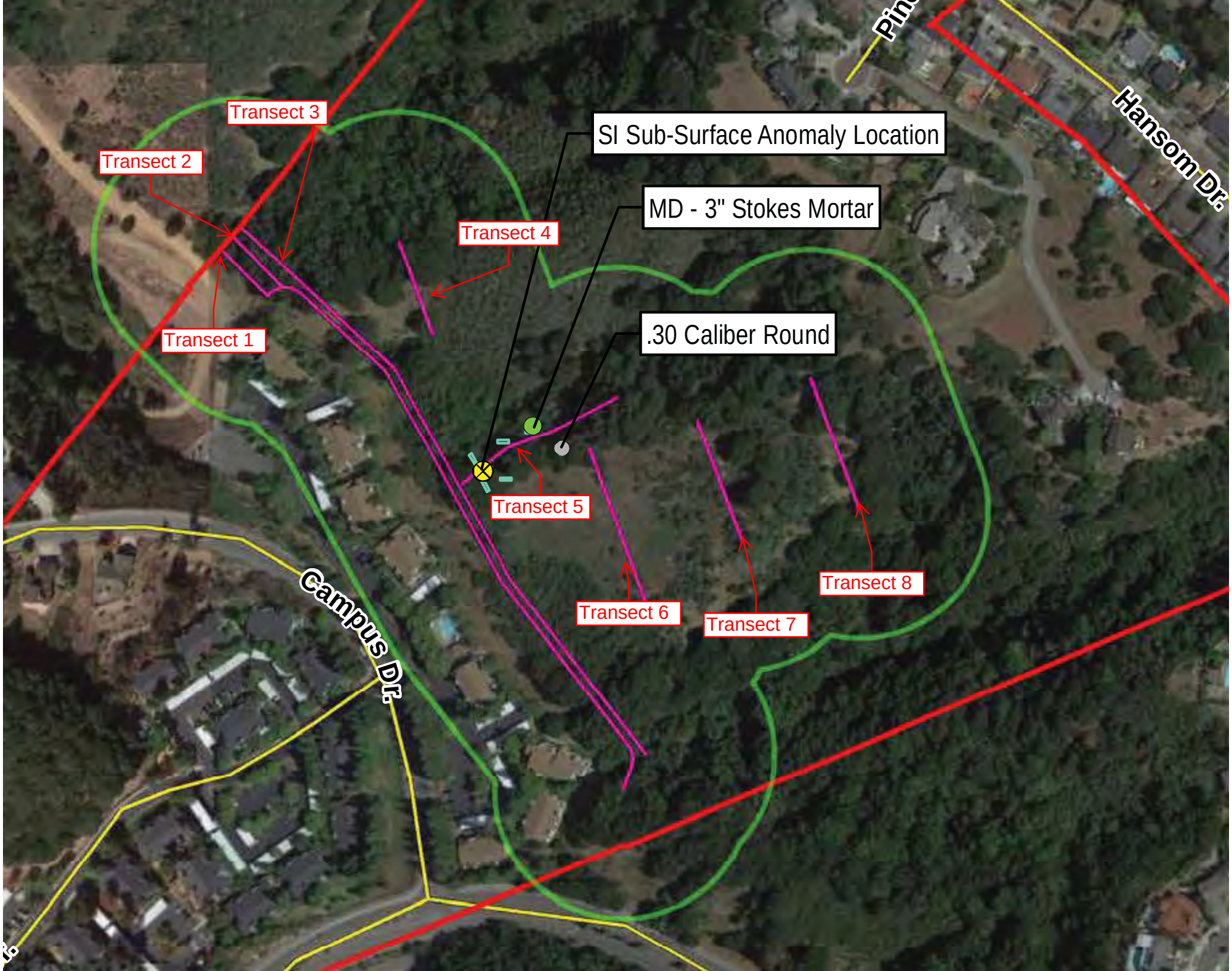
Photo 11 – Vegetation cutting in transect 3.

Photo 12 – View looking south from transect 8.

PREPARED BY:

Shawn MacMillan

SIGNATURE:


Transect 3
Transect 2
Transect 1
Transect 4
SI Sub-Surface Anomaly Location
MD - 3" Stokes Mortar
.30 Caliber Round
Transect 5
Transect 6
Transect 7
Transect 8
Campus Dr.
Hansom Dr.

Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Wednesday 6/8/2016 @1730

WEATHER/TEMPERATURE: Overcast/Sunny, Low 59° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski (Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

None

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Transect tracks (location & length) recorded, analog survey of transects flagging anomaly locations and anomaly location data collection.
Transects T01-T08 100% staked (start & end) and tracks collected with GPS. Figure will be provided tomorrow.
Analog survey, and anomaly count:
Transect T01 100% complete 12 anomalies,
T02 100% complete 134 anomalies,
T03 100% complete 84 anomalies.
Anomaly locations recorded in GPS:
T01 completed 12 of 12,
T02 working 95 out of 134.

Two Ridgemont residents and three community member inquired about the project. They were given the fact sheet (dated April 2016) and instructed to call or email Patrick Shaw if they had any questions.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: **(6/9/2016)**

Analog survey: Transects T04- T08, anomaly location data collection T03 – T08.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – QC Seed #1 placement, ~8" bgs orientated parallel to the transect.

Photo 2 – QC seed area marked at ~2.5 on either side of center of the transect and start and end point.

Photo 3 – QC area marked at ~2.5 on either side of center of the transect and start and end point.

Photo 4 – Analog survey and flagging of anomalies in T01.

Photo 5 – Analog survey and flagging of anomalies in T02.

Photo 6 – Anomalies in eastern end of T01

Photo 7 – Anomly locations in T01.

Photo 8 – Anomaly location data collection in T02 and analog survey in T03.

Photo 9 – Anomaly location data collection in T02 with SUXOS oversite.

Photo 10 – Analog survey in T03 and QC check of anomaly numbering.

Photo 11 – Anomaly location on west side of T02.

Photo 12 – View looking south between T07 and T08.

PREPARED BY:

Shawn MacMillan

SIGNATURE:

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Thursday 6/9/2016

WEATHER/TEMPERATURE: Overcast, Low 59° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

Jim Lukasko

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Analog survey of transects flagging anomaly locations and anomaly location data collection.
Analog survey, and anomaly count:
Transect T06 100% complete 18 anomalies
T07 100% complete 14 anomalies
T08 100% complete 22 anomalies
T05 100% complete 11 anomalies
T04 100% complete 13 anomalies
Anomaly locations recorded in GPS:
T01 completed 12 of 12,
T02 completed 134 of 134
T03 complete 84 of 84
T07 complete 14 of 14
T08 complete 22 of 22
Total anomalies 310 as of 6/9/16.

Community members inquired about the project. They were given the fact sheet (dated April 2016) and instructed to call or email Patrick Shaw if they had any questions.

The attached figure shows data/anomalies as of 6/9/2016.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: (6/10/2016)

Anomaly location data collection T04 – T08 and intrusive investigation of T04 (partial), T05 (partial), and T06 – T08. Intrusive investigation will only be done in transects outside of the 225' evacuation work area (see figure).

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – QC Seed #2, med ISO (sch40 2”x8”) placement, ~10” bgs orientated perpendicular to the transect.

Photo 2 – QC seed area marked at ~2.5 on either side of center of the transect and start and end point.

Photo 3 – QC area marked at ~2.5 on either side of center of the transect.

Photo 4 – View from hillside.

Photo 5 –T02 stopping point due to the very dense vegetation.

Photo 6 – T02 starting point after the very dense vegetation.

Photo 7 – Anomaly 053 in T03 (T03-053).

Photo 8 – Stake marking directions to T06 – T08 from T03.

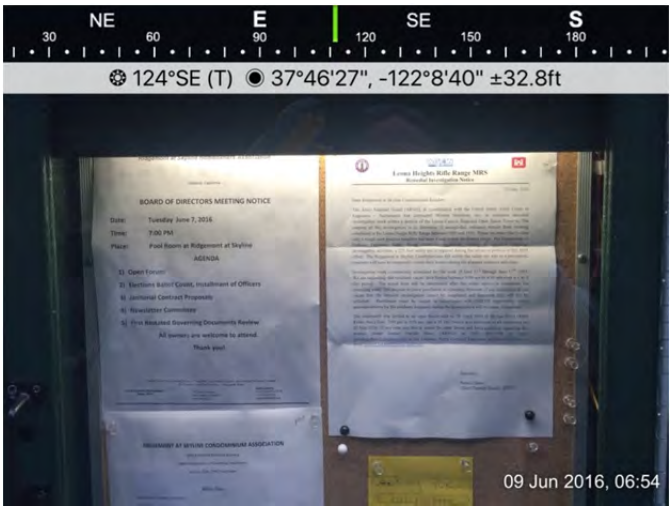


Photo 9 – 30m day evacuation notice dated 23 May 2016 posted in the Ridgemont information board near the mailboxes.

Photo 10 – Daily laydown area.

Photo 11 – USACE PM site visit at T08 talking to SUXOS.

Photo 12 – Dog walkers entering Leona Trail from the trailhead.

Photo 13 – UXO Team analog survey and flagging on T07.

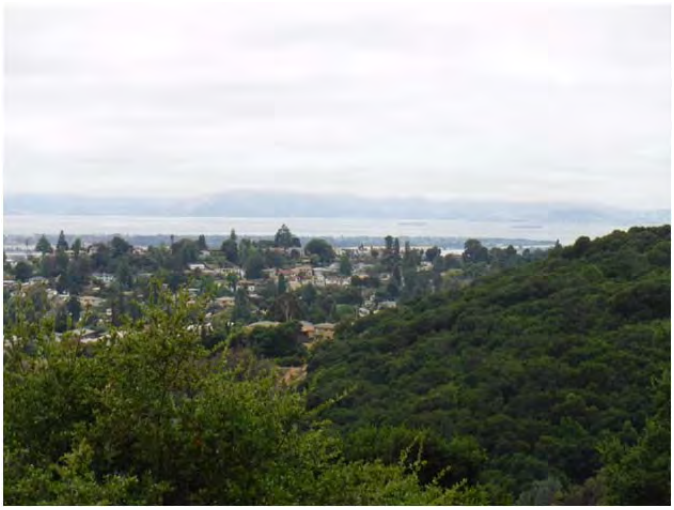
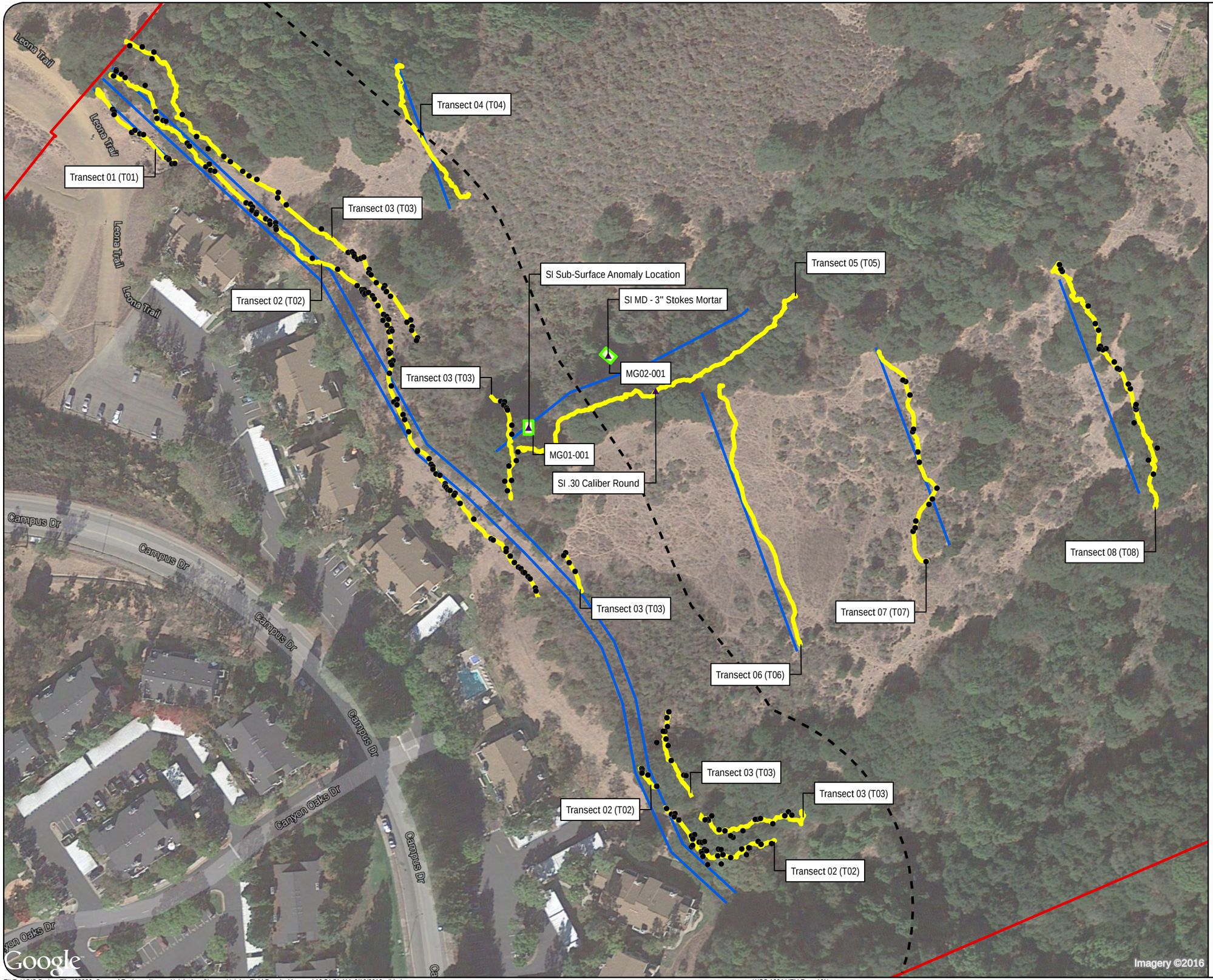


Photo 14 – Top of hillside looking south toward the bay.

PREPARED BY:

Shawn MacMillan

SIGNATURE:



Legend

- RI Subsurface Anomaly Locations (n = 264)
- Actual Transects
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid

N
W E
S

0 100 200 Feet

1 inch = 100 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/09/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN	DATE	CONTRACT NO.
WILDERJ	6/10/2016	W912DR-09-D-0006
CHKD BY	CHKD DATE	WORK ORDER NUMBER
MACMILS	6/10/2016	03886.551.304.5000.00

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Friday 6/10/2016 2200

WEATHER/TEMPERATURE: Sunny, Low 53° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Analog survey of transects flagging anomaly locations and anomaly location data collection.
Analog survey, and anomaly count:
Anomaly locations recorded in GPS:
T06 completed 18 of 18,
T05 completed 11 of 11
T04 complete 14 of 14
Mini-grid (MG)02 complete 1 of 1. 10'x15' grid centered where MD Stokes was found.
MG01 location will be collected next week.
Total anomalies 311 as of 6/9/16.

Intrusive investigation:
T08 100% complete 22 anomalies
T07 ~75% complete 11 of 14

Four community members inquired about the project. They were given the fact sheet (dated April 2016) and instructed to call or email Patrick Shaw if they had any questions.

The attached figure shows data/anomalies and work completed as of 6/10/2016.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: (6/13/2016)

Anomaly location data collection at MG01, recollection as needed and additional locations if required. Complete intrusive investigation of T07 and begin other transects outside of the 225' HFD until residents have evacuated. Resident evacuation verification, door to door. After evacuation verification begin lower transects T01 – T03, T04 (partial) and T05 (partial).

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – QC Seed #3, med ISO (sch40 2"x8") placement, ~8" bgs orientated perpendicular to the transect.

Photo 2 – QC seed area marked at ~2.5 on either side of center of the transect.

Photo 3 – Leona Trail trailhead closure sign for closure on Monday 6/13/16 from 8:30am-4:00pm.

Photo 4 – Closure sign at Merritt College trailhead. Contact phone number added to all signs at the request of EBP park supervisor..

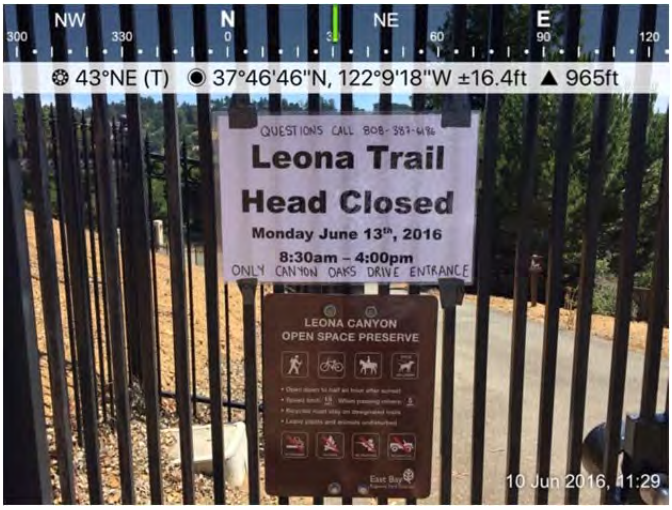


Photo 5 – Closure sign at the Pyrite Trail trailhead.

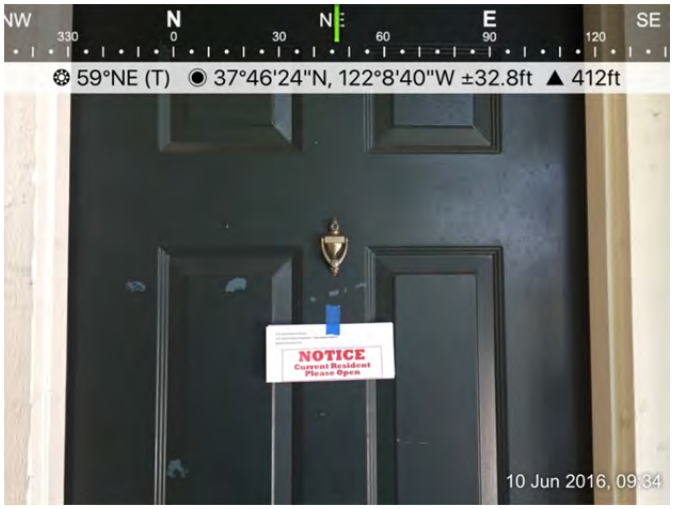


Photo 6 – 72 hour evacuation notice and fact sheet (April 2016) taped to residents door.

Photo 7 – 72 hour evacuation notice and fact sheet (April 2016) taped to residents entry way.

Photo 8 – Anomaly location GPS data collection on T06.

Photo 9 – Intrusive anomaly investigation in T08.

Photo 10 – Recording anomaly from T08.

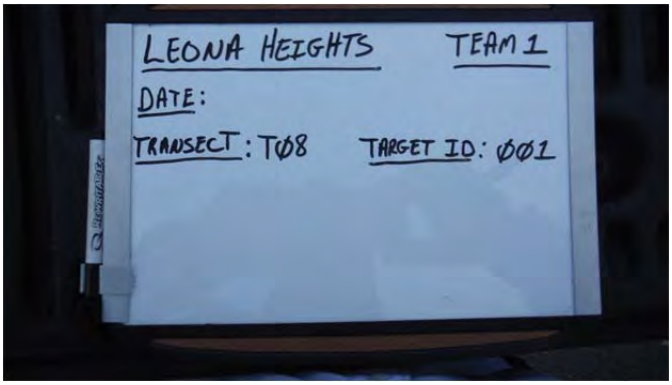


Photo 11 – Whiteboard template for intrusive investigation anomaly recording.

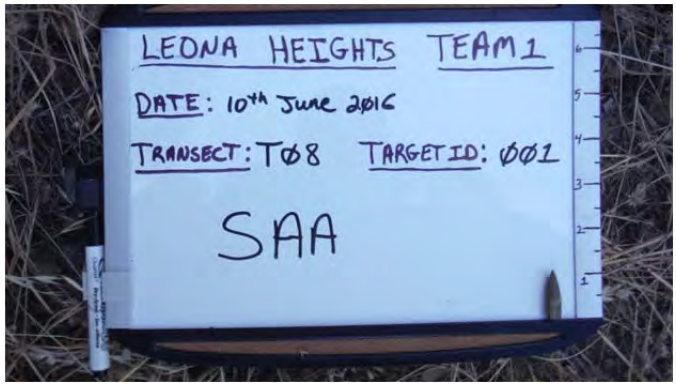


Photo 12 – Anomaly record of T08-001, small arms ammunition (SAA).

Photo 13 – Dense vegetation around MG02, MD stokes mortar location from SI.

Photo 14 – Dense vegetation around MG02, MD stokes mortar location from SI.

Photo 15 – Dense vegetation around MG02, MD stokes mortar location from SI.

Photo 16 – Dense vegetation around MG02, MD stokes mortar location from SI.

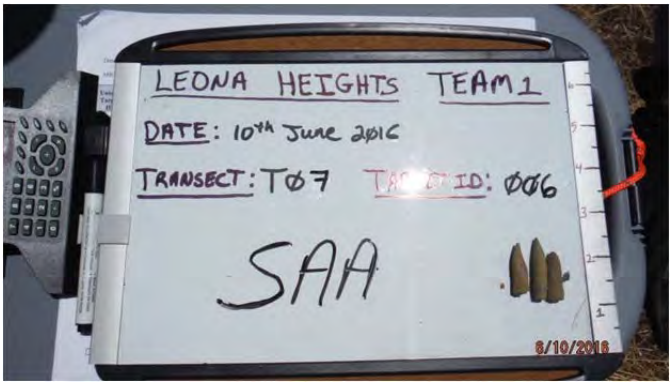


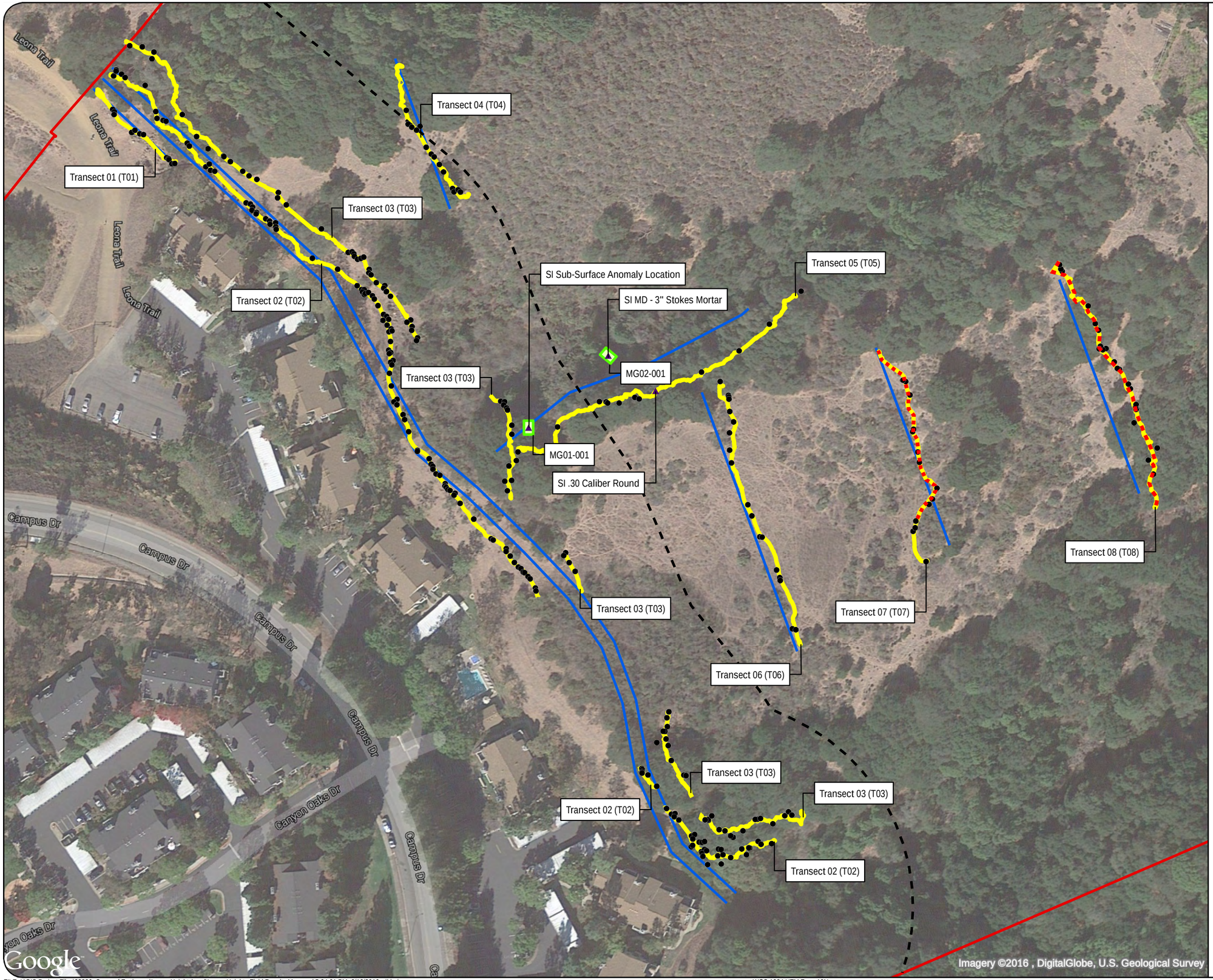
Photo 17 – Anomaly record of T07-006.

Photo 18 – QC Seed #2 from T07-011.

PREPARED BY:

Shawn MacMillan

SIGNATURE:



Legend

- RI Subsurface Anomaly Locations (n = 307)
- Actual Transects
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid

- Intrusive Investigation Complete

N
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0 100 200 Feet

1 inch = 100 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/10/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN WILDERJ	DATE 6/10/2016	CONTRACT NO. W912DR-09-D-0006
CHKD BY MACMILS	CHKD DATE 6/10/2016	WORK ORDER NUMBER 03886.551.304.5000.00

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Monday 6/13/2016 1900

WEATHER/TEMPERATURE: Sunny, Low 53° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

Walt Gee ARNG
Reuben Sendejas CAARNG
James Britt USACE OESS

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Anomaly location data collection at MG01-001, MG02-001and recollect at T02-038 and T02-103.
Intrusive investigation in:
T07 100% complete 14 of 14 anomalies.
T06 100% complete 18 of 18 anomalies
T01 100% complete 12 of 12 anomalies
T02 46 of 134 anomalies
T03 38 of 83 anomalies (total number of anomalies corrected)

Anomalies recovered include:
MPPEH – 3” Stokes mortars x3 T03-035, T03-034 and T03-016
MD – 3” Stokes mortars x1 T02-023
SAA – multiple
NMD – multiple

Resident in 750G did not evacuate and intrusive investigation stopped at 225’ from residence. Walt Gee, Reuben Sendejas and Shawn MacMillan spoke to her and she will vacate tomorrow from 1000 – 1200. Trailhead closure signs were removed and the trailhead will be open tomorrow.

The attached figure shows data/anomalies and work completed as of 6/13/2016.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: **(6/14/2016)**

Resident evacuation verification, door to door. After evacuation verification continue intrusive investigation of T02 and T03 and begin T04 and T05.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – Leona Trail trailhead closure signs.

Photo 2 – Evacuation check-out station.

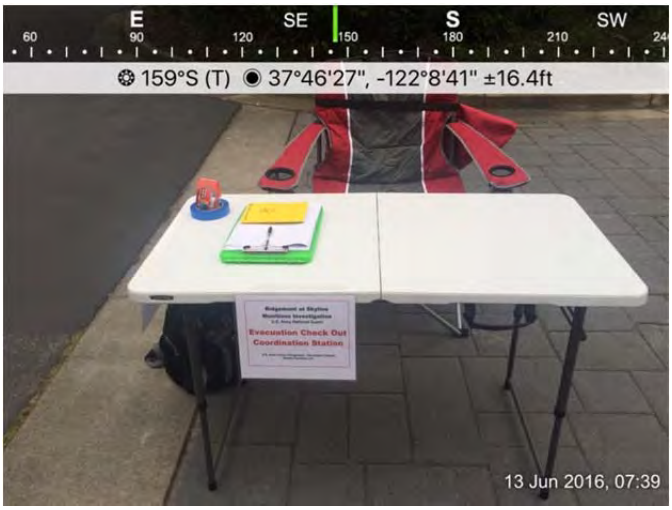


Photo 3 – Evacuation check-out station.

Photo 4 – Dig team investigating T01.

Photo 5 – Dig team investigating T01.

Photo 6 – Dig team investigating T02.

Photo 7 – T02-023 MD 3”Stokes Mortar, ~4” bgs.

Photo 8 – T02-023 MD 3”Stokes Mortar.

Photo 9 – T03-035 MPPEH 3” Stokes Mortar, ~24” bgs.

Photo 10 – T03-035 MPPEH 3” Stokes Mortar, ~24” bgs.

Photo 11 – T03-034 MPPEH 3” Stokes Mortar, ~8” bgs.

Photo 12 – T03-016 MPPEH 3” Stokes Mortar, ~2” bgs.

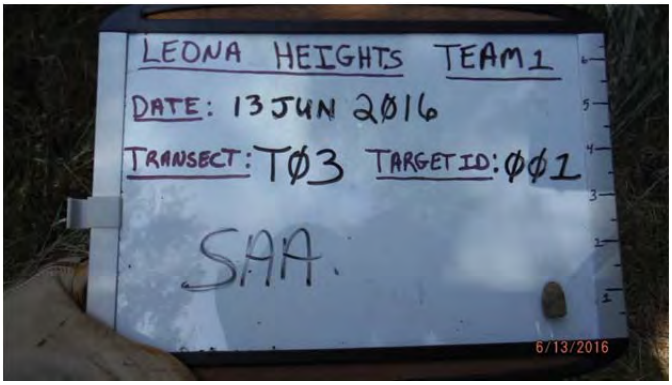


Photo 13 – T03-001 SAA.

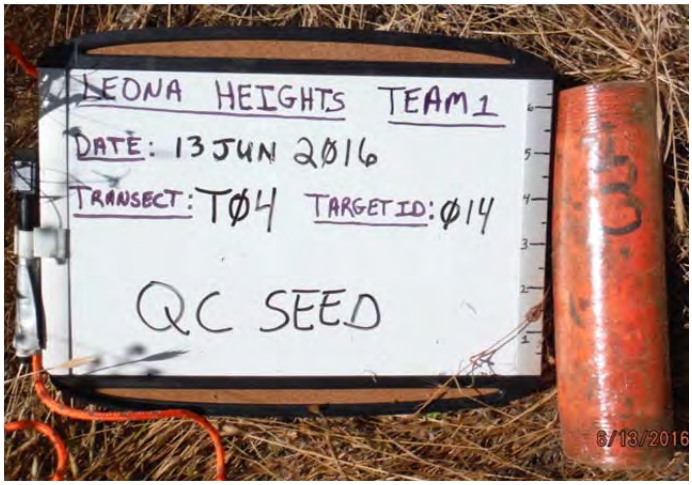
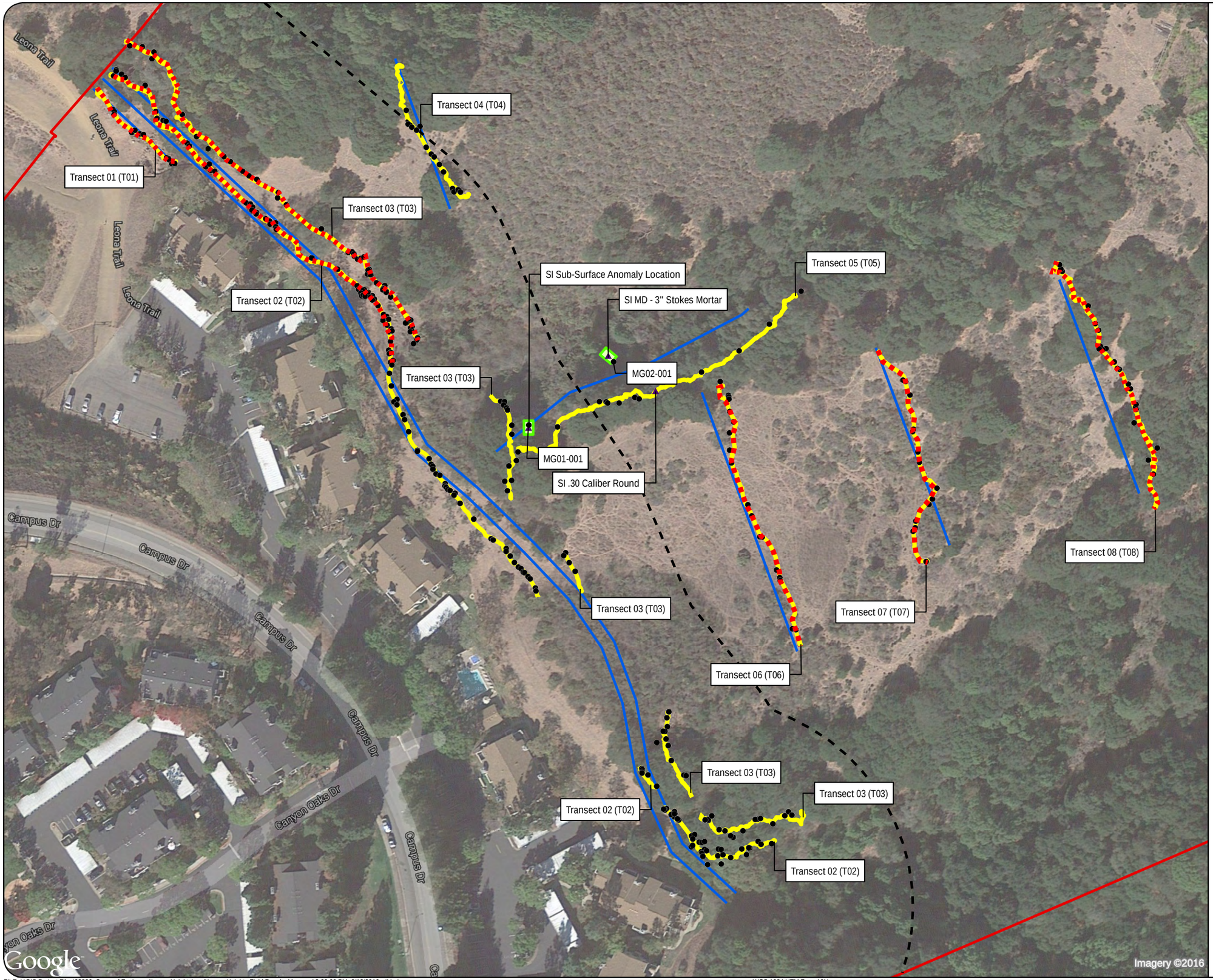


Photo 14 – QC Seed #3 from T04-014.

PREPARED BY:

Shawn MacMillan

SIGNATURE:



Legend

- RI Subsurface Anomaly Locations (n = 339)
- Actual Transects
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid

Intrusive Investigation Complete

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0 100 200 Feet

1 inch = 100 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/13/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN	DATE	CONTRACT NO.
WILDERJ	6/13/2016	W912DR-09-D-0006
CHKD BY	CHKD DATE	WORK ORDER NUMBER
MACMILS	6/13/2016	03886.551.304.5000.00

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Tuesday 6/13/2016 1730

WEATHER/TEMPERATURE: Sunny, Low 53° High 70°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

Reuben Sendejas CAARNG

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Relieve the Black Bear Security guard posted to keep people away from the site.

Intrusive investigation in:
T04 100% complete 14 of 14 anomalies.
T02 100% complete 134 of 134 anomalies
T03 100% complete 83 of 83 anomalies

Anomalies recovered include:
MPPEH – 0
MD – 0
SAA – multiple
NMD – multiple

Spoke to an Oakland Police patrol passing the site about demo on Friday and they asked that we call the non-emergency number 1 hour prior to demo. This will give them a chance to let personnel know if calls come in about the sound.

Black Bear Security guard onsite at 1600 for overnight guard duty.

The attached figure shows data/anomalies and work completed as of 6/14/2016.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: (6/15/2016)

Resident evacuation verification, door to door. After evacuation verification mini-grid locates and intrusive investigation of MG anomalies.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – Overnight security guard from Black Bear Security

Photo 2 – T02 looking North up the ridge on the eastern portion of the site.

Photo 3 – T02 looking West.

Photo 4 – Dig team recording anomaly on T02.

Photo 5 – Dig team investigating T01.

Photo 6 – Dig team investigating T02.

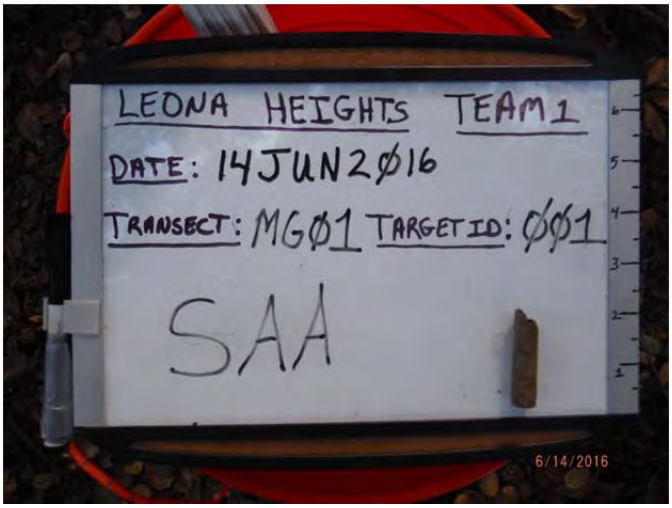

Photo 7 – MG01-001 SAA. Grid was 10’ x 15’ around the location of the SI subsurface anomalies.

Photo 8 – MG02-001 NMD. Grid was 10’ x 15’ around the location of the MD Stokes found during the SI.

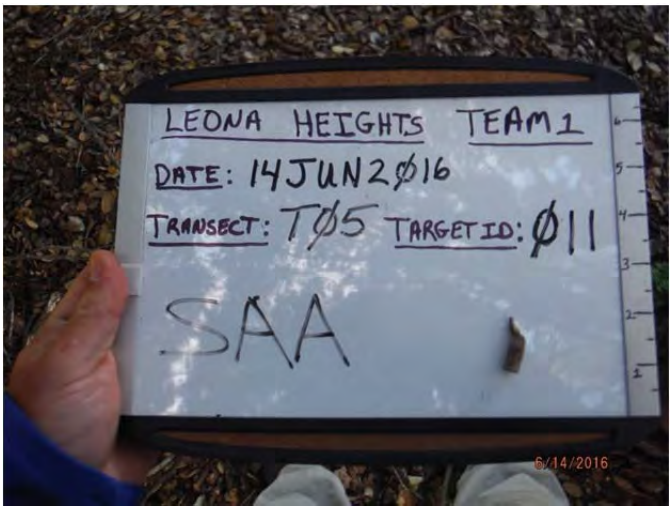

Photo 9 – T05-011 SAA.

Photo 10 – T02-049 Pipe left in place.

Photo 11 – QC Seed #1 from T04-050.

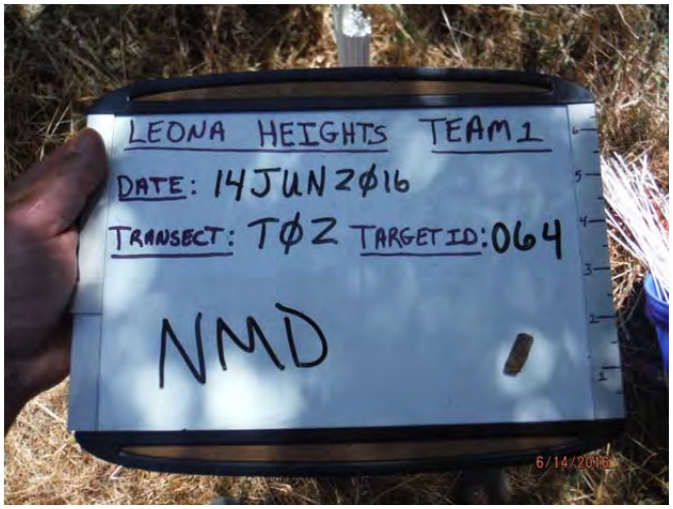

Photo 12 – T02-064 small NMD item.

PREPARED BY:

Shawn MacMillan

SIGNATURE:

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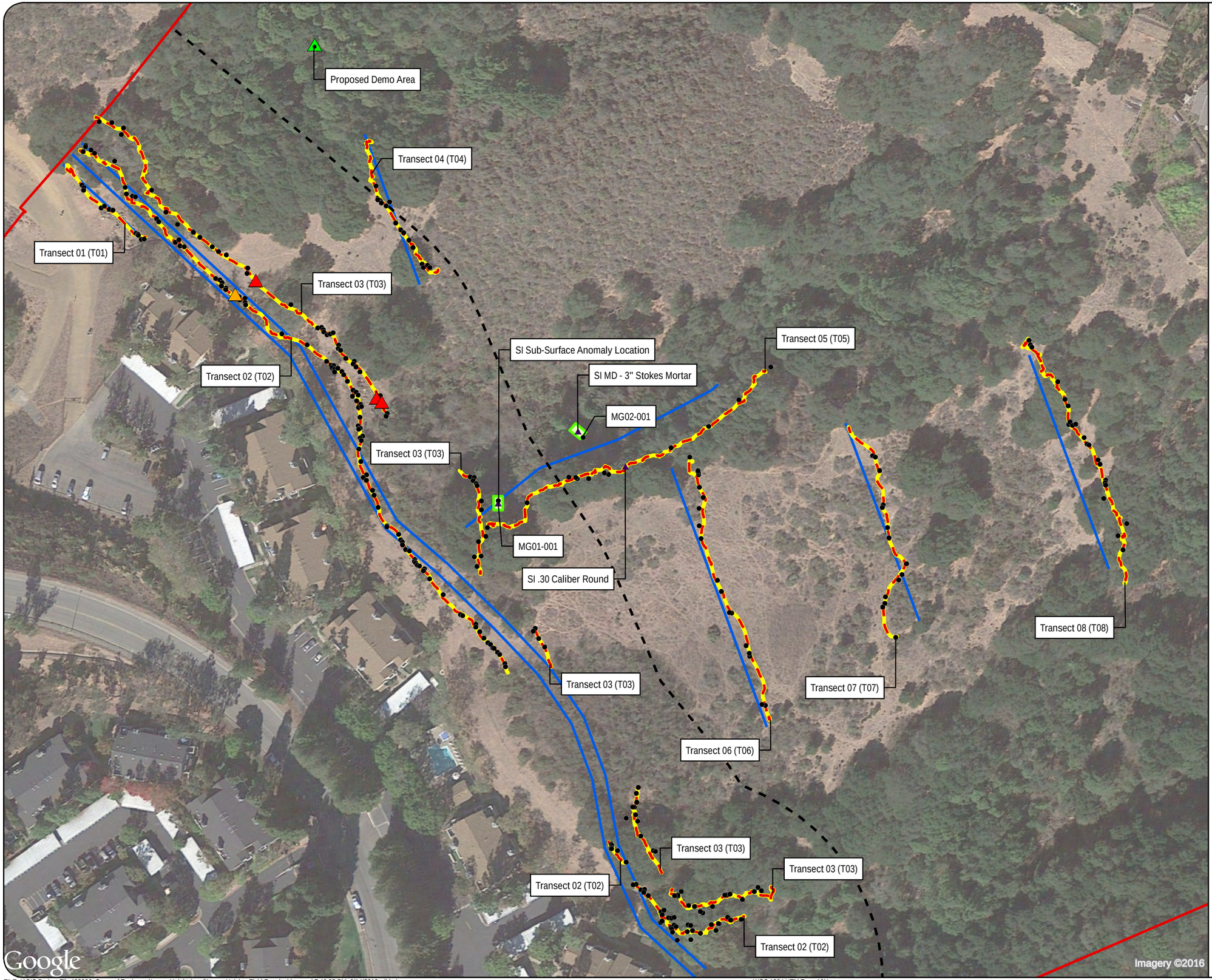

Legend

- RI Subsurface Anomaly Location (n = 306)
- MD Location (n = 1)
- MPPEH Location (n = 3)
- Proposed Demo Area (n = 1)
- Actual Transects
- Intrusive Investigation Complete
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid

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0 100 200 Feet

1 inch = 100 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/14/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN	DATE	CONTRACT NO.
WILDERJ	6/14/2016	W912DR-09-D-0006
CHKD BY	CHKD DATE	WORK ORDER NUMBER
MACMILS	6/14/2016	03886.551.304.5000.00

FILE: I:\GIS Project Files\03886_Corps of Engineers\Leona Heights\mxd\Leona Heights Field Results Map.mxd 7:46:25 PM 6/14/2016 wilderj
WGS 1984 UTM Zone 10N
Service Layer Credits:

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Wednsday 6/15/2016 1700

WEATHER/TEMPERATURE: Sunny, Low 55° High 66°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Relieve the Black Bear Security guard posted to keep people away from the site.
Transect layout, analog survey and intrusive investigation:
MG03 100% complete 6 of 6 anomalies.
MG04 100% complete 2 of 2 anomalies
MG05 100% complete no anomalies
T09 100% complete 22 of 22 anomalies
T10 100% complete 9 of 9 anomalies
T11 100% complete 5 of 5 anomalies

Anomalies recovered include:
MPPEH – 0
MD – 0
SAA – multiple
NMD – multiple

EBP supervisor Janet Gomes onsite to open Leona Trail trailhead gate for delivery of sandbags. Provided a picture of the locked gate after the sandbags were delivered and gate was secure. Sandbags were delivered by White cap and staged in the demo area in preparation for Friday. Left a message for EBP information supervisor Carolyn Jones and Lt. Rose regarding demo on Friday. Spoke to EBP Fire Assistant Chief Cutino inquiring about the fire index (acceptable for demo) and requested standby support during demo. He indicated someone will be onsite during demo for fire support. Black Bear Security guard onsite at 1600 for overnight guard duty.

An updated figure will be provided with tomorrows daily report.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: **(6/15/2016)**

Mini-grid locates and intrusive investigation of MG anomalies. Demolition preparation and procedure review.

TO DO LIST FOR CLIENT:
No action at this time.

PHOTOS:

Photo 1 – UXO personnel testing equipment and technique in the ITS.

Photo 2 – UXOQCS/SO testing equipment and technique in the ITS.


Photo 3 – UXO T# team leader collection anomaly location data iin the GPS at MG04.

Photo 4 – Corner flag at MG04.


Photo 5 – UXO personnel surveying MG03.

Photo 6 – QC Seed #4 located in MG04 as anomaly 001 of 006.

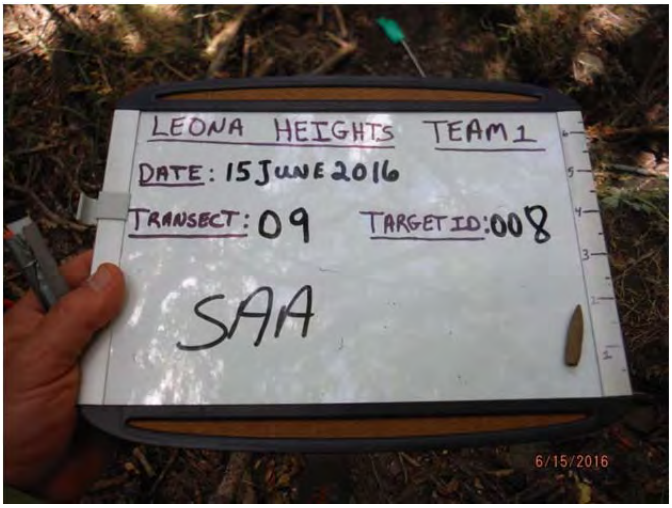

Photo 7 – T09-008 SAA.

Photo 8 – UXO personnel surveying T10.

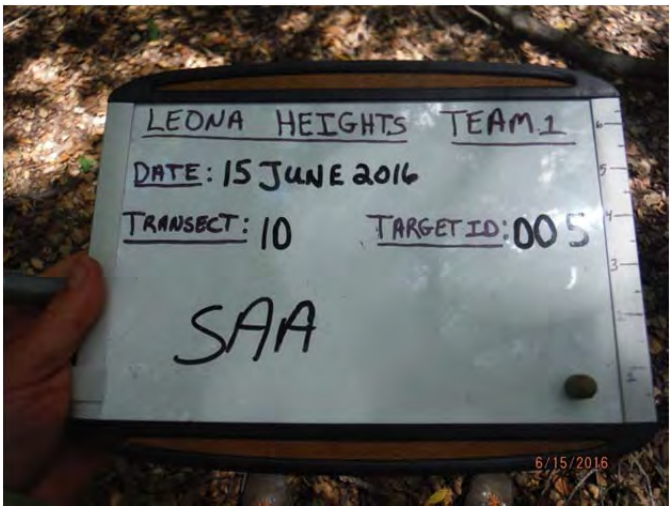

Photo 9 – T10-005 SAA. Location was saturated with SAA.

Photo 10 – T11-005 SAA, last anomaly for the day.

Photo 11 – Leona Trail trailhead gate secure. Picture sent to park supervisor.

Photo 12 – Leona Trail trailhead closure sign approximately 200 yards northeast of the trailhead.

Photo 13 – Leona Trail trailhead closure sign at the trailhead.

Photo 14 – Leona Trail trailhead closure sign at the Pyrite Trail trailhead .

Photo 15 – Leona Trail trailhead closure sign at the Merritt College entrance.

Photo 16 – Black Bear Security onsite to guard site entrance.

PREPARED BY:

Shawn MacMillan

SIGNATURE:

Legend

- RI Subsurface Anomaly Location (n = 350)
- MD Location (n = 1)
- MPPEH Location (n = 3)
- Proposed Demo Area (n = 1)
- Actual Transects
- Intrusive Investigation Complete
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid

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1 inch = 125 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/14/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN	DATE	CONTRACT NO.
WILDERJ	6/15/2016	W912DR-09-D-0006
CHKD BY	CHKD DATE	WORK ORDER NUMBER
MACMILS	6/15/2016	03886.551.304.5000.00

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Thursday 6/16/2016 1630

WEATHER/TEMPERATURE: Sunny, Low 55° High 64°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Relieve the overnight Black Bear Security guard.
Transects and Mini-Grids cleared of all pin flags, flagging, transect markers, and any other items that were used during the RI.
Intentional demolition area cleared of debris, leaves, dead grass, etc. within 50 ft.
All personnel review demolition operations for 6/17/2016 including where personnel will be located, safety procedures, communication procedures, location of demolition materials, demolition day schedule, and post demolition procedures.
1100 site secure, UXO personnel remain onsite to guard items until security arrives.
Black Bear Security onsite at 1600 for overnight guard duty.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

Provide all interested residents and community members with a fact sheet (April 2016) and direct questions to Patrick Shaw.

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY: (6/17/2016)

Demolition procedure review, intentional detonation of 3 MPPEH items and site housekeeping.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – UXO personnel removing flagging and transect markers from MRS.

Photo 2 – Transect markers removed from MRS.

Photo 3 – UXO personnel clearing approximately 50 ft. around demolition area

Photo 4 – SUXOS directing demolition area setup.

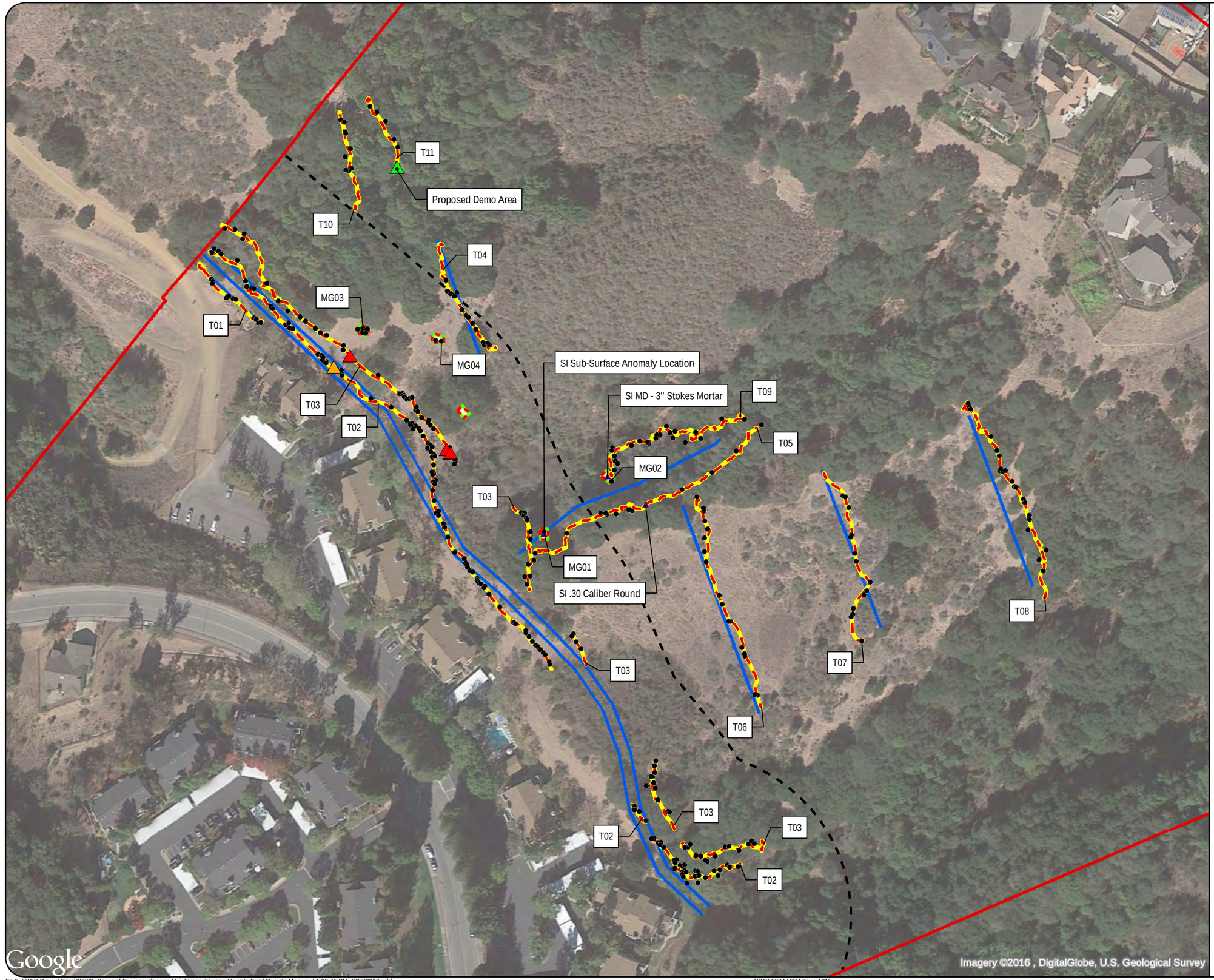
Photo 5 – Approximately 50 ft. cleared around demolition area.

Photo 6 – UXO personel discussing demolition operations.

PREPARED BY:

Shawn MacMillan

SIGNATURE:



Legend

- RI Subsurface Anomaly Location (n = 350)
- MD Location (n = 1)
- MPPEH Location (n = 3)
- Proposed Demo Area
- Intrusive Investigation Complete
- Actual Transects
- Proposed Transects
- Evacuation Work Area Boundary - 225'
- Mini-grid
- Leona Heights Rifle Range MRS Boundary

SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect

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0 125 250 Feet

1 inch = 125 feet

LEONA HEIGHT EZ
FIELD STATUS MAP
AS OF 06/16/2016

Leona Heights Rifle Range MRS
Remedial Investigation
Work Plan

FIGURE
1-1

WESTON SOLUTIONS
841 BISHOP STREET SUITE 2301 HONOLULU, HAWAII 96813 808.275.2900

DRAWN	DATE	CONTRACT NO.
WILDERJ	6/16/2016	W912DR-09-D-0006
CHKD BY	CHKD DATE	WORK ORDER NUMBER
MACMILS	6/16/2016	03886.551.304.5000.00

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Daily Summary

MMRP Leona Heights Rifle Range, Oakland, California

CONTRACT #	WORK ORDER #	DAY/DATE/TIME
W912DR-09-D-0006 Delivery Order: 0011 Mod#3	03886.551.304.5000.00	Friday 6/17/2016 1600

WEATHER/TEMPERATURE: Cloudy, Low 54° High 72°

WORK LOCATION: Leona Heights Rifle Range MRS

Subcontractor(s) and/or Teaming Partner(s) On-Site: ☐ NONE ☒ EOTI ☐ OTHER2 ☐ OTHER3

PERSONNEL:

Bob Prosperi (Weston) SUXOS
Wayne Stebelski(Weston) UXOQCS/SO
Rob Holt (Weston) Tech 3
Doug Gates (Weston) Tech 2
Rick Holmes (Weston) Tech 2
Jimmy Hensley (EOTI) Tech 2
Shawn MacMillan (Weston) Field Team Lead
Christine Kline (Weston) Field Support

SITE VISITORS:

Reuben Sendejas, CAARNG PM
Mike Wheeler, USACE OESS
James Britt, USACE OESS
2 Alpha Explosives Personnel
4 East Bay Regional Parks District Fire Department Personnel with Brush Truck.

SUMMARY OF DAILY ACTIVITIES & SITE STATUS:

Relieve overnight Black Bear Security guard.
Put safety measures in place to ensure no one entered detonation area (ex: closed all gates and put caution tape around gaps).
Pre-demolition safety meeting with all personnel. Discussed personnel roles, locations during demolition (North, East and West), communication, etc.
4 successful demolition shots (3ea 3” Stokes Mortars, and 1 clean up shot) starting at 0830 and ending at 0945.
No high order detonations, 3 MPPEH items classified as MD post-demolition.
Successful collection of pre- and post-demolition soil samples.
UXO personnel filled in demolition shot area, removed all signs of demolition, and returned to preexisting condition to match natural surroundings.

ONGOING SITE ACTIVITIES/CONDITIONS: *(comments will remain in this section until no longer valid)*

None

PROBLEMS/RESOLUTIONS: *(Including nonconformance details, corrective actions, and other government instructions)*

No problems at this time.

SCHEDULED WORK FOR THE DAY:

RI fieldwork complete.

TO DO LIST FOR CLIENT:

No action at this time.

PHOTOS:

Photo 1 – Closed gate and caution tape covering gaps to ensure no one enters demolition area.

Photo 2 – Pre-demolition safety briefing.

Photo 3 – Prepping for demoliton operations.

Photo 4 – Collecting pre-demolition soil sample from demolition area.

Photo 5 – Pin flag showing location of soil sample.

Photo 6 – Pre-demolition soil sample successfully collected, labelled, and packaged for transportation to lab.

Photo 7 – Alpha Explosives truck containing demolition materials.

Photo 8 – Safety briefing with site visitors.


Photo 9 – Shot ready for burial and sandbag placement.


Photo 10 – Shot buried and covered in sandbags.

Photo 11 – UXO personnel on hillside to the North to ensure no one enters demolition area.


Photo 12 – UXO personnel setting up demolition shot.

Photo 13 – 3 MD items post-demolition.

Photo 14 – Demolition area returned to preexisiting condition to match surroundings.

PREPARED BY:

Shawn MacMillan

SIGNATURE:

White's Daily Check Out

Work Site: Leona Heights Rifle Range, CA

Month _June 2016_ Contract No. W912DR-09-D-0006

Serial No._5323 0308 022 B1D2__

Signature of Operator	Comments	Date	CHECK OUT PROCEDURE: Check instrument for damage	Turn ON and check batteries	Install new batteries (if needed)	Verify Digital Display	Adjust settings to WP	Report to the IVS for testing	Pass/Fail	O.O.C. return to shop for repairs	RETURN PROCEDURES: Clean instrument	Ensure instrument is OFF	Stow instrument in designated area
		1											
		2											
		3											
		4											
		5											
		6											
		7											
pm		8	✓	✓		✓	✓	✓	P		✓	✓	✓
pm		9	✓	✓		✓	✓	✓	P		✓	✓	✓
pm	Changed Batteries	10	✓	✓		✓	✓	✓	P		✓	✓	✓
		11											
		12											
pm		13	✓	✓		✓	✓	✓	P		✓	✓	✓
pm		14	✓	✓		✓	✓	✓	P		✓	✓	✓
Robin Hall		15	✓	✓		✓	✓	✓	P		✓	✓	✓
		16											
		17											
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White's Daily Check Out

Work Site: Leona Heights Rifle Range, CA

Month _June 2016_

Contract No. W912DR-09-D-0006

Serial No._5323 0308 024 E519__

Signature of Operator	Comments	Date	CHECK OUT PROCEDURE: Check instrument for damage	Turn ON and check batteries	Install new batteries (if needed)	Verify Digital Display	Adjust settings to WP	Report to the IVS for testing	Pass/Fail	O.O.C. return to shop for repairs	RETURN PROCEDURES: Clean instrument	Ensure instrument is OFF	Stow instrument in designated area
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		2											
		3											
		4											
		5											
		6											
		7											
pm		8	/	/	/	/	/	P			✓	✓	✓
Wam		9	/	/	/	/	/	P			/	/	/
Way		10	/	/	/	/	/	P			/	✓	✓
		11											
		12											
		13											
		14											
		15	✓	✓	✓	✓	✓	P			✓	✓	✓
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White's Daily Check Out

Work Site: Leona Heights Rifle Range, CA

Month _June 2016_

Contract No. W912DR-09-D-0006

Serial No._2220 3261 031 52CB__

Signature of Operator	Comments	Date	CHECK OUT PROCEDURE: Check instrument for damage	Turn ON and check batteries	Install new batteries (if needed)	Verify Digital Display	Adjust settings to WP	Report to the IVS for testing	Pass/Fail	O.O.C.: return to shop for repairs	RETURN PROCEDURES: Clean instrument	Ensure instrument is OFF	Stow instrument in designated area
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		3											
		4											
		5											
		6											
		7											
pm		8	/	/		/	/	/	P		✓	✓	✓
		9											
		10											
		11											
		12											
Wayne Stiles		13	✓	✓	✓	✓	✓	✓	P		✓	✓	✓
Wayne Stiles		14	✓	✓	✓	✓	✓	✓	P				
		15											
		16											
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White's Daily Check Out

Work Site: Leona Heights Rifle Range, CA

Month _June 2016_

Contract No. W912DR-09-D-0006

Serial No._5323 0308 023
3DCC__

Signature of Operator	Comments	Date	CHECK OUT PROCEDURE: Check instrument for damage	Turn ON and check batteries	Install new batteries (if needed)	Verify Digital Display	Adjust settings to WP	Report to the IVS for testing	Pass/Fail	O.O.C. return to shop for repairs	RETURN PROCEDURES: Clean instrument	Ensure instrument is OFF	Stow instrument in designated area
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		2											
		3											
		4											
		5											
		6											
		7											
[signature]		8	✓	✓	✓	✓	✓	✓	P		✓	✓	✓
		9											
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Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	7 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☐ Intrusive Investigation
- ☐ Digital Geophysical Mapping(DGM)
- ☐ UXO Technician Escort Activities
- ☒ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List.
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
PP	Verify planning documents have been approved, are available and on-site.	Once at mobilization and as required if new documents are generated or revised.	• Verified work plan, APP and SSHP are on site and signed.
PP	Verify work personnel are available and are qualified to perform the work	Once at mobilization and follow-up as new employees mobilize.	• Verified EOD/UXO qualifications for positions assigned • Verified required 40hr HAZWOPER, 8hr refresher, and physicals are current
PP	Verify all personnel have read and understand the planning documentation.	Once at mobilization and follow-up as new employees mobilize.	• All site personnel have read and displayed an understanding of the planning document
PP	Confirm all personnel have signed the Work Plan and APP acknowledgement forms.	Once at mobilization and follow-up as new employees mobilize.	• Verified work plan and APP are signed by all site personnel

PP	Confirm staging area location has been approved before materials/equipment arrives on-site.	Once before materials/ equipment arrive on-site.	• Staging area is sited on an approved location
PP	Vegetation Thinning	Daily	• Ensure equipment is available, properly operated, and maintained • PPE is worn properly • Confirm brush is sufficiently thinned so that surveys can be conducted while compliance of the environmental protection plan is maintained.
PP	Em & Dig transects have been located and marked as described in the Work Plan.	As transects are being marked.	• Verified transect lines are in the proper location and are properly marked
PP	The instrument test strip was constructed in accordance with the Work Plan (type and number of seed items, depth, and separation).	Once during instrument test strip construction.	• Verified instrument test strip was constructed IAW the work plan
PP, IP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Repair or replace instrument if functionality is questionable

General notes/observations for quality: Team performed all operations in a professional manner.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	8 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☐ Intrusive Investigation
- ☒ Mag & Flag
- ☐ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
PP, IP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded

General notes/observations for quality: Team performed all operations in a professional manner.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	9 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☐ Intrusive Investigation
- ☒ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
PP, IP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded

General notes/observations for quality: Team performed all operations in a professional manner.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	10 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☒ Intrusive Investigation
- ☐ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded
FP	Confirm UXO teams are recording/logging all required parameters during item recovery.	Daily	• Team is recording items found properly
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

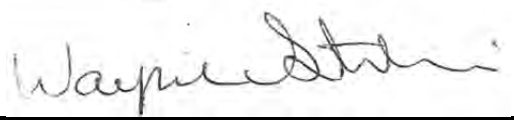
General notes/observations for quality: Team performed all operations in a professional manner. Team recovered QC seed #2 in Transect 7. Seed recovery has been recorded properly.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	13 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☒ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☒ Intrusive Investigation
- ☐ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances
FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand

FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded
FP	Observe Em & Dig intrusive work accuracy and completeness.	Daily and as required	• Observe team is verifying anomaly number prior to digging • Observe anomaly is removed and area does not contain secondary anomalies
FP	Confirm UXO teams are recording/logging all required parameters during item recovery.	Daily	• Team is recording items found properly
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

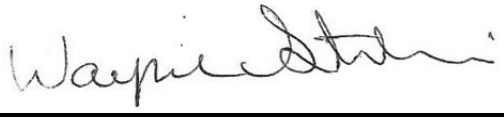
General notes/observations for quality: Team performed all operations in a professional manner. Team recovered seed #3 in Transect 4. Seed recovery has been recorded properly.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	14 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☒ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☒ Intrusive Investigation
- ☐ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded
FP	Observe Em & Dig intrusive work accuracy and completeness.	Daily and as required	• Observe team is verifying anomaly number prior to digging • Observe anomaly is removed and area does not contain secondary anomalies
FP	Confirm UXO teams are recording/logging all required parameters during item recovery.	Daily	• Team is recording items found properly
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

General notes/observations for quality: Team performed all operations in a professional manner. Team recovered seed #1 in Transect 2. Seed recovery has been recorded properly.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments): **Other QC inspections:**	
PREPARED BY: Wayne Stebelski UXOQCS	**SIGNATURE:** 

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Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	15 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☒ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☒ Intrusive Investigation
- ☒ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded
FP	Observe Em & Dig intrusive work accuracy and completeness.	Daily and as required	• Observe team is verifying anomaly number prior to digging • Observe anomaly is removed and area does not contain secondary anomalies
FP	Confirm UXO teams are recording/logging all required parameters during item recovery.	Daily	• Team is recording items found properly
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

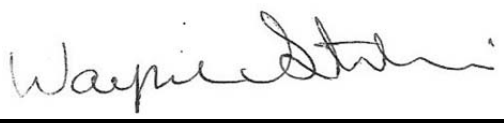
General notes/observations for quality: Team performed all operations in a professional manner. Team recovered seed #4 in Mini-Grid 03. Seed recovery has been recorded properly.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	15 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☒ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☒ Intrusive Investigation
- ☒ Mag & Flag
- ☒ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☐ Grid QC List
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances

FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Verify all seed items have been recovered within a specific grid or area.	Daily	• Verify proper placement of seed items • Verified seed recovery is recovered and recorded
FP	Observe Em & Dig intrusive work accuracy and completeness.	Daily and as required	• Observe team is verifying anomaly number prior to digging • Observe anomaly is removed and area does not contain secondary anomalies
FP	Confirm UXO teams are recording/logging all required parameters during item recovery.	Daily	• Team is recording items found properly
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

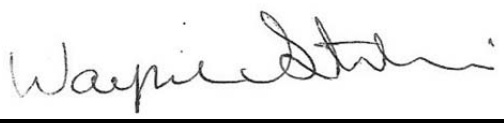
General notes/observations for quality: Team performed all operations in a professional manner. Team recovered seed #1 in Transect 2. Seed recovery has been recorded properly.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	16 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☐ Intrusive Investigation
- ☐ Mag & Flag
- ☐ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☐ MEC/MPPEH/MDEH Disposal
- ☒ QC Transects
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Positioning systems are capable of achieving sub-meter accuracy.	Daily	• Verify GPS is operating properly and is receiving maximum satellites possible
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Ensure the appropriate safety distances are established and maintained in active work areas based on the ESP.	Daily	• Verify all safety distances are maintained
FP	Verify team separation distances.	Daily	• Verify teams maintain proper separation distances
FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand

FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Conduct random inspections of at least 10% of the transects with the same type of instrumentation used for Em & dig to determine if metallic anomalies remain along the transect.	As needed to cover 10% of transects.	• Transects will have an inspection of at least 10% of total length • Instrument will be of the same make and model as the one used by the team
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis
PP, IP	Verify disposal procedures are being conducted in accordance with the Work Plan.	Each MEC/MPPEH item, as required.	• Verify demolition process is conducted IAW WP, SOP's, 60A1-1-31 and Appendix H
PP, IP	Confirm all site features, equipment, supplies, and personnel are removed and all work locations are restored as documented in the Work Plan.	Completion of project.	• Perform inspection following completion of DFW.

General notes/observations for quality Team performed all operations in a professional manner.

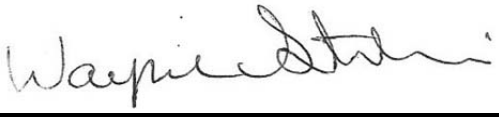
Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

Performed at least 10% QC inspection on all transects

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

Daily UXO QC Site Report

California Army National Guard, Leona Heights, CA

CONTRACT NO. / D.O. NO.:	WORK ORDER NUMBER:	DATE:
W912DR-09-D-0006	03886.551.304.5000.00	17 June 2016

WORK LOCATION: Leona Heights Rifle Range, CA

WORK COMPLETED:

- ☐ Grid Staking
- ☐ Anomaly Reacquisition
- ☐ Surface Clearance Activities
- ☐ Intrusive Investigation
- ☐ Mag & Flag
- ☐ UXO Technician Escort Activities
- ☐ Vegetation Thinning
- ☒ Equipment Maintenance
- ☒ MEC/MPPEH/MDEH Disposal
- ☐ QC Transects
- ☒ Safety Briefing

PROBLEMS/RESOLUTIONS: None

QUALITY INSPECTIONS PERFORMED: *(PP – Preparatory Phase; IP – Initial Phase; FP – Follow On Phase)*

Phase	DFOW	FQCY	Audit(s) Performed:
FP	Analog instruments are tested on the instrument test strip to confirm functionality before transect and grid activities.	Daily and following repair or maintenance.	• Observed analog instruments during testing at the ITS • Verify instrument is retested at the ITS after repair or maintenance
FP	Visual observations during operations to confirm procedures documented in the RIWP are being properly executed.	Daily	• Observe team during operations to verify all required procedures are being executed
FP	Confirm all personnel have the appropriate PPE and supplies.	Daily	• Verify personnel have PPE and necessary supplies on hand
FP	Ensure equipment is available, properly operated, and maintained.	Daily	• Verify equipment is on hand • Verify equipment is being properly operated • Verify maintenance is being performed as needed
FP	Perform inspections on accumulated MDAS.	Daily as accumulated	• MDAS is being inspected on a daily basis

FP	Verify disposal procedures are being conducted in accordance with the Work Plan.	Each MEC/MPPEH item, as required.	• Verify demolition process is conducted IAW WP, SOP's, 60A1-1-31 and Appendix H
FP	Confirm all site features, equipment, supplies, and personnel are removed and all work locations are restored as documented in the Work Plan.	Completion of project.	• Perform inspection following completion of DFW.

General notes/observations for quality Team performed demo operations in a professional manner.

Grids QC'd/QA'd and disposition:

Returned for Rework:

FURTHER DISCUSSION (List Topic and Comments):

Other QC inspections:

None

PREPARED BY:	**SIGNATURE:**
Wayne Stebelski UXOQCS	

U.S. Army National Guard

U.S. Army Corps of Engineers – Sacramento District

Weston Solutions, Inc.

NOTICE

Current Resident
Please Open

Leona Heights Rifle Range MRS
Remedial Investigation Notice

03 May 2016

Dear Ridgemont at Skyline Condominium Resident:

The United States Army National Guard, in coordination with the United States Army Corps of Engineers – Sacramento has contracted Weston Solutions, Inc. to complete remedial investigation work within a portion of the Leona Canyon Regional Open Space Preserve. The purpose of the investigation is to determine if munition remnants from training conducted at the Leona Height Rifle Range between 1900 and 1930 remain. Please be aware that to date only a single inert practice munition has been found within the former range. Per Department of Defense Explosive Safety Board (DDESB) regulations relating to intrusive (digging) investigative activities, a 225 foot safety arc is required during the intrusive portion of this field effort. The Ridgemont at Skyline Condominiums fall within the safety arc and as a precaution, residents will have to temporarily evacuate their homes during the planned intrusive activities.

Investigation work and the associated temporary evacuations are tentatively scheduled for the week of June 13th through June 17th, 2016. The actual temporary evacuation days and duration (estimated at 1 to 3 days between 0900 to 1600) will be determined after the initial survey is completed the preceding week. The temporary evacuations are voluntary, however, if any resident(s) do not evacuate then the intrusive investigation cannot be completed and important data will not be collected. Residences must be vacant in accordance with DDESB regulations. Daily accommodations for the residents displaced during the investigation will be made, if required.

The community was invited to an open forum held on 28 April 2016 at Skyline Pizza (4400 Keller Ave.) from 1930 to 2100. If you were not able to attend the open forum and have questions regarding the project, please contact Patrick Shaw, Army National Guard, at (703) 607-7199 or email patrick.p.shaw2.civ@mail.mil or Jim Lukasko, Army Corps of Engineers, at (916) 557-5392 or email james.j.lukasko@usace.army.mil.

Sincerely,

Patrick Shaw

U.S. Army National Guard

U.S. Army Corps of Engineers – Sacramento District

Weston Solutions, Inc.

NOTICE

Current Resident
Please Open

Leona Heights Rifle Range MRS
Remedial Investigation Notice

23 May 2016

Dear Ridgemont at Skyline Condominium Resident:

The Army National Guard (ARNG), in coordination with the United States Army Corps of Engineers – Sacramento has contracted Weston Solutions, Inc. to complete remedial investigation work within a portion of the Leona Canyon Regional Open Space Preserve. The purpose of the investigation is to determine if unexploded ordnance remain from training conducted at the Leona Height Rifle Range between 1900 and 1930. Please be aware that to date only a single inert practice munition has been found within the former range. Per Department of Defense Explosive Safety Board (DDESB) regulations relating to intrusive (digging) investigative activities, a 225 foot safety arc is required during the intrusive portion of this field effort. The Ridgemont at Skyline Condominiums fall within the safety arc and as a precaution, residents will have to temporarily vacate their homes during the planned intrusive activities.

Investigation work is tentatively scheduled for the week of June 13th through June 17th, 2016. We are requesting that residents vacate their homes between 9:00 am to 4:00 pm over a 1 to 3 day period. The actual time will be determined after the initial survey is completed the preceding week. The decision to leave your home is voluntary, however, if any resident(s) do not vacate then the intrusive investigation cannot be completed and important data will not be collected. Residences must be vacant in accordance with DDESB regulations. Daily accommodations for the residents displaced during the investigation will be made, if required.

The community was invited to an open forum held on 28 April 2016 at Skyline Pizza (4400 Keller Ave.) from 7:00 pm to 9:00 pm and a 30 Day Notice was delivered to all residences on 05 May 2016. If you were not able to attend the open forum and have questions regarding the project, please contact Patrick Shaw, (ARNG), at (703) 607-7199 or email patrick.p.shaw2.civ@mail.mil or Jim Lukasko, Army Corps of Engineers, at (916) 557-5392 or email james.j.lukasko@usace.army.mil.

Sincerely,

Patrick Shaw
Chief Cleanup Branch, ARNG

U.S. Army National Guard

U.S. Army Corps of Engineers – Sacramento District

Weston Solutions, Inc.

NOTICE

Current Resident
Please Open

Leona Heights Rifle Range MRS
Remedial Investigation Notice

10 June 2016

Dear Ridgemont at Skyline Condominium Resident:

The Army National Guard (ARNG), in coordination with the United States Army Corps of Engineers – Sacramento has contracted Weston Solutions, Inc. to complete remedial investigation work within a portion of the Leona Canyon Regional Open Space Preserve. The purpose of the investigation is to determine if unexploded ordnance remain from training conducted at the Leona Height Rifle Range between 1900 and 1930. Please be aware that to date only a single inert practice munition has been found within the former range. Per Department of Defense Explosive Safety Board (DDESB) regulations relating to intrusive (digging) investigative activities, a 225 foot safety arc is required during the intrusive portion of this field effort. The Ridgemont at Skyline Condominiums fall within the safety arc and as a precaution, residents will have to temporarily vacate their homes during the planned intrusive activities. Investigation activities will be conducted on the hillside behind the condominium only, not within private property.

Investigation work is tentatively scheduled for the week of June 13th through June 17th, 2016. We are requesting that residents vacate their homes between 9:00 am to 4:00 pm over a 1 to 3 day period. The actual time will be determined after the initial survey is completed the preceding week. The decision to leave your home is voluntary, however, if any resident(s) do not vacate then the intrusive investigation cannot be completed and important data will not be collected. Residences must be vacant in accordance with DDESB regulations. Daily accommodations for the residents displaced during the investigation will be made, if required.

The community was invited to an open forum held on 28 April 2016 at Skyline Pizza (4400 Keller Ave.) from 7:00 pm to 9:00 pm, a 30 Day Notice was delivered to all residences on 05 May 2016 and a two week notice was delivered to all residences on 23 May 2016. If you were not able to attend the open forum and have questions regarding the project, please contact Patrick Shaw, (ARNG), at (703) 607-7199 or email patrick.p.shaw2.civ@mail.mil or Jim Lukasko, Army Corps of Engineers, at (916) 557-5392 or email james.j.lukasko@usace.army.mil.

Sincerely,

Patrick Shaw
Chief Cleanup Branch, ARNG

U.S. Army National Guard
U.S. Army Corps of Engineers –
Sacramento District
Weston Solutions, Inc.

24 Hour Notice Prior to Evacuation

The evacuation dates
for your residence are:

Monday June 13th through Wednesday June 15th, 2016 From 9:00am to 4:00pm

On the day(s) of evacuation please provide your contact information at the evacuation coordination check-out point located at the entrance to Ridgemont at Skyline:

Canyon Oaks Drive & Campus Avenue

You will be notified daily if you can return to your residence before 4:00pm.

If you have questions please contact:
Shawn MacMillan
Weston Solutions, Inc.
Phone: (808) 387-6186

U.S. Army National Guard
U.S. Army Corps of Engineers –
Sacramento District
Weston Solutions, Inc.

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Shawn MacMillan
Weston Solutions, Inc.
Phone: (808) 387-6186

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Army National Guard
U.S. Army Corps of Engineers – Sacramento District
Weston Solutions, Inc.

24 Hour Notice Prior to Intentional Detonation

Items found during the temporary evacuations will be intentionally detonated on:

Friday June 17th from 8:00am to 2:00pm

There is no need to evacuate during this time.

Please be aware that there will be up to 10 loud bang sounds from the intentional detonations similar to thunder or firecrackers.

If you have questions please contact:
Patrick Shaw
Army National Guard
Phone: (703) 607-7199
Email: Patrick.p.shaw2.civ@mail.mil

Army National Guard
U.S. Army Corps of Engineers – Sacramento District
Weston Solutions, Inc.

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Friday June 17th from 8:00am to 2:00pm

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Please be aware that there will be up to 10 loud bang sounds from the intentional detonations similar to thunder or firecrackers.

If you have questions please contact:
Patrick Shaw
Army National Guard
Phone: (703) 607-7199
Email: Patrick.p.shaw2.civ@mail.mil

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Leona Heights Rifle Range Military Munitions Response Program Remedial Investigation

Information Sheet

Oakland, CA
April 2016

Introduction

The Army National Guard (ARNG) Directorate, California Army National Guard (CAARNG), and U.S. Army Corps of Engineers are conducting a remedial investigation at the Former Leona Heights Rifle Range Munitions Response Site (MRS).

A remedial investigation (RI) is one phase of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process. The process is long-term and includes a series of steps: investigation, evaluation of cleanup options, public comment period on preferred cleanup plan, decision document, and the actual cleanup as needed at each phase. The RI is being conducted under the Department of Defense's Military Munitions Response Program (MMRP).

Where is the Leona Heights Rifle Range MRS?

The Leona Heights Rifle Range MRS is approximately 7 miles southeast of Downtown Oakland, Alameda County, CA. The boundary of the MRS was designated in the Final Site Inspection (SI) Report (TLI Solutions, 2012). The SI Report is part of the CERCLA process and completes the Preliminary Assessment (PA) /SI requirement for the MMRP-eligible sites. An SI identifies sites for further action and confirms the presence of munitions and explosives of concern (MEC) or munitions constituent (MC) contamination at sites identified in the PA phase.

The historical 81.33-acre Leona Heights Rifle Range MRS is located along Keller Avenue and Campus Drive in the Sequoyah neighborhood. The historical range is located on land owned by the East Bay Regional Park District, Alameda Flood Control and individual property owners.

What is the Military Munitions Response Program (MMRP)?

The MMRP program began in 2001, and addresses explosives safety, health, and environmental issues caused by past munitions-related activities at current and former military installations and adjacent properties. The program follows the requirements of the National Contingency Plan as set under the 1980 CERCLA and its amendments of 1986.

What prompted the remedial investigation?

The Final State/Territory Inventory Report for California, the equivalent of a PA in the CERCLA process, identified the historic munitions use at the Leona Heights Rifle Range MRS. In 2012, an SI was conducted at the MRS to evaluate the presence or absence of MEC and MC as a result of training activities.

During the SI, a 3-inch Stokes mortar was discovered at the surface on the eastern side of the Leona Canyon Regional Open Space Preserve. The mortar was transported and disposed of by the Alameda County Sheriff's Office (ACSO) Explosives Ordnance Disposal (EOD) Squad. Although the field team identified the mortar as potential MEC, the responding ACSO EOD officer, following inspection, determined that the mortar did not pose an explosive hazard. The mortar was taken to the ACSO EOD range for final disposition.

Sub-surface anomalies were also detected within the vicinity of the mortar during the SI; however, no intrusive investigation was performed to identify the anomalies. Therefore, the MRS was recommended for further investigation for MEC.

Analytical results did not indicate MC (explosives or metals) in concentrations above screening levels. As a result, the MRS was recommended for No Further Action (NFA) for MC during the SI and therefore will not be investigated further.

What does the remedial investigation entail?

The objectives of the remedial investigation are:

- Assess if and where additional munitions items are present.
- Assess the explosive safety hazards.
- Assess if there is any environmental contamination in the soil from munitions.

Unexploded Ordnance (UXO) qualified personnel will walk transects and mini-grids with White's all-metals detectors to locate surface and sub-surface anomalies (potential MEC). UXO qualified personnel will hand dig at the anomaly locations to determine whether MEC and/or munitions debris (MD) are present. If found and determined to be acceptable to move, MEC will be moved to a safe area for destruction. However, if a MEC item is not acceptable to move, it will be detonated in place. MD will be removed for proper disposal.

It is important to note that the results of the field work will provide an estimate of the types and amount of MEC that are potentially on the site. After the field work phase of the RI is completed, a report will be prepared. The purpose of the RI is to gather sufficient on-site data necessary to characterize the nature and extent of MEC and MC contamination, if present.

Information collected during the RI will be used to fill data gaps, update the conceptual site model (CSM), evaluate potential human health and ecological risks, conduct an explosive hazard assessment, and update the Munitions Response Site Prioritization Protocol (MRSPP). Results from the RI will be used to determine the need for further evaluation of the site, if any, and to develop and evaluate remedial alternatives in a Feasibility Study (FS).

The FS is the mechanism for the development, screening, and detailed evaluation of remedial action alternatives if such are determined to be required. In addition, a Proposed Plan (PP) describing the recommendations of the RI and results of the FS will be completed for Stakeholder and public concurrence. A Decision Document (DD) will be prepared following approval of the PP to identify the remedial alternative chosen from the FS, or to document NFA if no remedial efforts are necessary.

How will the public be informed about the remedial investigation?

The public will be informed through news releases prepared for *The Oakland Tribune* newspaper to announce the start of the project, public meetings, key field activities, completion of field activities, completion of the RI/FS report and findings. In addition, the project team will maintain a mailing list of persons who need or want to be informed. As fieldwork draws near, a newsletter will provide information to residents living at the Ridgemont at Skyline Condominiums, informing them of the upcoming activities.

If you have any questions regarding the investigation, please contact Patrick Shaw, Army National Guard, at (703) 607-7199 or email to patrick.p.shaw2.civ@mail.mil.

Administrative Record File and Information Repository

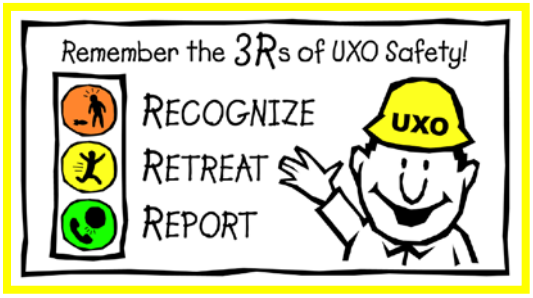
Documents associated with the remedial investigation will be available to the public at:

Administrative Record
California Army National Guard
Military Department
3900 Roseville Road
North Highlands, CA 95660

Information Repository
Eastmont Public Library
7200 Bancroft, Suite 211
Oakland, CA

Estimated Project Schedule for Leona Heights Rifle Range MRS

Timeframe	Technical Milestones
Mar. 2016 – Jun. 2016	Preparation of Work Plans
Jun. 2016 – Aug. 2016	Remedial Investigation Fieldwork
Sep. 2015 – May 2017	Preparation of Remedial Investigation and Feasibility Study Reports
Jun.2017 – Oct. 2017	Proposed Plan, Public Comment Period, and Public Meeting
Oct. 2017 – Jan. 2018	Decision Document



APPENDIX F

PHOTOGRAPH LOGS (SEE DAILY REPORTS)

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APPENDIX G

DIGITAL GEOPHYSICAL MAPPING DATA
(NOT APPLICABLE)

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APPENDIX H

ANALOG SUMMARY TABLE (DIG LIST)

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Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	T01	001	6/13/2016	4181329.774	575216.225	1	2	0.01	NMD	MISC.	SCREW	1914	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	002	6/13/2016	4181328.944	575216.756	1	3	0.1	NMD	MISC.	CAN	1915	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	003	6/13/2016	4181328.066	575216.669	1	1	0.01	NMD	MISC.	NAIL	1916	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	004	6/13/2016	4181322.150	575222.488	2	3	3	NMD	MISC.	PIPE, BANDING	1917	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	005	6/13/2016	4181322.825	575223.585	2	4	0.4	NMD	MISC.	CANS	1918	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	006	6/13/2016	4181321.703	575225.227	1	0	50	NMD	CONSTRUCTION DEBRIS	CONCRETE W/REBAR	1919	LEFT IN PLACE	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	007	6/13/2016	4181321.423	575226.416	1	2	0.03	NMD	MISC.	CAN	1920	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	008	6/13/2016	4181313.748	575234.078	1	1	0.01	NMD	MISC.	NAIL	1921	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	009	6/13/2016	4181313.460	575234.743	1	2	0.01	SAA	MISC.	BULLET	1922	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	010	6/13/2016	4181313.111	575234.854	1	2	0.01	NMD	MISC.	NAIL	1923	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	011	6/13/2016	4181311.746	575235.809	1	3	0.01	NMD	MISC.	NAIL	1924	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T01	012	6/13/2016	4181311.839	575236.801	1	2	0.01	NMD	MISC.	NAIL	1925	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	001	6/13/2016	4181340.867	575216.500	1	2	0.02	SAA	MISC.	STRIPPER CLIP	1926	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	002	6/13/2016	4181342.866	575217.405	1	2	0.25	NMD	MISC.	VALVE STEM	1927	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	003	6/13/2016	4181342.469	575217.326	1	1	0.01	SAA	MISC.	BULLET	1928	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	004	6/13/2016	4181341.421	575219.182	1	2	0.01	SAA	MISC.	BULLET	1929	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	005	6/13/2016	4181340.338	575220.319	1	1	0.01	SAA	MISC.	BULLET	1930	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	006	6/13/2016	4181337.749	575226.998	1	2	0.02	NMD	MISC.	FOIL	1931	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	007	6/13/2016	4181329.022	575230.464	1	3	0.25	NMD	MISC.	BUCKLE	1932	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	008	6/13/2016	4181326.813	575230.913	1	3	0.25	NMD	MISC.	BANDING	1933	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	009	6/13/2016	4181326.135	575232.937	1	2	0.1	NMD	MISC.	SALT SHAKER TOP	1934	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	010	6/13/2016	4181325.844	575233.912	2	3	0.5	NMD	MISC.	PIPE, METAL RING	1935	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	011	6/13/2016	4181318.593	575240.923	1	2	0.01	NMD	MISC.	NAIL	1936	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	012	6/13/2016	4181317.591	575241.636	1	2	0.1	NMD	MISC.	WIRE	1937	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	013	6/13/2016	4181310.773	575247.113	3	4	0.5	NMD	MISC.	PIPE PIECES	1938	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	014	6/13/2016	4181311.636	575248.293	2	3	0.1	NMD	MISC.	METAL CAP, FOIL	1939	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	015	6/13/2016	4181309.595	575248.663	1	2	0.01	SAA	MISC.	CARTRIDGE BRASS	1940	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	016	6/13/2016	4181309.304	575250.053	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	1941	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	017	6/13/2016	4181298.790	575260.440	1	3	0.01	SAA	MISC.	BULLET	1942	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	018	6/13/2016	4181298.337	575261.906	1	2	0.01	SAA	MISC.	BULLET	1943	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	019	6/13/2016	4181297.412	575262.586	1	3	0.01	SAA	MISC.	BULLET	1944	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	020	6/13/2016	4181296.352	575262.399	1	2	0.01	SAA	MISC.	BULLET	1945	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	021	6/13/2016	4181295.634	575263.933	1	2	0.01	NMD	MISC.	NAIL	1946	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	022	6/13/2016	4181295.128	575263.787	1	3	0.01	NMD	MISC.	NAIL	1947	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	023	6/13/2016	4181293.476	575266.952	1	7	9	MD	MORTAR	3" STOKES PRACTICE	1948	MDAS PROCESSING	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	024	6/13/2016	4181292.779	575268.229	1	2	0.01	NMD	MISC.	BOTTLE CAP	1949	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	025	6/13/2016	4181291.685	575268.401	1	3	0.01	SAA	MISC.	BULLET	1951	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	026	6/13/2016	4181292.226	575270.203	2	3	0.02	NMD	MISC.	NAILS	1952	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	027	6/13/2016	4181290.866	575270.256	3	4	0.03	NMD	MISC.	NAILS	1953	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	028	6/13/2016	4181290.037	575270.399	1	2	0.01	NMD	MISC.	NAILS	1954	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	029	6/13/2016	4181280.422	575282.384	1	3	0.1	NMD	MISC.	CAN	1955	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	030	6/13/2016	4181276.784	575290.764	1	4	0.1	NMD	MISC.	SCRAP METAL	1956	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	031	6/13/2016	4181271.346	575297.254	1	2	0.01	SAA	MISC.	BULLET	1957	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	032	6/13/2016	4181270.088	575298.735	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	1958	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	T02	033	6/13/2016	4181270.002	575299.560	1	3	0.01	SAA	MISC.	BULLET	1959	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	034	6/13/2016	4181269.270	575298.994	1	2	0.01	SAA	MISC.	BULLET	1960	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	035	6/13/2016	4181268.367	575299.645	1	2	0.01	NMD	MISC.	FENCE STAPLE	1961	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	036	6/13/2016	4181268.757	575299.944	1	3	0.01	SAA	MISC.	BULLET	1962	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	037	6/13/2016	4181269.085	575300.981	1	2	2	NMD	MISC.	FENCE PIECE	1963	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	038	6/13/2016	4181267.797	575299.902	1	3	0.01	NMD	MISC.	WIRE	1964	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	039	6/13/2016	4181267.983	575302.340	1	4	0.1	NMD	MISC.	CAN	1965	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	040	6/13/2016	4181266.907	575302.913	1	2	0.01	NMD	MISC.	SODA CAN PULL TAB	1967	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	041	6/13/2016	4181264.736	575304.139	1	3	0.01	NMD	MISC.	BOLT	1968	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	042	6/13/2016	4181261.791	575306.013	2	5	0.4	NMD	MISC.	WIRE	1969	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	043	6/13/2016	4181261.145	575307.031	1	3	0.02	NMD	MISC.	WIRE	1970	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	044	6/13/2016	4181259.786	575305.845	1	2	5	NMD	MISC.	PIPE	1971	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	045	6/13/2016	4181260.163	575307.713	1	0	20	NMD	CONSTRUCTION DEBRIS	REINFORCED CONCRETE	1972	LEFT IN PLACE	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	046	6/13/2016	4181258.248	575307.209	1	1	2	NMD	MISC.	FENCE PIECE	1973	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	047	6/14/2016	4181257.070	575308.507	1	1	20	NMD	CONSTRUCTION DEBRIS	REINFORCED CONCRETE	2069	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	048	6/14/2016	4181256.058	575307.795	1	3	2	NMD	MISC.	WIRE	2070	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	049	6/14/2016	4181256.359	575308.827	1	22	10	NMD	MISC.	PIPE	2071	LEFT IN PLACE	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	050	6/14/2016	4181252.825	575308.298	1	8	2	QC SEED	MED.ISO	SEED #1	2072	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	051	6/14/2016	4181249.950	575307.684	2	3	0.01	NMD	MISC.	SCREW	2073	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	052	6/14/2016	4181249.206	575308.430	1	2	0.02	SAA	MISC.	BULLETS	2074	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	053	6/14/2016	4181248.848	575307.927	1	3	0.1	NMD	MISC.	SCRAP METAL	2075	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	054	6/14/2016	4181246.551	575309.160	1	4	1	NMD	MISC.	HORSESHOE	2076	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	055	6/14/2016	4181245.932	575308.371	1	10	0.01	NMD	MISC.	SCREW	2077	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	056	6/14/2016	4181245.065	575308.760	1	4	0.02	NMD	MISC.	BOLT	2078	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	057	6/14/2016	4181242.296	575307.954	1	3	0.01	NMD	MISC.	NAIL	2079	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	058	6/14/2016	4181238.121	575308.612	1	3	0.01	SAA	MISC.	CARTRIDGE BRASS	2080	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	059	6/14/2016	4181233.701	575310.509	1	4	0.01	NMD	MISC.	NAIL	2081	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	060	6/14/2016	4181232.843	575309.431	1	4	0.01	NMD	MISC.	BANDING	2082	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	061	6/14/2016	4181231.860	575310.457	1	5	0.2	NMD	MISC.	CAN	2083	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	062	6/14/2016	4181228.560	575312.471	1	3	0.01	NMD	MISC.	NAIL	2084	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	063	6/14/2016	4181226.960	575312.978	1	2	0.1	NMD	MISC.	SCRAP METAL	2085	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	064	6/14/2016	4181222.934	575314.330	1	2	0.01	NMD	MISC.	SCRAP METAL	2086	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	065	6/14/2016	4181216.783	575317.256	1	3	0.01	SAA	MISC.	BULLET	2087	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	066	6/14/2016	4181216.424	575317.206	1	4	0.01	SAA	MISC.	BULLET	2088	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	067	6/14/2016	4181213.980	575321.110	1	3	0.01	SAA	MISC.	BULLET	2089	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	068	6/14/2016	4181212.152	575321.786	1	4	0.01	SAA	MISC.	BULLET	2090	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	069	6/14/2016	4181211.450	575322.311	1	3	0.01	SAA	MISC.	BULLET	2091	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	070	6/14/2016	4181210.466	575322.389	1	2	0.01	NMD	MISC.	NAIL	2092	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	071	6/14/2016	4181208.964	575323.422	1	4	0.25	NMD	MISC.	PIPE PIECES	2093	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	072	6/14/2016	4181208.506	575324.649	1	3	3	NMD	MISC.	DOOR HINGE	2094	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	073	6/14/2016	4181205.680	575326.452	1	2	0.01	SAA	MISC.	BULLET	2095	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	074	6/14/2016	4181205.005	575326.338	1	3	2	NMD	MISC.	DOOR HINGE	2096	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

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LEONA HEIGHTS RIFLE RANGE	T02	075	6/14/2016	4181204.513	575326.755	1	4	2	NMD	MISC.	DOOR HINGE	2097	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	076	6/14/2016	4181203.769	575327.332	1	5	0.01	SAA	MISC.	BULLET	2098	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	077	6/14/2016	4181203.491	575328.003	1	4	0.01	SAA	MISC.	BULLET	2099	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	078	6/14/2016	4181202.550	575329.700	1	3	0.01	SAA	MISC.	BULLET	2100	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	079	6/14/2016	4181201.893	575329.325	1	2	0.01	SAA	MISC.	BULLET	2101	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	080	6/14/2016	4181199.197	575331.352	1	3	0.01	SAA	MISC.	BULLET	2102	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	081	6/14/2016	4181193.970	575335.874	1	2	0.01	NMD	MISC.	PENNY	2103	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	082	6/14/2016	4181187.452	575341.632	1	3	0.01	SAA	MISC.	BULLET	2104	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	083	6/14/2016	4181187.050	575342.353	1	4	0.01	SAA	MISC.	BULLET	2105	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	084	6/14/2016	4181184.205	575346.667	1	2	0.01	SAA	MISC.	BULLET	2106	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	085	6/14/2016	4181183.250	575346.642	1	2	0.1	NMD	MISC.	BOTTLE CAP	2107	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	086	6/14/2016	4181181.719	575347.986	1	3	0.01	SAA	MISC.	BULLET	2108	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	087	6/14/2016	4181179.594	575349.384	1	2	0.01	SAA	MISC.	BULLET	2109	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	088	6/14/2016	4181178.086	575350.674	1	3	0.01	SAA	MISC.	BULLET	2110	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	089	6/14/2016	4181177.544	575351.540	1	4	0.01	SAA	MISC.	BULLET	2111	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	090	6/14/2016	4181176.371	575352.324	1	2	0.01	SAA	MISC.	BULLET	2112	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	091	6/14/2016	4181176.181	575352.741	1	3	0.01	SAA	MISC.	BULLET	2113	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	092	6/14/2016	4181174.927	575353.873	1	4	0.01	SAA	MISC.	BULLET	2114	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	093	6/14/2016	4181174.160	575354.588	1	3	0.01	SAA	MISC.	BULLET	2115	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	094	6/14/2016	4181171.127	575356.322	1	2	0.1	NMD	MISC.	FOIL	2116	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	095	6/14/2016	4181170.154	575356.529	1	3	0.1	NMD	MISC.	FOIL	2117	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	096	6/14/2016	4181111.340	575391.559	1	2	0.01	SAA	MISC.	BULLET	2153	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	097	6/14/2016	4181110.978	575391.714	1	3	0.01	SAA	MISC.	BULLET	2152	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	098	6/14/2016	4181110.221	575391.689	1	4	0.01	SAA	MISC.	BULLET	2151	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	099	6/14/2016	4181109.769	575391.679	1	3	0.01	SAA	MISC.	BULLET	2150	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	100	6/14/2016	4181109.167	575393.649	1	2	0.01	SAA	MISC.	BULLET	2149	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	101	6/14/2016	4181105.401	575396.547	1	4	0.01	SAA	MISC.	BULLET	2148	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	102	6/14/2016	4181098.037	575399.796	1	3	0.01	SAA	MISC.	BULLET	2147	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	103	6/14/2016	4181097.858	575398.815	1	2	0.01	SAA	MISC.	BULLET	2146	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	104	6/14/2016	4181096.175	575401.443	1	3	0.01	SAA	MISC.	BULLET	2145	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	105	6/14/2016	4181096.364	575402.623	1	4	0.01	SAA	MISC.	BULLET	2144	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	106	6/14/2016	4181095.333	575402.354	1	3	0.01	SAA	MISC.	BULLET	2143	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	107	6/14/2016	4181094.248	575403.861	1	2	0.01	SAA	MISC.	BULLET	2142	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	108	6/14/2016	4181088.943	575408.071	1	2	0.01	SAA	MISC.	BULLET	2141	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	109	6/14/2016	4181089.441	575409.105	2	1	0.02	SAA	MISC.	BULLET	2140	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	110	6/14/2016	4181087.959	575408.489	1	2	0.25	NMD	MISC.	DOOR HINGE	2139	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	111	6/14/2016	4181085.366	575407.992	1	3	0.01	NMD	MISC.	BULLET	2138	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	112	6/14/2016	4181085.806	575408.421	1	2	0.01	NMD	MISC.	BULLET	2137	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	113	6/14/2016	4181086.899	575410.636	1	3	0.01	NMD	MISC.	BULLET	2136	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	114	6/14/2016	4181083.754	575411.344	1	2	0.01	SAA	MISC.	BULLET	2135	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	115	6/14/2016	4181086.771	575411.554	1	3	0.01	SAA	MISC.	BULLET	2068	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	116	6/14/2016	4181087.071	575412.414	1	2	0.01	SAA	MISC.	BULLET	2067	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	117	6/14/2016	4181084.513	575412.395	2	3	0.02	SAA	MISC.	BULLET	2066	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	118	6/14/2016	4181083.219	575411.566	1	2	0.01	SAA	MISC.	BULLET	2065	REMOVED	WHITE	RH	

Leona Heights Rifle Range
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LEONA HEIGHTS RIFLE RANGE	T02	119	6/14/2016	4181084.016	575413.084	1	3	0.01	SAA	MISC.	BULLET	2064	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	120	6/14/2016	4181079.461	575413.413	2	2	0.02	SAA	MISC.	BULLET	2063	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	121	6/14/2016	4181082.177	575411.852	1	3	0.01	SAA	MISC.	BULLET	2062	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	122	6/14/2016	4181079.681	575417.921	1	2	0.02	SAA	MISC.	BULLET	2061	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	123	6/14/2016	4181082.334	575416.778	1	3	0.01	SAA	MISC.	BULLET	2060	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	124	6/14/2016	4181084.618	575417.013	1	2	0.01	SAA	MISC.	BULLET	2059	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	125	6/14/2016	4181082.701	575418.480	2	3	0.02	SAA	MISC.	BULLET	2058	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	126	6/14/2016	4181084.421	575417.866	1	3	0.01	SAA	MISC.	BULLET	2057	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	127	6/14/2016	4181081.774	575421.094	1	2	0.01	SAA	MISC.	BULLET	2056	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	128	6/14/2016	4181084.666	575424.757	2	3	0.03	SAA	MISC.	STRIPPER CLIP, BULLET	2055	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	129	6/14/2016	4181082.731	575426.341	2	3	0.02	SAA	MISC.	BULLET	2054	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	130	6/14/2016	4181084.928	575427.372	2	3	0.02	SAA	MISC.	BULLET	2053	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	131	6/14/2016	4181085.010	575427.094	1	1	0.01	SAA	MISC.	BULLET	2052	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	132	6/14/2016	4181087.109	575430.201	1	2	0.01	SAA	MISC.	BULLET	2051	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	133	6/14/2016	4181086.176	575431.150	2	3	0.02	SAA	MISC.	BULLET	2050	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T02	134	6/14/2016	4181086.386	575434.677	1	2	0.01	SAA	MISC.	BULLET	2049	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	001	6/13/2016	4181350.825	575221.866	1	2	0.01	SAA	MISC.	BULLET	2019	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	002	6/13/2016	4181350.493	575226.042	1	1	0.01	SAA	MISC.	BULLET	2018	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	003	6/13/2016	4181346.544	575229.204	1	2	0.01	SAA	MISC.	BULLET	2017	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	004	6/13/2016	4181348.742	575229.903	1	3	0.01	SAA	MISC.	BULLET	2016	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	005	6/13/2016	4181328.083	575239.298	7	6	1	NMD	MISC.	NAILS	2015	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	006	6/13/2016	4181320.771	575244.013	1	3	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2014	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	007	6/13/2016	4181316.718	575247.868	1	1	0.01	SAA	MISC.	BULLET	2013	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	008	6/13/2016	4181314.317	575252.977	1	3	0.25	NMD	MISC.	PIPE PIECE	2012	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	009	6/13/2016	4181314.134	575253.100	1	3	0.01	SAA	MISC.	BULLET	2011	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	010	6/13/2016	4181312.423	575255.250	1	2	0.1	NMD	MISC.	SCRAP METAL	2010	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	011	6/13/2016	4181309.301	575259.345	1	3	0.25	NMD	MISC.	PIPE PIECES	2009	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	012	6/13/2016	4181307.739	575261.435	1	1	0.01	NMD	MISC.	SCREW	2008	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	013	6/13/2016	4181306.595	575264.030	1	2	0.2	NMD	MISC.	SCRAP METAL	2007	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	014	6/13/2016	4181302.245	575271.103	1	3	0.01	NMD	MISC.	NAIL	2006	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	015	6/13/2016	4181300.464	575270.895	1	4	0.25	NMD	MISC.	PIPE PIECE	2005	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	016	6/13/2016	4181298.100	575273.759	1	2	11	MD	MORTAR	3" STOKES	2002	MDAS PROCESSING	WHITE	RH	6/17/16
LEONA HEIGHTS RIFLE RANGE	T03	017	6/13/2016	4181290.162	575285.415	1	2	0.01	SAA	MISC.	BULLET	2001	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	018	6/13/2016	4181282.377	575294.304	1	3	0.01	SAA	MISC.	BULLET	1999	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	019	6/13/2016	4181282.553	575295.568	1	3	0.2	NMD	MISC.	PIPE PIECE	1998	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	020	6/13/2016	4181281.827	575296.184	1	2	0.02	NMD	MISC.	FOIL	1997	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	021	6/13/2016	4181281.061	575296.343	1	3	0.01	SAA	MISC.	BULLET	1996	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	022	6/13/2016	4181280.067	575297.367	1	3	0.01	SAA	MISC.	BULLET	1995	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	023	6/13/2016	4181280.374	575298.435	1	2	0.01	SAA	MISC.	BULLET	1994	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	024	6/13/2016	4181280.803	575299.439	1	3	0.01	SAA	MISC.	BULLET	1993	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	025	6/13/2016	4181276.723	575301.238	1	4	0.01	SAA	MISC.	BULLET	1992	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	026	6/13/2016	4181275.580	575301.104	1	4	0.01	SAA	MISC.	BULLET	1990	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	027	6/13/2016	4181274.936	575301.847	1	3	0.02	SAA	MISC.	CARTRIDGE BRASS	1989	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	028	6/13/2016	4181272.353	575303.609	1	4	0.02	NMD	MISC.	SCRAP METAL	1988	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	T03	029	6/13/2016	4181271.403	575306.445	2	3	2	NMD	MISC.	SCRAP METAL	1987	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	030	6/13/2016	4181270.498	575306.100	1	2	0.02	NMD	MISC.	SCRAP METAL	1986	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	031	6/13/2016	4181269.466	575306.977	1	3	1	NMD	MISC.	SCRAP METAL	1985	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	032	6/13/2016	4181267.844	575308.332	1	2	0.01	SAA	MISC.	BULLET	1984	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	033	6/13/2016	4181259.965	575315.002	1	12	10	NMD	MISC.	PIPE	1983	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	034	6/13/2016	4181259.208	575313.739	1	8	11	MD	MORTAR	3"STOKES	2004	MDAS PROCESSING	WHITE	RH	6/17/16
LEONA HEIGHTS RIFLE RANGE	T03	035	6/13/2016	4181257.825	575315.493	1	24	11	MD	MORTAR	3"STOKES	2003	MDAS PROCESSING	WHITE	RH	6/17/16
LEONA HEIGHTS RIFLE RANGE	T03	036	6/13/2016	4181256.564	575315.307	1	2	0.01	NMD	MISC.	KETCHUP WRAPPER	1976	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	037	6/13/2016	4181254.062	575317.285	1	4	0.01	SAA	MISC.	BULLET	1975	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	038	6/13/2016	4181253.156	575316.957	1	3	0.01	NMD	MISC.	FOIL	1974	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	039	6/14/2016	4181233.033	575344.846	1	3	0.02	SAA	MISC.	CARTRIDGE BRASS	2134	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	040	6/14/2016	4181232.864	575346.125	1	2	0.01	NMD	MISC.	NAIL	2133	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	041	6/14/2016	4181231.776	575345.825	1	3	0.01	SAA	MISC.	BULLET	2132	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	042	6/14/2016	4181230.817	575346.794	1	4	0.02	NMD	MISC.	NAIL	2131	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	043	6/14/2016	4181230.148	575347.075	1	2	0.01	SAA	MISC.	BULLET	2130	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	044	6/14/2016	4181225.081	575348.528	1	3	0.02	SAA	MISC.	CARTRIDGE BRASS	2129	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	045	6/14/2016	4181222.110	575348.547	1	2	0.01	SAA	MISC.	BULLET	2128	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	046	6/14/2016	4181216.228	575350.527	1	3	0.01	SAA	MISC.	BULLET	2127	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	047	6/14/2016	4181213.347	575349.996	1	4	0.01	SAA	MISC.	BULLET	2126	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	048	6/14/2016	4181211.589	575347.544	1	3	0.01	SAA	MISC.	BULLET	2125	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	049	6/14/2016	4181206.775	575348.467	1	2	0.01	SAA	MISC.	BULLET	2124	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	050	6/14/2016	4181206.519	575346.170	1	3	0.02	SAA	MISC.	CARTRIDGE BRASS	2123	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	051	6/14/2016	4181203.348	575347.012	1	2	0.01	SAA	MISC.	BULLET	2122	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	052	6/14/2016	4181182.847	575366.356	1	2	0.01	SAA	MISC.	BULLET	2121	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	053	6/14/2016	4181181.890	575365.741	1	3	0.01	SAA	MISC.	BULLET	2120	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	054	6/14/2016	4181179.520	575367.524	1	4	0.01	SAA	MISC.	BULLET	2119	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	055	6/14/2016	4181176.659	575369.515	1	4	0.25	NMD	MISC.	SPRINKLER HEAD	2118	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	056	6/14/2016	4181130.134	575400.569	1	5	0.01	SAA	MISC.	BULLET	2154	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	057	6/14/2016	4181128.136	575399.927	1	3	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2155	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	058	6/14/2016	4181125.204	575400.039	1	3	0.01	SAA	MISC.	BULLET	2156	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	059	6/14/2016	4181123.597	575399.244	25+	3	0.01	SAA	MISC.	BULLET	2157	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	060	6/14/2016	4181123.639	575398.667	25+	2	0.01	SAA	MISC.	BULLET	2158	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	061	6/14/2016	4181121.057	575399.635	1	3	0.01	SAA	MISC.	BULLET	2159	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	062	6/14/2016	4181118.883	575400.338	1	3	0.01	SAA	MISC.	BULLET	2160	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	063	6/14/2016	4181119.913	575396.555	1	2	0.01	SAA	MISC.	BULLET	2161	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	064	6/14/2016	4181113.964	575401.386	1	3	0.01	SAA	MISC.	BULLET	2162	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	065	6/14/2016	4181109.140	575405.542	1	2	0.01	SAA	MISC.	BULLET	2163	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	066	6/14/2016	4181108.908	575406.245	2	3	0.02	SAA	MISC.	BULLET	2164	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	067	6/14/2016	4181094.218	575412.536	1	3	0.01	SAA	MISC.	BULLET	2165	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	068	6/14/2016	4181094.133	575413.737	1	2	0.01	SAA	MISC.	BULLET	2166	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	069	6/14/2016	4181094.391	575413.600	1	3	0.01	SAA	MISC.	BULLET	2167	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	070	6/14/2016	4181094.280	575412.630	25+	2	0.01	SAA	MISC.	BULLET	2168	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	071	6/14/2016	4181095.631	575414.794	1	2	0.01	SAA	MISC.	BULLETS	2169	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	072	6/14/2016	4181091.032	575417.218	1	3	0.01	SAA	MISC.	BULLETS	2170	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

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LEONA HEIGHTS RIFLE RANGE	T03	073	6/14/2016	4181090.651	575419.162	1	4	0.02	NMD	MISC.	CHAIN LINK	2171	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	074	6/14/2016	4181088.516	575421.904	1	3	0.01	SAA	MISC.	BULLETS	2172	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	075	6/14/2016	4181089.007	575421.087	1	2	0.2	NMD	MISC.	FOIL	2173	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	076	6/14/2016	4181090.655	575425.169	2	3	0.02	SAA	MISC.	BULLET	2174	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	077	6/14/2016	4181094.516	575429.923	1	2	0.01	SAA	MISC.	BULLET	2175	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	078	6/14/2016	4181094.433	575429.233	1	3	0.01	SAA	MISC.	BULLET	2176	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	079	6/14/2016	4181094.758	575430.943	1	4	0.5	NMD	MISC.	CO2 BOTTLE	2177	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	080	6/14/2016	4181092.980	575435.053	1	3	0.01	SAA	MISC.	BULLETS	2179	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	081	6/14/2016	4181095.653	575439.032	1	3	0.01	SAA	MISC.	BULLETS	2180	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	082	6/14/2016	4181096.988	575440.242	25+	2	0.02	SAA	MISC.	BULLETS	2181	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	083	6/14/2016	4181095.890	575441.351	1	3	0.5	NMD	MISC.	CO2 BOTTLE	2182	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T03	084	6/14/2016	4181095.881	575441.340	1	5	0.01	SAA	MISC.	BULLETS	2183	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	001	6/14/2016	4181329.476	575313.571	1	3	0.01	SAA	MISC.	BULLET	2021	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	002	6/14/2016	4181324.894	575314.133	1	4	0.01	SAA	MISC.	BULLET	2022	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	003	6/14/2016	4181323.840	575315.366	1	2	0.01	SAA	MISC.	BULLET	2023	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	004	6/14/2016	4181324.163	575318.094	1	3	0.01	SAA	MISC.	BULLET	2024	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	005	6/14/2016	4181322.875	575316.968	1	2	0.25	NMD	MISC.	PIPE PIECE	2025	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	006	6/14/2016	4181314.909	575321.823	1	3	0.01	SAA	MISC.	BULLET	2026	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	007	6/14/2016	4181313.985	575322.806	1	2	0.1	NMD	MISC.	FENCE STAPLE	2027	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	008	6/14/2016	4181311.491	575324.506	1	4	0.01	SAA	MISC.	BULLET	2028	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	009	6/14/2016	4181309.021	575325.870	1	4	0.01	SAA	MISC.	BULLET	2029	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	010	6/14/2016	4181303.551	575328.890	1	3	0.01	SAA	MISC.	BULLET	2030	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	011	6/14/2016	4181302.435	575329.338	1	4	0.01	SAA	MISC.	BULLET	2031	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	012	6/14/2016	4181303.151	575330.712	1	3	0.01	SAA	MISC.	BULLET	2032	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	013	6/14/2016	4181302.381	575331.457	1	4	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2033	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T04	014	6/13/2016	4181317.191	575320.143	1	6	2	QC SEED	MED.ISO	SEED #3	2020	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	001	6/10/2016	4181269.493	575444.418	1	3	0.01	SAA	MISC.	BULLET	2037	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	002	6/10/2016	4181258.590	575433.904	1	2	0.01	SAA	MISC.	BULLET	2038	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	003	6/10/2016	4181249.750	575423.893	1	3	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2039	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	004	6/10/2016	4181242.703	575411.374	1	2	0.01	SAA	MISC.	BULLET	2040	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	005	6/10/2016	4181233.814	575390.725	1	2	0.01	SAA	MISC.	BULLET	2041	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	006	6/10/2016	4181234.311	575389.291	1	3	1	NMD	MISC.	RAILROAD SPIKE	2042	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	007	6/10/2016	4181232.431	575384.083	1	2	0.01	SAA	MISC.	BULLET	2043	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	008	6/10/2016	4181232.419	575380.278	1	3	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2045	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	009	6/10/2016	4181232.952	575377.576	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2046	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	010	6/10/2016	4181232.845	575379.812	1	3	0.02	SAA	MISC.	BULLETS	2047	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T05	011	6/10/2016	4181224.477	575363.692	1	2	0.01	SAA	MISC.	BULLETS	2048	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	001	6/10/2016	4181157.282	575442.657	4	3	0.04	SAA	MISC.	BULLETS	1896	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	002	6/10/2016	4181157.598	575441.509	2	2	0.02	SAA	MISC.	BULLETS	1897	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	003	6/10/2016	4181173.578	575437.478	2	3	0.02	SAA	MISC.	BULLETS	1898	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	004	6/10/2016	4181174.583	575437.343	3	4	0.03	SAA	MISC.	BULLETS	1899	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	005	6/10/2016	4181177.122	575436.265	3	3	0.03	SAA	MISC.	BULLETS	1900	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	006	6/10/2016	4181187.955	575431.498	4	4	0.04	SAA	MISC.	BULLETS	1901	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	007	6/10/2016	4181188.066	575430.727	2	2	0.02	SAA	MISC.	BULLETS	1902	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	T06	008	6/10/2016	4181195.031	575428.077	1	3	0.01	SAA	MISC.	BULLETS	1903	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	009	6/10/2016	4181198.758	575426.788	1	5	2	NMD	MISC.	THREADED PIPE COUPLER	1904	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	010	6/10/2016	4181212.590	575421.352	1	2	0.01	SAA	MISC.	BULLET	1905	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	011	6/10/2016	4181216.850	575420.711	2	3	0.02	SAA	MISC.	BULEET	1906	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	012	6/10/2016	4181222.564	575420.681	1	3	0.02	SAA	MISC.	CARTRIDGE BRASS	1907	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	013	6/10/2016	4181226.177	575422.041	4	3	0.04	SAA	MISC.	BULLETS	1908	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	014	6/10/2016	4181229.613	575420.801	4	2	0.04	SAA	MISC.	BULLETS	1909	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	015	6/10/2016	4181233.737	575420.551	1	3	0.01	SAA	MISC.	BULLETS	1910	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	016	6/10/2016	4181234.446	575420.487	1	2	0.01	SAA	MISC.	BULLETS	1911	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	017	6/10/2016	4181235.034	575420.315	1	3	0.01	SAA	MISC.	BULLETS	1912	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T06	018	6/10/2016	4181239.591	575417.602	1	2	0.01	SAA	MISC.	BULLETS	1913	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	001	6/10/2016	4181240.056	575478.174	6	4	0.55	SAA,NMD	MISC.	COIL PIPE, BULLETS SHOTGUN SHELL BASE.	1879/1880	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	002	6/10/2016	4181239.591	575479.089	6		0.06	SAA	MISC.	BULLETS	1881	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	003	6/10/2016	4181235.133	575480.530	1	2	0.01	NMD	MISC.	GROMMET	1882	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	004	6/10/2016	4181223.750	575481.672	25	6	0.25	SAA	MISC.	BULLETS	1883	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	005	6/10/2016	4181222.902	575481.394	23	6	0.23	SAA	MISC.	BULLETS	1885	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	006	6/10/2016	4181216.232	575483.133	3	4	0.03	SAA	MISC.	BULLET	1886	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	007	6/10/2016	4181212.824	575483.630	2	3	0.02	SAA	MISC.	BULLET	1888	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	008	6/10/2016	4181204.239	575489.443	2	2	0.02	SAA	MISC.	BULLET	1889	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	009	6/10/2016	4181200.619	575487.951	4	4	0.04	SAA	MISC.	BULLET	1890	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	010	6/10/2016	4181198.854	575486.826	4	3	0.04	SAA	MISC.	BULLET	1891	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	011	6/10/2016	4181193.282	575482.439	1	8	2	QC SEED	MED.ISO	SEED #2	1892	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	012	6/10/2016	4181191.084	575482.249	3	3	0.03	SAA	MISC.	BULLETS	1893	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	013	6/10/2016	4181189.899	575481.556	4	2	0.04	SAA	MISC.	BULLETS	1894	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T07	014	6/10/2016	4181179.875	575485.872	1	2	0.01	SAA	MISC.	BULLETS	1895	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	001	6/10/2016	4181278.310	575530.079	1	2	0.01	SAA	MISC.	BULLET	1851	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	002	6/10/2016	4181276.800	575530.520	1	1	0.02	SAA	MISC.	BULLET	1852	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	003	6/10/2016	4181276.048	575530.983	1	1	0.01	SAA	MISC.	BULLET	1853	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	004	6/10/2016	4181264.617	575539.599	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	1854	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	005	6/10/2016	4181258.743	575541.948	1	3	0.01	SAA	MISC.	BULLET	1855	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	006	6/10/2016	4181256.591	575543.000	1	4	0.01	SAA	MISC.	BULLET	1856	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	007	6/10/2016	4181250.401	575543.226	1	3	1	NMD	FENCE	BARBED WIRE	1857	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	008	6/10/2016	4181251.269	575543.607	2	3	0.02	SAA	MISC.	BULLET	1858	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	009	6/10/2016	4181250.093	575544.453	2	2	0.02	SAA	MISC.	BULLET	1860	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	010	6/10/2016	4181250.516	575545.502	3	4	0.03	SAA	MISC.	BULLET	1862	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	011	6/10/2016	4181246.047	575548.267	2	3	0.02	SAA	MISC.	BULLET	1863	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	012	6/10/2016	4181243.906	575549.252	2	3	0.02	SAA	MISC.	BULLET	1864	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	013	6/10/2016	4181243.599	575549.929	1	2	0.01	SAA	MISC.	BULLET	1865	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	014	6/10/2016	4181238.707	575552.918	2	4	0.02	SAA	MISC.	BULLET	1866	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	015	6/10/2016	4181237.200	575553.591	1	3	0.01	SAA	MISC.	BULLET	1867	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	016	6/10/2016	4181231.956	575555.432	2	4	0.02	SAA	MISC.	BULLET	1868	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	017	6/10/2016	4181231.128	575555.322	6	5	0.06	SAA	MISC.	BULLET	1869	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	T08	018	6/10/2016	4181230.326	575555.434	4	2	0.04	SAA	MISC.	BULLET	1870	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	019	6/10/2016	4181225.859	575554.798	1	3	0.01	SAA	MISC.	BULLET	1871	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	020	6/10/2016	4181217.561	575562.451	1	3	0.5	NMD	MISC.	SCRAP METAL	1872	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	021	6/10/2016	4181213.529	575559.537	2	4	0.02	SAA	MISC.	BULLET, SHOTGUN SHELL BASE	1873	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T08	022	6/10/2016	4181208.846	575561.173	2	4	0.02	SAA	MISC.	BULLET	1874	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	001	6/15/2016	4181271.738	575437.327	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2203	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	002	6/15/2016	4181271.997	575427.834	1	4	0.01	SAA	MISC.	BULLET	2204	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	003	6/15/2016	4181263.844	575419.077	1	3	0.01	SAA	MISC.	BULLET	2205	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	004	6/15/2016	4181266.359	575417.004	1	4	0.01	SAA	MISC.	BULLET	2206	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	005	6/15/2016	4181266.778	575408.473	1	2	0.01	SAA	MISC.	BULLET	2207	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	006	6/15/2016	4181262.159	575412.734	1	4	0.01	SAA	MISC.	BULLET	2208	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	007	6/15/2016	4181263.997	575407.560	1	3	0.01	SAA	MISC.	BULLET	2209	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	008	6/15/2016	4181266.163	575406.422	1	2	0.01	SAA	MISC.	BULLET	2210	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	009	6/15/2016	4181268.993	575405.018	1	3	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2211	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	010	6/15/2016	4181265.245	575402.339	1	3	0.01	SAA	MISC.	BULLET	2212	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	011	6/15/2016	4181265.272	575400.900	1	3	0.01	SAA	MISC.	BULLET	2213	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	012	6/15/2016	4181263.937	575400.589	1	3	0.01	SAA	MISC.	BULLET	2214	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	013	6/15/2016	4181261.833	575397.772	1	2	0.01	SAA	MISC.	BULLET	2215	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	014	6/15/2016	4181262.241	575397.073	1	3	0.01	SAA	MISC.	BULLET	2216	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	015	6/15/2016	4181262.703	575393.853	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2217	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	016	6/15/2016	4181260.985	575390.432	1	2	0.01	SAA	MISC.	BULLET	2218	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	017	6/15/2016	4181259.958	575382.512	1	3	0.01	SAA	MISC.	BULLET	2219	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	018	6/15/2016	4181258.834	575382.443	1	2	0.01	SAA	MISC.	BULLET	2220	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	019	6/15/2016	4181256.545	575383.348	1	3	0.01	SAA	MISC.	BULLET	2221	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	020	6/15/2016	4181254.402	575383.743	1	2	0.01	SAA	MISC.	BULLET	2222	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	021	6/15/2016	4181253.389	575384.596	1	4	0.01	SAA	MISC.	BULLET	2223	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T09	022	6/15/2016	4181250.641	575383.378	1	3	0.01	SAA	MISC.	BULLET	2224	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	001	6/15/2016	4181395.841	575269.944	1	3	0.01	SAA	MISC.	BULLET	2229	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	002	6/15/2016	4181394.973	575271.344	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2230	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	003	6/15/2016	4181391.016	575271.708	3	3	0.03	SAA	MISC.	BULLETS	2231	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	004	6/15/2016	4181390.278	575271.946	1	2	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2232	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	005	6/15/2016	4181383.881	575273.962	1	3	0.01	SAA	MISC.	BULLET	2233	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	006	6/15/2016	4181380.632	575271.761	1	3	0.01	SAA	MISC.	BULLET	2234	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	007	6/15/2016	4181375.846	575274.303	1	2	0.01	SAA	MISC.	BULLET	2235	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	008	6/15/2016	4181374.883	575273.249	1	3	0.01	SAA	MISC.	BULLET	2236	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T10	009	6/15/2016	4181375.034	575272.009	1	2	0.01	SAA	MISC.	BULLET	2237	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T11	001	6/15/2016	4181401.560	575282.010	1	3	0.2	NMD	MISC.	SCRAP METAL	2238	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T11	002	6/15/2016	4181399.193	575284.944	1	2	0.01	SAA	MISC.	BULLET	2239	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T11	003	6/15/2016	4181395.279	575288.510	1	3	0.01	SAA	MISC.	BULLET	2240	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T11	004	6/15/2016	4181387.802	575291.915	1	4	0.01	SAA	MISC.	BULLET	2241	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	T11	005	6/15/2016	4181384.562	575293.552	1	3	0.01	SAA	MISC.	BULLET	2242	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG01	001	6/10/2016	4181225.121	575354.126	1	2	0.02	SAA	MISC.	CARTRIDGE BRASS	2034	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG02	001	6/10/2016	4181246.102	575382.265	2	3	2	NMD	MISC.	RAILROAD SPIKES	2036	REMOVED	WHITE	RH	

Leona Heights Rifle Range
Remedial Investigation Dig List

MRS	Transect/Grid	Unique Target ID	Dig Date	Northing	Easting	Count	Depth (inches)	Weight LBS	Item Category	Item Type	Description	Photo ID	Final Disposition	DETECTION EQUIPMENT	TEAM LEADERS INTIALS	Detonation Date[1]
LEONA HEIGHTS RIFLE RANGE	MG03	001	6/15/2016	4181309.320	575279.106	1	8	2	QC SEED	MED.ISO	SEED #4	2195	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG03	002	6/15/2016	4181308.920	575278.519	1	2	0.01	SAA	MISC.	BULLET	2196	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG03	003	6/15/2016	4181309.032	575277.029	1	3	0.01	SAA	MISC.	BULLET	2197	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG03	004	6/15/2016	4181307.597	575279.122	1	2	0.01	SAA	MISC.	BULLET	2198	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG03	005	6/15/2016	4181307.429	575280.244	1	5	0.01	SAA	MISC.	SHOTGUN SHELL BASE	2199	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG03	006	6/15/2016	4181309.193	575280.967	1	3	0.01	NMD	MISC.	SCRAP METAL	2200	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG04	001	6/15/2016	4181304.436	575309.196	1	3	0.01	SAA	MISC.	BULLET	2201	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG04	002	6/15/2016	4181304.116	575311.709	1	5	0.01	SAA	MISC.	BULLET	2202	REMOVED	WHITE	RH	
LEONA HEIGHTS RIFLE RANGE	MG05	NONE												WHITE	RH	

[1] - Detonation date indicates item was identified as MPPEH prior to intentional detonation.

T# - Transect Number

MG - Mini-grid #

MD - Munitions Debris

SAA - Small Arms Ammunition

NMD - Non-munitions Debris

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APPENDIX I

MATERIAL DOCUMENTED AS SAFE DOCUMENTS

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Leona Heights Rifle Range MRS Remedial Investigation
Demolition Shot Record

Contract No.: W912DR-09-D-0006, Delivery Order No. 0011 Modification #3

Shot Number: 01, 02, 03 & 04 Date: 17 June 2016

Time: 0820, 0850, 0920 & 0940

Anomaly Number	Description	End Result:			Remarks
		High Order	Vented,MD	Other	
T03-016	3" stokes Mortar, Practice		X		
T03-034	3" stokes Mortar		X		
T03-035	3" stokes Mortar		X		
n/a	Clean up shot			X	Disposed of remaining demo material.

Explosives Used		
Type	Quantity	Remarks
ST Lead Line	2500'	
Jet perforator, ea.	8ea	
PrimaLine, Det Cord 100gpf	40'	
40MS ST detonators	10ea	
Shotshell primers	100ea	
Blasting cap.l electric, ea.		
Blasting cap, nonelectric, ea.		
Other.		

Demolition Team Leader: Robert Prosperi Signature: Robert A Prosperi Date: 6/17/2016

SUXOS: Robert Prosperi Signature: Robert A Prosperi Date: 6/17/2016

DEMOLITION MATERIAL ACCOUNTABILITY FORM

WESTON SOLUTIONS
Restoring Resource Efficiency

Project: LEONA HEIGHTS RIFLE RNG	Site Location: ALAMEDA, CA	Date: 6-17-2016
Work Area/ Grid ID/ Transect ID: LEONA HEIGHTS MMS	Action: DEMIL	

EXPLOSIVES ISSUED

Signature of Team Leader:

Item Description	Manufacturer Identification	Quantity	Initials of Verifier
ST LEAD LINE	PJ25025 LOT# 09FE16W1	2500'	
PRIMA LINE 21 (160 gr)	A382004 LOT# 12AP12C1	40'	
PERFENATORS	LOT# 28JUL15C1	8 ea	
NONEL 40 MS DETONATOR	DA14641 LOT# 08JU15W1	10 ea	
SHOTSHELL TRIMER #209	10037	100 ea	

EXPLOSIVES EXPENDED

Signature of Team Leader:

Item Description	Manufacturer Identification	Quantity	Initials of Verifier

ALL ISSUED ITEMS EXPENDED

EXPLOSIVES RETURNED

Signature of Senior UXO Supervisor:

Item Description	Manufacturer Identification	Quantity	Initials of Verifier

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

ALPHA EXPLOSIVES
P.O. BOX 310
LINCOLN, CALIFORNIA 95648
TELEPHONE (916) 645-3377
FAX (916) 645-8512

06/16/2016	44410

STRAIGHT
BILL OF LADING

NON-NEGOTIABLE

SOLD TO WESTON SOLUTIONS
1340 TREAT BLVD STE 210
WALNUT CREEK, CA 94597

SHIP TO WESTON SOLUTIONS
770 CANYON OAKS DRIVE
OAKLAND, CA 94605

ATF #: C/O 9CA061208B06193

EXPIRATION: 2/1/18

ORDER NO.	ORDER DATE	CUSTOMER NO.	SALES PERSON	PURCHASE ORDER NO.	SHIP VIA	SHIP DATE	ROUTE
44410	06/16/2016	523592		0091613	ALPHA TRUCK	06/17/2016	

PROPER SHIPPING NAME	HAZARD CLASS	UN NUMBER	PKG GROUP	DOT EXEMPTION	SHIPPED QUANTITY
QTY RETURNED / UNIT / QTY SHIPPED / ITEM NUMBER / LOT NO. / ITEM DESCRIPTION					
~~BOOSTERS, WITHOUT DETONATORS~~	~~1.1D~~	~~UN0042~~	~~II~~		
~~EA 5.00 BS4059 LOT: 38NO06L4 PENTEX CD 3~~					~~5.00~~
CORD, DETONATING, FLEXIBLE	1.1D	UN0065	II		
FT 40.00 A382004 LOT: 12AP12G1 PRIMALINE 21 (100GR/FT) 800 FT S					40.00
DETONATOR ASSEMBLIES, NON-ELECTRIC, FOR BLASTING	1.4B	UN0361	II		
EA 10.00 DA14641 LOT: 08JU15W1 NONEL MS 40' 500MS F80					10.00
CHARGES, SHAPED, PERFORATORS	1.4D	UN0440	II		
EA 8.00 TAG-3375-311L LOT: 28JUL15C1 CHARGE, PERFORATORS, 3 3/8" D					8.00
ARTICLES, EXPLOSIVE, N.O.S (CONTAINS HMX, ALUMINUM POWDER)	1.4S	UN0349	II		
RL 1.00 DJ25025 LOT: 08FE16W1 LEAD LINE 2500'					1.00
MISCELLANEOUS SUPPLIES			O		
EA 1.00 *LB LOT: LICENSED BLASTER					1.00
HR 1.00 *DELCH LOT: DELIVERY CHARGE					1.00
EA 1.00 *LABOR LOT: PACK-OUT FEE					1.00
EA 100.00 10037 LOT: SHOT SHELL PRIMERS #209					100.00

EMERGENCY CONTACT:
1/800/535-5053

FEDERAL LICENSE NO. 9CA029226J01202
FEDERAL LICENSE NO. 9CA061208B06193
U.S. DOT NO. 118279
HAZ. MAT. LIC. NO. HMX 35151

THIS IS TO CERTIFY THAT THE ABOVE NAMED MATERIALS ARE PROPERLY CLASSIFIED, DESCRIBED, PACKAGED, MARKED AND LABELED, AND ARE IN PROPER CONDITION FOR TRANSPORTATION ACCORDING TO THE APPLICABLE REGULATIONS OF THE DEPARTMENT OF TRANSPORTATION.

FOR ALPHA DYNO NOBEL BY _____

RECEIVED BY: _____

TITLE: _____

DATE: 06 / 17 / 2016

CUSTOMER

DOC IDENT	RI FROM	M & S	U/I	QUANTITY	SER	SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	RDD EEA QLTDE	ADV	UNIT PRICE DOLLARS CTS	DOLLARS CTS

Munitions Debris (MD) turned in as;
Materials Documented as Safe (MDAS)

1ea. Box filled with MDAS ; Mixed metals, EST WT 150lbs

CAARNG/ Keystone /Weston Solutions / 001

24. DOCUMENT NUMBER & SUFFIX (30-44)

Seal Numbers: B433238

I acknowledge that all items listed above must be shredded and or melted before resale.

Signature: Rebecca Hauff

25. NATIONAL STOCK NUMBER & ADD (8-22)

1. TOTAL PRICE	2. SHIP FROM	SHIP TO
	Keystone Rifle Range, Sonora, CA	Timberline Enviornmental Services, Inc. 29925 Highway 108, Coldsprings, CA 95335
		Weston Solutions Inc.
$0.00	4. MARK FOR	

5. DOCDATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS

10. QTY. REC'D	11. UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC	15. SL
NA					

16. FREIGHT CLASSIFICATION NOMENCLATURE

17. ITEM NOMENCLATURE

Munitions Debris

18. TYCONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE
		185	

22. RECEIVED BY	23. DATE RECEIVED
Rebecca Hauff	6/23/16

26

1 This certifies and verifies that the material listed has been 100% inspected and to the best of our knowledge and belief is inert and/or free of explosives or related materials.

2 We Certify that the MD scrap materials were demilitarized in accordance with Appendix 4, Category III, Para 6a, that were compiled with in the DOD 4160.21-M-1 and other applicable regulations.

3 Each piece of MD scrap metal has been inspected by (3) separate Senior qualified UXO Tech's (Unexploded Ordnance Technicians).

27. ADDITIONAL DATA

Signature: Robert Prosperi Title: Senior UXO Supervisor, Weston Solutions Inc. (828) 450-3179 Date: 23 June 2016
Certifer

Signature: Wayne Stebelski Title: UXOQCS, Weston Solution Inc. (480) 250-8337 Date: 23 June 2016
Verifier

DD FORM 1348-1A, JUL 91 ISSUE RELEASE/RECEIPT DOCUMENT S/N 0102-LF-016-4100

Included 3 MD items from Leona Heights Rifle Range MRS.

Timberline Environmental Services, Inc.
29925 Highway 108
Cold Springs, CA 95335
Office: (209) 965-3118

To:
Weston Solutions
Attn: Shawn MacMillan

The item(s) described below were obtained from Weston Solutions Inc. while conducting Remedial Action Investigation of Areas within Keystone Range (Remedial Investigation/ Feasibility Study)		
Description of Item: Munitions Debris (Material Documented As Safe) Mixed Metals/Steel: 150 est. **lbs**		
Obtained from: (title, name, location, phone number) Weston Solutions Inc., Robert Prosperi (SUXOS), Keystone Rifle Range, CA (828) 450-3179		
Printed name of SUXOS: Robert Prosperi	**Signature of SUXOS:**	**Date Obtained:** 6/23/2016
Load Number/Bin Number: Container #001 Seal # B433238		

As the representative for, Timberline Environmental Services, Inc. 29925 Highway 108 Cold Springs, CA 95335 Office: (209) 965-3118 I Rebecca Hauff certify that the above materials have been processed accordingly on (date) 7/18/16. The material is now only identifiable by its basic metal content and has reached its final disposition.

Signed: Rebecca Hauff date: 7/18/16

MD from Leona Heights Rifle Range was transported to Keystone Rifle Range and delivered to Timberline for processing as one shipment.

DEMILITARIZATION CHAIN OF CUSTODY CERTIFICATION FOR UXO/OE SCRAP

Load No.

1. Releasing Generators (RG) Name and Mailing Address: Shawn MacMillan 841 Bishop St. Ste 2301 Honolulu Hi 96813	1a. RG's Phone No.: 702-275-7501	2. RG's Site Manager: Shawn MacMillan
3. Releasing Generators (RG) Project Name and Location: Keystone / Leona Heights	3a. RG Project Phone No.: 702-275-7501	4. RG's SUXOS: Bob Prospero
5. Transportation Company: Timberline Environmental Services 29925 Highway 108, Cold Springs, CA 95335	5a. Transporter Phone No.: (209)586-1541	6. Transporter Name: John Morgan
7. Demil Processor: Timberline Environmental Services 29925 Highway 108, Cold Springs, CA 95335	7a. Demil Processor Phone No.: (209)586-1541	8. Demil Processor Manager: Terry Northcutt

9. # Of Containers	10. Seal No.'s	11. Estimated Weight
1	3133238	180 lbs

12. Freight Classification Nomenclature	13. Item Nomenclature
Ordnance Related Scrap	

14. Material Released to the Transporter By RG's Site Manager

"This certifies that the material listed here has been 100% properly inspected and to the best of my knowledge and belief is free of explosive hazards."

Print/Type Name	Signature	Time and Date
Shawn MacMillan		6/23/16 1115

15. Received for Transport By (Receiving Signature Verifies that Seals are Intact)

Print/Type Name	Signature	Time and Date
John Morgan	John Morgan	6/23/16

16. TES Site Manager: I ACKNOWLEDGE THE RECEIPT OF MATERIAL (Receiving Signature Verifies that Seals are Intact)

RECEIVED BY:	# of Containers/Weight	Date
Rebecca Hauff	1 @ 185 lbs	6/23/16

17. Material Demilitarized

"I certify that the materials listed here have been demilitarized/destroyed so as to no longer resemble AEDA/ordnance beyond DOD requirements 4160.21.M.1"

Processed By: Print/Type Name	Signature	Date
Rebecca Hauff	Rebecca Hauff	7/18/16

18. Material Recycled in Accordance with DOD Guidelines

Shipped By: Print/Type Name	Recycling Facility	Date

19. Documents sent to RG

Print/Type Name	Documents	Month/Day/Year
		/ /

20. Discrepancies

8-12-04 Rev 1

Certificate of Destruction

Sealed Container Generating Contractor **Weston**

Generating Location **Keystone/** Leona Heights

Gross Weight **185 lbs MDAS**

[I certify that the items/assets/material received were demilitarized in accordance with guidelines contained in DoD 4160.21-M-1 and having been smelted are only identifiable by their basic content.]

COD# **072516** *Date* **7/25/2016**

Certifying Official **Terry Northcutt** *Title* **President**

Signature

TES Inc. 22709 Twain Harte Dr. Twain Harte, Ca. 209-586-1541 caoffice@timberlineenvsv.com

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APPENDIX J

ABORATORY ANALYTICAL RESULTS AND DATA VALIDATION REPORTS (CD ONLY)

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APPENDIX K

MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL SHEETS

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MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

Installation Name:	**Leona Heights Rifle Range**	**EHE Score:**	**C**
Site Name:	**Leona Heights Rifle Range (CAHQ-013-R-01)**	**CHE Score:**	**No Known or Suspected CWM Hazard**
Completed By:	**Weston Solutions, Inc.**	**HHE Evaluation:**	**No Known or Suspected MC Hazard**
Date Completed:	**January 2017**	**Overall Priority:**	**4**

Background

The Munitions Response Site Prioritization Protocol reflects the statement in 10 U.S.C. § 2710(b)(2) that the priority assigned should be based on the overall conditions at each location, taking into consideration various factors relating to safety and environmental hazard potential. As required under 10 U.S.C. § 2710(b)(1), the priority assigned to each munitions response site will be included with the inventory information made publicly available. The requirement for an inventory of munitions response sites known or suspected of containing unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC) is found at 10 U.S.C. § 2710(a). The assigned priority will be updated annually to reflect new information that becomes available.

Description

The Munitions Response Site Prioritization Protocol evaluates the following potential explosive safety and environmental hazards:

- Explosive hazards posed by unexploded ordnance (UXO) and discarded military munitions (DMM)
- Hazards associated with the effects of chemical warfare materiel (CWM)
- The chronic health and environmental hazards posed by munitions constituents (MC) or other chemical constituents.

DoD recognizes the different hazards inherent to each class of materials. To address these differences, the Protocol has three hazard evaluation modules, each of which is specific to one type of hazard, specifically:

- Explosive hazards are evaluated using the Explosives Hazard Evaluation (EHE) module
- CWM-related hazards are evaluated using the Chemical Warfare Materiel Hazard Evaluation (CHE) module
- Health and environmental hazards posed by MC are evaluated using the Health Hazard Evaluation (HHE) module.

DoD recognized that sufficient data to apply all three of the hazard evaluation modules may not be immediately available for some munitions response sites. In such cases where data are available for only one or two of the modules, the priority will be assigned based on the modules for which sufficient data are available. This initial priority may change when additional data are collected and all three modules are evaluated. Modules for which there are insufficient data will be assigned a status of “evaluation pending”.

Upon completion of all necessary munitions responses at a munitions response site, the status “prioritization no longer required” will be assigned. The sequencing of munitions response sites for environmental restoration activities will be based primarily on the priority assigned using this Protocol, but may also reflect other relevant information, such as stakeholder concerns, economic issues, and program management considerations.

Instructions

Enter the appropriate score for each “Classification” in the “Site Score” column. Enter the highest Site Score in the last row of each table. Follow the matrix presented in Table 10 to determine the EHE rating. Repeat this process to determine the CHE rating (Table 20) and HHE rating (Table 24).

EHE Site Scores are calculated in Tables 1 through 9. The EHE rating is calculated in Table 10. CHE Site Scores are calculated in Tables 11 through 19. The CHE rating is calculated in Table 20. HHE Site Scores are calculated in Tables 21 through 27. The HHE rating is calculated in Table 28. The Site Priority based on the three hazard evaluations (EHE, CHE, and HHE) is calculated in Table 29. The value determined in Table 29 is used to determine the priority of the site.

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: Leona Heights Rifle Range (CAHQ-013-R-01)

Component: Army National Guard (ARNG) Directorate

Installation/Property Name: Leona Heights Rifle Range

Location (City, County, State): Oakland, Alameda County, CA

Site Name/Project Name (Project No.): Leona Heights Rifle Range Remedial Investigation, W912DR-09-D-0006-DM 0011 Modification #3

Date Information Entered/Updated: July 2016 (prepared by Weston Solutions, Inc.)

Point of Contact (Name/Phone): Walter Gee, ARNG Project Manager/ (703) 607-7980

Project Phase (check only one):

❑ PA	❑ SI	☑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary: MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Leona Heights Rifle Range MRS is a transferred range that was used for artillery and mortar practice, and small arms training by multiple CAARNG units from 1913 until the mid to late 1930s. Leona Heights Rifle Range consists of 81.33 acres. Beginning in 1913, the range was first used for artillery practice, with the small arms range constructed in 1920 (SI Report, Section 4.13.1). The range consisted of as many as five target berms at varying distances extending out to 1,000 yards (SI Report, Section 4.13.1).

During the SI visual survey, the field team identified a small arms impact area near the eastern end of the MRS. Small arms debris, consisting of .30 caliber projectiles, was identified on the surface of the earthen berm in front of and on the slope behind the target system (SI Report, Section 4.13.3). The field team also identified one MD item, a 3-inch Stokes mortar round located on the eastern slope of the MRS in an area covered in dense vegetation that was not easily accessible. A number of sub-surface anomalies were also detected a short distance below the Stokes mortar (SI Report, Section 4.13.3).

The RI field investigation was conducted between 6 June 2016 through 17 June 2016. The survey design was based on subsurface anomalies that were not intrusively investigated during the SI, assumed migration paths (low spots), and lines of evidence observed real-time during the RI fieldwork. Analog survey and subsequent intrusive investigation in accessible areas within the Leona Canyon area and where the subsurface anomalies were identified in the SI were completed. 351 anomalies were identified and intrusively investigated resulting in; 0 – MEC, 4 – MD 3-inch Practice Stokes Mortars, 245 – SAA, and 102 – NMD items.

Table A
MRS Background Information

Description of Pathways for Human and Ecological Receptors: The exposure pathways for human receptors to contact MEC are complete (SI Report, Section 4.13.4, Figure 4-13.4). Potential exposure pathways include surface and subsurface soils. The exposure pathways for human receptors to contact MC are incomplete (SI Report, Section 4.13.4, Figure 4-13.5).

Description of Receptors (Human and Ecological): Residents and recreational users.
MRSPP Score: 4

Table 1
EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	**30**
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	**2**
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**30**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

Four practice 3-inch Stokes Mortars were found during the analog survey and subsequent intrusive investigation. Three of the practice mortars were classified as MPPEH, however after intentional detonation they were reclassified as MD (no high-order detonation), and their classification as a practice round was confirmed.

Table 2
EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	**10**
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	**1**
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The MRS was used for artillery and mortar practice, and small arms training. During the RI intrusive investigation four practice 3-inch Stokes Mortars were found and classified as MD and SAA.

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	**10**
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	**5**
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

During the SI, a 3-inch stokes mortar was found on the surface.

During the RI intrusive investigation four practice 3-inch Stokes Mortars (MD) were found between 6-inches bgs and 24-inces bgs.

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	**10**
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**10**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The Leona Heights Rifle Range MRS is located in Oakland, CA within a residential neighborhood on land that is owned by private and public entities. There is partial public access to the site due to the majority of the land being privately owned; however, there are no barriers that prevent trespassing onto the site.

Table 5
EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. ◆ The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	**5**
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Leona Heights Rifle Range MRS is a transferred range. The entire site is located on land owned by private and public entities.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	**5**
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The U.S. Census data for 2010 indicates a population density for Oakland, CA of 7,004 persons per square mile

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**5**
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Leona Heights Rifle Range lies within a residential neighborhood and multiple houses and roads are located within and adjacent to the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	**5**
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	**4**
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	**3**
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

Leona Heights Rifle Range lies within a residential neighborhood and multiple houses and roads are located within and adjacent to the MRS. The majority of the residences are in the western half of the site. There are also large undeveloped areas.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	**0**
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are several federal and/or state listed species of concern, threatened, and/or endangered species known to occur within Alameda County, California. These include one reptile, one bird, one fish, and one amphibian species. None of these species are known to occur within the MRS. No cultural resources are known to exist on the MRS.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	30	**40**
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	10	**25**
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	**15**
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			**80**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	**C**
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**C**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	**0**
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

No historical or visual evidence indicates that CWM is or was present at this MRS.

Tables 12 through 19 are intentionally omitted according to Army Guidance

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	**0**
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/Structures	Table 18		
Ecological and/or Cultural Resources	Table 19		
CHE MODULE TOTAL			**0**

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No groundwater samples were taken.			

CHF Scale	CHF Value	Sum The Ratios
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ☑

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were taken.			
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☑

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were taken.			
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☑

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were taken.			
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☑

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were taken.			
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☑

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
Copper	56	3,100	0.019
Zinc	110	23,000	0.005
Lead	48	400	0.120
CHF Scale	**CHF Value**	**Sum the Ratios**	0.144
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	**L**

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	**L**
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

Analytical results for the nine samples and one field duplicate sample collected were all below the established screening criteria and no explosives were detected in the samples. Therefore, there is no potential for MC to migrate in the environment.

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	**L**
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

All results for the nine samples and one field duplicate sample were below the screening criteria and no explosives were detected in the samples. Therefore, there is no potential for receptors to encounter MC.

No Known or Suspected Surface Soil MC Hazard ☑

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)	L	L	L	LLL	**G**

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	G

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

No analytes exceeded the site screening values as agreed upon by all stakeholders at the completion of the Site Inspection and required No Further Action for MC.

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	**4**	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**4**	

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MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

Installation Name:	**Leona Heights Rifle Range**	**EHE Score:**	**No Known or Suspected Explosive Hazard**
Site Name:	**Leona Heights Rifle Range (CAHQ-013-R-02)**	**CHE Score:**	**No Known or Suspected CWM Hazard**
Completed By:	**Weston Solutions, Inc.**	**HHE Evaluation:**	**No Known or Suspected MC Hazard**
Date Completed:	**January 2017**	**Overall Priority:**	**No Known or Suspected Hazards**

Background

The Munitions Response Site Prioritization Protocol reflects the statement in 10 U.S.C. § 2710(b)(2) that the priority assigned should be based on the overall conditions at each location, taking into consideration various factors relating to safety and environmental hazard potential. As required under 10 U.S.C. § 2710(b)(1), the priority assigned to each munitions response site will be included with the inventory information made publicly available. The requirement for an inventory of munitions response sites known or suspected of containing unexploded ordnance (UXO), discarded military munitions (DMM), or munitions constituents (MC) is found at 10 U.S.C. § 2710(a). The assigned priority will be updated annually to reflect new information that becomes available.

Description

The Munitions Response Site Prioritization Protocol evaluates the following potential explosive safety and environmental hazards:

- Explosive hazards posed by unexploded ordnance (UXO) and discarded military munitions (DMM)
- Hazards associated with the effects of chemical warfare materiel (CWM)
- The chronic health and environmental hazards posed by munitions constituents (MC) or other chemical constituents.

DoD recognizes the different hazards inherent to each class of materials. To address these differences, the Protocol has three hazard evaluation modules, each of which is specific to one type of hazard, specifically:

- Explosive hazards are evaluated using the Explosives Hazard Evaluation (EHE) module
- CWM-related hazards are evaluated using the Chemical Warfare Materiel Hazard Evaluation (CHE) module
- Health and environmental hazards posed by MC are evaluated using the Health Hazard Evaluation (HHE) module.

DoD recognized that sufficient data to apply all three of the hazard evaluation modules may not be immediately available for some munitions response sites. In such cases where data are available for only one or two of the modules, the priority will be assigned based on the modules for which sufficient data are available. This initial priority may change when additional data are collected and all three modules are evaluated. Modules for which there are insufficient data will be assigned a status of “evaluation pending”.

Upon completion of all necessary munitions responses at a munitions response site, the status “prioritization no longer required” will be assigned. The sequencing of munitions response sites for environmental restoration activities will be based primarily on the priority assigned using this Protocol, but may also reflect other relevant information, such as stakeholder concerns, economic issues, and program management considerations.

Instructions

Enter the appropriate score for each “Classification” in the “Site Score” column. Enter the highest Site Score in the last row of each table. Follow the matrix presented in Table 10 to determine the EHE rating. Repeat this process to determine the CHE rating (Table 20) and HHE rating (Table 24).

EHE Site Scores are calculated in Tables 1 through 9. The EHE rating is calculated in Table 10. CHE Site Scores are calculated in Tables 11 through 19. The CHE rating is calculated in Table 20. HHE Site Scores are calculated in Tables 21 through 27. The HHE rating is calculated in Table 28. The Site Priority based on the three hazard evaluations (EHE, CHE, and HHE) is calculated in Table 29. The value determined in Table 29 is used to determine the priority of the site.

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from Service and DoD databases. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the **MRS Summary**, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental nonmunitions-related contaminants (e.g., benzene, trichloroethylene) found at the MRS, and any potentially exposed human and ecological receptors. If possible, include a map of the MRS.

Munitions Response Site Name: Leona Heights Rifle Range (CAHQ-013-R-02)

Component: Army National Guard (ARNG) Directorate

Installation/Property Name: Leona Heights Rifle Range

Location (City, County, State): Oakland, Alameda County, CA

Site Name/Project Name (Project No.): Leona Heights Rifle Range Remedial Investigation, W912DR-09-D-0006-DM 0011 Modification #3

Date Information Entered/Updated: January 2017 (prepared by Weston Solutions, Inc.)

Point of Contact (Name/Phone): Walter Gee, ARNG Project Manager/ (703) 607-7980

Project Phase (check only one):

❑ PA	❑ SI	☑ RI	❑ FS	❑ RD
❑ RA-C	❑ RIP	❑ RA-O	❑ RC	❑ LTM

Media Evaluated (check all that apply):

❑ Groundwater	❑ Sediment (human receptor)
☑ Surface soil	❑ Surface Water (ecological receptor)
❑ Sediment (ecological receptor)	❑ Surface Water (human receptor)

MRS Summary: MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM, or MC known or suspected to be present. When possible, identify munitions, CWM, and MC by type:

The Leona Heights Rifle Range MRS is a transferred range that was used for artillery and mortar practice, and small arms training by multiple CAARNG units from 1913 until the mid to late 1930s. Leona Heights Rifle Range consists of 81.33 acres. Beginning in 1913, the range was first used for artillery practice, with the small arms range constructed in 1920 (SI Report, Section 4.13.1). The range consisted of as many as five target berms at varying distances extending out to 1,000 yards (SI Report, Section 4.13.1).

During the SI visual survey, the field team identified a small arms impact area near the eastern end of the MRS (Leona Canyon Regional Open Space Preserve [ROSP]). Small arms debris, consisting of .30 caliber projectiles, was identified on the surface of the earthen berm in front of and on the slope behind the target system (SI Report, Section 4.13.3). The field team also identified one MD item, a 3-inch Stokes mortar round located on the eastern slope of the MRS in an area covered in dense vegetation that was not easily accessible. A number of sub-surface anomalies were also detected a short distance below the Stokes mortar (SI Report, Section 4.13.3).

The MRS encompasses a portion (31.73 acres) of the public 290 acre East Bay Regional Parks District (EBRPD) Leona Canyon ROSP and two residential areas (48.29 acres) consisting of condominium and townhouse complexes and single family residences. The residential areas within the MRS are adjacent to the Leona Canyon ROSP on the northeast (16 acres) and southwest (32.29 acres) Both of these areas have had significant earthwork performed as part of the residential development. The greater majority of these developed areas are hardscape including residences, condominiums, parking lots, roads,

Table A
MRS Background Information

sidewalks, and recreational areas (tennis courts and pools).
There is a small area in the southwest portion of the MRS which has most likely has been disturbed, however is not hardscape. During the SI approximately 3 miles of visual survey transects aided by hand-held metal detectors were conducted within the southwest portion of the MRS. At the completion of the survey in this portion no MD or MEC was identified. Furthermore, there was no evidence of the historical target areas or training. This lack of evidence is attributed to the substantial development within the MRS. During the TPP process, discussion was held regarding the developed areas of the MRS. All parties agreed that they will not be investigated further due to the substantial development and extensive coverage during the SI. These developed areas are recommended for No Further Action as data does not indicate that MEC or MC poses a risk to human health or the environment within in these areas.

Description of Pathways for Human and Ecological Receptors: The exposure pathways for human receptors to contact MEC and MC in the developed areas are incomplete.

Description of Receptors (Human and Ecological): Residents and recreational users.

MRSPP Score: No Known or Suspected Hazards

Table 1
EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the scores that correspond with **all** the munitions types known or suspected to be present at the MRS.

Note: The terms *practice munitions, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ UXO that are considered most likely to function upon any interaction with exposed persons (e.g., submunitions, 40mm high-explosive [HE] grenades, white phosphorus [WP] munitions, high-explosive antitank [HEAT] munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions). ◆ Hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazard.	30
High explosive (used or damaged)	◆ UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ UXO containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades). ◆ DMM containing a pyrotechnic filler other than white phosphorus (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ DMM containing a high-explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrotechnics, or propellant	◆ DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ DMM that are bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ DMM containing a pyrotechnic filler (i.e., red phosphorus), other than white phosphorus filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ UXO that are practice munitions that are not associated with a sensitive fuze. ◆ DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ Used munitions or DMM that are categorized as small arms ammunition. (Physical evidence or historical evidence that no other types of munitions [e.g., grenades, subcaliber training rockets, demolition charges] were used or are present on the MRS is required for selection of this category.)	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	**0**
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

No MEC or MD was identified in the developed areas.

Table 2
EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the scores that correspond with **all** the sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms *former range, practice munitions, small arms range, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include impact or target areas and associated buffer and safety zones.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	**0**
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The developed areas have undergone substancial earthwork and the majority is hardscape including residences, condominiums, parking lots, roads, sidewalks, and recreational areas (tennis courts and pools).

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the scores that correspond with **all** the locations where munitions are known or suspected to be present at the MRS.

Note: The terms *confirmed, surface, subsurface, small arms ammunition, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS. ◆ Historical evidence (i.e., a confirmed report such as an explosive ordnance disposal [EOD], police, or fire department report that an incident or accident that involved UXO or DMM occurred) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS, and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris such as fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability. (There must be evidence that no other types of munitions [e.g., grenades] were used or are present at the MRS to place an MRS into this category.)	1
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	**0**
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

No MEC or MD was identified in the developed areas.

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to the MRS. Circle the score that corresponds with the ease of access to the MRS.

Note: The term *barrier* is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	10
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	**8**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classification in the space provided.

The developed areas are private property, and the southwest area is surrounded by a fence with two gated access points.

Table 5
EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies. ◆ The MRS is at a location that is owned by DoD, but that DoD has leased to another entity and for which DoD does not control access 24 hours per day.	**5**
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the Protocol is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classification in the space provided.

The Leona Heights Rifle Range MRS is a transferred range. The developed areas are private property.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications for population density and their descriptions. Determine the population density per square mile that most closely corresponds with the population of the MRS, including the area within a two-mile radius of the MRS's perimeter. Circle the most appropriate score.

Note: Use the U.S. Census Bureau tract data available to capture the **highest** population density within a two-mile radius of the perimeter of the MRS.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	**5**
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the U.S. Census Bureau tract in which the MRS is located.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classification in the space provided.

The U.S. Census data for 2010 indicates a population density for Oakland, CA of 7,004 persons per square mile

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the potential population near the MRS. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the number of inhabited structures.

Note: The term *inhabited structures* is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	**5**
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classification in the space provided.

Leona Heights Rifle Range lies within a residential neighborhood and multiple houses and roads are located within and adjacent to the MRS.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the scores that correspond with **all** the activities/structure classifications at the MRS.

Note: The term *inhabited structure* is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	**5**
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	**4**
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	**3**
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	2
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**5**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

Leona Heights Rifle Range lies within a residential neighborhood and multiple houses and roads are located within and adjacent to the MRS. The majority of the residences are in the western half of the site. There are also large undeveloped areas.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resources present on the MRS.

Note: The terms *ecological resources* and *cultural resources* are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	3
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	**0**
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classification in the space provided.

There are several federal and/or state listed species of concern, threatened, and/or endangered species known to occur within Alameda County, California. These include one reptile, one bird, one fish, and one amphibian species. None of these species are known to occur within the MRS. No cultural resources are known to exist on the MRS.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	**0**
Source of Hazard	Table 2	0	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	0	**13**
Ease of Access	Table 4	8	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	**15**
Population Near Hazard	Table 7	5	
Types of Activities/Structures	Table 8	5	
Ecological and/or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			**28**

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	**G**
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	**No Known or Suspected Explosive Hazard**

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the scores that correspond with **all** the CWM configurations known or suspected to be present at the MRS.

Note: The terms *CWM/UXO, CWM/DMM, physical evidence,* and *historical evidence* are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, that are either UXO, or explosively configured damaged DMM	The CWM known or suspected of being present at the MRS are: ◆ CWM that are UXO (i.e., CWM/UXO) ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are undamaged CWM/DMM or CWM not configured as a munition that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM/DMM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS are: ◆ Nonexplosively configured CWM/DMM either damaged or undamaged ◆ Bulk CWM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS are CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	**0**
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	**0**

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

No historical or visual evidence indicates that CWM is or was present at this MRS.

Tables 12 through 19 are intentionally omitted according to Army Guidance

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	**0**
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/Structures	Table 18		
Ecological and/or Cultural Resources	Table 19		
CHE MODULE TOTAL			**0**

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	**No Known or Suspected CWM Hazard**

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional groundwater contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No groundwater samples were taken.			

CHF Scale	CHF Value	Sum The Ratios
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$
100 > CHF > 2	M (Medium)	
2 > CHF	L (Low)	

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ☑

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were taken.			
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☑

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were taken.			
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☑

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface water contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples were taken.			
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☑

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional sediment contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard with ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples were taken.			
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☑

Table 26

HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B of the Primer) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the contaminant **ratios** together, including any additional surface soil contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
Copper	56	3,100	0.019
Zinc	110	23,000	0.005
Lead	48	400	0.120
CHF Scale	**CHF Value**	**Sum the Ratios**	0.144
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	**M (Medium)**		
2 > CHF	**L (Low)**		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	**L**

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to the presence of geological structures or physical controls).	**L**
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

Analytical results for the nine samples and one field duplicate sample collected were all below the established screening criteria and no explosives were detected in the samples. Therefore, there is no potential for MC to migrate in the environment.

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	**L**
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	**L**

All results for the nine samples and one field duplicate sample were below the screening criteria and no explosives were detected in the samples. Therefore, there is no potential for receptors to encounter MC.

No Known or Suspected Surface Soil MC Hazard ☑

Table 28

Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the **Contaminant Hazard**, **Migration Pathway**, and **Receptor Factors** for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the **Three-Letter Combination** boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the **HHE Ratings** provided below, determine each media's rating (A–G) and record the letter in the corresponding **Media Rating** box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)	L	L	L	LLL	**G**

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the **HHE Module Rating** box.

Note:

An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	G

HHE Ratings (for reference only)

Combination	Rating
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

No analytes exceeded the site screening values as agreed upon by all stakeholders at the completion of the Site Inspection and required No Further Action for MC.

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter **rating** for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical **priority** for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS Priority is the single highest priority; record this relative priority in the **MRS Priority or Alternative MRS Rating** at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		**No Known or Suspected CWM Hazard**		**No Known or Suspected MC Hazard**	
MRS PRIORITY or ALTERNATIVE MRS RATING				**No Known or Suspected Explosive Hazard**	

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APPENDIX L

RISK ASSESSMENT TABLES (NOT APPLICABLE)

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APPENDIX M

MUNITIONS AND EXPLOSIVES OF CONCERN HAZARD ASSESSMENT

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MEC HA Summary Information

Comments

Site ID: Leona Heights Rifle Range (CAHQ-013-R-01)
Date: 8/16/2016

Please identify the single specific area to be assessed in this hazard assessment. From this point forward, all references to "site" or "MRS" refer to the specific area that you have defined.

A. Enter a unique identifier for the site:

Leona Heights Rifle Range

Provide a list of information sources used for this hazard assessment. As you are completing the worksheets, use the "Select Ref(s)" buttons at the ends of each subsection to select the applicable information sources from the list below.

Ref. No.	Title (include version, publication date)
1	Weston Solutions, Inc. (WESTON), Final Site Inspection Report, Army National Guard Munitions Response Sites Site Inspection Phase California. August 2012.
2	Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

B. Briefly describe the site:

1. Area (include units): 81.33 acres
2. Past munitions-related use:

Target Area

3. Current land-use activities (list all that occur):

Residential and recreational

4. Are changes to the future land-use planned? No
5. What is the basis for the site boundaries?

Based on historical use of Leona Heights Rifle Range MRS; range was originally identified as a 91.0 acre transferred range, but later determined to be 81.33 acres based on geographic information systems (GIS) measurements.

6. How certain are the site boundaries?

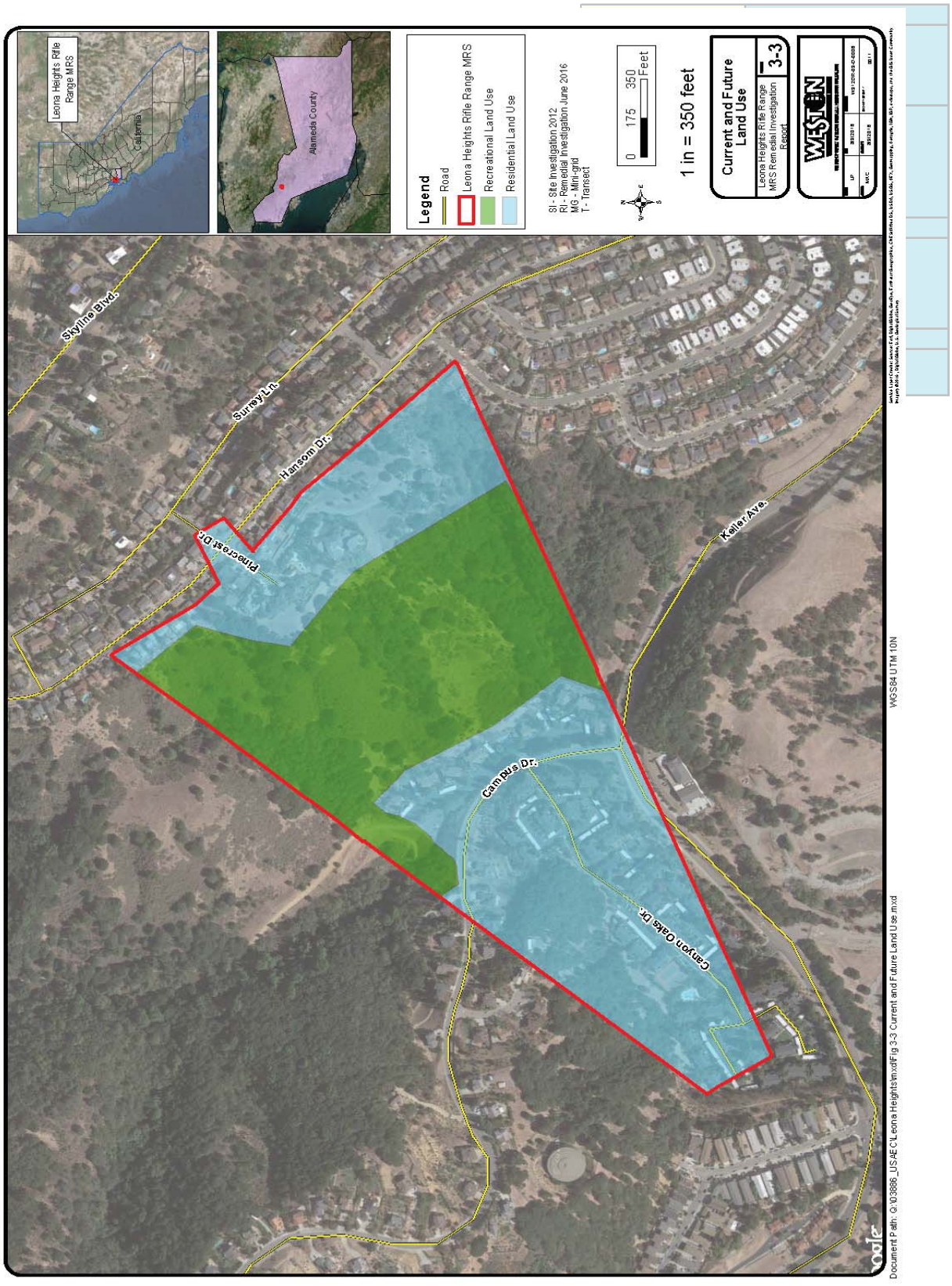
Limitations to the RI investigation include the defined acreage of the Leona Heights Rifle Range, which totals 81.33 acres according to the Site Investigation (SI) Historical Records Review (HRR). The site boundary is not shared with parcel boundaries therefore certainty is limited to the established MRS as determined by the SI.

Reference(s) for Part B:

Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

C. Historical Clearances

1. Have there been any historical clearances at the site? No, none
2. If a clearance occurred:


Leona Heights Rifle Range MRS
California
Alameda County
Legend
Road
Leona Heights Rifle Range MRS
Recreational Land Use
Residential Land Use
SI - Site Investigation 2012
RI - Remedial Investigation June 2016
MG - Mini-grid
T - Transect
0 175 350 Feet
1 in = 350 feet
Current and Future Land Use
Leona Heights Rifle Range MRS Remedial Investigation Report
3-3
WESTON
Skyline Blvd.
Surrey Ln.
Hanson Dr.
Pinecrest Dr.
Keller Ave.
Campus Dr.
Canyon Oaks Dr
WGS84 UTM 10N
Document Path: G:\03886_USAEC\Leona Heights\mxd\Fig 3-3 Current and Future Land Use.mxd

Site ID: **Leona Heights Rifle Range (CAHQ-013-R-01)**
Date: **8/16/2016**

Cased Munitions Information

Item No.	Munition Type (e.g., mortar, projectile, etc.)	Munition Size	Munition Size Units	Mark/ Model	Energetic Material Type	Is Munition Fuzed?	Fuzing Type	Fuze Condition	Minimum Depth for Munition (ft)	Location of Munitions	Comments (include rationale for munitions that are "subsurface only")
1	Mortars	3	inches		Low Explosive Filler in a fragmenting round	No	UNK	UNK	0	Surface and Subsurface	No MEC was identified during the SI or RI. A total of 4 MD items (practice 3-inch Stokes Mortars) were identifided.
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											

Reference(s) for table above:
Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

Bulk Explosive Information

Item No.	Explosive Type	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Reference(s) for table above:

Weston Solutions, Inc. (WESTON), Final Site Inspection Report, Army National Guard Munitions Response Sites Site Inspection Phase California. August 2012.

Site ID: **Leona Heights Rifle Range (CAHQ-013-R-01)**
Date: **8/16/2016**

Activities Currently Occurring at the Site

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Trespassing	12	2	24	0	Estimate only. Surface activity with limited potential intrusive activities (e.g., footprint while walking). Limited based upon steep topography.
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
			Total Potential Contact Time (receptor hrs/yr):	24		
			Maximum intrusive depth at site (ft):		0	

Reference(s) for table above:
Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

Activities Planned for the Future at the Site (If any are planned: see 'Summary Info' Worksheet, Question 4)

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Trespassing	12	2	24	0	Estimate only. Surface activity with limited potential intrusive activities (e.g., footprint while walking). Limited based upon steep topography.
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
	Total Potential Contact Time (receptor hrs/yr):			24		
	Maximum intrusive depth at site (ft):				0	

Reference(s) for table above:

Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

Site ID: **Leona Heights Rifle Range (CAHQ-013-R-01)**
Date: **8/16/2016**

Planned Remedial or Removal Actions

Response Action No.	Response Action Description	Expected Resulting Minimum MEC Depth (ft)	Expected Resulting Site Accessibility	Will land use activities change if this response action is implemented?	What is the expected scope of cleanup?	Comments
1	Baseline Assessment	0	Moderate Accessibility	No	No MEC cleanup	Current Site Use
2						
3						
4						

Reference(s) for table above:
Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

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Site ID: **Leona Heights Rifle Range (CAHQ-013-R-01)**
Date: **8/16/2016**

This worksheet needs to be completed for each remedial/removal action alternative listed in the 'Remedial-Removal Action' worksheet that will cause a change in land use.

Land Use Activities Planned After Response Alternative #1: Baseline Assessment

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):
Maximum intrusive depth at site (ft):

Reference(s) for table above:

Land Use Activities Planned After Response Alternative #2:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):
Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #3:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Land Use Activities Planned After Response Alternative #4:

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						

Total Potential Contact Time (receptor hrs/yr):

Maximum intrusive depth at site (ft):

Reference(s) for table above:

[redacted]

Site ID: **Leona Heights Rifle Range (CAHQ-013-R-01)**
Date: **8/16/2016**

Energetic Material Type Input Factor Categories

The following table is used to determine scores associated with the energetic materials. Materials are listed in order from most hazardous to least hazardous.

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
High Explosive and Low Explosive Filler in Fragmenting Rounds	100	100	100
White Phosphorus	70	70	70
Pyrotechnic	60	60	60
Propellant	50	50	50
Spotting Charge	40	40	40
Incendiary	30	30	30

The most hazardous type of energetic material listed in the 'Munitions, Bulk Explosive Info' Worksheet falls under the category 'High Explosive and Low Explosive Filler in Fragmenting Rounds'.

Score

Baseline Conditions: **100**
Surface Cleanup: **100**
Subsurface Cleanup: **100**

Location of Additional Human Receptors Input Factor Categories

1. What is the Explosive Safety Quantity Distance (ESQD) from the Explosive Siting Plan or the Explosive Safety Submission for the MRS? 1379 feet
2. Are there currently any features or facilities where people may congregate within the MRS, or within the ESQD arc? Yes
3. Please describe the facility or feature.

Residential Development

MEC Item(s) used to calculate the ESQD for current use activities

Item #1. Mortars

The following table is used to determine scores associated with the location of additional human receptors (current use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

4. Current use activities are 'Inside the MRS or inside the ESQD arc', based on Question 2.'

Score

Baseline Conditions: **30**
Surface Cleanup: **30**
Subsurface Cleanup: **30**

5. Are there future plans to locate or construct features or facilities where people may congregate within the MRS, or within the ESQD arc? Yes
6. Please describe the facility or feature.

Residential Development

MEC Item(s) used to calculate the ESQD for future use activities

Item #1. Mortars (3inches, Low Explosive Filler in a fragmenting round)

The following table is used to determine scores associated with the location of additional human receptors (future use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

Comments

MEC HA assigns the lowest score because there were no MEC items found at the MRS during the SI or RI.

Maximum Fragment Distance-Horizontal w/o Engineering Controls from ESP, based on 3 in Stokes HE mortar.

See figure below illustrating the ESQD arc buffer (red boundary).

There are no future plans to develop the MRS due to the steep topography of the site. However, development may occur within the ESQD arc buffer (red boundary).

MEC HA assigns the lowest score because there were no MEC items found at the MRS during the SI or RI.

7. Future use activities are 'Inside the MRS or inside the ESQD arc', based on Question 5.' *Score*

Baseline Conditions: **30**
Surface Cleanup: **30**
Subsurface Cleanup: **30**

Site Accessibility Input Factor Categories

The following table is used to determine scores associated with site accessibility:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Full Accessibility	No barriers to entry, including signage but no fencing	80	80	80
Moderate Accessibility	Some barriers to entry, such as barbed wire fencing or rough terrain	55	55	55
Limited Accessibility	Significant barriers to entry, such as unguarded chain link fence or requirements for special transportation to reach the site	15	15	15
Very Limited Accessibility	A site with guarded chain link fence or terrain that requires special equipment and skills (e.g., rock climbing) to access	5	5	5

Current Use Activities *Score*

Select the category that best describes the site accessibility under the current use scenario:

Moderate Accessibility

There are residential homes to the north and south of the MRS and there is no fencing. However, the steep topography and dense vegetation limit accessibility.

Baseline Conditions: **55**
Surface Cleanup: **55**
Subsurface Cleanup: **55**

Future Use Activities

Select the category that best describes the site accessibility under the future use scenario:

Moderate Accessibility

There are residential homes to the north and south of the MRS and there is no fencing. However, the steep topography and dense vegetation limit accessibility.

Baseline Conditions: **55**
Surface Cleanup: **55**
Subsurface Cleanup: **55**

Reference(s) for above information:
Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

Potential Contact Hours Input Factor Categories

The following table is used to determine scores associated with the total potential contact time:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Many Hours	≥1,000,000 receptor-hrs/yr	120	90	30
Some Hours	100,000 to 999,999 receptor hrs/yr	70	50	20
Few Hours	10,000 to 99,999 receptor-hrs/yr	40	20	10
Very Few Hours	<10,000 receptor-hrs/yr	15	10	5

Current Use Activities :

Input factors are only determined for baseline conditions for current use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **24** hrs/yr receptor
Based on the table above, this corresponds to a input factor score for baseline conditions of: **15** Score

Contact hours are unconfirmed estimates based upon best professional judgments and additional input is required to finalize.

Future Use Activities :

Input factors are only determined for baseline conditions for future use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is: **24** hrs/yr receptor
Based on the table above, this corresponds to a input factor score of: **15** Score

Contact hours are unconfirmed estimates based upon best professional judgments and additional input is required to finalize.

Amount of MEC Input Factor Categories

The following table is used to determine scores associated with the Amount of MEC:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Target Area	Areas at which munitions fire was directed	180	120	30
OB/OD Area	Sites where munitions were disposed of by open burn or open detonation methods. This category refers to the core activity area of an OB/OD area. See the "Safety Buffer Areas" category for safety fans and kick-outs.	180	110	30
Function Test Range	Areas where the serviceability of stored munitions or weapons systems are tested. Testing may include components, partial functioning or complete functioning of stockpile or developmental items.	165	90	25
Burial Pit	The location of a burial of large quantities of MEC items.	140	140	10
Maneuver Areas	Areas used for conducting military exercises in a simulated conflict area or war zone	115	15	5
Firing Points	The location from which a projectile, grenade, ground signal, rocket, guided missile, or other device is to be ignited, propelled, or released.	75	10	5
Safety Buffer Areas	Areas outside of target areas, test ranges, or OB/OD areas that were designed to act as a safety zone to contain munitions that do not hit targets or to contain kick-outs from OB/OD areas.	30	10	5
Storage	Any facility used for the storage of military munitions, such as earth-covered magazines, above-ground magazines, and open-air storage areas.	25	10	5
Explosive-Related Industrial Facility	Former munitions manufacturing or demilitarization sites and TNT production plants	20	10	5

Select the category that best describes the ***most hazardous*** amount of MEC: ***Score***

Target Area

The MRS is identified as a target area as based on the historical use of artillery and mortar practice, and small arms training by multiple National Guard units from 1913 to the mid to late 1930s. There have been no MEC items found at the site as based on the SI and RI.

Baseline Conditions: **180**
Surface Cleanup: **120**
Subsurface Cleanup: **30**

Minimum MEC Depth Relative to the Maximum Intrusive Depth Input Factor Categories

Current Use Activities

The shallowest minimum MEC depth, based on the 'Cased Munitions Information' Worksheet: **0** ft
The deepest intrusive depth: **0** ft
The table below is used to determine scores associated with the minimum MEC depth relative to the maximum intrusive depth:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	150	95
Baseline Condition: MEC located surface and subsurface, After Cleanup: Intrusive depth does not overlap with subsurface MEC.	240	50	25
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth overlaps with minimum MEC depth.	150	N/A	95

Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50	N/A	25

Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth will overlap after cleanup. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.' For 'Current Use Activities', only Baseline Conditions are considered. **240** ***Score***

Future Use Activities

Deepest intrusive depth: **0** ft

Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'. For 'Future Use Activities', only Baseline Conditions are considered. **240** ***Score***

Migration Potential Input Factor Categories

Is there any physical or historical evidence that indicates it is possible for natural physical forces in the area (e.g., frost heave, erosion) to expose subsurface MEC items, or move surface or subsurface MEC items? Yes

If "yes", describe the nature of natural forces. Indicate key areas of potential migration (e.g., overland water flow) on a map as appropriate (attach a map to the bottom of this sheet, or as a separate worksheet).

Erosion due to heavy rain events and steep topography.

The following table is used to determine scores associated with the migration potential:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Possible	30	30	10
Unlikely	10	10	10

Based on the question above, migration potential is 'Possible.' ***Score***

Baseline Conditions: **30**
Surface Cleanup: **30**
Subsurface Cleanup: **10**

Reference(s) for above information:
Weston Solutions, Inc. (WESTON). 2016. Final Remedial Investigation Work Plan, MMRP Munitions Response Services, National Guard Bureau, Leona Heights Rifle Range (CAHQ-013-R-01), Alameda County, California. May 2016.

MEC Classification Input Factor Categories

Cased munitions information has been inputed into the 'Munitions, Bulk Explosive Info' Worksheet; therefore, bulk explosives do not comprise all MECs for this MRS.
The 'Amount of MEC' category is 'Target Area'. It cannot be automatically assumed that the MEC

Has a technical assessment shown that MEC in the OB/OD Area is DMM?
Are any of the munitions listed in the 'Munitions, Bulk Explosive Info' Worksheet: Yes

- Submunitions
- Rifle-propelled 40mm projectiles (often called 40mm grenades)
- Munitions with white phosphorus filler
- High explosive anti-tank (HEAT) rounds
- Hand grenades
- Fuzes
- Mortars

None of the items listed in the 'Munitions, Bulk Explosive Info' Worksheet were identified as 'fuzed'.

The following table is used to determine scores associated with MEC classification categories:

UXO Special Case	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
UXO Special Case	180	180	180
UXO	110	110	110
Fuzed DMM Special Case	105	105	105
Fuzed DMM	55	55	55
Unfuzed DMM	45	45	45
Bulk Explosives	45	45	45

Based on your answers above, the MEC classification is 'UXO Special Case'. ***Score***

Baseline Conditions: **180**
Surface Cleanup: **180**
Subsurface Cleanup: **180**

MEC Size Input Factor Categories

The following table is used to determine scores associated with MEC Size:

Description		Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Small	Any munitions (from the 'Munitions, Bulk Explosive Info' Worksheet) weigh less than 90 lbs; small enough for a receptor to be able to move and initiate a detonation	40	40	40
Large	All munitions weigh more than 90 lbs; too large to move without equipment	0	0	0

Based on the definitions above and the types of munitions at the site (see 'Munitions, Bulk Explosive Info' Worksheet), the MEC Size Input Factor is: Small

Score

Baseline Conditions: **40**
Surface Cleanup: **40**
Subsurface Cleanup: **40**

Scoring Summary

Site ID:	Leona Heights Rifle Range (CAHQ-01	a. Scoring Summary for Current Use Activities	
Date:	8/16/2016	Response Action Cleanup:	No Response Action
Input Factor		**Input Factor Category**	**Score**
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Inside the MRS or inside the ESQD arc	30
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Target Area	180
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240
VII. Migration Potential		Possible	30
VIII. MEC Classification		UXO Special Case	180
IX. MEC Size		Small	40
		Total Score	**870**
		Hazard Level Category	**1**

Site ID:	Leona Heights Rifle Range (CAHQ-01	b. Scoring Summary for Future Use Activities	
Date:	8/16/2016	Response Action Cleanup:	No Response Action
Input Factor		**Input Factor Category**	**Score**
I. Energetic Material Type		High Explosive and Low Explosive Filler in Fragmenting Rounds	100
II. Location of Additional Human Receptors		Inside the MRS or inside the ESQD arc	30
III. Site Accessibility		Moderate Accessibility	55
IV. Potential Contact Hours		<10,000 receptor-hrs/yr	15
V. Amount of MEC		Target Area	180
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth		Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240
VII. Migration Potential		Possible	30
VIII. MEC Classification		UXO Special Case	180
IX. MEC Size		Small	40
		Total Score	**870**
		Hazard Level Category	**1**

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MEC HA Hazard Level Determination		
Site ID: Leona Heights Rifle Range (CAHQ-013-R-01) Date: 8/16/2016	Hazard Level Category	Score
a. Current Use Activities	1	870
b. Future Use Activities	1	870

Characteristics of the MRS	
Is critical infrastructure located within the MRS or within the ESQD arc?	Yes
Are cultural resources located within the MRS or within the ESQD arc?	No
Are significant ecological resources located within the MRS or within the ESQD arc?	No

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APPENDIX N

STAKEHOLDER COMMENTS

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Comments for the

Draft Remedial Investigation Report
MMRP Munitions Response Services
National Guard Bureau
Leona Heights Rifle Range (CAHQ-013-R-01)
Alameda County, California
Contract No.: W912DR-09-D-0006
Delivery Order No. 0011 Mod #3

Comment Number	Commenter	Page(s)	Section	Line(s)	Comment	Response By	Response
TECHNICAL COMMENTS							
					No comments were received from Stakeholders.		
EDITORIAL COMMENTS							

COMMENTS PROVIDED BY

Initials	Name	Department/Organization	Email Address	Phone

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