

Unit 23 Risk Reduction Technical Memorandum Former Fort Ord, California

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Prepared for



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List of Acronyms

AGCMR-QAPP	Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan
AR	Administrative Record
Army	United States Department of the Army
β	beta (principal axis polarizability)
CSM	conceptual site model
DGM	digital geophysical mapping
EM61	EM61-MK2
EMI	electromagnetic induction
FS	Feasibility Study
FWV	Field Work Variance
GPS	global positioning system
HMP	Habitat Management Plan
IMU	inertial measurement unit
ISO	industry standard object
ISO-80	schedule 80 industry standard object
IVS	instrument verification strip
KEMRON	KEMRON Environmental Services, Inc.
MACTEC	MACTEC Engineering and Environmental Services
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MM2x2	MetalMapper 2x2
MQO	measurement quality objective
MRA	munitions response area
mV	millivolt
NAEVA	NAEVA Geophysics, Inc.
NRL	Naval Research Laboratories
QA	quality assurance
QC	quality control
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
ROD	Record of Decision
RTK	real-time kinematic
SOP	standard operating procedure
TM	Technical Memorandum
TOI	target of interest
Tx	transmit
USACE	United States Army Corps of Engineers
UXA	UX-Analyze
UXO	unexploded ordnance
WP	Work Plan

EXECUTIVE SUMMARY

The potential presence of large munitions and explosives of concern (MEC) items, specifically 155millimeter (mm) and 8-inch projectiles, remaining in the shallow subsurface in Unit 23 presented an unacceptable risk to prescribed burn personnel should an unintentional detonation occur during prescribed burn operations. Therefore, a risk reduction activity was undertaken with the objective of removal of anomalies to reduce hazards to ground personnel providing fire control activities and to air personnel operating helicopter support activities during future prescribed burns.

To reduce the risk associated with the potential presence of large, shallow MEC items, KEMRON Environmental Services (KEMRON) conducted an advanced classification-based investigation targeting 155mm projectiles and 8-inch projectiles above the risk reduction depth thresholds of 2 feet in the outer 436 feet of Unit 23 and 1 foot in the interior of Unit 23.

Subsurface anomalies matching large MEC items above the risk reduction depth thresholds of 2 feet in the outer 436 feet of Unit 23 and 1 foot in the interior of the unit were identified from digital geophysical mapping (DGM) detection survey data. A static classification survey was then conducted with the Geometrics MetalMapper 2x2 (MM2x2) to measure the response of each selected subsurface anomaly. Targets classified as potential targets of interest (TOI) were excavated and removed.

A total of 1,279 anomalies potentially representing large MEC items were identified from the DGM data. The MM2x2 was utilized to acquire static data measurements over each identified anomaly. The MM2x2 data was analyzed to estimate the intrinsic physical features of each anomaly source, allowing a comparison of the measured data to a site-specific TOI signature library and classification of each anomaly as a TOI or a non-TOI.

The ranked classification list included 242 anomalies identified for intrusive investigation and subsurface removal. The remainder were classified as high-confidence non-TOI which did not require removal to meet the objective of the risk reduction activity. Of the 242 anomalies intrusively investigated, 146 TOI were recovered and removed during intrusive investigation, including 3 UXO items, 83 munitions debris (MD) items, 30 quality control (QC) validation seed items, and 30 quality assurance (QA) validation seed items.

Based on the completion of the static MM2x2 investigation and classification process, the associated removal of TOI to the specified risk reduction activity depth thresholds, and the demonstrated absence of TOI remaining in the selected anomaly population, the risk reduction activity objective of removal of large MEC items from planned burn areas to address the potential risk identified for areas to be burn-ready (with additional site preparation activities) has been successfully met.

The risk reduction activity was also completed with a reduction in required effort by utilizing the MM2x2 system, which reduced the number of intrusive investigations that would have been required if all DGM anomalies had been intrusively investigated.

Technical and procedural details are presented in this report.

1 INTRODUCTION

This technical memorandum (TM) describes the work elements and results for the munitions and explosives of concern (MEC) risk reduction conducted at Unit 23 in the Impact Area Munitions Response Area (MRA) at the former Fort Ord, California, in preparation for prescribed burn operations. The risk reduction was performed by KEMRON Environmental Services, Inc (KEMRON) for the United States Army Corps of Engineers (USACE) under the Worldwide Environmental Remediation Services Contract #W912DY-10-D-0027, Task Order No. CM01. This work has been completed in accordance with the *Final Quality Assurance Project Plan, Superfund Response Actions Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action* (KEMRON, 2016a); the *Final Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II, Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan* (AGCMR-QAPP; KEMRON, 2016b), the *Final Work Plan, Remedial Design (RD)/Remedial Action (RA), Track 3 Impact Area Munitions Response Area (MRA), Munitions and Explosives of Concern (MEC) Removal, Former Fort Ord, California* [RD/RA WP, (USACE, 2009)]; the *Final Track 3 Record of Decision (ROD), Impact Area Munitions Response Area, Track 3 Munitions Response Site, Former Fort Ord, California* [Track 3 ROD; United States Department of the Army (Army), 2008]; *Field Work Variance No. 008, Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California* (FWV 008; KEMRON, 2017a), and the procedures and measurement performance criteria included in *Field Work Variance 012 for Final, Work Plan, Munitions with Sensitive Fuzes Field Study, Former Fort Ord, California* (FWV 012; KEMRON, 2018).

1.1 Site Location and History

The former Fort Ord consists of approximately 28,000 acres of land located in northwestern Monterey County, California. The Impact Area MRA consists of the 6,560-acre portion of the 8,000-acre historical impact area that lies within the natural resources management area described in the *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California* (HMP; USACE, 1997) and is designated as a habitat reserve.

Military activity at the former Fort Ord included the use of the site for cavalry, field artillery, and infantry unit training, including maneuvers and live-fire training operations, from 1917 through 1994. Munitions used at the former Fort Ord included artillery and mortar projectiles, rockets, guided missiles, rifle and hand grenades, training land mines, pyrotechnics, bombs, and demolition materials. Multiple firing ranges operated within the historical impact area, with weapon firing generally directed toward the center of the impact area, where Unit 23 is located.

Fort Ord was placed on the National Priorities List of Superfund sites by the U.S. Environmental Protection Agency in 1990. Remedial investigation (RI), feasibility study (FS), and remedial action (RA) activities at the former Fort Ord are being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. The former Fort Ord was

selected in 1991 for Base Realignment and Closure, and the base was officially closed in September 1994.

The Army completed a munitions response RI/FS for the Impact Area MRA in 2007 [MACTEC Engineering and Environmental Services (MACTEC), 2007], followed by the Track 3 ROD (Army, 2008) and development of the RD/RA WP (USACE, 2009) to guide future RA activities in the Impact Area MRA. RA activities under the Track 3 ROD (Army, 2008) and RD/RA WP (USACE, 2009) include MEC removals using vegetation clearance by prescribed burning; technology-aided surface removal; digital geophysical mapping (DGM) surveys; subsurface MEC removal in selected areas; and land use controls.

Unit 23 is centrally located in the Impact Area MRA and lies to the west of Orion Road, south of Nowhere Road, north of Darwin Road, and east of Evolution Road. The location of the project area in the central portion of the Impact Area MRA is shown on **Figure 1**.

Unit 23 is designated as habitat reserve under the HMP (USACE, 1997) and is currently designated for transfer to BLM. The HMP describes special land restrictions and habitat management requirements within habitat reserve areas. Based on information provided by BLM and the *Final Track 3 Impact Area Munitions Response Area Munitions Response Remedial Investigation/Feasibility Study Report Former Fort Ord, California* (MACTEC, 2007), the reuse of the area as a habitat reserve is anticipated to include a variety of activities including:

- Recreational access on established routes;
- Habitat enhancement, including prescribed burning;
- Fuel break construction and management;
- Use of administrative areas;
- Habitat monitoring and educational programs;
- Species-specific monitors and habitat enhancement; and
- Road management and maintenance.

1.2 MEC-Related Activities and Data Collected Prior to the Risk Reduction

Prior to the risk reduction activity, vegetation removal, technology-aided surface MEC removal, and EM61-MK2 (EM61) DGM data acquisition were conducted in Unit 23. These activities are described in the following documents:

- *Final MRS-BLM Units 4, 11 and 12, MEC Remedial Action Report, Former Fort Ord, California* (Gilbane, 2014)
- *MRS-BLM Units 6, 7, and 33 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (Gilbane, 2015)

- *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (Unit 23 TM; KEMRON, 2017b)

During technology-aided surface removal activities in Unit 23, eight 155mm high explosive projectiles and six 8-inch high explosive projectiles were recovered.

1.3 Risk Reduction Objectives

Based on the habitat requirement to burn Unit 23, and due to the discovery of high explosive 155mm and 8-inch projectiles during technology-aided surface MEC removal in Unit 23, the Unit 23 TM (KEMRON, 2017b) described the potential presence of 155mm and 8-inch projectiles remaining in the shallow subsurface as presenting a low-likelihood (but high-impact) risk to prescribed burn personnel, should an unintentional detonation occur during the prescribed burn operations and identified that removal of shallow 155mm and 8-inch projectiles within Unit 23 was required to reduce this risk while conducting prescribed burning.

FWV 008 (KEMRON, 2017a) identified that the Unit 23 MEC risk reduction activity would involve the following tasks, both of which were to be completed prior to prescribed burn operations:

- Removal of anomalies that are classified as 155mm projectiles, 8-inch projectiles, or unexpected larger MEC items to 2-foot depth in the outer zone of Unit 23, which exists within 436 feet of the perimeter of the 45-foot wide fuel break. This reduces the horizontal hazardous fragmentation distance for firefighters and prescribed burn personnel on the fuel break during burn operations. To accomplish this, geophysical anomalies with response values greater than 114mV on the third EM61 channel will be selected for static advanced geophysical classification investigation in the outer zone.
- Removal of anomalies that are classified as 155mm projectiles, 8-inch projectiles, or unexpected larger MEC items to 1-foot depth in the inner zone of Unit 23, which exists 436 feet or more from the perimeter of the 45-foot wide fuel break. This reduces the vertical hazardous fragmentation distance for safe overhead helicopter flight during burn operations. To accomplish this, geophysical anomalies with response values greater than 446mV on the third EM61 channel will be selected for static advanced geophysical classification investigation in the inner zone.

The inner and outer risk reduction zones for Unit 23 are shown on **Figure 2**.

1.4 Risk Reduction Approach

To reduce the risk associated with the potential presence of large, shallow MEC items, KEMRON conducted an advanced classification-based investigation targeting 155mm projectiles and 8-inch projectiles above the risk reduction depth thresholds of 2 feet in the outer 436 feet of Unit 23 and 1 foot in the interior of Unit 23. Whereas a standard DGM investigation involves a single detection geophysical survey followed by intrusive investigation of every selected subsurface anomaly, an advanced classification investigation includes an additional classification survey in which a cued (static) measurement is recorded over each detected subsurface anomaly with an advanced

multi-axis electromagnetic induction (EMI) sensor. The advanced classification survey data are analyzed utilizing inversion modeling techniques, and the modeled data for each measurement is compared to the known responses of items in a classification library to determine if the subsurface anomaly source is potentially related to a target of interest (TOI). Targets that can be confidently classified as non-TOI are left in place, while all other targets (potential TOI and those for which a confident classification decision cannot be made) are intrusively investigated and removed.

EM61 DGM detection surveys were completed in Unit 23 prior to the risk reduction activity. The EM61 DGM detection surveys were completed in three separate events. The northern containment line survey was conducted as part of the Units 11 and 12 DGM in 2012 (Gilbane, 2014). The western tip survey was conducted as part of prescribed burn preparation in Units 7 and 10 in 2013-2014 (Gilbane, 2015). The interior DGM survey was conducted in 2015-2016 (KEMRON, 2017b). The DGM data from the three surveys was combined, and subsurface anomalies with response value characteristics matching those of 155mm projectiles and 8-inch projectiles above the risk reduction depth thresholds of 2 feet in the outer 436 feet of Unit 23 and 1 foot in the interior of the unit were identified from the DGM data.

The risk reduction approach was based on FWV 008 (KEMRON, 2017a) and utilized the MetalMapper 2x2 (MM2x2) procedures and measurement performance criteria included in FWV 012 (KEMRON, 2018). A static classification survey was conducted with the MM2x2 to measure the response of each selected subsurface anomaly. Inversion modeling and classification analysis were then applied to the static MM2x2 data to determine which anomalies were potentially related to TOI that must be removed prior to prescribed burn activities and which anomaly sources were appropriate to leave in place. Targets classified as potential TOI were excavated and removed.

Several “lessons learned” from the MEC risk reduction previously conducted in Units 11 and 12 were incorporated into the Unit 23 risk reduction approach. Incorporated lessons learned included the use of a larger (23.5-inch) allowable offset between the data acquisition location and the flag location, documentation of cultural features by the data acquisition team, the availability of the DGM detection data to assist the data processors when evaluating targets that could not be analyzed, and the implementation of a chi-square analysis of the static MM2x2 data to identify measurements where a potentially high density of near-surface metal could result in modeled data that could not be accurately fit to the measured data.

1.5 Project Personnel and Subcontractors

MM2x2 data acquisition, analysis, and classification work was performed and supervised by geophysicists experienced in geophysical classification using advanced EMI sensors. Key personnel included the following:

- Senior Unexploded Ordnance Supervisor: Brad Olson (KEMRON)
- Unexploded Ordnance (UXO) Quality Control (QC) Specialist: Bruce McClain (KEMRON)
- UXO Safety Officer: Val Valdez (KEMRON)

- Contractor QC Systems Manager: Chuck Clyde (Gilbane)
- Project Manager: Steve Crane (KEMRON)
- Deputy Project Manager: Erin Caruso (Gilbane)
- Project Geophysicist: Andy Gascho (Gilbane)
- Lead Data Processor: Alison Paski [NAEVA Geophysics, Inc. (NAEVA)]
- QC Geophysicist: Alex Kostera (NAEVA)

Quality Assurance (QA) validation of geophysical operations was provided by USACE Geophysicist Kyle Lindsay.

1.6 Health and Safety

MEC risk reduction work was conducted in accordance with the *Final, Basewide Accident Prevention Plan, Munitions and Explosives of Concern Removal and Soil Remediation, Former Fort Ord, California* (KEMRON, 2015).

1.7 Report Organization

This TM details the work completed as part of the Unit 23 MEC Risk Reduction Activity and provides discussion of the following tasks:

- MEC Risk Reduction Activities
 - Anomaly Selection
 - Blind Seed Item Placement
 - MetalMapper 2x2 Assembly and Verification
 - Classification Library Creation
 - MetalMapper 2x2 Data Acquisition
 - Data Analysis and Classification
 - Intrusive Investigation and Subsurface Removal
- Results
- Quality Control
- Data Validation

2 MEC RISK REDUCTION ACTIVITIES

2.1 Anomaly Selection

As described in **Section 1.4**, EM61 detection surveys were previously conducted in Unit 23 in three separate events. The northern containment line survey was conducted as part of the Units 11 and 12 DGM in 2012 (Gilbane, 2014). The western tip survey was conducted as part of prescribed burn preparation in Units 7 and 10 in 2013-2014 (Gilbane, 2015). The interior DGM survey was conducted in 2015-2016 (KEMRON, 2017b). The DGM surveys were primarily conducted with a vehicle-towed array consisting of three EM61 sensors, and fill-in surveys, where necessary, were completed with a person-portable EM61. Geophysical data were processed using Geosoft's Oasis Montaj, in accordance with applicable project work plans. Processing included correcting for instrument latency, leveling of the data, and gridding to provide an amplitude response layer from which subsurface target anomalies were identified and selected. The EM61 DGM detection data is displayed on **Figure 3**.

The target detection list was comprised of subsurface anomalies selected from the existing EM61 detection survey data with response amplitude characteristics similar to those of the smallest TOI munition, a 155mm projectile, at the depths of interest [2-foot depth in the outer zone (within 436 feet of the perimeter of the 45-foot wide fuel break); 1-foot depth in the inner zone (436 feet or more from the perimeter of the 45-foot wide fuel break)]. EM61 response thresholds were based on the Naval Research Laboratory (NRL) response calculator for the three-coil EM61 system used at Fort Ord. Anomalies with response values greater than 114mV on the third EM61 channel were selected for investigation in the outer zone of Unit 23, and anomalies with response values greater than 446 mV on the third EM61 channel were selected for investigation in the inner zone of Unit 23.

The selected thresholds represent conservative response values for high confidence in the identification of anomalies potentially representing TOI. The target selection thresholds were determined assuming horizontal orientation of the item, which provides the lowest EM response. In the horizontal orientation, large cylindrical targets (such as a 155mm projectile) result in double-peaked EM signatures with higher values at each end of the response footprint along the long axis of the target. The NRL response values, however, are based on the non-peak response that is generated when the sensor is directly over the center of the item. The predicted response values (and the target selection thresholds used) are therefore considerably lower than the peak responses for a horizontal 155mm projectile at 1 foot and 2 feet below ground surface seen in the EM61 DGM data. Targets were selected from the DGM data based on all peak responses without merging large double-peaked responses. Thus, the higher responses over the ends of a TOI are captured and used in the target selection process. In all orientations other than horizontal, the response for a TOI is significantly greater than that of the horizontal orientation.

Additionally, the depths used in the NRL response calculator included an additional 3 inches beyond the 1- and 2-foot target depths to account for the center of mass of a horizontal 155mm projectile when its upper edge is at the 1- or 2-foot target depth. The upper edge of the most sensitive part of a horizontal 155mm projectile, the fuze, is therefore 2.5 inches below the

maximum targeted depth, adding an additional degree of safety to the risk reduction activity. The additional 3 inches of depth to account for the item's center of mass lowered the channel 3 response calculator prediction from 160.3 mV to 114.2 mV in the outer zone, and from 673 mV to 446.5 mV in the inner zone when the EM61 coils are at their standard height of 16.5 inches above the ground. The corresponding detection thresholds of 114 mV and 446 mV described above are therefore conservative amplitude values selected to add an additional degree of safety to the risk reduction activity.

Using these amplitude thresholds, 1,279 anomalies (including QC and QA seed locations emplaced after the DGM survey) were selected from the EM61 DGM detection data for static MM2x2 investigation. All anomalies identified for static MM2x2 investigation were assigned unique identification numbers. The investigated anomalies are displayed on **Figure 4** and listed in **Appendix C**. The quantity in each zone is shown in **Table 1**.

Table 1
Distribution of Anomalies for Investigation

Zone	Response Value Threshold (mV)	Anomalies
Unit 23 – Outer Zone	114	1,258
Unit 23 – Inner Zone	446	21
TOTAL		1,279

2.2 Blind Seed Item Placement

Prior to MM2x2 data acquisition activities, QC seed items were placed in random locations in the subsurface throughout Unit 23 to provide verification of data acquisition, processing and analysis, and intrusive investigation quality. QC seed items consisted of large industry standard objects (ISO) and inert 155mm projectiles. 30 QC seed items (26 large ISOs and 4 inert 155mm projectiles) were buried at depths between 12 and 24 inches below ground surface. Seed items were emplaced by the QC Geophysicist and a UXO Technician II utilizing a real-time kinematic (RTK) global positioning system (GPS) receiver to measure location information for each seed item, and precise burial information was recorded. To maintain the integrity of the QC program, seed item burial information was not provided to personnel involved in data acquisition, processing, or intrusive investigation activities until those activities were completed. Details of the blind seeding burial information and results are included in **Section 4.1** and in the Quality Control Seeding Report – Unit 23 Risk Reduction, Former Fort Ord, California, which is included in **Appendix A**.

Thirty additional QA validation seed items were emplaced by the USACE Project Geophysicist. QA validation seed item information was not provided to the risk reduction team until data acquisition, processing, and intrusive investigation activities were completed. QA validation seed information is presented in **Section 5.1**.

2.3 MetalMapper 2x2 Assembly and Verification

Prior to MM2x2 static data acquisition, instrument assembly and performance were verified through instrument function tests and an instrument verification strip (IVS) survey. The IVS was constructed adjacent to Unit 23 by the QC Geophysicist and a UXO Technician II, in accordance with the specifications provided in the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018).

2.3.1 MetalMapper 2x2 Assembly

The MM2x2 system was assembled in accordance with standard operating procedure (SOP) AGCMR-01 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018) on April 12, 2018. Assembly of the system included mounting the coil assembly, wheels, RTK GPS and inertial measurement unit (IMU) on the survey sled, and connecting and routing all cables to the data acquisition computer. Assembly of the MM2x2 system included verification of the orientation of the transmit coils, the orientation of the IMU, operation of the RTK GPS, and correct input of the data acquisition parameters. Digital photographs of the assembled MM2x2 system were taken as a record of assembly.

2.3.2 Initial Instrument Function Tests

On April 12, 2018, initial system operation was verified by acquiring a system function test utilizing a small schedule 80 ISO (ISO-80), as described in SOP AGCMR-01 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Transmit current levels were monitored in addition to verification of correct modeled location and library match of the ISO-80 test object. System assembly and verification were completed by the data acquisition geophysicist and overseen by the Project Geophysicist.

After completion of the instrument tests, an initial static IVS survey was performed, also on April 12, 2018, as described in SOP AGCMR-02 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). The IVS consisted of 2 large ISO and 1 blank location. One large ISO was buried vertically, 12 inches below ground surface (to the center of mass of the ISO), and the second large ISO was buried horizontally, 12 inches below ground surface (to the center of mass of the ISO). The IVS location and layout are shown on **Figure 5**. Construction of the IVS and details of the initial IVS survey are described in the Instrument Verification Strip Memorandum – Unit 23 Risk Reduction, Former Fort Ord, California, which is included in **Appendix B**.

2.4 Classification Library Creation

The existing Department of Defense classification library data derived from previous Environmental Security Technology Certification Program and Military Munitions Response Program projects and included with UX-Analyze (UXA) was used to establish the site-specific classification library for the Unit 23 risk reduction activity. The site-specific library used for classification for this activity was created by augmenting the existing classification library with test pit measurements of an 8-inch projectile conducted in the Badger Flats area of Unit 12.

Test pit measurements were conducted by placing the 8-inch projectile at precisely measured depths and orientations in an open excavation below the MM2x2 sensor and acquiring static measurements as described in SOP AGCMR-04 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Background measurements were acquired over the empty test pit excavation prior to the test pit measurements and subtracted from the TOI responses to isolate the portion of each measurement related to the 8-inch projectile. The test pit measurements were processed as described in SOP AGCMR-05 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018), and the signature of the 8-inch projectile was added to the site-specific classification library. The final site-specific classification library included signatures for all expected risk reduction TOI, including large ISOs, 155mm projectiles, and 8-inch projectiles.

2.5 MetalMapper 2x2 Data Acquisition

The static MM2x2 survey of the 1,279 subsurface anomalies identified for classification analysis was conducted between April and July, 2018, in accordance with SOP AGCMR-07 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Measurements of 1,223 anomalies were acquired between April 16 and May 3, 2018. The final 56 anomalies, which were in grids with habitat concerns, were completed July 24 and July 26, 2018, after the spring germination and growth season.

Static function test measurements and IVS surveys were completed at the beginning and end of each day during the MM2x2 survey. Static data acquisition for target classification involved positioning the MM2x2 sensor over each anomaly selected from the EM61 detection survey, and acquiring static measurements. Data acquisition procedures included the following steps, which are described in detail in SOP AGCMR-07 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018):

1. **Background measurement acquisition.** Static MM2x2 data was acquired at previously-identified background locations, where no metallic interference exists. Background measurements record the non-target system response, which includes responses from the ambient environment, soil and geologic features, and the MM2x2 system itself. During data processing, the background signal was removed from target anomaly measurements, leaving only the response from the unknown metallic anomaly source. Background measurements were collected at a minimum of every hour during data acquisition activities to provide background signatures representative of changing target locations and environmental conditions.
2. **Navigation to the anomaly location.** Anomaly locations were loaded into the MM2x2 data acquisition computer prior to data acquisition operations to allow navigation to each anomaly through the use of the MM2x2 RTK GPS positioning system. Although the MM2x2 has the ability to direct the data acquisition geophysicist to an anomaly location based upon the geophysical signal received, the first measurement was always acquired at the provided detection anomaly location. After navigation to the anomaly location, the

center of the sensor was precisely positioned (within 2 inches) over the provided anomaly location.

3. **Static sensor measurement acquisition.** The static measurement acquisition process was initiated, taking care that the sensor remained stationary during the measurement and was isolated from all external sources of electromagnetic signals. Any metal associated with the sensor and deployment platform (e.g., console, support structures) that could not be reasonably distanced from the sensor was kept in the same physical location with respect to the sensor as during background measurements.
4. **Acquired data integrity and quality verification.** Immediately after data acquisition, the integrity and quality of the data were verified by the data acquisition geophysicist by inspection of the MM2x2 data acquisition display to ensure the following:
 - The data acquisition cycle completed properly
 - The transmit current for each transmitter was within an acceptable range (≥ 5.5 amps)
 - The decay curves measured by each receiver coil appeared reasonable and were not flat-lined or over-saturated
 - GPS and IMU information were recorded

The additional step of performing a field inversion to verify that the acquired data measurement was centered over the anomaly source, which is described in SOP AGCMR-07, was not conducted as part of the data acquisition process because this function was not available in the MM2x2 acquisition software at the time. The inversion was therefore performed by the data processor to verify that each measurement met the measurement performance criteria.

2.6 Data Analysis and Classification

Static data processing and classification analysis were completed by NAEVA data analysts in accordance with SOP AGCMR-08 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Data processing included isolation and removal of background responses from the MM2x2 data measurements, and application of the inversion algorithms in the UXA extension of Geosoft Oasis Montaj to model the intrinsic features of each anomaly source. The modeled features, in the form of primary, secondary, and tertiary polarizability curves, were used to classify each anomaly as a TOI (likely to be a 155mm projectile or 8-inch projectile) or a non-TOI (highly-likely to be something other than a TOI). Classification was accomplished primarily through matching each target's polarizability curves to the site-specific library of TOI signatures, with additional consideration given to cluster and feature space analysis. Targets classified as TOI (and those for which the acquired MM2x2 data did not support a confident classification decision) were selected for reacquisition and subsurface removal. Targets classified as non-TOI were left in place.

After applying background corrections, the data was modeled to estimate the intrinsic and extrinsic features for each target anomaly using the UXA process data interface. The modeled features for each anomaly include extrinsic parameters (location and orientation) as well as the intrinsic parameters related to the object size, shape and composition. The target feature estimation process was accomplished through inversion modeling of the MM2x2 data. Inversion modeling involves proposing and testing multiple combinations of potential targets and locations to determine which combinations produce a result most like the measured data for each anomaly. Both single-source and multiple-source inversion routines were run to determine the parameters of each target (single-source inversion), or of each group of targets (multiple-source inversion), that would produce a response similar to each measured response. The modeled intrinsic parameters are visualized as three principal axis polarizabilities, also known as betas (β), which describe the EMI response of each target along the three principal axes of the item. The combination of principal axis polarizabilities is unique to an item and is therefore used for classification by comparing the polarizabilities to a library of representative munitions item polarizabilities. Size and decay parameters of each anomaly at specific timegates were also calculated.

The single-source inversion solves for a single target as the anomaly source, while the multiple-source inversion assumes that the measured response is the result of multiple anomaly sources. The multiple-source solver not only presupposes multiple sources contributing to a measured anomaly response but also produces several potential combinations of anomaly sources. Each potential combination proposes a configuration of targets whose modeled response reasonably fits the measured data. For example, one potential combination may have three targets, while a second potential combination for the same measurement may have two or four targets. This process reflects the fact that, with an unknown number of potential targets of different sizes and shapes, several different models can closely match the measured data. A separate fit coherence value, which measures the degree of fit to the measured data, is derived for each multiple-source potential combination as well as for the single-source model.

An example inversion fit summary, showing single-source and multiple-source solutions for a target measurement and the three modeled primary axis polarizabilities contributing to the anomaly response is shown on **Figure 6**.

Model results were used for classification only if they met the measurement quality objectives (MQO) in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018), verifying that they are of sufficient quality to support classification.

2.6.1 Daily Instrument Verification Strip

At the beginning and at the end of each day of data acquisition, static measurements were acquired at each IVS target location, as described in SOP AGCMR-02 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). The IVS measurements were processed as described above, and the derived features were assessed against the MQO presented in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018).

2.6.2 Data Verification

Data verification was conducted each day of data acquisition to demonstrate the achievement of project MQO. Prior to importing MM2x2 data into the UXA module within Geosoft's Oasis Montaj geophysical processing environment, the data processor specified general settings in UXA to define the data acquisition parameters for the survey, including settings such as survey mode (static or dynamic), database names, and distance units. After initial setup of the UXA project, the data processor imported data into the following four separate databases:

- Static background measurement data
- Background features
- Static anomaly measurement data
- Target features

The target features database initially contained the locations of each surveyed anomaly but was subsequently populated with summaries of the derived feature and classification information for each target. The background features database initially contained the locations of each background measurement but was subsequently populated with statistics and QC check values.

After importing the static data, the data processor verified the quality of the measurements against the MQO provided in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018), for the following characteristics:

- Transmit (Tx) current within limits
- GPS fix quality
- Valid IMU data
- EMI response signal not saturated
- Offset of acquisition location from flag/anomaly list location

A preliminary library match using the single-source modeled parameters was performed as part of data verification to assist in determining the usability of the data and to verify that static classification survey MQO have been satisfied.

Graphic decision plots displaying a summary of measured and modeled data associated with each static measurement were evaluated along with the targets feature database for the following:

- Tx current
- Valid GPS fix
- Valid IMU reading (or correctable based on field notes)

- Offset from flag within MQO
- Acceptable fit error
- Fit coherence within MQO
- Reasonable size and decay
- Successful library match

2.6.3 Initial Classification

Classification of targets was based upon objective and quantitative criteria. Using these criteria, a prioritized list was created with high-likelihood TOI placed at the top of the list (just after digs classified as cannot analyze) and high likelihood non-TOI placed at the bottom of the list. Cannot analyze targets are those for which the measured data could not support a confident classification decision. Because these targets could not be confidently identified as non-TOI, they were excavated. The primary method for classification was library matching, supplemented by cluster analysis and feature space analysis.

2.6.3.1 Library Matching

Classification was based primarily on the fit metric (values from 0.0 to 1.0, with 1.0 representing a perfect match) generated by UXA during a comparison of the β values estimated for each surveyed target and the β values of the TOI items in the classification library. The comparison was performed via the library match utility in UXA. The fit metric is a measure of the fit correlation between a target and the library entry that best fits that target, with higher values indicating a better fit between the target and the corresponding item in the library. The library fit analysis matches the following four combinations of β s to those of the candidate library TOI:

- β_1 , β_1/β_2 , β_1/β_3
- β_1 , β_1/β_2
- β_1/β_2 , β_1/β_3
- β_1

The confidence metrics for each fit combination were averaged to derive a decision metric.

Both single-source and multiple-source models were used during the inversion process for each flagged location. The results of all the models were compared against the library signatures, and the most conservative result, or the result most similar to a TOI, was saved. Once completed, the targets were ranked, or ordered, from TOI to non-TOI according to their library-match comparison values. Library-match comparison values below the project decision metric threshold, which is discussed in **Section 2.6.4**, were considered non-TOI.

2.6.3.2 Cluster Analysis and Feature Space Analysis

Cluster analyses were performed using the UXa scatter analysis utility to identify clusters of anomalies with similar β signatures not in the classification library. Due to the small list of TOI for the risk reduction activity, and their large, distinct sizes and shapes, cluster analysis was expected to be unnecessary, and it was anticipated that all TOI were already identified with signatures in the library. Cluster analysis, however, was performed to provide additional confidence in the risk reduction activity. The same library matching method described above was used, but instead of using the known TOI signature library, a “self-match” of each measured anomaly was performed. Static measurements with high cluster threshold confidence metrics were identified and reviewed along with a size-decay feature space plot to determine if they were related to a grouping of unique signatures potentially representing a TOI not contained in the initial classification library. For each identified cluster, the data processor selected a representative sample to be intrusively investigated. If the intrusive investigation identified a potentially hazardous item that should be on the TOI list, a representative signature would have been placed in the site-specific library, and the library matching process would have been repeated to ensure that all items with similar β signatures were classified as TOI. No additional TOI requiring placement in the munitions library were identified during the risk reduction activity.

Individual items not matching any library items but having β signatures indicating large, axially-symmetric, thick-walled objects were also identified and investigated as part of the calibration data, and would have been added to the library if they were determined to be TOI. No additional TOI requiring placement in the munitions library were identified during the risk reduction activity.

2.6.4 Classification Thresholds

Classification threshold values were derived from previous advanced classification work at the former Fort Ord and evaluated throughout the work by comparing intrusive investigation results to modeled anomaly source predictions. Classification expressions utilized during classification analysis contained the logic for sorting the ranked target list and included the following categories:

- Category 0 (Cannot Analyze)
- Category 1 (High-Confidence TOI)
- Category 2 (Inconclusive)
- Category 3 (High-Confidence Non-TOI)

Category 0 (Cannot analyze) anomalies included measurements where the inversion process failed, reliable polarizabilities could not be extracted from the data, modeled depths were unreasonable, or fit coherence was poor. Category 1 anomalies were those highly-likely to be TOI. Category 2 (Inconclusive) anomalies consisted of measurements not obviously TOI but with enough TOI characteristics that they could not be confidently classified as non-TOI. Category 3 anomalies were those highly-likely to be non-TOI. The following library match metric thresholds were used to classify and rank the anomalies:

- Category 1 (High-Confidence TOI) > 0.925
- Category 2 (Inconclusive) > 0.825
- Category 2 (Inconclusive, Low Signal) > 0.750
- Category 0 (Cannot Analyze)
 - Poor Fit Coherence < 0.800
 - Unreasonable depth > 2 meters
 - High Chi-square value > 8000

The selection thresholds utilized were (a) the industry standard values (or within an acceptable range of that value based on site conditions), (b) set low enough to ensure that all TOI were recovered based on validation digs and QC checks, (c) set at values that reduce the number of unnecessary digs, and (d) tailored to the signal to noise ratio of the collected data, so that lower signal targets were classified more conservatively. The Category 1 threshold is the typical industry-standard value used for most sites. Conservative thresholds were used for the low end of Category 2 for this risk reduction activity due to the specific TOI.

2.6.5 Final Classification

After all data were acquired and analyzed, a preliminary ranked list containing all anomalies was delivered to the QC Geophysicist to verify that all relevant MQO (including QC seed classification) were met, and a final review of the ranked list was performed to generate the ranked target list, which is included in **Appendix C**. Every investigated target was included on the prioritized list; classified as TOI, non-TOI, or cannot analyze; and sorted based on its likelihood to be a TOI. All targets in the cannot analyze and TOI categories were selected for intrusive investigation. Intrusive investigation locations, including classification categories, are shown on **Figure 7**.

2.7 Intrusive Investigation and Subsurface Removal

As described in **Section 3.1**, 1,037 anomalies, greater than 81% of the 1,279 DGM detection targets, were classified as high-confidence non-TOI and determined to be acceptable to leave in place. The remaining 242 anomalies, including those classified as TOI, those that could not be analyzed, and those for which a confident non-TOI classification could not be made, were identified for intrusive investigation and removal. An additional set of 25 high-confidence non-TOI anomalies were also selected for intrusive investigation as part of the validation process, as discussed in **Section 5.2**. All intrusive operations were performed in general accordance with the MEC-QAPP (KEMRON, 2016a), with advanced classification-specific details in accordance with SOP AGCMR-09 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018).

2.7.1 Reacquisition of Anomalies Selected for Intrusive Investigation

Anomalies selected for intrusive investigation were reacquired by a NAEVA Geophysicist and a KEMRON UXO Technician II using RTK GPS to place a flag at the modeled target location derived through the data processing and classification process in accordance with SOP AGCMR-07 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). The anomaly ID was written in indelible marker on a survey flag placed at the anomaly location.

2.7.2 Intrusive Investigation and Removal of Anomaly Sources

After reacquisition of the anomalies selected for intrusive investigation, each anomaly was intrusively investigated in accordance with SOP AGCMR-09 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Intrusive investigation and subsurface removal of the targets on the ranked classification list began January 9, 2019 and was completed April 1, 2019. The final set of anomalies to be investigated included those selected as part of the validation process approved in the final Geophysical Classification Validation Plan. Validation digs were completed between March 27, 2019 and April 1, 2019.

Specific intrusive investigation procedures, including vertical and lateral excavation limits, are detailed in SOP AGCMR-09 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Due to the precision of advanced classification geophysical data and modeling results, as well as to the nature of classification surveys, where non-TOI metallic items are purposely left in the ground, intrusive investigations were conducted with different procedures than those of intrusive investigations based on standard DGM. Each excavation was conducted only in the immediate vicinity of the reacquired target location, with an approximate 10-inch search radius. The investigation proceeded until the predicted item (or a metallic item of comparable size and shape) was recovered, until the excavation depth reached 12 inches below the predicted depth, or until the risk reduction depth threshold (1 foot in the inner zone or 2 feet in the outer zone) was reached.

Post-investigation anomaly resolution was verified by comparing the modeled classification results (predicted item, identity, and depth) to the actual intrusive investigation results. All intrusive investigation results successfully matched the predicted target characteristics.

3 RESULTS

3.1 Classification Results

A total of 1,279 anomalies were investigated by static MM2x2 analysis. The classification process resulted in the identification of 242 anomalies for intrusive investigation and subsurface removal and 1,037 anomalies as non-TOI, or items not selected for intrusive investigation. A summary of the classification results is presented in **Table 2**.

Table 2
Classification Category Summary

Classification Category	Quantity
Category 0 (Cannot Analyze)	26
Category 1 (High-Confidence TOI)	171
Category 2 (Inconclusive)	45
Category 3 (High-Confidence Non-TOI)	1,037
TOTAL	1,279

3.2 Subsurface Removal Results

Intrusive investigation and subsurface removal results indicated that the majority of TOI were, in fact, recovered from the Category 1 (high-confidence TOI) anomalies with good correlation between modeled data sources and intrusive results.

3.2.1 Recovered Targets of Interest

All of the 242 anomalies classified as Category 0, Category 1, and Category 2 were intrusively investigated, resulting in the recovery of 146 actual TOI. The recovered TOI included two 8-inch projectiles, 84 155mm projectiles, 30 QC seed items (large ISO and inert 155mm projectiles) and 30 QA validation seed items (large ISO and inert 155mm projectiles). Three of the recovered TOI were UXO items, including 1 projectile, 8inch, high explosive, M106 Series and 2 projectiles, 155mm, shrapnel, MK 1. Eight of the 146 recovered TOI were recovered deeper than the 1-foot depth threshold in the inner zone, validating that the risk reduction activity was successful in removing TOI to the required depths. Subsurface removal results are summarized in **Table 3**, and the locations of the recovered TOI are displayed on **Figure 8**.

Table 3
Recovered Target of Interest Summary

Item	Quantity Recovered	Correctly Classified as Potential TOI	Category 0	Category 1	Category 2	MEC	MD
8-inch Projectile	2	2	1	1	0	1	1
155mm Projectile	84	84	1	82	1	2	82
QC Seed	30	30	0	30	0	N/A	N/A
QA Validation Seed	30	30	0	30	0	N/A	N/A

Category 0 = Cannot Analyze

Category 1 = High-Confidence TOI

Category 2 = Inconclusive

3.2.2 Non-Targets of Interest in Category 1

Of the 171 anomalies classified as Category 1 (high-confidence TOI), 2 resulted in the recovery of non-TOI MEC items (MEC items smaller than the risk reduction targets of interest) and are described in **Section 3.3**. Two additional Category 1 anomalies did not result in the recovery of MEC or munitions debris (MD). One, target 11237, was a culvert at 20 inches below ground surface. The second target that did not have a MEC or MD source, target 10744, was deeper than the investigation limit, and intrusive investigation was suspended before the anomaly source was located. This target modeled as a high-confidence match to an 8-inch projectile at a depth greater than 38 inches below ground surface.

3.2.3 Targets of Interest in Category 2

The majority of Category 2 (inconclusive) anomalies resulted in the recovery of non-TOI, as expected, with only one of the 45 Category 2 anomalies resulting in the recovery of a TOI. Target 11015 modeled as a 91% match to a deep (greater than 30 inches below ground surface) 155mm projectile, but the depth of the item resulted in noisy polarizability, leading to a decision statistic (0.90978) below the Category 1 threshold in the category 2 range. An MD 155mm projectile was recovered at a reported depth of 24 inches below ground surface. This result confirms that the library match thresholds were appropriately selected, with enough conservativeness to provide additional reduction of risk.

3.3 Non-Target of Interest Munitions

As a result of the conservativeness in the selection of the stop-dig point on the ranked classification list, 61 munitions items, both MEC and MD, were recovered in addition to the 155mm and 8-inch projectiles recovered during intrusive investigation. Cluster analysis resulted in the identification of several groups of targets that appeared axially-symmetric and thick-walled, though smaller than the risk reduction TOI. Sampling of these clusters resulted in recovery of non-TOI munitions, including 75mm projectiles, 81mm mortar projectiles, and 4.2-inch mortar projectiles. Other non-TOI items were recovered during routine excavation of the anomalies on the ranked classification list, including 4.2-inch mortar projectiles and 105mm projectiles. The majority of the non-TOI munitions were MD, but 2 non-TOI UXO items (1 projectile, 75mm, high explosive, MK I; and 1 projectile, 105mm, high explosive, M1) were recovered. Recovered MEC items, including both TOI and non-TOI MEC, are displayed on **Figure 9**.

4 QUALITY CONTROL

Quality control of MM2x2 data, processing and classification was conducted by the QC Geophysicist. Data that had undergone quality verification by the data processor was provided to the QC Geophysicist for validation prior to data processing and classification. The QC Geophysicist validated the data quality by monitoring the data for agreement with the MQO in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018) and returned the data to the data processor for completion of data classification. The QC Geophysicist also validated the completeness and quality of the site-specific classification library. The data processing, classification, and ranking process were verified against the MQO in Worksheet 22 by the QC Geophysicist prior to finalization of the ranked classification dig list.

4.1 Blind Seeding Program

As described in **Section 2.2** and the Quality Control Seeding Report (**Appendix A**), 26 large ISOs and 4 inert 155mm projectiles were placed in random locations throughout Unit 23 at depths of 12 – 24 inches below ground surface, equivalent to the risk reduction depth thresholds, as blind QC seed items. All 30 QC seed items were classified as Category 1 (high-confidence TOI), identified for subsurface removal on the ranked classification dig list, and recovered during subsurface removal operations in accordance with the seed item recovery MQO established in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018). The QC seed item recovery information is summarized in **Table 4**, and the locations are displayed on **Figure 10**.

Table 4
Quality Control Seed Item Information

Seed ID	Flag ID	X	Y	Depth (Inches)	Orientation	Item	Horizontal Offset (inches) ¹
MM-17	11218	5747882.57	2110927.75	12	Horizontal	Large ISO	4.5
MM-21	10950	5747503.43	2109913.13	12	Horizontal	Large ISO	4.6
MM-22	11153	5747766.55	2110309.26	12	Vertical	Large ISO	1.0
QC-05	11236	5747943.64	2110641.13	13	Horizontal	Large ISO	0.8
MM-19	10138	5743964.666	2109420.062	12	Horizontal	Large ISO	0.2
QC-23-04	10187	5744358.962	2109187.667	24	20°	155mm	2.1
QC-23-03	10208	5744615.314	2109460.74	24	Vertical	155mm	1.6
MM-29	10293	5745116.629	2109496.747	16	45°	Large ISO	2.0
QC-09	10434	5745889.754	2109271.911	14	Vertical	Large ISO	2.7
MM-30	10719	5747001.357	2109126.887	15	Vertical	Large ISO	1.1
QC-07	11059	5747599.925	2109265.573	12	Horizontal	Large ISO	1.0
QC-23-01	11034	5747578.434	2109505.448	24	15°	155mm	3.3
MM-16	10318	5745185.204	2111952.516	13	Horizontal	Large ISO	2.8
QC-23-06	10189	5744387.161	2112452.781	15	Horizontal	Large ISO	1.1
QC-23-05	10162	5744130.334	2112786.128	14	Horizontal	Large ISO	1.3
MM-35	10115	5743840.578	2112598.266	18	Vertical	Large ISO	0.9
MM-26	10086	5743529.33	2112269.814	14	45°	Large ISO	5.2
MM-14	10057	5743077.131	2112155.152	12	Horizontal	Large ISO	0.2
MM-34	10033	5742887.076	2111327.311	17	45°	Large ISO	4.0
QC-22	10028	5742778.899	2111006.654	14	45°	Large ISO	3.2
QC-03	10026	5742768.877	2110453.572	16	Vertical	Large ISO	0.6
MM-28	10015	5742576.692	2110081.292	12	Horizontal	Large ISO	1.0
MM-20	10012	5742468.852	2109771.412	15	Vertical	Large ISO	4.1
MM-24	10075	5743441.296	2109648.768	16	Horizontal	Large ISO	1.0
QC-23-08	10370	5745515.725	2112291.838	17	Horizontal	Large ISO	0.1
QC-20	10422	5745811.898	2112567.918	17	45°	Large ISO	2.2
QC-26	10565	5746643.467	2111875.126	16	Vertical	Large ISO	3.1

Seed ID	Flag ID	X	Y	Depth (Inches)	Orientation	Item	Horizontal Offset (inches) ¹
QC-04	10740	5747117.336	2111542.531	15	45°	Large ISO	2.8
QC-23-07	11003	5747545.332	2111195.06	23	Vertical	155mm	2.1
QC-21	11169	5747788.051	2111118.235	14	Horizontal	Large ISO	0.4

¹ Seed item recovery offsets are provided to demonstrate compliance with the MQO established in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b) (all seed predicted seed item locations within 10 inches of the known locations).

4.2 Measurement Quality Objectives

The MQO for MM2x2 data processing and analysis are presented in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018) (including MQO for daily IVS and function test performance as well as for individual measurement metrics). Performance relative to the MQO was assessed during the processing and analysis of the data. Static MM2x2 data were not used to classify targets until these MQO were shown to have been met. Performance relative to key MQO is shown in **Table 5**.

Table 5
Measurement Quality Objective Performance

Measurement Quality Objective	DFW/SOP Reference	Frequency	Acceptance Criteria	Performance
Initial derived polarizabilities accuracy (IVS)	Cued Classification Survey/ SOP AGCMR-02/ SOP AGCMR-07/ SOP AGCMR-08	Once during initial system IVS test	Library Match metric ≥ 0.9 for each set of inverted polarizabilities	The derived polarizabilities of the IVS items matched the classification library item with decision statistics of 0.9704 and 0.9925.
Initial derived target position accuracy (IVS)	Cued Classification Survey/ SOP AGCMR-02/ SOP AGCMR-07/ SOP AGCMR-08	Once during initial system IVS test	All IVS item fit locations within 5 inches of ground truth locations	The fit locations of the IVS items were offset 1.8 inches and 3.1 inches from the ground truth locations.
Ongoing derived polarizabilities precision (IVS)	Cued Classification Survey/ SOP AGCMR-02/ SOP AGCMR-07/ SOP AGCMR-08	Twice daily as part of IVS testing	Library match to initial polarizabilities metric ≥ 0.9 for each set of three inverted polarizabilities	The derived polarizabilities of the IVS items from daily IVS tests matched the classification library item with a decision statistic greater than 0.9534

Measurement Quality Objective	DFW/SOP Reference	Frequency	Acceptance Criteria	Performance
Ongoing derived target position precision (IVS)	Cued Classification Survey/ SOP AGCMR-02/ SOP AGCMR-07/ SOP AGCMR-08	Twice daily as part of IVS testing	All IVS item fit locations within 5 inches of average of derived fit locations	The fit locations of all IVS items from the daily IVS tests were within 4.2 inches
Ongoing production area background measurement frequency	Cued Classification Survey/ SOP AGCMR-04/ SOP AGCMR-07	Evaluated for each background measurement	Time separation between background measurement and anomaly measurement < 2 hour	All anomaly measurements were acquired within 2 hours of a valid background measurement.
Confirm inversion model supports classification	Cued Classification Survey/ SOP AGCMR-08	Evaluated for all models derived from a measurement (i.e., single-source and multiple-source models)	Derived model response must fit the observed data with a fit coherence > 0.8	All anomaly measurement used for classification fit the observed data with fit coherences >0.8.
Confirm all anomalies classified	Cued Classification Survey/ SOP AGCMR-08	Evaluated for each anomaly (flag) location	100% of anomalies are classified as: TOI/Non-TOI/can't analyze	All anomalies were classified and are included in the ranked target list (Appendix C).
Confirm derived features match ground truth	Intrusive Investigation/ SOP AGCMR-09	Evaluated for all recovered seed items	100% of predicted seed item positions < 10 inches from known position	All QC seed item positions were within 5.2 inches of the known positions.
Classification performance	Intrusive Investigation/ SOP AGCMR-09	Evaluated for the final delivered dig list	100% of seed items classified as TOI	All seed items were classified as TOI.
Classification validation	Intrusive Investigation/ SOP AGCMR-09	For each delivered dig list	100% of predicted intrusively investigated non-TOI are confirmed to be non-TOI	All predicted intrusively investigated non-TOI were confirmed to be non-TOI.

4.3 Instrument Verification

On April 12, 2018, initial system operation was verified by acquiring a system function test utilizing a small ISO-80, as described in SOP AGCMR-01 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). Transmit current levels were monitored in addition to verification of correct modeled location and library match of the ISO-80 test object.

System assembly and verification were completed by the data acquisition geophysicist and overseen by the Project Geophysicist.

After completion of the instrument tests, an initial static IVS survey was performed, also on April 12, 2018, as described in SOP AGCMR-02 [Appendix B of the AGCMR-QAPP (KEMRON, 2016b)], as modified by FWV 012 (KEMRON, 2018). The IVS consisted of 2 large ISO and 1 blank location. One large ISO was buried vertically, 12 inches below ground surface (to the center of mass of the ISO), and the second large ISO was buried horizontally, 12 inches below ground surface (to the center of mass of the ISO). The IVS location and layout are shown on **Figure 5**. Construction of the IVS and details of the initial IVS survey are described in the Instrument Verification Strip Memorandum – Unit 23 Risk Reduction, Former Fort Ord, California, which is included in **Appendix B**.

Ongoing verification of the MM2x2 system performance was conducted through IVS surveys prior to and after completion of daily data acquisition activities.

5 DATA VERIFICATION AND VALIDATION

Data verification and validation activities were conducted throughout the course of the risk reduction data acquisition, processing and analysis, and intrusive investigation activities. Verification and validation activities are described in the Geophysical Classification Validation Plan (**Appendix D**) and summarized in the sections below. Results of the verification and validation investigations are presented in **Section 5.2**.

5.1 Quality Assurance Validation Seeding

The QA Geophysicist placed 30 blind subsurface QA validation seed items across the risk reduction area prior to the static MM2x2 investigation. The integrity of the QA validation seeding program was maintained by keeping QA validation seed item information unknown to the data acquisition, processing and analysis, intrusive investigation, and QC personnel until the initial classification results were submitted and the successful identification of all QA validation seed items was confirmed by the QA Geophysicist. QA validation seed items were emplaced by a UXO Technician not otherwise involved in the risk reduction activities, and burial information was recorded by the QA Geophysicist.

QA validation seed items consisted of large ISO and inert 155mm projectiles and were placed at depths between 12 and 18 inches below ground surface. The QA validation seed item burial and recovery information is summarized in **Table 6**, and the locations are displayed on **Figure 11**.

Table 6
Quality Assurance Validation Seed Item Information

Seed ID	Flag ID	X	Y	Depth (Inches)	Orientation	Item	Horizontal Offset (inches) ¹
23-RR-01	10281	5745055.54	2109597.78	17	E-W	Large ISO	0.9
23-RR-02	10859	5747346.63	2111392.77	17	E-W	Large ISO	2.8
23-RR-03	10202	5744549.55	2112048.06	15	E-W	Large ISO	1.1
23-RR-04	10163	5744132.01	2112340.06	16	N-S	Large ISO	5.5
23-RR-05	11168	5747786.74	2111145.10	16	NE-SW	Large ISO	2.8
23-RR-06	10070	5743354.78	2112238.65	16	E-W	Large ISO	6.9
23-RR-07	10122	5743891.28	2109528.95	14	N-S	Large ISO	3.8
23-RR-08	10098	5743653.20	2109468.14	15	N-S	Large ISO	4.4
23-RR-09	10038	5742950.01	2111291.01	18	N-S	Large ISO	3.7
23-RR-10	10181	5744286.17	2112364.17	14	E-W	Large ISO	2.4
23-RR-11	11103	5747653.46	2110346.19	12	N-S	Large ISO	3.8
23-RR-12	10030	5742809.98	2110943.80	15	N-S	Large ISO	4.7
23-RR-13	11109	5747666.42	2109346.85	13	E-W	Large ISO	3.7
23-RR-14	10195	5744447.43	2112166.05	15	N-S	Large ISO	7.7
23-RR-15	20008	5746178.29	2111040.84	16	Vertical	Large ISO	4.2
23-RR-16	10067	5743217.49	2112079.52	15	N-S	Large ISO	2.3
23-RR-17	11040	5747581.80	2111209.77	16	N-S	Large ISO	1.9
23-RR-18	10149	5743988.79	2112383.20	16	N-S	Large ISO	2.6
23-RR-19	11122	5747702.52	2109979.55	16	E-W	Large ISO	1.8
23-RR-20	20003	5745690.81	2111208.21	17	Vertical	Large ISO	6.1
23-RR-21	10294	5745124.83	2111940.03	17	E-W	Large ISO	0.7
23-RR-22	20019	5747082.24	2110664.09	12	E-W	155mm	8.1
23-RR-25	20015	5746822.65	2110789.33	12	N-S	155mm	5.3
23-RR-31	10488	5746300.54	2112236.28	16	E-W	155mm	3.9
23-RR-32	10538	5746554.05	2111903.22	13	N-S	155mm	1.9
23-RR-33	10886	5747396.71	2111448.55	15	E-W	155mm	2.8
23-RR-34	11121	5747702.16	2111391.66	15	E-W	155mm	3.6

Seed ID	Flag ID	X	Y	Depth (Inches)	Orientation	Item	Horizontal Offset (inches) ¹
23-RR-35	11246	5748043.20	2111097.80	12	E-W	155mm	8.1
23-RR-36	11256	5748104.43	2110833.13	17	N-S	155mm	7.7
23-RR-37	11194	5747831.79	2110482.69	13	E-W	155mm	3.2

¹ Seed item recovery offsets are provided to demonstrate compliance with the MQO established in Worksheet 22 of the AGCMR-QAPP (KEMRON, 2016b), as modified by FWV 012 (KEMRON, 2018) (all predicted seed item locations within 10 inches of the known locations).

5.2 Classification Verification and Validation

Included in the targets selected for intrusive investigation and subsurface removal on the ranked classification dig list were verification and validation investigations. These verification and validation investigations included the following:

- 42 library match threshold verification investigations
- 25 QA validation investigations

5.2.1 Library Match Threshold Verification

Intrusive investigation of 25 anomalies ranked immediately below the lowest-ranked TOI recovered from the ranked classification dig list was required to verify that the library match threshold was appropriately selected to identify the risk reduction TOI. Included in the dig list were 42 Category 2 anomalies ranked lower than the last recovered TOI, each of which were investigated as part of routine intrusive investigation activities. Intrusive investigation of the 42 library match threshold verification investigations resulted in the recovery of 25 75mm MD items and 2 4.2-inch MD items, but no risk reduction TOI were recovered. This satisfied the requirement for intrusive investigation of 25 anomalies ranked immediately below the lowest-ranked recovered TOI.

5.2.2 Modeled Depth Verification

The classification process resulted in a modeled depth of each classified target. Verification of modeled TOI depths is built into the processing and classification scheme. Recovery depths of all recovered items were recorded by the intrusive investigation team and compared to the modeled depths from the classification results to successfully verify that recovered TOI depths matched the modeled depths.

5.2.3 Quality Assurance Validation Investigations

After completion of subsurface removal of the targets classified as TOI, the QA Geophysicist selected 25 QA validation investigations for reacquisition and intrusive investigation as overall validation of the classification process to confirm that 155mm projectiles and 8-inch projectiles shallower than the risk reduction removal depths have not been left in place. Reacquisition and intrusive investigation were conducted in the same manner as that of the targets classified as

TOI. The 25 QA validation investigations, including investigation results, are listed in **Appendix C**. Intrusive investigation of the 25 validation investigations resulted in the recovery of 10 75mm MD items, 1 37mm MD item, and various assorted MD components, but no risk reduction TOI were recovered.

5.2.4 Verification and Validation Results

A total of 67 verification and validation investigations were completed. No TOI were recovered from the verification and validation investigations. Several non-TOI MD items were recovered during the verification and validation investigations, including the following:

- 37mm projectile MD (1 item)
- 75mm projectile MD (35 items)
- 4.2-inch mortar projectile MD (2 items)
- Various assorted MD components

The successful completion of the verification and validation investigations constituted the final risk reduction process validation.

6 CONCLUSIONS

6.1 Risk Reduction Results

A total of 1,279 anomalies were identified from previously-existing EM61 DGM detection data that potentially represented large munitions items (155mm and 8-inch projectiles) in the shallow subsurface of Unit 23. The anomaly selection was based on minimum response values for a 155mm projectile at 1-foot depth in the inner zone of the unit, which exists 436 feet or more from the perimeter of the 45-foot wide fuel break, and at 2-foot depth in the outer zone, which exists less than 436 feet from the perimeter of the 45-foot wide fuel break. The MM2x2 advanced EMI sensor was utilized to acquire static data measurements over each identified anomaly. The MM2x2 data was inverted and analyzed to estimate the intrinsic physical features of each anomaly source, allowing a comparison of the measured data to a site-specific TOI signature library and classification of each anomaly as a TOI or a non-TOI.

The ranked classification list included 242 anomalies identified for intrusive investigation and subsurface removal. 1,037 anomalies, over 81% of the investigated DGM anomalies, were classified as high-confidence non-TOI and determined to be acceptable to leave in place. 146 TOI were recovered and removed during intrusive investigation of the 242 anomalies identified for subsurface removal, including two 8-inch projectiles, 84 155mm projectiles, 30 QC seed items, and 30 QA validation seed items. Three of the recovered TOI were UXO items, including 1 projectile, 8inch, high explosive, M106 Series and 2 projectiles, 155mm, shrapnel, MK 1. Although not specifically targeted for the purposes of the risk reduction activity, an additional 61 non-TOI munitions items were also recovered and removed. Recovered non-TOI munitions included 75mm projectile MD, 81mm mortar projectile MD, 4.2-inch mortar projectile MD, 105mm projectile MD,

and 2 non-TOI MEC items (1 projectile, 75mm, high explosive, MK I; and 1 projectile, 105mm, high explosive, M1).

No TOI were recovered from intrusive investigation of 67 verification and validation anomalies, demonstrating the validity of the classification process.

Final classification and subsurface removal results are illustrated in the receiver operating characteristic curve shown on **Figure 12**.

6.2 Accomplishment of Risk Reduction Objectives

Based on the completion of the static MM2x2 investigation and classification process, the associated removal of TOI to the specified risk reduction activity depth thresholds, and the demonstrated absence of TOI remaining in the selected anomaly population, the risk reduction activity objective of removal of large MEC items from planned burn areas to address the potential risk identified for areas to be burn-ready (with additional site preparation activities) has been successfully met.

The risk reduction activity was also completed with a significant reduction in required effort by utilizing the MM2x2 system, which reduced the number of intrusive investigations that would have been required if all EM61 anomalies had been intrusively investigated.

6.3 Final Conceptual Site Model

The results of the risk reduction activity, including the identities, locations, and depths of recovered munitions items (both TOI and non-TOI munitions) support the existing conceptual site model (CSM) for the Impact Area MRA in general and for historical usage of Unit 23 in particular. Data derived from the risk reduction activity will be added to the existing Fort Ord GIS and Military Munitions Response Program database to enhance the CSM.

7 REFERENCES

Gilbane, 2014. Final MRS-BLM Units 4, 11 and 12, MEC Remedial Action Report, Former Fort Ord, California. [Administrative Record (AR)# OE-0799B]

Gilbane, 2015. MRS-BLM Units 6, 7, and 33 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California. (AR# OE-0842)

KEMRON Environmental Services, Inc. [KEMRON], 2015. Final, Basewide Accident Prevention Plan, Munitions and Explosives of Concern Removal and Soil Remediation, Former Fort Ord, Monterey County, California.

KEMRON, 2016a. Final Quality Assurance Project Plan Superfund Response Actions Former Fort Ord, California Volume II Appendix A Munitions and Explosives of Concern Remedial Action. (AR# OE-0884A)

KEMRON, 2016b. Final Quality Assurance Project Plan Superfund Response Action Former Fort Ord, California Volume II Munitions Response Appendix B Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan. (AR# OE-0868B)

KEMRON, 2017a. Field Work Variance No. 008, Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California. (AR# OE-0862B.5)

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

KEMRON, 2018. Field Work Variance 012 for Final, Work Plan, Munitions with Sensitive Fuzes Field Study, Former Fort Ord, California. (AR# OE-0888B.2)

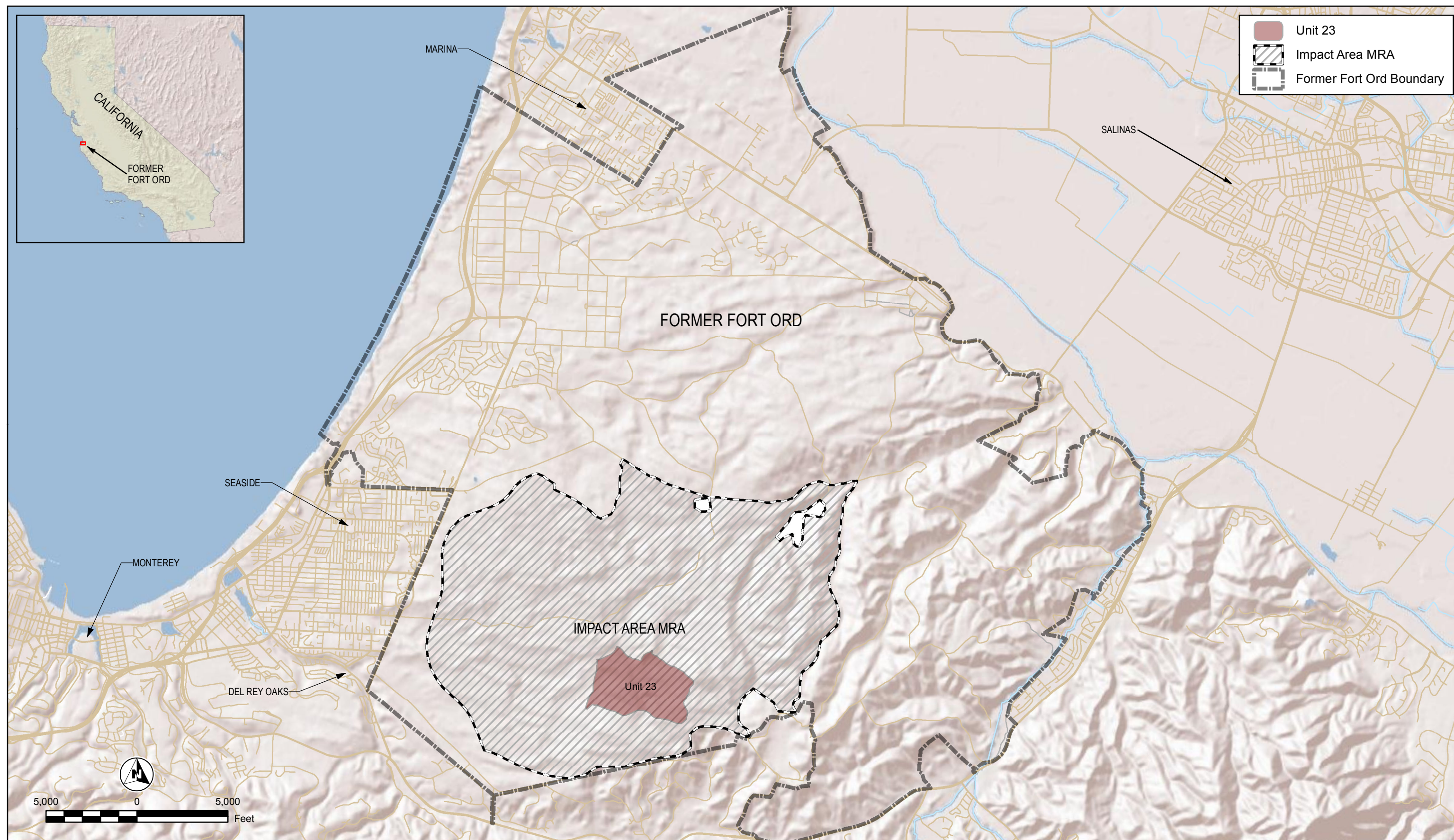
MACTEC Engineering and Consulting, Inc., 2007. Final Track 3 Impact Area Munitions Response Area Munitions Response Remedial Investigation/Feasibility Study Report Former Fort Ord, California. (AR# OE-0596R)

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

U.S. Army Corps of Engineers (USACE), 1997. *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California*. With technical assistance from Jones and Stokes Associates, Sacramento, California. (AR# BW-1787)

USACE, 2009. *Final Work Plan Remedial Design (RD)/Remedial Action (RA) Track 3 Impact Area Munitions Response Area (MRA) Munitions and Explosives of Concern (MEC) Removal Former Fort Ord, California*. (AR# OE-0660K)

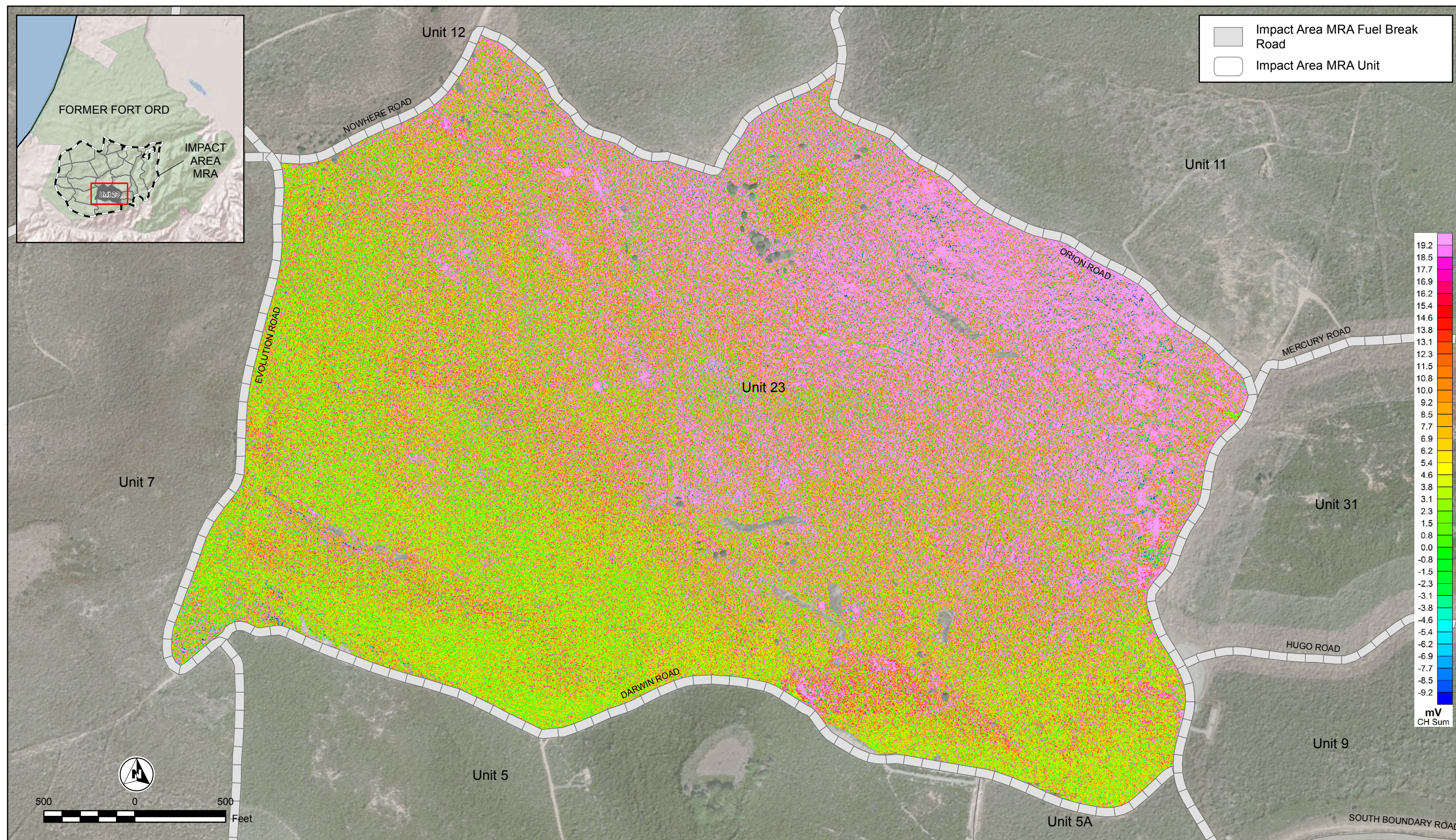
Figures



Technical Memorandum
Unit 23 Risk Reduction
Former Fort Ord, California

Figure 1
Regional Location Map





Technical Memorandum
Unit 23 Risk Reduction
Former Fort Ord, California

Figure 3
Digital Geophysical Mapping Detection Data

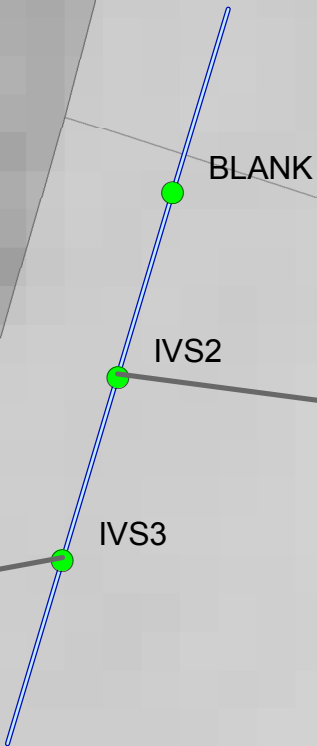


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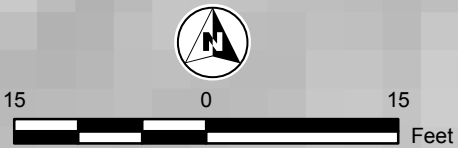
Figure 4
Anomalies Identified for Static Investigation



- Instrument Verification Strip Point
- Instrument Verification Strip Line
- Impact Area MRA Fuel Break Road
- Impact Area MRA Unit



Unit 23



Point ID	Easting ¹	Northing ¹	Item	Depth (inches) ²	Orientation
Blank	5742800.92	2111504.80	N/A	N/A	N/A
IVS2	5742796.66	2111490.44	Large ISO	12	Vertical
IVS3	5742792.32	2111476.11	Large ISO	12	Horizontal

¹ Coordinates are reported in California State Plane, Zone 4, NAD83, US survey feet

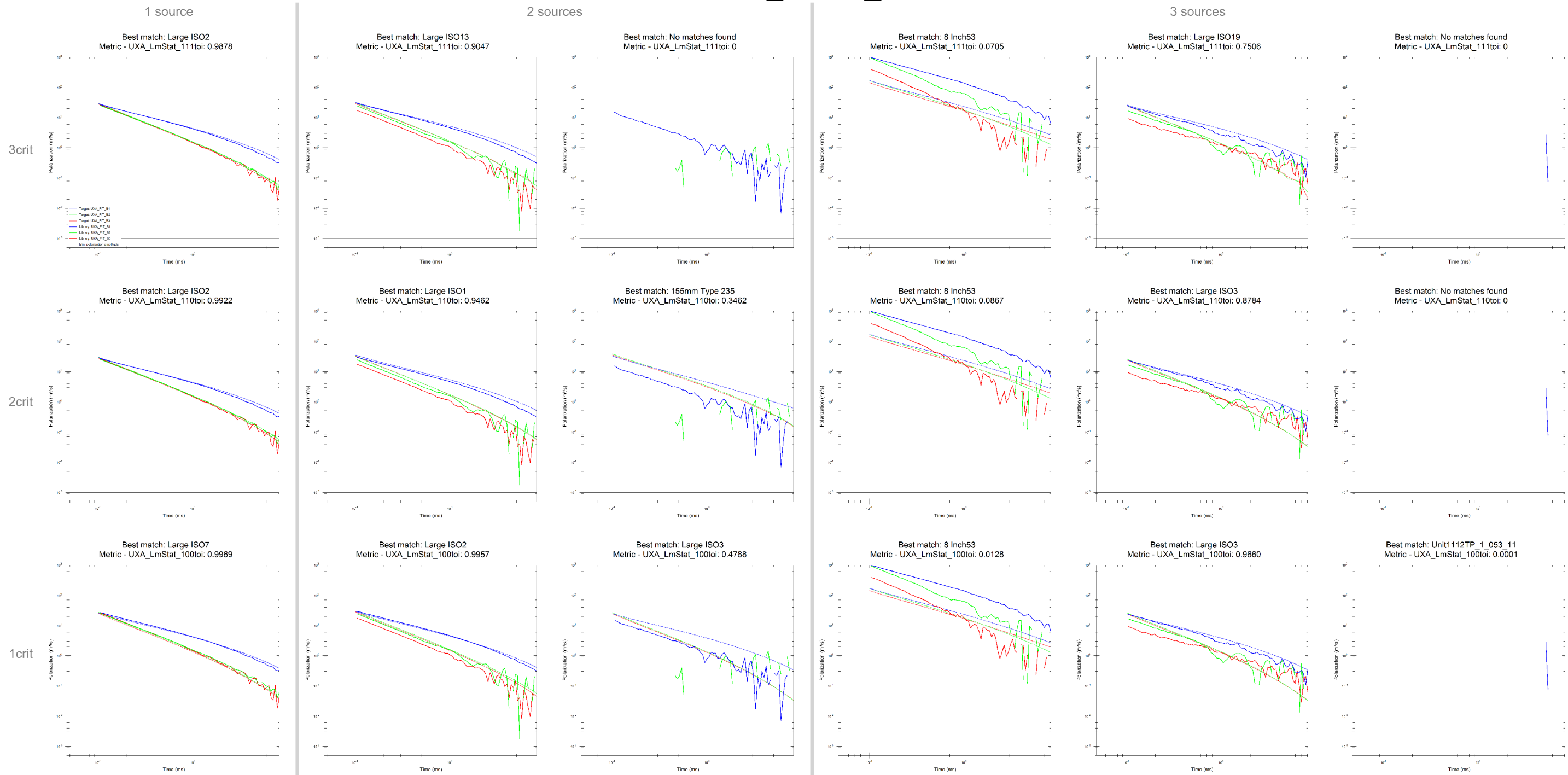
² Depths are reported to the center of mass of the item below ground surface



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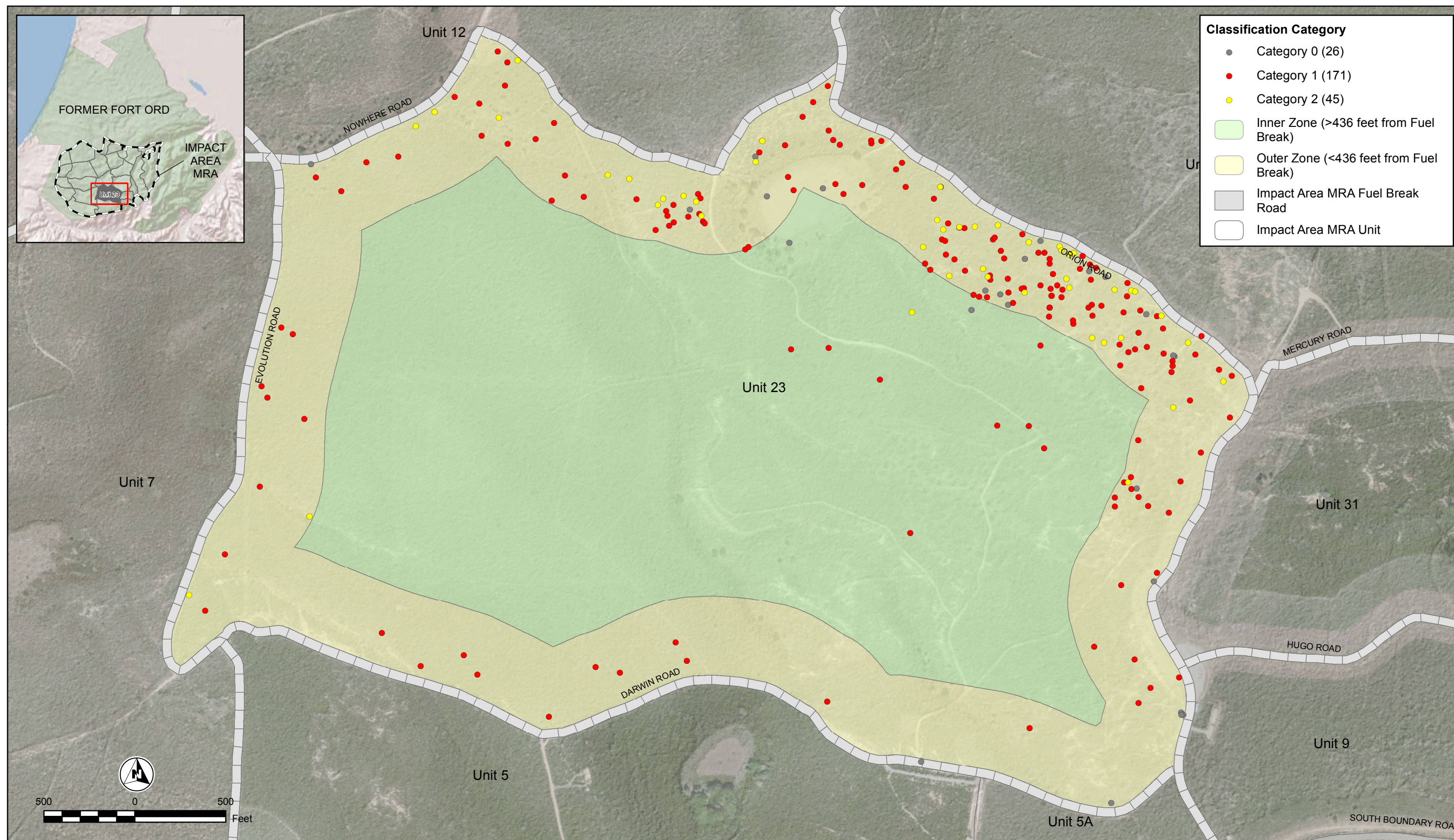
Figure 5
Instrument Verification Strip

UNIT23_10028_001



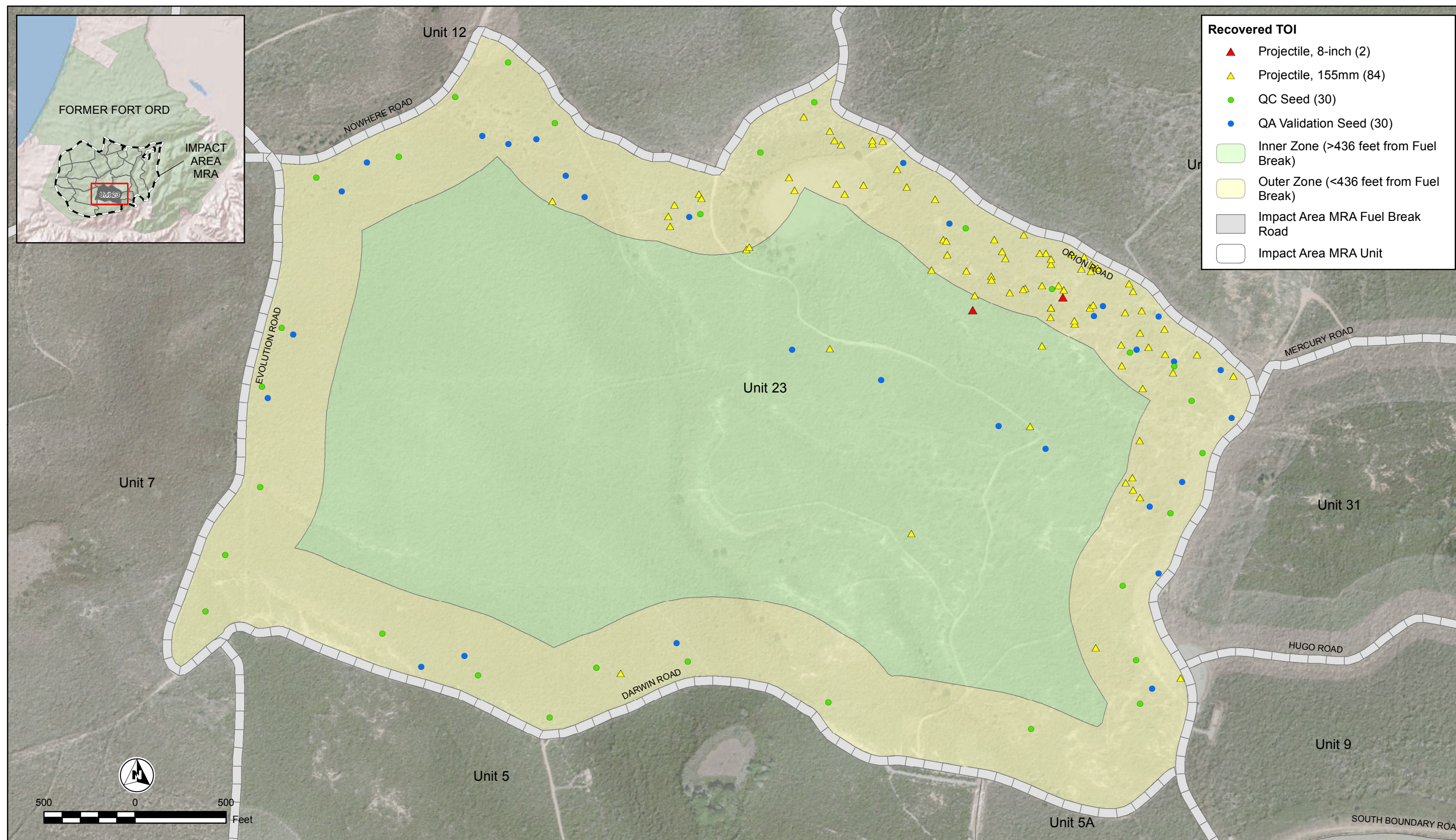
Technical Memorandum
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Figure 6
Example Multiple-Source Polarizability Curves



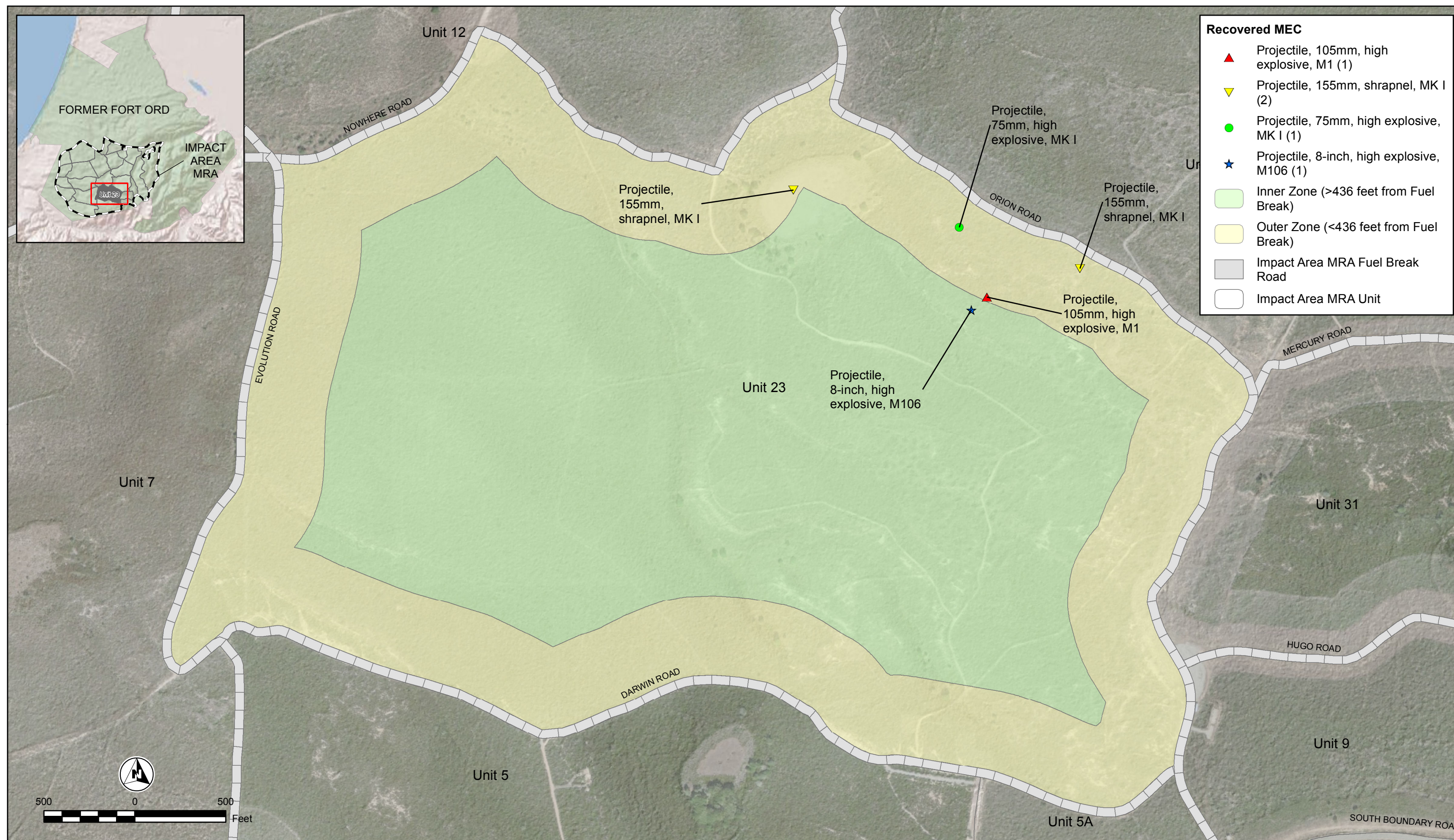
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Figure 7
Intrusive Investigation Locations



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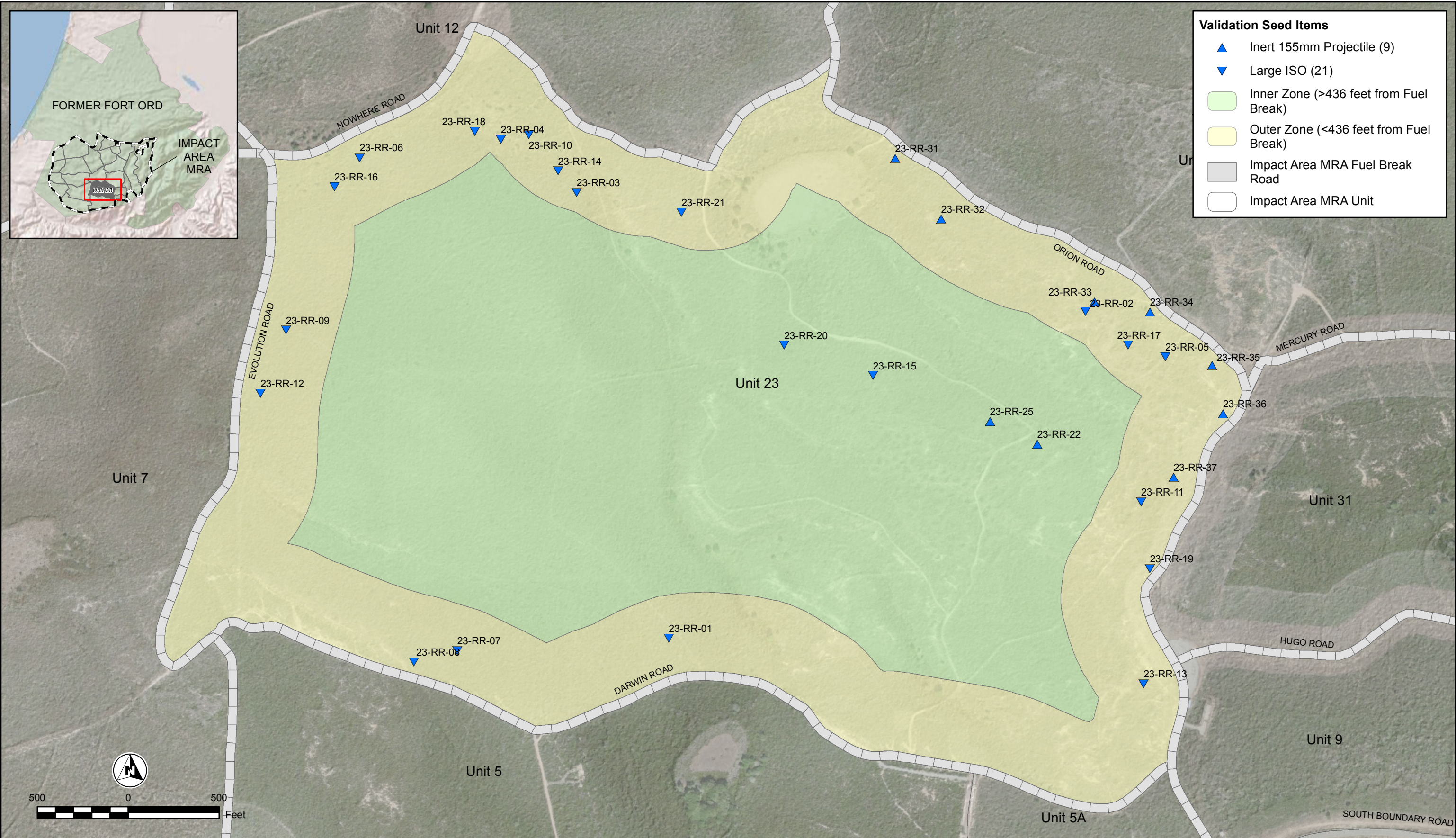
Figure 8
Recovered Targets of Interest





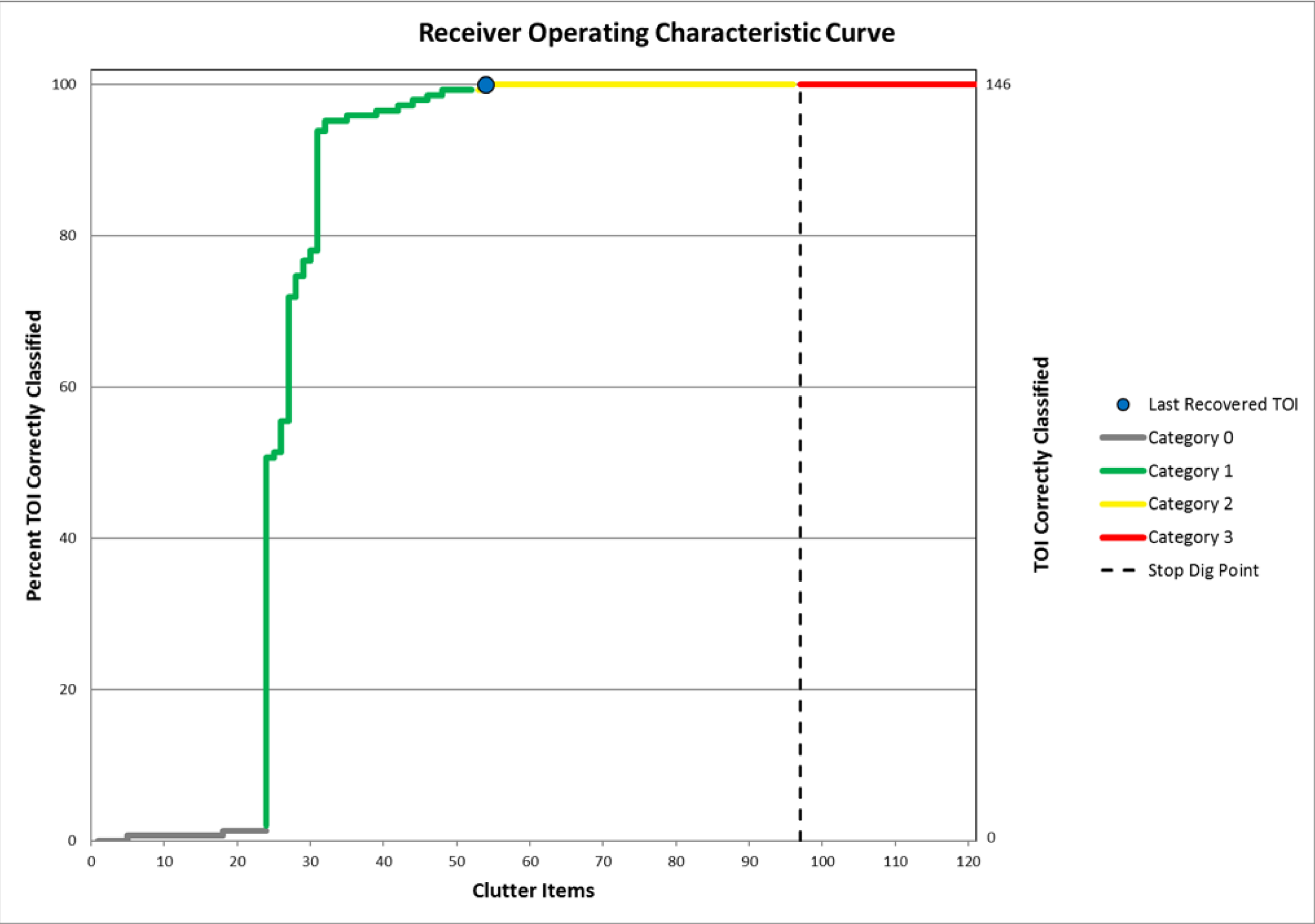
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Figure 10
Quality Control Seed Item Locations



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Figure 11
Quality Assurance Validation Seed Item Locations



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Figure 12
Receiver Operating Characteristic Curve

Appendix A

Quality Control Seeding Report – Unit 23 Risk Reduction, Former Fort Ord, California

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DATE: April 15, 2019; September 20, 2019 (revision 1)

Prior to risk reduction geophysical classification activities in Unit 23 at the Former Fort Ord, the remedial action area was seeded with subsurface quality control (QC) seed items to provide verification of data acquisition, processing and analysis, classification, and intrusive investigation performance. QC seeding was accomplished in accordance with Standard Operating Procedure (SOP) AGCMR-03 - Quality Control Seeding for Advanced Geophysical Classification in Appendix B of the *Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan* (AGCMR-QAPP; KEMRON, 2016) and the *Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California* (Unit 23 SSWP; KEMRON, 2015), with modification by FWV 008 (KEMRON, 2017).

Thirty blind QC seed items, including 26 large industry standard objects (ISO) and 4 inert 155mm projectiles, were placed in random locations throughout Unit 23 at depths of 12 – 24 inches below ground surface, equivalent to the risk reduction depth thresholds, in anticipation of encountering at least one seed item during each day of cued classification data acquisition. Seed items were emplaced by a UXO Technician II and the QC Geophysicist, utilizing anomaly avoidance techniques and real-time kinematic global positioning system for location measurement and recording of burial information.

To maintain the integrity of the QC program, seed item burial information was not provided to personnel involved in data acquisition, processing, or intrusive investigation activities until those activities were completed, the initial classification results were submitted by the Project Geophysicist to the USACE Quality Assurance (QA) Geophysicist, and the successful identification of all QC seed items was confirmed by the QC Geophysicist and the QA Geophysicist. QC seeding results are reported in the Unit 23 Risk Reduction Technical Memorandum. Additional validation seed items were emplaced by the USACE QA Geophysicist, details of which were unknown to the contractor team at the time of field work. Details of the validation seeding program are presented in the Broadway Bypass remedial action report.

QC seed item burial information is included in **Table 1**, and seed item burial locations are displayed on **Figure 1**.

Table 1
Quality Control Seed Item Burial Information

Seed ID	X ¹	Y ¹	Depth (in.) ²	Orientation	Item
MM-17	5747882.57	2110927.75	12	Horizontal	Large ISO
MM-21	5747503.43	2109913.13	12	Horizontal	Large ISO
MM-22	5747766.55	2110309.26	12	Vertical	Large ISO
QC-05	5747943.64	2110641.13	13	Horizontal	Large ISO
MM-19	5743964.67	2109420.06	12	Horizontal	Large ISO
QC-23-04	5744358.96	2109187.67	24	20 degrees	155mm
QC-23-03	5744615.31	2109460.74	24	Vertical	155mm
MM-29	5745116.63	2109496.75	16	45 degrees	Large ISO
QC-09	5745889.75	2109271.91	14	Vertical	Large ISO
MM-30	5747001.36	2109126.89	15	Vertical	Large ISO
QC-07	5747599.93	2109265.57	12	Horizontal	Large ISO
QC-23-01	5747578.43	2109505.45	24	15 degrees	155mm
MM-16	5745185.20	2111952.52	13	Horizontal	Large ISO
QC-23-06	5744387.16	2112452.78	15	Horizontal	Large ISO
QC-23-05	5744130.33	2112786.13	14	Horizontal	Large ISO
MM-35	5743840.58	2112598.27	18	Vertical	Large ISO
MM-26	5743529.33	2112269.81	14	45 degrees	Large ISO
MM-14	5743077.13	2112155.15	12	Horizontal	Large ISO
MM-34	5742887.08	2111327.31	17	45 degrees	Large ISO
QC-22	5742778.90	2111006.65	14	45 degrees	Large ISO
QC-03	5742768.88	2110453.57	16	Vertical	Large ISO
MM-28	5742576.69	2110081.29	12	Horizontal	Large ISO
MM-20	5742468.85	2109771.41	15	Vertical	Large ISO
MM-24	5743441.30	2109648.77	16	Horizontal	Large ISO
QC-23-08	5745515.73	2112291.84	17	Horizontal	Large ISO
QC-20	5745811.90	2112567.92	17	45 degrees	Large ISO
QC-26	5746643.47	2111875.13	16	Vertical	Large ISO
QC-04	5747117.34	2111542.53	15	45 degrees	Large ISO
QC-23-07	5747545.33	2111195.06	23	Vertical	155mm
QC-21	5747788.05	2111118.24	14	Horizontal	Large ISO

¹ Location coordinates are reported in NAD83, California State Plane, Zone 4, US survey feet.

² Burial depth information is reported to the center of mass of the item below ground surface.

References

KEMRON, 2015. *Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California.* (OE-0862).

KEMRON, 2016. *Final, Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II, Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan.* (OE-0868B).

KEMRON, 2017. *Field Work Variance 008.* (OE-0862B.5).



Quality Control Seeding Report
Unit 23 Risk Reduction
Former Fort Ord, California

Figure 1
Quality Control Seed Item Locations

Appendix B

Instrument Verification Strip Memorandum – Unit 23 Risk Reduction, Former Fort Ord, California

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DATE: September 4, 2019 (revision 1)

At the onset of the advanced geophysical classification (AGC) activities for the Unit 23 Risk Reduction at the Former Fort Ord, the performance of the Geometrics MetalMapper 2x2 (MM2x2) was demonstrated using an instrument verification strip (IVS). Details of the MM2x2 system assembly, the IVS construction, the initial dynamic and cued IVS surveys and the initial IVS survey results are presented in this memorandum.

1. MetalMapper 2x2 System Assembly and Verification

The MM2x2 is a person-portable advanced electromagnetic induction sensor designed for the detection and classification of buried metal objects. The MM2x2 is comprised of four co-planar transmitter coils oriented in a 2 by 2 square. Each transmitter coil is approximately 35 centimeters (cm) x 35 cm in size. Located in the center of each transmitter coil is a 10 cm x 10 cm x 10 cm receiver cube, each one containing three orthogonal coils to measure magnetic fields resulting in 12 different receiver coils. The receiver coils are oriented in 3 dimensions. The center-to-center distance of each receiver cube is approximately 40 cm. The transmitter coils are powered using a bi-polar half duty cycle, and the time decays of the subsurface currents (transients) are measured during the time that the transmitter coils are off. The sensors are mounted on a platform 20 cm above the ground surface. A real-time kinematic (RTK) global navigation satellite system (GNSS) and six-degree-of-freedom inertial measurement unit (IMU) are mounted on a tower centered above the sensor platform to provide positioning and orientation, respectively. The transmitter electronics and batteries are mounted on a backpack carried by the operator, and the system is operated from a tablet computer.

The MM2x2 system was assembled in accordance with Standard Operating Procedure (SOP) AGCMR-01 - Advanced EMI Sensor Assembly and Verification, which is located in Appendix B of

the *Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan* (AGCMR-QAPP; KEMRON, 2016a), with modification by Field Work Variance (FWV) 012 (KEMRON, 2018). Verification of system assembly, including inertial measurement unit orientation, RTK GNSS operation, data acquisition parameters, and system operation, was also conducted in accordance with SOP AGCMR-01 and is documented on the SOP AGCMR-01 Assembly Checklist.

The results of the MM2x2 static function test conducted with a small schedule 80 industry standard object (ISO80) met the acceptance criteria of the initial sensor function test, as demonstrated by the display of 4 delta values below the 2.000 threshold, indicating that the test results agreed with the reference values for each sensor. Note that the acceptance criteria for the initial function test measurement quality objective (MQO) in Table 22 of the AGCMR-QAPP (KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), applies only to the alternate function test procedure if the built-in MM2x2 system function test cannot be utilized, as described in SOP AGCMR-01.

2. Instrument Verification Strip Construction

The Unit 23 AGC IVS was constructed for use during a previous AGC activity on July 18, 2017, by the QC Geophysicist in accordance with SOP AGCMR-02 – Advanced EMI Sensor Instrument Verification Strip (AGCMR-QAPP; KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), along Evolution Road adjacent to the western boundary of Unit 23 (**Figure 1**). Prior to emplacement of IVS seed items, a background digital geophysical mapping (DGM) survey of the IVS location was conducted with a person-portable Geometrics EM61-MK2A (EM61) on July 18, 2017. The EM61 data were processed in accordance with GEO SOP 5 – DGM Data Processing for a PP System (Attachment B to the *Quality Assurance Project Plan, Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action; KEMRON, 2016b*), and the IVS location was determined to be suitable for use.

Figure 1. Instrument Verification Strip Location



After verification that the IVS burial locations were free of metallic interference, the IVS seed items were placed at precisely measured depths and orientations at the locations listed in **Table 1**. Each IVS item location was recorded with a Leica Viva GS15 RTK-GNSS prior to burial. The IVS consisted of 2 large ISO and 1 blank location. One large ISO was buried vertically, 12 inches below ground surface (to the center of mass of the ISO), and the second large ISO was buried horizontally, 12 inches below ground surface (to the center of mass of the ISO).

Table 1. IVS Location Information

Point ID	Easting ¹	Northing ¹	Item	Depth (inches) ²	Orientation
Blank	5742800.92	2111504.80	N/A	N/A	N/A
IVS2	5742796.66	2111490.44	Large ISO	12	Vertical
IVS3	5742792.32	2111476.11	Large ISO	12	Horizontal

¹ Coordinates are reported in California State Plane, Zone 4, NAD83, US survey feet

² Depths are reported to the center of mass of the item below ground surface

3. Initial Static Instrument Verification Strip Survey

Static MM2x2 measurements were acquired at each IVS item location (IVS2 and IVS3) and at the blank location on April 12, 2018, in accordance with SOP AGCMR-07 – Advanced EMI Sensor Cued Data Acquisition (AGCMR-QAPP; KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018). The blank location, where no metallic item was buried, was used as a background measurement to record the components of the measured response caused by the ambient environment and by the MM2x2 system itself. During data processing, the background

response was subtracted from the overall measured responses, leaving only the signal response from the large ISO buried at each IVS item location.

4. Initial Static Instrument Verification Strip Survey Results

The static MM2x2 IVS data were processed and analyzed in accordance with SOP AGCMR-08 – Advanced EMI Sensor Cued Data Processing and Analysis. The MM2x2 data files were imported into the UX-Analyze module within Geosoft’s Oasis Montaj, where the quality of the measured data was verified and the background measurement acquired at the blank IVS location was subtracted from each target measurement.

UX-Analyze estimates the features of each anomaly source through a dipole inversion process where a series of modeled dipole responses are compared to the measured data to determine the set of parameters that generates a response that best fits the observed data. If the modeled response closely matches the observed response (as indicated by the resulting fit coherence value), the parameters of that model can be used as estimates of the intrinsic features of the source (such as size, shape, and composition) as well as extrinsic features (such as position and orientation in the ground). The fit coherence is reported as a value between 0 and 1, where 1 is a perfect fit. The inversion modeling also estimates the physical location of each anomaly source.

For the initial cued measurements over each of the IVS items, the inversion modeled response closely matched the observed response, as indicated by fit coherence values of 0.9964 (for item IVS2) and 0.9967 (for item IVS3). The modeled locations the IVS items were offset 1.8 inches (for item IVS2) and 3.1 inches (for item IVS3) from the item locations measured during construction of the IVS.

The inversion of the MM2x2 data results in estimated intrinsic features of the measured items in the form of polarizabilities of the anomaly source item’s three principle axes (β_1 , β_2 , and β_3). The derived polarizabilities are used to classify the IVS targets by matching them to a library of target of interest signatures. UX-Analyze generates a correlation metric, or decision statistic value, to compare the estimated polarizabilities of each measured item to the polarizabilities of the items in the classification library. Similar to the fit coherence value, the decision statistic is a value between 0 and 1, where 1 is an exact match between the measured item and a library item.

The library match for the cued measurement over IVS item IVS2 is shown on **Figure 3**, and the library match for the cued measurement over IVS item IVS3 is shown on **Figure 4**. The figures display the derived polarizabilities of the measured IVS items as solid blue, green, and red lines and those of the library items as dashed blue, green, and red lines. Both measurements

resulted in close matches to a large ISO, with decision statistic values of 0.9704 (for item IVS2) and 0.9925 (for item IVS3).

Figure 3. IVS Item IVS2 Library Match Results

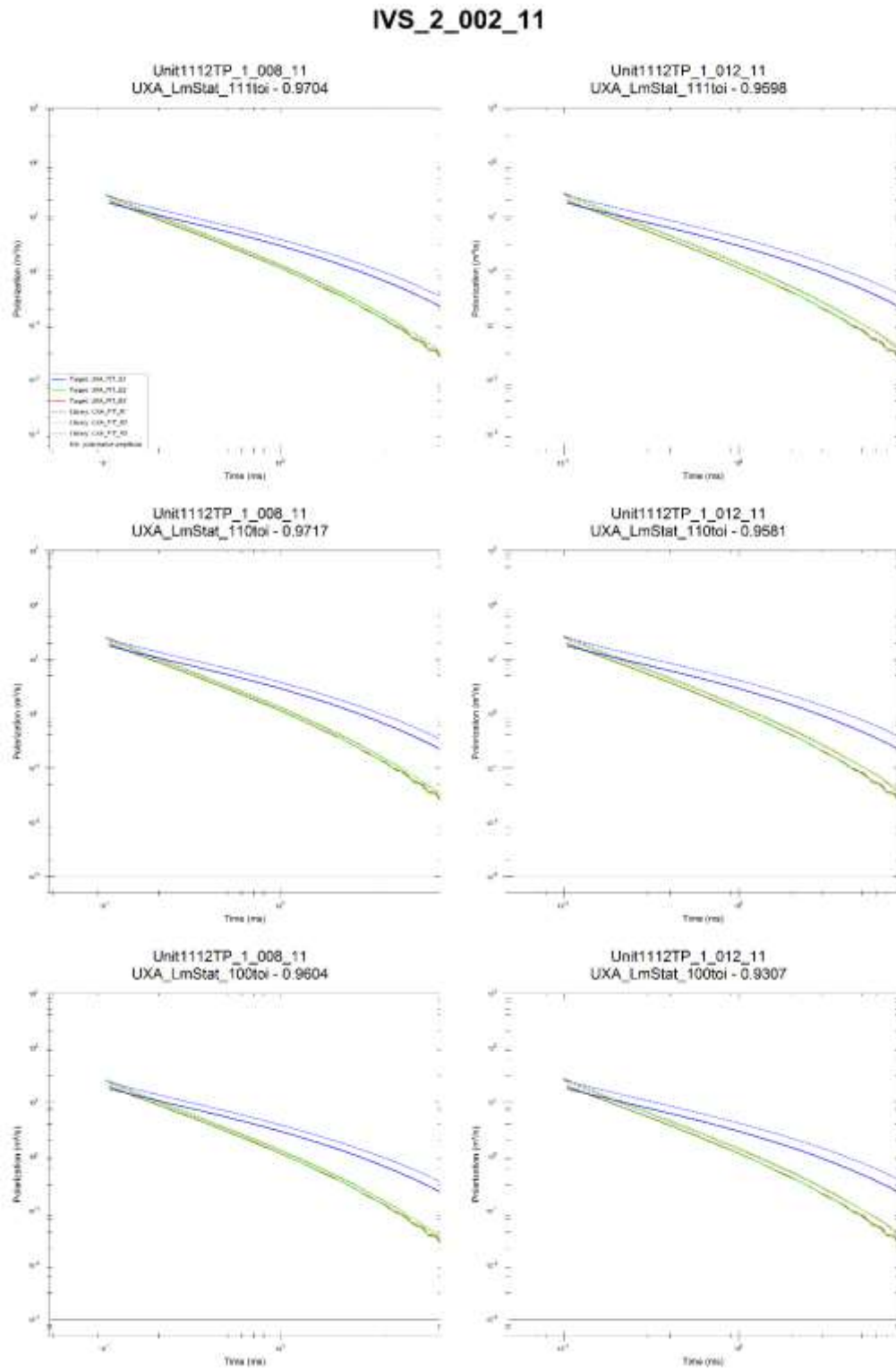
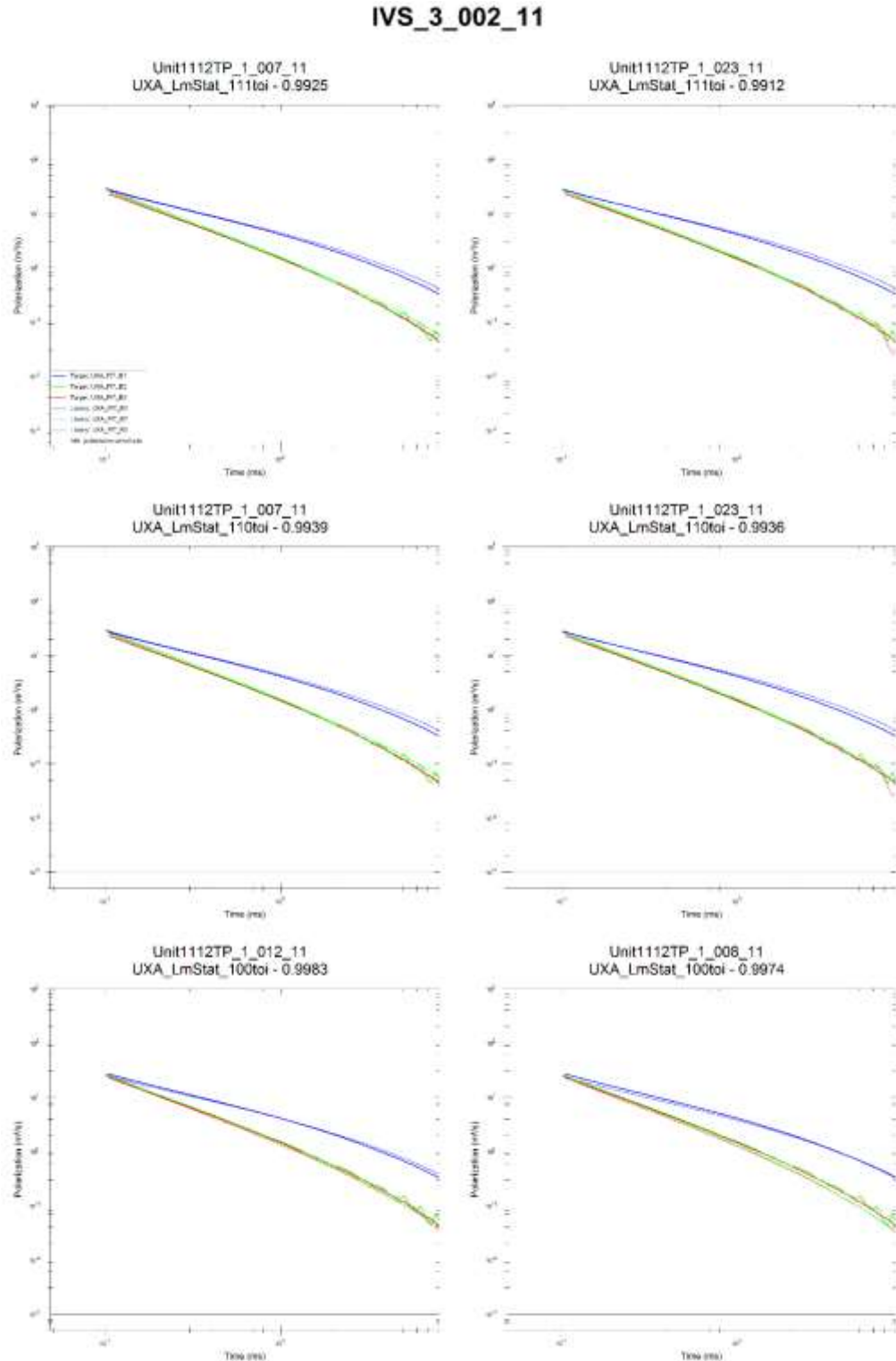


Figure 4. IVS Item IVS3 Library Match Results



Worksheet #22 in the AGCMR-QAPP (KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), defines the MQO and measurement performance criteria (MPC) related to the MM2x2 IVS survey measurements. The initial static IVS survey results compared to the MPC are shown in **Table 2**.

Table 2. Initial Cued Instrument Verification Strip Performance

IVS Item Measurement	Fit Coherence Requirement	Measurement Fit Coherence	Library Match Requirement	Measurement Library Match Metric	Derived Position Accuracy Requirement	Measurement Derived Position Accuracy
IVS2	>0.8	0.9964	≥0.9	0.9704	≤10 inches	1.8 inches
IVS3	>0.8	0.9967	≥0.9	0.9925	≤10 inches	3.1 inches

The AGCMR-QAPP (KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), does not include an IVS-specific MQO for fit coherence between the modeled response and the observed response for each item but rather specifies a fit coherence MQO that applies to all static MM2x2 measurements. This MQO specifies a fit coherence greater than 0.8. Both initial IVS measurements met the acceptance criteria for this MQO. The MQO for accuracy of the derived IVS polarizabilities specifies a library match correlation metric of at least 0.9. Both initial IVS measurements met the acceptance criteria for this MQO. The MQO for the initial derived IVS target position accuracy specifies that all IVS item fit locations are within 10 inches of the item positions recorded during construction of the IVS. The derived position accuracies for the initial IVS measurements met the acceptance criteria for this MQO.

5. MetalMapper 2x2 Verification Results

As demonstrated in the preceding tables and figures, the MM2x2 system as tested at the Unit 23 AGC IVS is capable of meeting the MQOs in Worksheet #22 of the AGCMR-QAPP (KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), and, by extension, is able to achieve the overall data quality objectives of the Unit 23 Risk Reduction.

6. Conclusion

The Unit 23 Risk Reduction utilized the previously constructed AGC IVS along Evolution Road adjacent to the western boundary of Unit 23 at the Former Fort Ord to verify the functionality of the MM2x2 system, to demonstrate its ability to meet the MQO in the AGCMR-QAPP (KEMRON, 2016a), with modification by FWV 012 (KEMRON, 2018), and to achieve the data quality objectives of the Unit 23 Risk Reduction. Static MM2x2 surveys were performed at the IVS on April 12, 2018. The results of the initial static function test and the initial static IVS survey successfully demonstrated the functionality of the MM2x2 system, its ability to meet the MQO defined in Worksheet #22 of the AGCMR-QAPP, and, by extension, its capability of achieving the overall data quality objectives of the Unit 23 Risk Reduction.

7. References

KEMRON, 2016a. *Final, Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II, Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan.* (OE-0868B).

KEMRON, 2016b. *Final, Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action.* (OE-0884A).

KEMRON, 2018. *Field Work Variance 012.* January. (OE-0888B.2).

Appendix C

Table of Contents

C-1 – Detected Targets for Static Investigation	1-1
C-2 – Ranked Dig Lists Intrusive Investigation Results	2-1

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10001	5742379.38	2109859.38	126.10	Outer Zone
10002	5742390.63	2109913.13	840.05	Outer Zone
10003	5742431.88	2109605.31	215.20	Outer Zone
10004	5742455.31	2109600.94	674.17	Outer Zone
10005	5742455.94	2109605.63	173.22	Outer Zone
10006	5742457.50	2109605.31	192.01	Outer Zone
10007	5742457.81	2109600.94	730.81	Outer Zone
10008	5742459.38	2109605.63	389.63	Outer Zone
10009	5742464.06	2109590.31	159.63	Outer Zone
10010	5742466.88	2109597.50	772.69	Outer Zone
10011	5742468.44	2110138.44	124.90	Outer Zone
10012	5742468.85	2109771.41	140.36	Outer Zone
10013	5742486.25	2109975.63	116.17	Outer Zone
10014	5742492.50	2110020.00	254.57	Outer Zone
10015	5742576.69	2110081.29	346.66	Outer Zone
10016	5742620.00	2110163.75	147.80	Outer Zone
10017	5742646.56	2110198.44	173.44	Outer Zone
10018	5742677.50	2110454.06	136.96	Outer Zone
10019	5742688.75	2109970.00	151.04	Outer Zone
10020	5742690.00	2109986.25	131.03	Outer Zone
10021	5742699.38	2110708.44	196.63	Outer Zone
10022	5742724.38	2110436.25	142.06	Outer Zone
10023	5742727.19	2110065.94	127.71	Outer Zone
10024	5742743.13	2110508.13	118.52	Outer Zone
10025	5742744.38	2110703.13	124.97	Outer Zone
10026	5742768.88	2110453.58	221.54	Outer Zone
10027	5742776.56	2110334.38	162.53	Outer Zone
10028	5742778.90	2111006.65	193.20	Outer Zone
10029	5742799.69	2110072.81	177.96	Outer Zone
10030	5742809.98	2110943.80	214.63	Outer Zone
10031	5742861.56	2110356.88	120.68	Outer Zone
10032	5742863.44	2110356.88	140.28	Outer Zone
10033	5742887.08	2111327.31	148.00	Outer Zone
10034	5742902.19	2111033.75	118.79	Outer Zone
10035	5742905.94	2112050.94	239.01	Outer Zone
10036	5742925.31	2111963.44	120.32	Outer Zone
10037	5742925.63	2110295.94	294.94	Outer Zone
10038	5742950.01	2111291.01	279.66	Outer Zone
10039	5742952.50	2110305.63	131.59	Outer Zone
10040	5742954.06	2110603.44	149.75	Outer Zone
10041	5742955.00	2110305.94	177.68	Outer Zone
10042	5742956.25	2110356.56	115.57	Outer Zone
10043	5742966.88	2110536.25	124.77	Outer Zone
10044	5742975.31	2112199.38	123.70	Outer Zone
10045	5742990.31	2112211.56	254.62	Outer Zone
10046	5742992.50	2110227.19	147.85	Outer Zone
10047	5742993.44	2112212.19	347.16	Outer Zone
10048	5742997.19	2109872.81	168.54	Outer Zone
10049	5743001.88	2110293.75	131.85	Outer Zone
10050	5743012.81	2110826.56	224.90	Outer Zone
10051	5743018.44	2110430.94	182.93	Outer Zone
10052	5743023.13	2112225.63	254.94	Outer Zone
10053	5743034.06	2110774.69	121.70	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10054	5743040.94	2110287.50	173.52	Outer Zone
10055	5743041.56	2110287.81	174.54	Outer Zone
10056	5743050.94	2112226.88	1449.09	Outer Zone
10057	5743077.13	2112155.15	397.17	Outer Zone
10058	5743111.56	2110675.63	123.77	Outer Zone
10059	5743112.50	2112174.69	295.21	Outer Zone
10060	5743119.06	2110836.56	181.43	Outer Zone
10061	5743149.38	2112217.19	183.83	Outer Zone
10062	5743153.44	2111908.75	921.56	Outer Zone
10063	5743163.13	2111377.19	129.84	Outer Zone
10064	5743201.56	2112232.19	192.47	Outer Zone
10065	5743210.00	2109981.56	118.73	Outer Zone
10066	5743215.63	2111878.13	144.70	Outer Zone
10067	5743217.49	2112079.53	397.24	Outer Zone
10068	5743249.38	2109957.19	132.39	Outer Zone
10069	5743271.88	2109933.75	127.23	Outer Zone
10070	5743354.78	2112238.65	262.82	Outer Zone
10071	5743374.69	2112359.38	131.46	Outer Zone
10072	5743389.06	2112199.38	122.09	Outer Zone
10073	5743439.38	2112339.06	176.02	Outer Zone
10074	5743440.94	2112339.69	168.01	Outer Zone
10075	5743441.30	2109648.76	396.62	Outer Zone
10076	5743450.94	2112383.44	260.81	Outer Zone
10077	5743454.06	2112383.44	220.45	Outer Zone
10078	5743486.88	2112414.38	195.25	Outer Zone
10079	5743488.13	2112322.19	209.64	Outer Zone
10080	5743490.00	2112321.56	166.33	Outer Zone
10081	5743495.31	2112399.06	192.37	Outer Zone
10082	5743502.81	2111978.44	136.01	Outer Zone
10083	5743513.44	2112412.50	153.43	Outer Zone
10084	5743514.38	2112335.00	120.85	Outer Zone
10085	5743520.94	2112386.56	216.86	Outer Zone
10086	5743529.33	2112269.81	271.04	Outer Zone
10087	5743548.44	2112451.25	2365.96	Outer Zone
10088	5743556.88	2112440.63	220.80	Outer Zone
10089	5743565.94	2112159.69	733.80	Outer Zone
10090	5743567.81	2112158.13	775.89	Outer Zone
10091	5743585.31	2109425.31	306.06	Outer Zone
10092	5743590.00	2112433.75	902.19	Outer Zone
10093	5743605.94	2109754.69	214.85	Outer Zone
10094	5743607.81	2109754.06	343.82	Outer Zone
10095	5743625.63	2112436.88	117.46	Outer Zone
10096	5743627.50	2112436.88	141.80	Outer Zone
10097	5743640.63	2112497.19	838.98	Outer Zone
10098	5743653.20	2109468.14	182.06	Outer Zone
10099	5743656.56	2112193.13	136.06	Outer Zone
10100	5743660.63	2112503.75	135.79	Outer Zone
10101	5743682.50	2109399.06	3004.17	Outer Zone
10102	5743688.13	2112372.81	146.02	Outer Zone
10103	5743724.06	2112337.81	152.37	Outer Zone
10104	5743729.38	2112512.19	150.94	Outer Zone
10105	5743730.00	2112549.69	201.77	Outer Zone
10106	5743744.38	2112532.19	176.28	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10107	5743758.13	2112398.44	186.79	Outer Zone
10108	5743760.00	2112400.63	174.08	Outer Zone
10109	5743768.75	2112258.75	207.13	Outer Zone
10110	5743770.63	2112260.00	158.07	Outer Zone
10111	5743777.81	2109368.13	3140.33	Outer Zone
10112	5743808.75	2112275.31	125.48	Outer Zone
10113	5743814.38	2112562.19	115.81	Outer Zone
10114	5743822.19	2112424.38	291.55	Outer Zone
10115	5743840.58	2112598.26	361.76	Outer Zone
10116	5743852.81	2112560.94	341.11	Outer Zone
10117	5743865.31	2112379.38	174.14	Outer Zone
10118	5743869.38	2109339.38	3177.27	Outer Zone
10119	5743871.56	2112378.44	182.29	Outer Zone
10120	5743885.63	2112441.56	114.31	Outer Zone
10121	5743890.63	2112284.38	114.90	Outer Zone
10122	5743891.28	2109528.95	247.41	Outer Zone
10123	5743891.88	2112204.38	320.29	Outer Zone
10124	5743908.13	2112155.00	166.15	Outer Zone
10125	5743908.13	2112640.94	188.78	Outer Zone
10126	5743908.44	2112671.25	403.45	Outer Zone
10127	5743910.00	2112212.50	154.83	Outer Zone
10128	5743928.13	2112681.56	223.90	Outer Zone
10129	5743930.00	2112390.31	141.01	Outer Zone
10130	5743931.25	2112390.31	140.18	Outer Zone
10131	5743945.63	2112772.81	173.67	Outer Zone
10132	5743949.38	2112680.00	262.50	Outer Zone
10133	5743954.38	2112694.38	418.71	Outer Zone
10134	5743957.19	2112814.06	168.10	Outer Zone
10135	5743957.81	2112807.81	233.29	Outer Zone
10136	5743960.31	2112569.69	153.47	Outer Zone
10137	5743960.63	2112569.06	149.21	Outer Zone
10138	5743964.66	2109420.06	270.91	Outer Zone
10139	5743965.00	2112861.56	141.78	Outer Zone
10140	5743965.63	2112346.56	180.93	Outer Zone
10141	5743967.19	2109295.63	399.02	Outer Zone
10142	5743972.19	2112503.44	129.32	Outer Zone
10143	5743972.81	2112546.88	883.01	Outer Zone
10144	5743973.44	2112702.50	127.09	Outer Zone
10145	5743975.63	2112560.31	125.36	Outer Zone
10146	5743983.75	2112679.38	117.04	Outer Zone
10147	5743984.06	2112869.06	145.82	Outer Zone
10148	5743984.38	2112756.88	226.04	Outer Zone
10149	5743988.79	2112383.20	174.95	Outer Zone
10150	5744013.44	2112633.44	214.95	Outer Zone
10151	5744014.06	2112752.50	184.19	Outer Zone
10152	5744033.44	2112651.25	483.90	Outer Zone
10153	5744035.31	2112606.25	221.74	Outer Zone
10154	5744036.56	2112504.06	135.61	Outer Zone
10155	5744055.63	2112265.31	119.90	Outer Zone
10156	5744056.56	2109251.25	4171.76	Outer Zone
10157	5744076.25	2112848.75	125.97	Outer Zone
10158	5744078.44	2112480.00	119.58	Outer Zone
10159	5744078.75	2112479.06	295.79	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10160	5744083.13	2112483.13	181.12	Outer Zone
10161	5744116.56	2112659.69	124.25	Outer Zone
10162	5744130.34	2112786.13	299.43	Outer Zone
10163	5744132.01	2112340.06	156.71	Outer Zone
10164	5744146.88	2112798.44	208.96	Outer Zone
10165	5744146.88	2112822.81	145.50	Outer Zone
10166	5744150.63	2112606.25	346.31	Outer Zone
10167	5744151.56	2112729.06	213.79	Outer Zone
10168	5744169.38	2112596.56	161.47	Outer Zone
10169	5744175.63	2112432.19	153.49	Outer Zone
10170	5744186.88	2112796.88	170.50	Outer Zone
10171	5744203.13	2112693.13	235.08	Outer Zone
10172	5744208.44	2112246.56	136.07	Outer Zone
10173	5744210.63	2112791.25	200.00	Outer Zone
10174	5744210.94	2112328.13	232.27	Outer Zone
10175	5744231.88	2112174.06	230.69	Outer Zone
10176	5744233.75	2112175.94	238.25	Outer Zone
10177	5744255.94	2112170.94	137.20	Outer Zone
10178	5744256.88	2112170.00	152.63	Outer Zone
10179	5744260.94	2112425.31	123.38	Outer Zone
10180	5744268.75	2112723.75	144.50	Outer Zone
10181	5744286.16	2112364.18	339.97	Outer Zone
10182	5744298.13	2112094.69	116.98	Outer Zone
10183	5744307.81	2112514.38	431.91	Outer Zone
10184	5744322.19	2112345.94	142.65	Outer Zone
10185	5744344.38	2112095.94	130.36	Outer Zone
10186	5744350.94	2112357.50	151.46	Outer Zone
10187	5744358.96	2109187.66	340.55	Outer Zone
10188	5744373.13	2112025.63	136.87	Outer Zone
10189	5744387.16	2112452.78	338.98	Outer Zone
10190	5744402.19	2112026.25	141.75	Outer Zone
10191	5744402.19	2112508.44	149.07	Outer Zone
10192	5744439.38	2112330.94	298.53	Outer Zone
10193	5744443.13	2112169.38	121.82	Outer Zone
10194	5744444.38	2112169.06	130.39	Outer Zone
10195	5744447.43	2112166.05	258.99	Outer Zone
10196	5744485.63	2112290.00	309.29	Outer Zone
10197	5744486.56	2112193.44	120.29	Outer Zone
10198	5744497.81	2112292.50	195.12	Outer Zone
10199	5744499.69	2112399.69	180.08	Outer Zone
10200	5744500.94	2109149.06	2622.24	Outer Zone
10201	5744531.25	2112349.69	149.77	Outer Zone
10202	5744549.55	2112048.06	229.59	Outer Zone
10203	5744553.13	2112328.44	133.48	Outer Zone
10204	5744560.00	2112293.75	150.70	Outer Zone
10205	5744592.81	2109189.38	711.59	Outer Zone
10206	5744598.13	2112109.69	141.53	Outer Zone
10207	5744604.06	2112193.75	1422.97	Outer Zone
10208	5744615.31	2109460.74	276.81	Outer Zone
10209	5744619.06	2112123.13	147.76	Outer Zone
10210	5744625.94	2112181.88	156.57	Outer Zone
10211	5744633.75	2112185.00	177.66	Outer Zone
10212	5744634.06	2112187.81	361.47	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10213	5744634.69	2112186.56	213.39	Outer Zone
10214	5744651.25	2112180.94	131.83	Outer Zone
10215	5744652.19	2112305.94	130.11	Outer Zone
10216	5744652.81	2112059.69	163.12	Outer Zone
10217	5744657.50	2112338.13	130.05	Outer Zone
10218	5744667.19	2111996.25	218.29	Outer Zone
10219	5744680.31	2109229.06	4080.82	Outer Zone
10220	5744681.25	2112165.94	117.90	Outer Zone
10221	5744682.81	2112094.38	118.69	Outer Zone
10222	5744684.69	2109229.06	341.09	Outer Zone
10223	5744692.50	2112314.06	120.77	Outer Zone
10224	5744700.63	2112140.94	138.04	Outer Zone
10225	5744700.94	2112140.94	120.16	Outer Zone
10226	5744703.13	2112321.56	143.90	Outer Zone
10227	5744738.44	2112176.56	128.48	Outer Zone
10228	5744740.31	2112169.69	119.88	Outer Zone
10229	5744744.38	2112183.44	151.14	Outer Zone
10230	5744746.56	2112057.81	125.99	Outer Zone
10231	5744749.38	2109431.56	419.67	Outer Zone
10232	5744752.19	2111947.81	272.34	Outer Zone
10233	5744756.56	2111947.50	228.41	Outer Zone
10234	5744770.63	2111950.63	116.80	Outer Zone
10235	5744775.00	2109260.63	132.08	Outer Zone
10236	5744778.75	2111916.56	146.10	Outer Zone
10237	5744779.38	2109261.56	2729.77	Outer Zone
10238	5744786.88	2112090.31	124.26	Outer Zone
10239	5744787.50	2111896.88	134.07	Outer Zone
10240	5744799.38	2112148.44	157.04	Outer Zone
10241	5744803.44	2112192.50	142.32	Outer Zone
10242	5744804.69	2112135.00	173.58	Outer Zone
10243	5744806.88	2112135.94	369.98	Outer Zone
10244	5744819.06	2109279.69	787.26	Outer Zone
10245	5744822.81	2109280.31	1246.83	Outer Zone
10246	5744835.00	2111870.94	149.30	Outer Zone
10247	5744836.25	2112271.56	223.49	Outer Zone
10248	5744837.19	2112124.69	121.69	Outer Zone
10249	5744839.69	2112034.69	227.76	Outer Zone
10250	5744853.13	2111982.19	143.39	Outer Zone
10251	5744853.75	2112188.75	132.87	Outer Zone
10252	5744863.13	2109302.81	2392.01	Outer Zone
10253	5744864.38	2111977.81	126.13	Outer Zone
10254	5744876.88	2111949.06	125.19	Outer Zone
10255	5744898.44	2111844.69	139.55	Outer Zone
10256	5744899.06	2112205.94	183.68	Outer Zone
10257	5744905.00	2112051.88	166.70	Outer Zone
10258	5744906.88	2112054.06	187.10	Outer Zone
10259	5744916.25	2112219.69	125.90	Outer Zone
10260	5744943.75	2112176.56	125.50	Outer Zone
10261	5744945.94	2111865.94	159.14	Outer Zone
10262	5744954.38	2109349.06	2200.29	Outer Zone
10263	5744957.19	2112003.13	166.21	Outer Zone
10264	5744959.38	2112035.00	189.77	Outer Zone
10265	5744961.88	2112054.69	183.61	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10266	5744986.88	2112037.81	163.10	Outer Zone
10267	5744999.38	2112213.44	182.73	Outer Zone
10268	5745001.88	2112069.06	138.27	Outer Zone
10269	5745003.13	2111969.69	280.23	Outer Zone
10270	5745005.63	2112035.94	123.86	Outer Zone
10271	5745009.06	2111943.13	161.35	Outer Zone
10272	5745015.94	2111975.94	124.22	Outer Zone
10273	5745019.69	2111886.88	581.23	Outer Zone
10274	5745021.56	2112118.13	120.78	Outer Zone
10275	5745044.06	2112004.69	205.53	Outer Zone
10276	5745045.31	2111906.25	120.12	Outer Zone
10277	5745045.63	2111907.81	210.33	Outer Zone
10278	5745048.44	2109387.50	677.04	Outer Zone
10279	5745049.06	2111886.56	151.67	Outer Zone
10280	5745051.88	2111934.69	154.68	Outer Zone
10281	5745055.54	2109597.78	198.13	Outer Zone
10282	5745059.69	2112170.31	248.21	Outer Zone
10283	5745072.19	2111889.06	117.79	Outer Zone
10284	5745085.00	2112080.94	194.37	Outer Zone
10285	5745092.19	2112182.81	270.77	Outer Zone
10286	5745094.38	2109402.19	3170.55	Outer Zone
10287	5745097.19	2112003.13	167.90	Outer Zone
10288	5745098.44	2112052.81	120.57	Outer Zone
10289	5745099.06	2109405.00	333.29	Outer Zone
10290	5745100.63	2112052.19	115.96	Outer Zone
10291	5745101.25	2112202.50	151.76	Outer Zone
10292	5745110.31	2112074.69	337.91	Outer Zone
10293	5745116.63	2109496.75	286.88	Outer Zone
10294	5745124.83	2111940.03	131.38	Outer Zone
10295	5745131.25	2111915.94	127.14	Outer Zone
10296	5745133.44	2111975.63	143.52	Outer Zone
10297	5745135.63	2112092.19	227.60	Outer Zone
10298	5745138.13	2112091.56	316.85	Outer Zone
10299	5745138.75	2111848.13	206.92	Outer Zone
10300	5745139.69	2112092.81	248.68	Outer Zone
10301	5745143.13	2112061.25	133.47	Outer Zone
10302	5745144.38	2112114.69	127.20	Outer Zone
10303	5745145.31	2112113.13	133.77	Outer Zone
10304	5745146.56	2111810.94	241.89	Outer Zone
10305	5745151.88	2109411.25	766.01	Outer Zone
10306	5745151.88	2109415.00	1510.00	Outer Zone
10307	5745153.13	2112112.81	331.12	Outer Zone
10308	5745155.31	2109816.88	116.73	Outer Zone
10309	5745161.88	2111982.50	123.69	Outer Zone
10310	5745167.81	2112020.94	135.51	Outer Zone
10311	5745167.81	2112024.06	118.52	Outer Zone
10312	5745172.81	2111793.44	185.71	Outer Zone
10313	5745177.50	2111855.63	125.56	Outer Zone
10314	5745178.75	2111920.31	199.82	Outer Zone
10315	5745179.38	2112066.25	1157.60	Outer Zone
10316	5745182.50	2111875.00	140.31	Outer Zone
10317	5745183.75	2112080.31	142.62	Outer Zone
10318	5745185.20	2111952.51	117.42	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10319	5745193.75	2112040.31	375.88	Outer Zone
10320	5745195.94	2111869.38	122.65	Outer Zone
10321	5745197.50	2111945.00	120.07	Outer Zone
10322	5745198.13	2111781.88	192.96	Outer Zone
10323	5745198.75	2111779.69	214.66	Outer Zone
10324	5745198.75	2111805.31	125.11	Outer Zone
10325	5745203.75	2111892.81	163.38	Outer Zone
10326	5745206.25	2111910.63	254.44	Outer Zone
10327	5745210.31	2111908.44	184.69	Outer Zone
10328	5745210.63	2112123.44	155.53	Outer Zone
10329	5745214.38	2111740.94	162.17	Outer Zone
10330	5745215.00	2109840.94	135.90	Outer Zone
10331	5745215.00	2111902.50	114.05	Outer Zone
10332	5745228.75	2112050.63	487.54	Outer Zone
10333	5745229.38	2112169.69	671.57	Outer Zone
10334	5745236.88	2111945.94	160.37	Outer Zone
10335	5745254.69	2109420.00	1115.87	Outer Zone
10336	5745256.56	2109418.75	1548.79	Outer Zone
10337	5745256.88	2109691.88	128.67	Outer Zone
10338	5745263.44	2112077.19	218.21	Outer Zone
10339	5745265.00	2112053.75	116.26	Outer Zone
10340	5745284.38	2111978.13	119.21	Outer Zone
10341	5745301.25	2109757.19	154.57	Outer Zone
10342	5745309.06	2109636.56	120.23	Outer Zone
10343	5745337.81	2112250.63	127.75	Outer Zone
10344	5745345.63	2112244.06	126.61	Outer Zone
10345	5745356.88	2109415.63	322.35	Outer Zone
10346	5745357.19	2112183.44	246.18	Outer Zone
10347	5745357.50	2109413.75	3381.78	Outer Zone
10348	5745360.31	2112235.00	126.47	Outer Zone
10349	5745362.50	2112141.88	123.49	Outer Zone
10350	5745366.25	2112295.00	288.44	Outer Zone
10351	5745375.94	2109539.69	149.81	Outer Zone
10352	5745379.69	2111984.38	116.03	Outer Zone
10353	5745396.88	2112183.13	129.90	Outer Zone
10354	5745409.69	2112165.63	184.10	Outer Zone
10355	5745415.31	2111828.44	140.78	Outer Zone
10356	5745422.50	2112132.19	173.39	Outer Zone
10357	5745438.44	2111760.94	159.75	Outer Zone
10358	5745439.69	2111821.56	153.23	Outer Zone
10359	5745456.25	2109398.44	2890.71	Outer Zone
10360	5745456.56	2111772.81	252.32	Outer Zone
10361	5745460.31	2112238.44	307.41	Outer Zone
10362	5745482.19	2112120.63	136.89	Outer Zone
10363	5745483.44	2111990.94	132.94	Outer Zone
10364	5745485.63	2112423.75	114.36	Outer Zone
10365	5745489.38	2112454.69	175.73	Outer Zone
10366	5745491.25	2112350.94	364.53	Outer Zone
10367	5745494.38	2112268.13	225.65	Outer Zone
10368	5745496.25	2112239.69	176.12	Outer Zone
10369	5745515.00	2112454.38	178.68	Outer Zone
10370	5745515.73	2112291.84	162.87	Outer Zone
10371	5745521.25	2112419.69	125.00	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10372	5745530.00	2111926.88	186.57	Outer Zone
10373	5745532.50	2112355.63	134.73	Outer Zone
10374	5745533.13	2112123.75	146.10	Outer Zone
10375	5745545.94	2111843.75	149.05	Outer Zone
10376	5745547.19	2109715.00	131.14	Outer Zone
10377	5745557.81	2112049.06	115.23	Outer Zone
10378	5745559.69	2109378.75	362.45	Outer Zone
10379	5745561.56	2112049.69	160.88	Outer Zone
10380	5745583.44	2112524.69	137.22	Outer Zone
10381	5745583.75	2109412.81	163.26	Outer Zone
10382	5745595.00	2112216.88	117.43	Outer Zone
10383	5745600.31	2112299.06	192.16	Outer Zone
10384	5745604.38	2112083.44	136.56	Outer Zone
10385	5745607.50	2112408.13	307.76	Outer Zone
10386	5745608.13	2109358.13	907.54	Outer Zone
10387	5745616.56	2112379.06	131.40	Outer Zone
10388	5745635.63	2112441.88	166.44	Outer Zone
10389	5745640.00	2112426.25	128.44	Outer Zone
10390	5745642.19	2112049.06	169.09	Outer Zone
10391	5745644.69	2112484.38	143.05	Outer Zone
10392	5745653.75	2109331.56	3488.59	Outer Zone
10393	5745656.88	2112328.75	693.21	Outer Zone
10394	5745662.81	2112403.13	142.44	Outer Zone
10395	5745662.81	2112404.06	141.83	Outer Zone
10396	5745674.69	2112155.94	541.01	Outer Zone
10397	5745676.88	2112009.06	136.89	Outer Zone
10398	5745677.81	2112010.00	132.87	Outer Zone
10399	5745686.56	2112105.94	159.45	Outer Zone
10400	5745692.50	2112543.44	275.13	Outer Zone
10401	5745696.88	2112531.25	209.82	Outer Zone
10402	5745697.81	2112465.94	143.48	Outer Zone
10403	5745704.06	2112085.31	286.28	Outer Zone
10404	5745705.31	2112578.44	199.66	Outer Zone
10405	5745705.94	2112505.63	238.92	Outer Zone
10406	5745717.50	2112596.88	241.45	Outer Zone
10407	5745725.00	2109401.88	175.18	Outer Zone
10408	5745731.88	2109402.19	167.73	Outer Zone
10409	5745736.88	2112554.69	152.67	Outer Zone
10410	5745739.38	2109280.31	540.80	Outer Zone
10411	5745739.69	2109275.00	128.20	Outer Zone
10412	5745753.44	2112117.19	522.92	Outer Zone
10413	5745755.00	2112487.19	736.55	Outer Zone
10414	5745763.75	2112577.19	146.09	Outer Zone
10415	5745768.75	2112597.19	241.52	Outer Zone
10416	5745775.63	2112585.31	282.22	Outer Zone
10417	5745780.63	2109249.06	115.82	Outer Zone
10418	5745781.56	2109254.38	408.51	Outer Zone
10419	5745794.69	2112441.25	380.53	Outer Zone
10420	5745800.31	2112234.38	211.01	Outer Zone
10421	5745803.75	2112359.38	119.22	Outer Zone
10422	5745811.90	2112567.91	319.86	Outer Zone
10423	5745825.31	2109222.19	115.02	Outer Zone
10424	5745838.75	2112355.63	207.68	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10425	5745845.00	2109199.38	750.35	Outer Zone
10426	5745849.69	2112390.63	288.37	Outer Zone
10427	5745850.00	2112107.19	148.82	Outer Zone
10428	5745860.63	2112096.88	116.62	Outer Zone
10429	5745861.25	2112362.50	239.00	Outer Zone
10430	5745865.63	2112094.69	192.84	Outer Zone
10431	5745870.00	2112106.88	114.96	Outer Zone
10432	5745871.25	2112548.44	171.57	Outer Zone
10433	5745888.75	2112324.69	266.99	Outer Zone
10434	5745889.75	2109271.91	234.92	Outer Zone
10435	5745891.88	2112658.13	119.41	Outer Zone
10436	5745892.81	2112657.50	120.80	Outer Zone
10437	5745895.00	2112445.63	145.51	Outer Zone
10438	5745898.13	2112410.94	178.69	Outer Zone
10439	5745911.56	2112308.44	159.51	Outer Zone
10440	5745922.19	2112358.44	345.07	Outer Zone
10441	5745930.94	2112184.06	199.20	Outer Zone
10442	5745934.69	2112118.44	329.17	Outer Zone
10443	5745958.13	2112334.06	293.39	Outer Zone
10444	5745959.06	2112381.25	293.49	Outer Zone
10445	5745962.19	2112073.13	169.50	Outer Zone
10446	5745965.31	2112279.69	140.41	Outer Zone
10447	5745978.13	2112063.13	132.22	Outer Zone
10448	5745992.50	2112047.19	159.85	Outer Zone
10449	5746008.75	2112183.44	228.10	Outer Zone
10450	5746021.56	2112302.19	223.04	Outer Zone
10451	5746030.94	2112348.13	148.87	Outer Zone
10452	5746049.69	2112296.56	135.60	Outer Zone
10453	5746056.56	2111946.88	116.06	Outer Zone
10454	5746056.88	2112089.38	199.37	Outer Zone
10455	5746066.88	2112391.56	294.00	Outer Zone
10456	5746067.19	2112338.44	227.03	Outer Zone
10457	5746081.25	2112113.44	554.43	Outer Zone
10458	5746094.06	2112352.81	148.70	Outer Zone
10459	5746101.88	2112157.19	114.48	Outer Zone
10460	5746102.81	2112364.06	121.74	Outer Zone
10461	5746103.44	2112212.50	120.61	Outer Zone
10462	5746104.38	2111909.69	196.08	Outer Zone
10463	5746110.94	2111961.56	281.77	Outer Zone
10464	5746120.63	2112182.19	261.03	Outer Zone
10465	5746122.50	2112046.88	151.93	Outer Zone
10466	5746124.69	2111902.19	114.75	Outer Zone
10467	5746125.00	2112373.75	125.72	Outer Zone
10468	5746130.31	2112356.25	359.34	Outer Zone
10469	5746131.88	2112340.00	225.70	Outer Zone
10470	5746144.06	2112378.75	167.82	Outer Zone
10471	5746167.19	2112132.19	171.62	Outer Zone
10472	5746170.31	2112065.63	132.78	Outer Zone
10473	5746185.94	2112353.75	419.28	Outer Zone
10474	5746199.38	2112300.94	137.34	Outer Zone
10475	5746205.00	2112323.75	445.98	Outer Zone
10476	5746234.69	2112325.00	121.99	Outer Zone
10477	5746234.69	2112326.88	139.00	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10478	5746246.56	2111992.19	115.80	Outer Zone
10479	5746265.31	2112146.88	114.86	Outer Zone
10480	5746266.88	2112200.00	221.12	Outer Zone
10481	5746269.69	2112035.63	119.88	Outer Zone
10482	5746272.81	2108984.06	1296.06	Outer Zone
10483	5746274.69	2111888.13	125.59	Outer Zone
10484	5746275.63	2111888.44	124.61	Outer Zone
10485	5746278.44	2112285.63	239.73	Outer Zone
10486	5746295.94	2112184.38	143.97	Outer Zone
10487	5746296.56	2111907.50	117.36	Outer Zone
10488	5746300.54	2112236.28	216.13	Outer Zone
10489	5746316.35	2109152.29	172.04	Outer Zone
10490	5746319.38	2112102.81	122.29	Outer Zone
10491	5746320.94	2112045.00	121.86	Outer Zone
10492	5746320.94	2112065.94	131.03	Outer Zone
10493	5746321.25	2112114.69	115.01	Outer Zone
10494	5746323.44	2112045.31	123.31	Outer Zone
10495	5746352.81	2112144.06	121.46	Outer Zone
10496	5746364.38	2112225.31	184.26	Outer Zone
10497	5746367.81	2111780.94	179.94	Outer Zone
10498	5746380.00	2112058.44	198.92	Outer Zone
10499	5746384.06	2111836.25	150.57	Outer Zone
10500	5746390.63	2112100.63	209.65	Outer Zone
10501	5746404.38	2111687.50	305.72	Outer Zone
10502	5746405.94	2108939.38	1610.43	Outer Zone
10503	5746411.88	2112054.38	739.78	Outer Zone
10504	5746414.06	2111785.31	261.14	Outer Zone
10505	5746414.06	2112055.94	589.21	Outer Zone
10506	5746416.56	2111868.13	147.41	Outer Zone
10507	5746417.19	2108956.25	513.89	Outer Zone
10508	5746417.81	2111772.81	145.51	Outer Zone
10509	5746422.19	2111740.00	202.34	Outer Zone
10510	5746422.19	2111903.44	138.39	Outer Zone
10511	5746426.88	2111680.00	238.94	Outer Zone
10512	5746437.81	2111798.75	216.02	Outer Zone
10513	5746441.25	2112050.00	230.92	Outer Zone
10514	5746452.50	2111840.00	115.29	Outer Zone
10515	5746455.31	2111648.44	165.56	Outer Zone
10516	5746456.56	2111809.38	138.51	Outer Zone
10517	5746456.56	2111840.00	133.59	Outer Zone
10518	5746474.38	2112036.25	156.92	Outer Zone
10519	5746474.69	2111721.25	372.09	Outer Zone
10520	5746474.69	2111895.94	159.46	Outer Zone
10521	5746476.88	2111898.75	228.75	Outer Zone
10522	5746492.19	2111839.69	167.86	Outer Zone
10523	5746493.75	2111920.31	332.30	Outer Zone
10524	5746510.31	2112101.88	241.59	Outer Zone
10525	5746514.38	2112101.56	136.18	Outer Zone
10526	5746516.25	2112030.94	296.22	Outer Zone
10527	5746516.25	2112101.56	146.18	Outer Zone
10528	5746518.13	2111633.75	180.63	Outer Zone
10529	5746520.63	2111813.44	967.32	Outer Zone
10530	5746525.31	2111768.75	210.08	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10531	5746525.94	2111857.50	118.33	Outer Zone
10532	5746526.88	2111868.13	130.76	Outer Zone
10533	5746535.63	2111939.06	244.15	Outer Zone
10534	5746538.13	2111806.25	214.85	Outer Zone
10535	5746541.88	2111730.63	240.58	Outer Zone
10536	5746544.38	2111799.69	236.84	Outer Zone
10537	5746553.44	2112111.25	265.35	Outer Zone
10538	5746554.05	2111903.23	357.24	Outer Zone
10539	5746554.06	2111706.25	203.41	Outer Zone
10540	5746556.88	2111865.63	264.40	Outer Zone
10541	5746559.69	2111613.13	124.29	Outer Zone
10542	5746567.81	2109275.31	131.25	Outer Zone
10543	5746573.75	2111653.44	339.22	Outer Zone
10544	5746575.31	2109098.44	151.70	Outer Zone
10545	5746584.06	2111629.06	120.44	Outer Zone
10546	5746585.63	2111696.25	114.73	Outer Zone
10547	5746589.38	2112077.19	146.19	Outer Zone
10548	5746589.69	2111705.63	220.31	Outer Zone
10549	5746592.50	2111927.19	148.49	Outer Zone
10550	5746593.75	2111730.00	124.40	Outer Zone
10551	5746604.06	2111759.06	130.40	Outer Zone
10552	5746607.19	2111963.44	138.24	Outer Zone
10553	5746610.00	2111670.63	115.13	Outer Zone
10554	5746613.75	2111880.31	127.45	Outer Zone
10555	5746614.69	2111845.63	146.35	Outer Zone
10556	5746615.31	2111880.31	135.68	Outer Zone
10557	5746619.38	2111610.94	169.57	Outer Zone
10558	5746620.53	2109092.11	298.59	Outer Zone
10559	5746621.56	2111845.63	128.30	Outer Zone
10560	5746626.88	2111844.69	165.92	Outer Zone
10561	5746631.88	2111824.69	265.84	Outer Zone
10562	5746634.38	2111666.88	344.62	Outer Zone
10563	5746635.94	2111844.38	408.76	Outer Zone
10564	5746636.88	2111809.69	141.64	Outer Zone
10565	5746643.46	2111875.13	152.94	Outer Zone
10566	5746644.06	2111686.88	125.17	Outer Zone
10567	5746645.31	2111712.50	211.06	Outer Zone
10568	5746645.94	2111687.19	143.21	Outer Zone
10569	5746647.81	2111592.50	118.16	Outer Zone
10570	5746648.13	2111641.88	319.30	Outer Zone
10571	5746650.94	2111782.19	293.16	Outer Zone
10572	5746652.50	2111675.00	147.33	Outer Zone
10573	5746654.38	2111676.25	209.74	Outer Zone
10574	5746655.63	2111948.44	194.00	Outer Zone
10575	5746657.50	2112004.06	205.98	Outer Zone
10576	5746658.13	2111701.56	522.43	Outer Zone
10577	5746659.38	2111867.50	665.11	Outer Zone
10578	5746661.25	2111869.38	700.46	Outer Zone
10579	5746664.69	2111669.38	140.64	Outer Zone
10580	5746674.69	2111535.00	160.47	Outer Zone
10581	5746677.50	2111848.75	162.27	Outer Zone
10582	5746691.25	2111914.69	212.57	Outer Zone
10583	5746693.75	2111509.69	194.89	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10584	5746700.00	2111883.13	117.44	Outer Zone
10585	5746700.31	2111642.19	235.90	Outer Zone
10586	5746707.19	2111581.88	143.36	Outer Zone
10587	5746709.69	2111679.06	156.20	Outer Zone
10588	5746713.75	2111607.81	132.41	Outer Zone
10589	5746714.38	2111524.69	211.34	Outer Zone
10590	5746715.94	2111600.94	152.91	Outer Zone
10591	5746719.69	2111589.38	184.20	Outer Zone
10592	5746719.69	2111686.56	483.21	Outer Zone
10593	5746720.63	2111522.19	161.64	Outer Zone
10594	5746722.81	2111577.81	122.14	Outer Zone
10595	5746724.69	2111498.13	119.95	Outer Zone
10596	5746726.56	2111495.94	131.82	Outer Zone
10597	5746739.38	2111907.19	137.90	Outer Zone
10598	5746739.69	2111672.19	144.97	Outer Zone
10599	5746740.31	2111869.06	202.60	Outer Zone
10600	5746740.94	2111637.19	141.50	Outer Zone
10601	5746741.25	2111907.50	149.08	Outer Zone
10602	5746741.88	2111660.00	134.46	Outer Zone
10603	5746744.69	2111653.75	176.98	Outer Zone
10604	5746746.25	2111753.75	380.54	Outer Zone
10605	5746746.56	2111653.44	206.15	Outer Zone
10606	5746747.81	2111831.25	743.73	Outer Zone
10607	5746748.13	2111825.00	684.92	Outer Zone
10608	5746748.44	2111741.88	377.53	Outer Zone
10609	5746748.44	2111820.63	676.75	Outer Zone
10610	5746750.00	2111821.25	786.89	Outer Zone
10611	5746750.00	2111829.69	675.84	Outer Zone
10612	5746752.81	2111726.56	162.66	Outer Zone
10613	5746758.44	2111530.63	242.30	Outer Zone
10614	5746760.63	2111700.00	362.37	Outer Zone
10615	5746762.19	2111698.44	465.27	Outer Zone
10616	5746764.38	2108902.19	222.04	Outer Zone
10617	5746766.25	2111618.75	125.15	Outer Zone
10618	5746766.88	2111583.44	149.51	Outer Zone
10619	5746766.88	2111584.69	142.50	Outer Zone
10620	5746767.50	2111497.19	686.69	Outer Zone
10621	5746768.13	2111720.00	211.02	Outer Zone
10622	5746770.31	2111620.31	116.88	Outer Zone
10623	5746770.63	2111609.69	118.20	Outer Zone
10624	5746773.75	2111808.44	119.32	Outer Zone
10625	5746775.63	2111683.13	299.19	Outer Zone
10626	5746782.50	2111644.06	127.11	Outer Zone
10627	5746783.13	2111816.56	120.15	Outer Zone
10628	5746785.00	2111615.63	432.23	Outer Zone
10629	5746785.31	2111593.13	303.18	Outer Zone
10630	5746785.31	2111800.00	537.42	Outer Zone
10631	5746791.56	2111760.31	148.65	Outer Zone
10632	5746798.44	2111746.88	153.82	Outer Zone
10633	5746799.06	2111812.19	242.13	Outer Zone
10634	5746809.38	2111622.81	227.20	Outer Zone
10635	5746810.00	2111824.69	154.69	Outer Zone
10636	5746811.56	2111825.00	145.46	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10637	5746813.44	2111673.75	138.99	Outer Zone
10638	5746814.69	2108889.69	638.05	Outer Zone
10639	5746822.81	2111565.31	217.49	Outer Zone
10640	5746825.94	2111892.19	142.19	Outer Zone
10641	5746826.56	2111565.31	237.64	Outer Zone
10642	5746826.88	2111539.69	153.32	Outer Zone
10643	5746827.50	2111831.25	212.05	Outer Zone
10644	5746828.13	2111563.44	163.40	Outer Zone
10645	5746831.56	2111520.63	155.24	Outer Zone
10646	5746832.81	2111522.19	148.61	Outer Zone
10647	5746838.13	2111559.69	127.56	Outer Zone
10648	5746838.75	2111504.06	135.49	Outer Zone
10649	5746839.06	2111505.63	135.24	Outer Zone
10650	5746841.25	2111507.81	120.96	Outer Zone
10651	5746841.25	2111511.88	199.42	Outer Zone
10652	5746843.13	2111500.00	142.63	Outer Zone
10653	5746844.69	2111558.13	195.50	Outer Zone
10654	5746844.69	2111750.00	152.22	Outer Zone
10655	5746845.31	2111511.25	131.96	Outer Zone
10656	5746846.56	2111578.75	161.49	Outer Zone
10657	5746851.88	2111537.81	133.53	Outer Zone
10658	5746855.31	2111591.56	122.13	Outer Zone
10659	5746862.50	2111709.69	379.46	Outer Zone
10660	5746865.00	2111489.06	166.31	Outer Zone
10661	5746865.00	2111743.75	133.52	Outer Zone
10662	5746866.56	2111488.44	213.00	Outer Zone
10663	5746870.31	2111788.44	227.80	Outer Zone
10664	5746874.38	2111873.75	133.47	Outer Zone
10665	5746882.81	2109210.94	138.52	Outer Zone
10666	5746883.13	2111488.44	153.78	Outer Zone
10667	5746883.13	2111596.56	211.73	Outer Zone
10668	5746884.06	2111454.38	120.68	Outer Zone
10669	5746884.69	2111578.13	190.48	Outer Zone
10670	5746885.31	2111522.19	476.71	Outer Zone
10671	5746886.88	2111577.50	185.56	Outer Zone
10672	5746888.13	2111460.94	184.53	Outer Zone
10673	5746889.69	2111459.69	132.41	Outer Zone
10674	5746893.13	2111449.69	177.18	Outer Zone
10675	5746896.56	2111568.13	209.79	Outer Zone
10676	5746898.13	2111573.44	395.85	Outer Zone
10677	5746899.38	2111731.25	139.86	Outer Zone
10678	5746902.19	2111729.38	146.01	Outer Zone
10679	5746904.38	2111607.81	273.27	Outer Zone
10680	5746904.69	2111515.00	120.39	Outer Zone
10681	5746905.63	2111584.06	139.92	Outer Zone
10682	5746906.25	2111514.06	118.73	Outer Zone
10683	5746909.38	2111465.31	281.78	Outer Zone
10684	5746911.25	2111465.31	386.72	Outer Zone
10685	5746911.56	2108852.50	496.54	Outer Zone
10686	5746914.69	2111531.25	125.29	Outer Zone
10687	5746916.88	2111576.25	197.61	Outer Zone
10688	5746916.88	2111746.25	233.40	Outer Zone
10689	5746926.88	2111860.31	118.23	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10690	5746927.19	2111551.88	128.78	Outer Zone
10691	5746929.69	2111860.31	132.60	Outer Zone
10692	5746932.81	2111425.63	125.47	Outer Zone
10693	5746934.06	2111860.63	290.25	Outer Zone
10694	5746934.38	2111432.19	160.08	Outer Zone
10695	5746935.63	2111534.38	149.39	Outer Zone
10696	5746939.69	2109034.69	154.94	Outer Zone
10697	5746941.88	2111767.50	253.58	Outer Zone
10698	5746943.13	2111505.31	386.23	Outer Zone
10699	5746945.94	2111584.06	280.29	Outer Zone
10700	5746950.94	2111408.13	116.04	Outer Zone
10701	5746953.75	2111582.81	143.22	Outer Zone
10702	5746958.44	2111529.06	192.65	Outer Zone
10703	5746959.38	2111541.88	223.54	Outer Zone
10704	5746959.38	2111766.88	133.05	Outer Zone
10705	5746962.81	2111841.56	478.81	Outer Zone
10706	5746969.06	2111595.31	593.34	Outer Zone
10707	5746969.69	2111544.06	186.29	Outer Zone
10708	5746971.25	2111592.19	220.62	Outer Zone
10709	5746971.56	2111544.06	235.83	Outer Zone
10710	5746973.13	2111524.06	153.95	Outer Zone
10711	5746973.44	2111706.25	116.41	Outer Zone
10712	5746975.31	2111706.88	253.44	Outer Zone
10713	5746976.25	2111569.69	122.84	Outer Zone
10714	5746987.50	2111615.31	155.32	Outer Zone
10715	5746990.00	2111615.00	172.34	Outer Zone
10716	5746991.88	2111785.94	154.78	Outer Zone
10717	5746992.81	2111646.25	123.28	Outer Zone
10718	5746997.19	2111798.13	151.97	Outer Zone
10719	5747001.36	2109126.89	144.01	Outer Zone
10720	5747017.81	2111727.81	130.85	Outer Zone
10721	5747025.94	2111751.88	121.31	Outer Zone
10722	5747027.50	2111752.19	134.81	Outer Zone
10723	5747033.44	2111736.25	134.16	Outer Zone
10724	5747050.63	2111741.88	122.93	Outer Zone
10725	5747060.63	2111561.88	195.90	Outer Zone
10726	5747062.81	2111806.25	264.22	Outer Zone
10727	5747065.63	2111590.63	185.59	Outer Zone
10728	5747066.56	2111750.31	251.76	Outer Zone
10729	5747068.44	2111810.00	129.72	Outer Zone
10730	5747072.81	2111380.00	179.85	Outer Zone
10731	5747083.44	2111740.94	184.40	Outer Zone
10732	5747089.38	2111742.19	117.63	Outer Zone
10733	5747096.88	2108777.50	298.00	Outer Zone
10734	5747108.75	2111388.44	232.64	Outer Zone
10735	5747111.88	2111438.75	144.06	Outer Zone
10736	5747111.88	2111679.69	426.99	Outer Zone
10737	5747112.50	2111439.38	143.55	Outer Zone
10738	5747112.81	2111706.56	164.56	Outer Zone
10739	5747115.00	2111487.19	163.07	Outer Zone
10740	5747117.34	2111542.53	140.48	Outer Zone
10741	5747121.25	2111503.75	736.84	Outer Zone
10742	5747123.13	2111504.06	827.20	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10743	5747123.13	2111751.25	145.94	Outer Zone
10744	5747129.69	2111622.50	198.53	Outer Zone
10745	5747141.88	2111694.38	231.62	Outer Zone
10746	5747147.19	2111522.81	229.79	Outer Zone
10747	5747148.44	2111556.25	151.04	Outer Zone
10748	5747149.06	2111522.81	292.18	Outer Zone
10749	5747149.38	2111798.75	117.62	Outer Zone
10750	5747155.00	2111560.94	222.66	Outer Zone
10751	5747162.19	2111739.06	203.64	Outer Zone
10752	5747165.00	2111588.13	381.26	Outer Zone
10753	5747165.63	2111690.31	143.65	Outer Zone
10754	5747167.81	2111509.69	217.07	Outer Zone
10755	5747167.81	2111775.31	121.29	Outer Zone
10756	5747168.44	2111341.56	151.29	Outer Zone
10757	5747169.38	2111468.44	134.00	Outer Zone
10758	5747170.31	2111800.63	152.55	Outer Zone
10759	5747176.88	2111754.69	137.89	Outer Zone
10760	5747178.75	2111496.25	390.10	Outer Zone
10761	5747179.06	2111754.38	196.72	Outer Zone
10762	5747179.38	2111555.31	114.28	Outer Zone
10763	5747179.69	2111715.94	210.00	Outer Zone
10764	5747181.25	2111620.31	133.38	Outer Zone
10765	5747181.56	2111317.50	122.61	Outer Zone
10766	5747181.56	2111538.75	200.04	Outer Zone
10767	5747184.06	2111447.19	124.40	Outer Zone
10768	5747186.88	2108735.94	293.96	Outer Zone
10769	5747186.88	2111659.69	229.24	Outer Zone
10770	5747188.13	2111326.25	128.73	Outer Zone
10771	5747194.69	2111382.19	172.46	Outer Zone
10772	5747196.56	2111629.06	221.30	Outer Zone
10773	5747196.88	2111337.81	231.21	Outer Zone
10774	5747197.50	2111383.75	378.95	Outer Zone
10775	5747197.81	2111632.50	255.59	Outer Zone
10776	5747201.56	2111607.50	145.21	Outer Zone
10777	5747201.88	2111639.69	208.07	Outer Zone
10778	5747205.00	2111598.75	129.03	Outer Zone
10779	5747205.63	2111741.88	153.15	Outer Zone
10780	5747206.56	2111785.63	142.01	Outer Zone
10781	5747214.38	2111773.44	174.98	Outer Zone
10782	5747215.31	2111446.25	126.96	Outer Zone
10783	5747215.31	2111565.31	265.60	Outer Zone
10784	5747219.38	2111549.06	215.11	Outer Zone
10785	5747219.69	2111364.69	138.58	Outer Zone
10786	5747221.88	2111732.50	116.72	Outer Zone
10787	5747222.50	2111664.06	213.11	Outer Zone
10788	5747225.31	2111704.38	168.00	Outer Zone
10789	5747225.63	2111389.38	150.48	Outer Zone
10790	5747227.19	2111734.38	402.25	Outer Zone
10791	5747227.50	2111598.44	170.05	Outer Zone
10792	5747228.13	2111361.25	146.55	Outer Zone
10793	5747230.63	2111466.88	114.22	Outer Zone
10794	5747231.56	2111705.00	338.47	Outer Zone
10795	5747231.88	2111360.00	183.91	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10796	5747234.06	2111360.63	179.87	Outer Zone
10797	5747234.69	2111469.69	166.92	Outer Zone
10798	5747235.00	2111336.56	251.31	Outer Zone
10799	5747236.88	2111556.25	167.84	Outer Zone
10800	5747238.44	2111276.88	154.24	Outer Zone
10801	5747238.44	2111280.00	272.56	Outer Zone
10802	5747239.06	2111338.13	247.97	Outer Zone
10803	5747239.06	2111369.69	136.69	Outer Zone
10804	5747241.25	2111500.63	141.17	Outer Zone
10805	5747241.88	2111350.31	213.17	Outer Zone
10806	5747244.38	2111336.56	145.02	Outer Zone
10807	5747244.38	2111755.00	203.27	Outer Zone
10808	5747244.69	2111625.00	141.17	Outer Zone
10809	5747246.25	2111739.06	190.20	Outer Zone
10810	5747246.56	2111338.13	257.10	Outer Zone
10811	5747249.38	2111694.06	288.19	Outer Zone
10812	5747250.31	2111334.38	264.29	Outer Zone
10813	5747250.63	2111743.44	205.88	Outer Zone
10814	5747255.00	2111515.31	116.73	Outer Zone
10815	5747255.63	2111696.25	162.30	Outer Zone
10816	5747256.88	2111734.69	118.72	Outer Zone
10817	5747257.81	2111695.00	139.95	Outer Zone
10818	5747258.13	2111278.13	167.42	Outer Zone
10819	5747259.69	2111437.19	115.56	Outer Zone
10820	5747269.06	2111278.75	162.33	Outer Zone
10821	5747272.50	2111285.94	131.43	Outer Zone
10822	5747274.06	2109686.56	114.12	Outer Zone
10823	5747274.69	2111634.69	229.95	Outer Zone
10824	5747274.69	2111715.94	121.30	Outer Zone
10825	5747277.19	2111653.44	257.54	Outer Zone
10826	5747279.06	2111653.13	273.27	Outer Zone
10827	5747280.94	2108712.81	2345.46	Outer Zone
10828	5747290.63	2109848.13	122.95	Outer Zone
10829	5747292.81	2111246.56	185.26	Outer Zone
10830	5747292.81	2111289.06	280.35	Outer Zone
10831	5747293.75	2111290.31	291.26	Outer Zone
10832	5747294.69	2111720.63	229.36	Outer Zone
10833	5747298.13	2111290.63	274.94	Outer Zone
10834	5747298.44	2109792.81	375.91	Outer Zone
10835	5747302.19	2111399.38	166.57	Outer Zone
10836	5747303.75	2111696.56	193.51	Outer Zone
10837	5747309.69	2111393.13	136.35	Outer Zone
10838	5747311.88	2111270.63	167.57	Outer Zone
10839	5747313.44	2111415.94	127.06	Outer Zone
10840	5747319.38	2111709.38	144.46	Outer Zone
10841	5747320.94	2109739.69	196.72	Outer Zone
10842	5747320.94	2111709.69	179.97	Outer Zone
10843	5747323.44	2109740.00	175.61	Outer Zone
10844	5747324.69	2111391.88	118.45	Outer Zone
10845	5747325.31	2111438.44	334.90	Outer Zone
10846	5747327.81	2111635.00	160.08	Outer Zone
10847	5747329.69	2109880.63	243.54	Outer Zone
10848	5747330.00	2111639.38	7515.06	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10849	5747331.88	2111706.88	133.31	Outer Zone
10850	5747332.19	2111676.88	155.86	Outer Zone
10851	5747334.69	2111706.88	120.82	Outer Zone
10852	5747335.63	2109859.38	136.72	Outer Zone
10853	5747339.69	2111593.13	161.13	Outer Zone
10854	5747343.13	2111454.06	266.94	Outer Zone
10855	5747345.00	2111272.81	159.74	Outer Zone
10856	5747345.31	2111489.69	116.56	Outer Zone
10857	5747346.56	2111227.19	132.30	Outer Zone
10858	5747346.56	2111532.50	120.96	Outer Zone
10859	5747346.63	2111392.78	117.17	Outer Zone
10860	5747348.44	2111207.81	136.31	Outer Zone
10861	5747354.38	2111574.06	150.10	Outer Zone
10862	5747355.00	2109574.69	194.43	Outer Zone
10863	5747359.38	2110168.44	246.38	Outer Zone
10864	5747360.00	2110170.00	184.58	Outer Zone
10865	5747360.31	2111358.13	129.65	Outer Zone
10866	5747361.88	2111505.94	139.42	Outer Zone
10867	5747367.19	2111488.13	258.56	Outer Zone
10868	5747367.19	2111658.13	189.55	Outer Zone
10869	5747372.50	2110020.31	248.59	Outer Zone
10870	5747376.56	2108695.63	199.76	Outer Zone
10871	5747377.19	2108694.06	165.47	Outer Zone
10872	5747377.19	2110174.38	134.26	Outer Zone
10873	5747377.19	2111340.94	130.37	Outer Zone
10874	5747378.13	2111541.25	214.97	Outer Zone
10875	5747379.06	2111380.94	130.31	Outer Zone
10876	5747380.00	2111220.63	393.18	Outer Zone
10877	5747382.50	2111625.63	165.92	Outer Zone
10878	5747382.50	2111667.50	114.36	Outer Zone
10879	5747385.31	2109845.63	201.19	Outer Zone
10880	5747385.63	2111600.00	135.96	Outer Zone
10881	5747386.25	2111457.50	307.52	Outer Zone
10882	5747387.50	2111592.19	263.76	Outer Zone
10883	5747389.69	2110197.19	174.29	Outer Zone
10884	5747394.06	2111501.56	114.12	Outer Zone
10885	5747396.56	2111581.56	142.55	Outer Zone
10886	5747396.70	2111448.55	147.54	Outer Zone
10887	5747399.38	2111337.19	169.25	Outer Zone
10888	5747406.88	2111587.19	146.06	Outer Zone
10889	5747407.81	2110037.50	143.83	Outer Zone
10890	5747408.44	2111515.94	155.89	Outer Zone
10891	5747410.63	2111245.94	132.84	Outer Zone
10892	5747411.88	2111575.00	295.33	Outer Zone
10893	5747412.81	2110095.63	438.68	Outer Zone
10894	5747417.81	2111301.88	120.12	Outer Zone
10895	5747418.13	2111525.00	176.15	Outer Zone
10896	5747418.13	2111608.44	142.65	Outer Zone
10897	5747418.44	2109675.63	176.58	Outer Zone
10898	5747419.06	2111301.56	117.53	Outer Zone
10899	5747421.56	2109885.94	274.46	Outer Zone
10900	5747423.13	2108691.25	164.85	Outer Zone
10901	5747424.69	2111436.88	252.76	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10902	5747430.00	2109983.44	228.73	Outer Zone
10903	5747430.63	2111639.38	336.55	Outer Zone
10904	5747430.63	2111640.94	457.64	Outer Zone
10905	5747431.25	2111123.75	128.22	Outer Zone
10906	5747433.75	2111279.69	174.61	Outer Zone
10907	5747436.56	2111596.56	168.65	Outer Zone
10908	5747437.19	2111124.38	721.33	Outer Zone
10909	5747437.50	2111602.19	118.30	Outer Zone
10910	5747437.81	2111290.00	163.38	Outer Zone
10911	5747439.38	2111324.69	450.39	Outer Zone
10912	5747442.19	2110314.69	132.73	Outer Zone
10913	5747442.50	2110312.19	158.90	Outer Zone
10914	5747446.25	2111640.94	146.94	Outer Zone
10915	5747448.44	2111549.38	218.08	Outer Zone
10916	5747449.38	2111361.25	125.58	Outer Zone
10917	5747449.69	2108714.69	566.14	Outer Zone
10918	5747459.38	2110374.69	154.98	Outer Zone
10919	5747460.00	2111537.81	148.99	Outer Zone
10920	5747460.94	2109490.31	340.87	Outer Zone
10921	5747461.88	2111538.44	180.39	Outer Zone
10922	5747464.38	2110215.94	153.21	Outer Zone
10923	5747465.63	2111579.38	190.91	Outer Zone
10924	5747466.25	2111362.50	220.82	Outer Zone
10925	5747466.25	2111538.75	213.65	Outer Zone
10926	5747466.88	2111333.75	435.12	Outer Zone
10927	5747467.50	2111538.75	222.88	Outer Zone
10928	5747468.13	2110393.44	180.54	Outer Zone
10929	5747468.75	2108692.81	183.82	Outer Zone
10930	5747470.00	2110392.50	198.38	Outer Zone
10931	5747470.31	2110344.38	140.74	Outer Zone
10932	5747471.88	2111375.31	145.41	Outer Zone
10933	5747473.44	2110394.06	128.80	Outer Zone
10934	5747474.69	2111620.00	140.61	Outer Zone
10935	5747476.88	2111595.31	167.33	Outer Zone
10936	5747480.31	2110197.81	124.27	Outer Zone
10937	5747481.88	2110196.88	137.01	Outer Zone
10938	5747484.06	2110328.75	159.40	Outer Zone
10939	5747489.38	2110294.38	120.82	Outer Zone
10940	5747494.06	2111369.38	172.73	Outer Zone
10941	5747494.38	2111480.00	156.57	Outer Zone
10942	5747495.63	2109549.38	146.70	Outer Zone
10943	5747496.25	2111368.13	183.31	Outer Zone
10944	5747496.88	2111236.56	252.13	Outer Zone
10945	5747498.44	2111285.94	268.78	Outer Zone
10946	5747500.31	2111120.63	292.94	Outer Zone
10947	5747501.88	2111615.31	264.79	Outer Zone
10948	5747502.19	2111115.63	143.67	Outer Zone
10949	5747503.13	2111613.75	204.71	Outer Zone
10950	5747503.44	2109913.13	191.71	Outer Zone
10951	5747504.06	2111270.31	166.38	Outer Zone
10952	5747507.19	2111600.31	152.16	Outer Zone
10953	5747507.81	2111412.19	119.16	Outer Zone
10954	5747508.13	2110320.00	187.86	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
10955	5747508.75	2110438.44	123.92	Outer Zone
10956	5747510.94	2108701.88	671.75	Outer Zone
10957	5747511.56	2110467.81	252.25	Outer Zone
10958	5747512.50	2111608.44	174.88	Outer Zone
10959	5747513.13	2111535.00	121.32	Outer Zone
10960	5747514.38	2111047.50	314.05	Outer Zone
10961	5747515.00	2111537.19	128.15	Outer Zone
10962	5747516.25	2111593.44	117.54	Outer Zone
10963	5747516.56	2110405.63	114.68	Outer Zone
10964	5747516.56	2110418.44	135.12	Outer Zone
10965	5747516.88	2111548.13	319.44	Outer Zone
10966	5747518.44	2111412.50	188.24	Outer Zone
10967	5747519.69	2110129.69	120.84	Outer Zone
10968	5747520.31	2110418.75	114.43	Outer Zone
10969	5747520.31	2110517.81	137.14	Outer Zone
10970	5747520.31	2111383.13	128.80	Outer Zone
10971	5747520.63	2110395.63	175.30	Outer Zone
10972	5747520.94	2111606.25	158.84	Outer Zone
10973	5747522.81	2110479.69	229.51	Outer Zone
10974	5747527.50	2110331.56	148.83	Outer Zone
10975	5747527.50	2111600.63	179.86	Outer Zone
10976	5747528.44	2111326.56	173.29	Outer Zone
10977	5747529.06	2111539.69	168.44	Outer Zone
10978	5747530.31	2111299.69	133.54	Outer Zone
10979	5747530.63	2110552.19	126.06	Outer Zone
10980	5747530.63	2111608.44	143.58	Outer Zone
10981	5747531.25	2110278.44	242.23	Outer Zone
10982	5747532.81	2110025.31	132.32	Outer Zone
10983	5747532.81	2110552.19	195.95	Outer Zone
10984	5747533.13	2111365.00	119.44	Outer Zone
10985	5747533.75	2111240.31	175.90	Outer Zone
10986	5747535.00	2111497.19	176.43	Outer Zone
10987	5747536.25	2111413.44	155.99	Outer Zone
10988	5747536.56	2111527.19	115.76	Outer Zone
10989	5747536.88	2111500.94	231.43	Outer Zone
10990	5747538.13	2110584.69	160.83	Outer Zone
10991	5747538.75	2111388.75	494.30	Outer Zone
10992	5747539.06	2110434.38	198.65	Outer Zone
10993	5747539.06	2110478.13	319.92	Outer Zone
10994	5747539.69	2111573.13	173.28	Outer Zone
10995	5747540.00	2109901.88	227.26	Outer Zone
10996	5747540.31	2111388.13	570.41	Outer Zone
10997	5747540.94	2111425.63	146.20	Outer Zone
10998	5747540.94	2111527.19	314.80	Outer Zone
10999	5747542.81	2110478.44	127.44	Outer Zone
11000	5747544.06	2111233.44	175.23	Outer Zone
11001	5747544.06	2111570.31	132.80	Outer Zone
11002	5747545.31	2110403.13	196.09	Outer Zone
11003	5747545.34	2111195.06	213.22	Outer Zone
11004	5747548.13	2111245.63	115.10	Outer Zone
11005	5747548.44	2111015.00	197.76	Outer Zone
11006	5747550.00	2110673.13	138.88	Outer Zone
11007	5747550.31	2111014.06	199.29	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
11008	5747551.25	2111133.13	154.17	Outer Zone
11009	5747551.56	2108718.44	1223.85	Outer Zone
11010	5747555.63	2111578.44	190.35	Outer Zone
11011	5747557.19	2111045.63	130.03	Outer Zone
11012	5747557.50	2110507.50	274.34	Outer Zone
11013	5747561.56	2110107.81	246.90	Outer Zone
11014	5747561.56	2110713.44	126.21	Outer Zone
11015	5747561.56	2111531.88	166.61	Outer Zone
11016	5747561.88	2110441.25	318.19	Outer Zone
11017	5747563.75	2110580.94	132.50	Outer Zone
11018	5747563.75	2110589.38	157.27	Outer Zone
11019	5747563.75	2111515.00	128.12	Outer Zone
11020	5747564.06	2110594.69	135.98	Outer Zone
11021	5747564.38	2110604.38	158.18	Outer Zone
11022	5747565.63	2111124.38	122.75	Outer Zone
11023	5747565.94	2111548.75	401.62	Outer Zone
11024	5747570.94	2111185.31	150.62	Outer Zone
11025	5747573.13	2111256.88	183.72	Outer Zone
11026	5747574.06	2110512.50	145.16	Outer Zone
11027	5747574.06	2110532.19	128.86	Outer Zone
11028	5747574.06	2111230.94	200.08	Outer Zone
11029	5747574.69	2111011.56	150.55	Outer Zone
11030	5747575.31	2111545.31	171.79	Outer Zone
11031	5747575.94	2110491.56	191.67	Outer Zone
11032	5747576.88	2110606.25	123.83	Outer Zone
11033	5747577.19	2110462.50	114.07	Outer Zone
11034	5747578.44	2109505.45	383.00	Outer Zone
11035	5747580.31	2110484.69	385.53	Outer Zone
11036	5747580.31	2110488.75	456.94	Outer Zone
11037	5747580.63	2111519.69	137.87	Outer Zone
11038	5747580.94	2111265.31	145.86	Outer Zone
11039	5747580.94	2111526.56	234.39	Outer Zone
11040	5747581.80	2111209.78	370.07	Outer Zone
11041	5747582.19	2110483.13	500.52	Outer Zone
11042	5747582.19	2110487.19	490.54	Outer Zone
11043	5747582.81	2111526.88	237.50	Outer Zone
11044	5747584.06	2110522.81	122.50	Outer Zone
11045	5747585.00	2111008.75	133.82	Outer Zone
11046	5747585.00	2111523.44	256.22	Outer Zone
11047	5747587.19	2111566.56	139.82	Outer Zone
11048	5747589.38	2111524.38	227.81	Outer Zone
11049	5747589.69	2110445.00	2336.59	Outer Zone
11050	5747590.63	2109519.69	120.98	Outer Zone
11051	5747591.88	2109777.81	118.12	Outer Zone
11052	5747591.88	2111556.25	134.19	Outer Zone
11053	5747593.75	2111558.44	134.71	Outer Zone
11054	5747595.00	2111480.63	132.80	Outer Zone
11055	5747596.25	2111525.31	211.79	Outer Zone
11056	5747596.88	2111481.25	120.51	Outer Zone
11057	5747598.44	2110711.56	380.55	Outer Zone
11058	5747598.44	2111039.06	255.88	Outer Zone
11059	5747599.93	2109265.58	391.65	Outer Zone
11060	5747600.00	2110397.19	133.80	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
11061	5747600.31	2111300.63	131.82	Outer Zone
11062	5747600.63	2110710.63	268.08	Outer Zone
11063	5747602.19	2111524.69	121.27	Outer Zone
11064	5747602.50	2110396.88	132.98	Outer Zone
11065	5747602.81	2111480.63	151.17	Outer Zone
11066	5747603.44	2110709.06	304.82	Outer Zone
11067	5747605.31	2110393.13	127.34	Outer Zone
11068	5747605.63	2111422.50	189.87	Outer Zone
11069	5747605.63	2111460.00	131.43	Outer Zone
11070	5747609.38	2110393.44	115.54	Outer Zone
11071	5747609.38	2111494.69	320.18	Outer Zone
11072	5747610.31	2109994.38	147.56	Outer Zone
11073	5747610.63	2111422.50	159.49	Outer Zone
11074	5747611.88	2110460.00	131.02	Outer Zone
11075	5747616.56	2110996.56	141.90	Outer Zone
11076	5747619.38	2111249.69	188.26	Outer Zone
11077	5747620.00	2111405.94	172.99	Outer Zone
11078	5747622.19	2111420.31	201.59	Outer Zone
11079	5747625.00	2111115.94	151.02	Outer Zone
11080	5747626.56	2111356.25	217.43	Outer Zone
11081	5747626.88	2111115.00	147.98	Outer Zone
11082	5747628.13	2111343.44	308.48	Outer Zone
11083	5747628.44	2111499.69	170.45	Outer Zone
11084	5747628.75	2111357.19	187.50	Outer Zone
11085	5747629.06	2111474.38	152.86	Outer Zone
11086	5747630.94	2111498.44	228.12	Outer Zone
11087	5747631.25	2111461.88	159.86	Outer Zone
11088	5747634.69	2111358.75	214.66	Outer Zone
11089	5747635.00	2111295.00	186.84	Outer Zone
11090	5747637.19	2111340.00	171.44	Outer Zone
11091	5747639.38	2111027.81	166.19	Outer Zone
11092	5747640.31	2111238.13	149.70	Outer Zone
11093	5747642.19	2111492.81	151.78	Outer Zone
11094	5747642.50	2111512.19	220.92	Outer Zone
11095	5747643.13	2111315.63	191.51	Outer Zone
11096	5747643.44	2111402.19	132.85	Outer Zone
11097	5747644.06	2111452.50	135.17	Outer Zone
11098	5747645.94	2111260.31	173.21	Outer Zone
11099	5747647.19	2111157.81	144.91	Outer Zone
11100	5747647.19	2111222.81	118.20	Outer Zone
11101	5747651.56	2110962.19	150.88	Outer Zone
11102	5747653.44	2109997.81	127.47	Outer Zone
11103	5747653.46	2110346.19	311.91	Outer Zone
11104	5747654.69	2111336.56	204.25	Outer Zone
11105	5747657.19	2108997.50	166.27	Outer Zone
11106	5747657.19	2110749.38	172.80	Outer Zone
11107	5747657.50	2110835.94	158.63	Outer Zone
11108	5747659.69	2110000.63	158.04	Outer Zone
11109	5747666.41	2109346.85	149.84	Outer Zone
11110	5747673.13	2110143.75	170.32	Outer Zone
11111	5747674.38	2110750.63	177.04	Outer Zone
11112	5747674.69	2110242.50	138.44	Outer Zone
11113	5747676.88	2111106.56	243.90	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
11114	5747684.69	2109932.81	5573.91	Outer Zone
11115	5747695.00	2110535.31	199.42	Outer Zone
11116	5747696.56	2111420.63	379.96	Outer Zone
11117	5747696.88	2110885.63	170.74	Outer Zone
11118	5747697.50	2110535.63	126.76	Outer Zone
11119	5747697.81	2111423.44	165.47	Outer Zone
11120	5747701.25	2111421.88	562.71	Outer Zone
11121	5747702.16	2111391.66	145.93	Outer Zone
11122	5747702.53	2109979.55	298.72	Outer Zone
11123	5747702.81	2111422.19	395.48	Outer Zone
11124	5747703.13	2111248.75	135.13	Outer Zone
11125	5747706.25	2111423.75	124.17	Outer Zone
11126	5747710.31	2110683.44	116.97	Outer Zone
11127	5747711.56	2110216.88	269.25	Outer Zone
11128	5747711.56	2111438.13	114.70	Outer Zone
11129	5747712.19	2111109.69	349.72	Outer Zone
11130	5747714.06	2111310.63	117.03	Outer Zone
11131	5747722.50	2111379.06	125.79	Outer Zone
11132	5747723.44	2111309.69	238.88	Outer Zone
11133	5747724.69	2110890.00	276.87	Outer Zone
11134	5747726.25	2111394.06	126.09	Outer Zone
11135	5747726.56	2110211.56	119.33	Outer Zone
11136	5747726.56	2110890.31	263.44	Outer Zone
11137	5747728.75	2110959.69	146.48	Outer Zone
11138	5747729.69	2111313.75	214.08	Outer Zone
11139	5747735.00	2111324.06	348.44	Outer Zone
11140	5747735.63	2110709.69	161.96	Outer Zone
11141	5747736.56	2111126.56	114.97	Outer Zone
11142	5747736.88	2111032.81	164.35	Outer Zone
11143	5747739.06	2111186.56	114.90	Outer Zone
11144	5747741.56	2111313.44	148.90	Outer Zone
11145	5747745.31	2110455.31	115.99	Outer Zone
11146	5747745.94	2110890.94	138.10	Outer Zone
11147	5747746.88	2110328.13	114.30	Outer Zone
11148	5747747.50	2111082.50	156.41	Outer Zone
11149	5747749.38	2111080.94	184.66	Outer Zone
11150	5747757.81	2111061.88	154.74	Outer Zone
11151	5747760.00	2111329.06	128.30	Outer Zone
11152	5747760.94	2111216.25	116.20	Outer Zone
11153	5747766.55	2110309.26	139.65	Outer Zone
11154	5747766.88	2110094.69	127.34	Outer Zone
11155	5747768.13	2109192.19	359.85	Outer Zone
11156	5747768.75	2111159.06	209.25	Outer Zone
11157	5747772.19	2111325.63	137.92	Outer Zone
11158	5747773.44	2108977.19	132.84	Outer Zone
11159	5747773.44	2110089.06	134.62	Outer Zone
11160	5747774.06	2111133.44	168.11	Outer Zone
11161	5747775.31	2110091.25	120.08	Outer Zone
11162	5747777.50	2111129.69	114.06	Outer Zone
11163	5747778.13	2111041.88	158.39	Outer Zone
11164	5747779.69	2111371.25	188.67	Outer Zone
11165	5747781.25	2111084.69	172.24	Outer Zone
11166	5747781.56	2111370.00	223.35	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
11167	5747784.38	2110729.69	164.83	Outer Zone
11168	5747786.74	2111145.10	292.66	Outer Zone
11169	5747788.05	2111118.24	356.53	Outer Zone
11170	5747790.94	2110419.69	114.38	Outer Zone
11171	5747791.88	2110890.31	114.53	Outer Zone
11172	5747791.88	2110961.88	149.38	Outer Zone
11173	5747792.81	2111175.00	153.80	Outer Zone
11174	5747793.75	2110415.31	160.24	Outer Zone
11175	5747799.06	2111171.25	394.30	Outer Zone
11176	5747803.13	2110793.13	131.50	Outer Zone
11177	5747808.13	2111207.19	271.92	Outer Zone
11178	5747810.00	2111233.44	191.61	Outer Zone
11179	5747810.31	2111206.56	289.02	Outer Zone
11180	5747812.19	2110601.56	179.30	Outer Zone
11181	5747812.50	2110905.63	541.60	Outer Zone
11182	5747813.13	2111208.13	128.23	Outer Zone
11183	5747815.31	2110603.44	142.84	Outer Zone
11184	5747816.25	2111083.44	174.58	Outer Zone
11185	5747817.19	2109060.31	167.92	Outer Zone
11186	5747821.56	2111147.81	119.50	Outer Zone
11187	5747824.06	2109405.00	263.38	Outer Zone
11188	5747825.31	2111200.94	131.22	Outer Zone
11189	5747827.19	2111167.50	183.88	Outer Zone
11190	5747827.50	2110535.00	170.88	Outer Zone
11191	5747828.44	2111167.19	210.30	Outer Zone
11192	5747829.06	2110853.75	122.70	Outer Zone
11193	5747829.69	2110371.25	242.16	Outer Zone
11194	5747831.79	2110482.69	396.46	Outer Zone
11195	5747834.06	2111135.94	146.33	Outer Zone
11196	5747835.63	2111057.50	136.54	Outer Zone
11197	5747835.94	2109210.94	538.36	Outer Zone
11198	5747836.56	2109267.50	161.42	Outer Zone
11199	5747837.81	2109198.75	573.22	Outer Zone
11200	5747839.06	2111163.13	189.94	Outer Zone
11201	5747840.94	2111126.25	145.86	Outer Zone
11202	5747841.56	2109199.06	443.85	Outer Zone
11203	5747844.06	2111133.75	170.56	Outer Zone
11204	5747845.00	2111309.38	168.94	Outer Zone
11205	5747847.19	2111131.56	192.64	Outer Zone
11206	5747847.81	2109199.38	386.17	Outer Zone
11207	5747851.56	2111228.75	126.29	Outer Zone
11208	5747857.19	2111127.50	131.22	Outer Zone
11209	5747859.06	2111127.19	139.03	Outer Zone
11210	5747863.44	2109259.38	201.75	Outer Zone
11211	5747864.38	2111161.56	116.90	Outer Zone
11212	5747872.19	2111238.44	120.83	Outer Zone
11213	5747872.81	2111246.88	227.48	Outer Zone
11214	5747872.81	2111263.44	114.83	Outer Zone
11215	5747874.38	2111244.69	297.31	Outer Zone
11216	5747874.69	2111093.44	124.08	Outer Zone
11217	5747875.31	2110745.00	212.54	Outer Zone
11218	5747876.28	2110934.05	233.34	Outer Zone
11219	5747884.69	2110547.19	158.34	Outer Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
11220	5747890.00	2110995.94	146.59	Outer Zone
11221	5747890.94	2110769.06	161.66	Outer Zone
11222	5747891.88	2110918.75	119.83	Outer Zone
11223	5747912.81	2111182.50	143.57	Outer Zone
11224	5747914.69	2110748.44	358.71	Outer Zone
11225	5747914.69	2111181.25	146.16	Outer Zone
11226	5747920.31	2110374.06	114.50	Outer Zone
11227	5747926.25	2111148.75	196.16	Outer Zone
11228	5747932.19	2111134.69	130.61	Outer Zone
11229	5747932.19	2111230.00	177.07	Outer Zone
11230	5747932.50	2111132.81	124.18	Outer Zone
11231	5747933.13	2111088.44	149.77	Outer Zone
11232	5747936.56	2110539.69	129.37	Outer Zone
11233	5747936.88	2111100.31	114.99	Outer Zone
11234	5747939.06	2111208.75	351.63	Outer Zone
11235	5747943.13	2111194.38	116.23	Outer Zone
11236	5747943.64	2110641.14	267.31	Outer Zone
11237	5747945.63	2111279.38	178.95	Outer Zone
11238	5747958.44	2110900.31	122.13	Outer Zone
11239	5747960.94	2110900.63	131.83	Outer Zone
11240	5747977.81	2110874.38	145.99	Outer Zone
11241	5747990.94	2111162.81	120.09	Outer Zone
11242	5747995.94	2110810.63	456.56	Outer Zone
11243	5748000.94	2111121.25	136.48	Outer Zone
11244	5748017.50	2111117.81	114.84	Outer Zone
11245	5748036.88	2111112.50	144.93	Outer Zone
11246	5748043.20	2111097.80	150.78	Outer Zone
11247	5748047.19	2111085.63	180.50	Outer Zone
11248	5748047.81	2111164.69	180.11	Outer Zone
11249	5748057.81	2111134.06	120.17	Outer Zone
11250	5748062.50	2111091.56	217.20	Outer Zone
11251	5748067.19	2111032.19	136.34	Outer Zone
11252	5748067.81	2111107.81	132.00	Outer Zone
11253	5748076.88	2110914.69	160.59	Outer Zone
11254	5748078.44	2111061.56	196.81	Outer Zone
11255	5748093.13	2110898.13	186.97	Outer Zone
11256	5748104.43	2110833.13	210.97	Outer Zone
11257	5748113.44	2111063.13	301.00	Outer Zone
11258	5748144.06	2110972.81	180.00	Outer Zone
20001	5744880.31	2111740.94	548.86	Inner Zone
20002	5745680.31	2111795.94	543.36	Inner Zone
20003	5745690.81	2111208.21	515.95	Inner Zone
20004	5745897.19	2111218.13	1304.63	Inner Zone
20005	5745993.75	2109768.75	1056.47	Inner Zone
20006	5746048.75	2109778.13	518.45	Inner Zone
20007	5746050.31	2109779.69	626.01	Inner Zone
20008	5746178.29	2111040.84	583.00	Inner Zone
20009	5746345.00	2110198.75	610.04	Inner Zone
20010	5746345.00	2110200.31	885.80	Inner Zone
20011	5746355.94	2111411.25	561.23	Inner Zone
20012	5746484.69	2111547.50	508.69	Inner Zone
20013	5746682.19	2111425.63	3767.38	Inner Zone
20014	5746766.25	2110432.19	1707.32	Inner Zone

Detected Targets for Static Investigation

Flag ID	X ¹	Y ¹	EM61 CH3 Response (mV)	Zone
20015	5746822.65	2110789.34	543.63	Inner Zone
20016	5746908.44	2111028.75	595.91	Inner Zone
20017	5746996.88	2110787.50	489.88	Inner Zone
20018	5747060.63	2111230.31	582.76	Inner Zone
20019	5747082.24	2110664.09	654.55	Inner Zone
20020	5747535.31	2110678.75	606.60	Inner Zone
20021	5747537.19	2110677.19	713.95	Inner Zone

¹ Coordinates reported in NAD83, California State Plane, Zone 4, U.S. survey feet

Ranked Dig List Intrusive Investigation Results

Dig Rank	Flag ID	Grid ID	Modeled X ¹	Modeled Y ¹	Modeled Depth (in.)	UXA Category ²	Decision Statistic	Dig Type	Dig Date	Recovery X ¹	Recovery Y ¹	Recovery Depth (in.)	Recovery Orientation	OE Type ^{2,3}	OE Item Description ⁵	Recovered TOI	TOI Type
0	10296	A2J0J7	5745133.11	2111975.01	38	0	0.8571	Cannot Analyze	3/5/2019	5745133.11	2111975.01	12	180	MD	Assorted MD Components		
0	10367	B2A0C0	5745492.40	2112269.56	21	0	0.6969	Cannot Analyze	3/25/2019	5745494.38	2112268.13	18	180	MD	Assorted MD Components		
0	10651	A3J2F4	5746840.66	2111510.83	24	0	0.6193	Cannot Analyze	3/19/2019	5746841.25	2111511.88	18	180	MD	Assorted MD Components		
0	10896	A3J2G0	5747418.53	2111608.41	25	0	0.6001	Cannot Analyze	3/18/2019	5747418.13	2111608.44	18	45	MD	Assorted MD Components		
0	10726	A3J2I6	5747062.09	2111805.73	16	0	0.5603	Cannot Analyze	3/21/2019	5747062.81	2111806.25	12	180	MD	Assorted MD Components		
0	20013	A3J2E2	5746682.68	2111425.65	12	0	0.9710	Cannot Analyze	3/19/2019	5746682.68	2111425.65	2	45	UXO	Projectile, 8inch, high explosive, M106 Series	Yes	UXO
0	10668	A3J2E4	5746883.56	2111451.14	23	0	0.8833	Cannot Analyze	3/19/2019	5746883.56	2111451.14	18	180	MD	Assorted MD Components		
0	20002	A3J1H2	5745680.03	2111796.45	9	0	0.5767	Cannot Analyze	1/9/2019	5745680.31	2111795.94	6	0	MD	Assorted MD Components;projo, 75mm		
0	10430	B3A1A4	5745865.82	2112095.20	7	0	0.3156	Cannot Analyze	1/9/2019	5745865.63	2112094.69	3	0	MD	Assorted MD Components;projo, 75mm;signal, illum;simulator, projectile, airburs;small arms, 50cal		
0	10377	B3A1A1	5745558.28	2112049.42	47	0	0.5000	Cannot Analyze	1/9/2019	5745557.81	2112049.06	24	0	Unknown	None		
0	10525	B3A2B1	5746515.41	2112100.36	5	0	0.5000	Cannot Analyze	3/25/2019	5746514.38	2112101.56	12	45	MD	Assorted MD Components		
0	10613	A3J2F3	5746759.38	2111530.74	17	0	0.5000	Cannot Analyze	3/19/2019	5746758.44	2111530.62	12	180	MD	Assorted MD Components		
0	10712	A3J2H5	5746976.36	2111706.84	11	0	0.5000	Cannot Analyze	3/21/2019	5746975.31	2111706.88	3	180	MD	projo, 75mm		
0	11096	A3J3E2	5747643.65	2111401.44	12	0	0.5000	Cannot Analyze	3/13/2019	5747643.44	2111402.19	6	90	MD	Assorted MD Components		
0	11197	A3H3C4	5747838.05	2109210.95	19	0	0.8573	Cannot Analyze	3/11/2019	5747835.94	2109210.94	24	90	RRD	None		
0	11114	A3H3J2	5747685.62	2109932.76	11	0	0.8521	Cannot Analyze	3/11/2019	5747684.69	2109932.81	2	180	OD	None		
0	10056	B2A8C6	5747352.92	2112226.63	-1	0	0.8294	Cannot Analyze	3/4/2019	5743050.94	2112226.88	2	180	OD	None		
0	11175	A3J3B3	5747798.96	2111170.36	19	0	0.7930	Cannot Analyze	3/12/2019	5747799.06	2111171.25	24	180	MD	Assorted MD Components;simulator, projectile, airburs		
0	10502	A3G1J0	5746405.96	2108939.06	22	0	0.7903	Cannot Analyze	3/7/2019	5746405.94	2108939.37	12	45	OD	None		
0	10848	A3J2G9	5747329.82	2111639.20	12	0	0.7455	Cannot Analyze	3/18/2019	5747330.00	2111639.37	18	180	MD	projo, 155mm	Yes	MD
0	10917	A3G2H0	5747450.29	2108714.79	9	0	0.7312	Cannot Analyze	3/7/2019	5747449.69	2108714.69	2	180	OD	None		
0	11049	A3I3E1	5747591.99	2110442.87	18	0	0.7001	Cannot Analyze	3/11/2019	5747589.69	2110445.00	24	180	OD	None		
0	11202	A3H3B4	5747842.31	2109199.67	13	0	0.6928	Cannot Analyze	3/11/2019	5747841.56	2109199.06	24	90	RRD	None		
0	11206	A3H3C4	5747846.31	2109200.33	13	0	0.4486	Cannot Analyze	3/11/2019	5747847.81	2109199.37	24	90	RRD	None		
0	11199	A3H3C4	5747837.93	2109200.05	18	0	0.4449	Cannot Analyze	3/11/2019	5747837.81	2109198.75	24	90	RRD	None		
0	11173	A3J3B3	5747792.21	2111173.99	24	0	0.3045	Cannot Analyze	3/12/2019	5747792.81	2111175.00	24	180	MD	Assorted MD Components		
1	10122	A2H9F4	5743891.22	2109528.64	18	1	0.9976	Category 1	3/7/2019	5743891.22	2109528.64	18	90	QA Seed	None	Yes	QA Seed
2	10070	B2A8C9	5743355.24	2112238.30	19	1	0.9972	Category 1	3/4/2019	5743355.24	2112238.30	18	180	QA Seed	None	Yes	QA Seed
3	10038	A2J8C5	5742949.79	2111290.79	19	1	0.9972	Category 1	3/6/2019	5742949.79	2111290.79	18	180	QA Seed	None	Yes	QA Seed
4	10149	B2A9D5	5743988.58	2112383.12	19	1	0.9965	Category 1	3/4/2019	5743988.58	2112383.12	12	180	QA Seed	None	Yes	QA Seed
5	10202	B2A0A1	5744549.61	2112048.13	19	1	0.9965	Category 1	3/6/2019	5744549.61	2112048.13	24	90	QA Seed	None	Yes	QA Seed
6	11109	A3H3D2	5747666.72	2109346.77	13	1	0.9962	Category 1	3/7/2019	5747666.72	2109346.77	12	45	QA Seed	None	Yes	QA Seed
7	10318	A2J0J7	5745185.44	2111952.54	19	1	0.9961	Category 1	3/5/2019	5745185.44	2111952.54	18	180	QC Seed	None	Yes	QC Seed
8	10015	A2I8A1	5742576.71	2110081.21	19	1	0.9960	Category 1	3/6/2019	5742576.71	2110081.21	18	180	QC Seed	None	Yes	QC Seed
9	10057	B2A8B6	5743077.14	2112155.17	15	1	0.9956	Category 1	3/4/2019	5743077.14	2112155.17	12	180	QC Seed	None	Yes	QC Seed
10	10162	B2A9H7	5744130.24	2112786.18	18	1	0.9955	Category 1	3/4/2019	5744130.24	2112786.18	18	180	QC Seed	None	Yes	QC Seed
11	10163	B2A9D7	5744131.58	2112339.92	19	1	0.9951	Category 1	3/4/2019	5744131.58	2112339.92	12	180	QA Seed	None	Yes	QA Seed
12	10138	A2H9E5	5743964.67	2109420.05	18	1	0.9946	Category 1	3/7/2019	5743964.67	2109420.05	18	45	QC Seed	None	Yes	QC Seed
13	10950	A3H3J1	5747504.78	2109912.96	15	1	0.9946	Category 1	3/11/2019	5747504.78	2109912.96	12	180	QC Seed	None	Yes	QC Seed
14	10030	A2I8J4	5742809.98	2110943.41	18	1	0.9945	Category 1	3/6/2019	5742809.98	2110943.41	18	45	QA Seed	None	Yes	QA Seed
15	10740	A3J2F7	5747117.31	2111542.76	18	1	0.9943	Category 1	3/20/2019	5747117.31	2111542.76	24	45	QC Seed	None	Yes	QC Seed
16	10189	B2A9E9	5744387.21	2112452.86	18	1	0.9939	Category 1	3/4/2019	5744387.21	2112452.86	12	180	QC Seed	None	Yes	QC Seed
17	10370	B3A1C1	5745515.73	2112291.84	23	1	0.9935	Category 1	3/25/2019	5745515.73	2112291.84	18	45	QC Seed	None	Yes	QC Seed
18	10181	B2A9D8	5744286.00	2112364.06	16	1	0.9934	Category 1	3/4/2019	5744286.00	2112364.06	18	180	QA Seed	None	Yes	QA Seed
19	11059	A3H3C1	5747599.85	2109265.54	16	1	0.9932	Category 1	3/7/2019	5747599.85	2109265.54	12	180	QC Seed	None	Yes	QC Seed
20	11103	A3I3D2	5747653.75	2110346.30	16	1	0.9931	Category 1	3/11/2019	5747653.75	2110346.30	18	45	QA Seed	None	Yes	QA Seed
21	11218	A3I3J4	5747882.95	2110927.73	14	1	0.9928	Category 1	3/12/2019	5747882.95	2110927.73	18	90	QC Seed	None	Yes	QC Seed
22	11040	A3J3C1	5747581.67	2111209.86	20	1	0.9925	Category 1	3/13/2019	5747581.67	2111209.86	18	90	QA Seed	None	Yes	QA Seed
23	10098	A2H9E2	5743653.17	2109467.78	17	1	0.9925	Category 1	3/6/2019	5743653.17	2109467.78	18	90	QA Seed	None	Yes	QA Seed
24	10293	A2H0E7	5745116.79	2109496.79	21	1	0.9917	Category 1	3/7/2019	5745116.79	2109496.79	18	180	QC Seed	None	Yes	QC Seed
25	10403	B3A1A3	5745703.06	2112085.23	18	1	0.9916	Category 1	1/9/2019	5745703.06	2112085.23	14	0	UXO	Projectile, 155mm, shrapnel, MK 1	Yes	UXO
26	10315	B2A0A7	5745179.33	2112065.08	15	1	0.9916	Category 1	3/5/2019	5745179.33	2112065.08	12	180	MD	projo, 155mm	Yes	MD
27	11121	A3J3D3	5747702.32	2111391.41	20	1	0.9912	Category 1	3/13/2019	5747702.32	2111391.41	24	180	QA Seed	projo, 155mm	Yes	QA Seed
28	10033	A2J8D4	5742886.74	2111327.31	19	1	0.9911	Category 1	3/6/2019	5742886.74	2111327.31	18	180	QC Seed	None	Yes	QC Seed
29	10281	A2H0F6	5745055.60	2109597.74	21	1	0.9911	Category 1	3/7/2019	5745055.60	2109597.74	18	90	QA Seed	None	Yes	QA Seed
30	11122	A3H3J3	5747702.41	2109979.45	19	1	0.9909	Category 1	3/11/2019	5747702.41	2109979.45	18	90	QA Seed	None	Yes	QA Seed
31	11153	A3I3D3	5747766.56	2110309.18	16	1	0.9908	Category 1	3/11/2019	5747766.56	2110309.18	12	180	QC Seed	None	Yes	QC Seed
32	11168	A3J3B3	5747786.51	2111145.09	17	1	0.9904	Category 1	3/12/2019	5747786.51	2111145.09	24	180	QA Seed	None	Yes	QA Seed
33	11257	A3J3A7	5748113.53	2111063.88	20	1	0.9895	Category 1	3/12/2019	5748113.53	2111063.88	24	45	MD	projo, 155mm	Yes	MD
34	11012	A3I3F1	5747558.40	2110506.34	18	1	0.9894	Category 1	3/11/2019	5747558.40	2110506.34	24	90	MD	projo, 155mm	Yes	MD
35	10028	A2J8A3	5742778.85	2111006.39	19	1	0.9894	Category 1	3/6/2019	5742778.85	2111006.39	18	90	QC Seed	None	Yes	QC Seed
36	20018	A3J2C6	5747061.28	2111230.52	17	1	0.9892	Category 1	3/14/2019	5747061.28	2111230.52	24*	90	MD	projo, 155mm	Yes	MD
37	20019	A3I2G6	5747082.91	2110664.13	14	1	0.9889	Category 1	3/26/2019	5747082.91	2110664.13	18*	180	QA Seed	projo, 155mm	Yes	QA Seed
38	10859	A3J2D9	5747346.72	2111392.99	20	1	0.9889	Category 1	3/13/2019	5747346.72	2111392.99	24	180	QA Seed	None	Yes	QA Seed
39	10845	A3J2E9	5747325.29	2111439.08	20	1	0.9889	Category 1	3/13/2019	5747325.29	2111439.08	18	90	MD	projo, 155mm	Yes	MD
40	10705	A3J2I5	5746962.88	2111841.33	15	1	0.9888	Category 1	3/21/2019	5746962.88	2111841.33	18	45	MD	projo, 155mm	Yes	MD
41	10469	B3A1D7	5746132.31	2112341.16	24	1	0.9884	Category 1	1/10/2019	5746132.31	2112341.16	18	0	MD	Assorted MD Components;projo, 155mm	Yes	MD
42	10195	B2A9B0	5744447.13	2112165.48	20	1	0.9882	Category 1	3/6/2019	5744447.13	2112165.48	18	180	QA Seed	None	Yes	QA Seed
43	10086	B2A9C1	5743529.74	2112269.95	19	1	0.9882	Category 1	3/4/2019</								

Ranked Dig List Intrusive Investigation Results

Dig Rank	Flag ID	Grid ID	Modeled X ¹	Modeled Y ¹	Modeled Depth (in.)	UXA Category ²	Decision Statistic	Dig Type	Dig Date	Recovery X ¹	Recovery Y ¹	Recovery Depth (in.)	Recovery Orientation	OE Type ^{2,3}	OE Item Description ⁵	Recovered TOI	TOI Type
48	10488	B3A1C9	5746300.86	2112236.30	21	1	0.9872	Category 1	3/25/2019	5746300.86	2112236.30	24	90	QA Seed	projo, 155mm	Yes	QA Seed
49	10862	A3H2F9	5747356.58	2109573.76	28	1	0.9872	Category 1	3/11/2019	5747356.58	2109573.76	24	180	MD	projo, 155mm	Yes	MD
50	10294	A2J0J7	5745124.88	2111940.05	20	1	0.9872	Category 1	3/5/2019	5745124.88	2111940.05	18	90	QA Seed	None	Yes	QA Seed
51	11246	A3J3A6	5748043.09	2111097.13	15	1	0.9867	Category 1	3/12/2019	5748043.09	2111097.13	18	90	QA Seed	projo, 155mm	Yes	QA Seed
52	10628	A3J2G3	5746784.38	2111615.25	22	1	0.9865	Category 1	3/19/2019	5746784.38	2111615.25	18	45	MD	projo, 155mm	Yes	MD
53	10275	B2A0A6	5745044.52	2112004.85	24	1	0.9865	Category 1	3/6/2019	5745044.52	2112004.85	24	45	MD	projo, 155mm	Yes	MD
54	10886	A3J2E9	5747396.72	2111448.32	19	1	0.9863	Category 1	3/13/2019	5747396.72	2111448.32	24	180	QA Seed	projo, 155mm	Yes	QA Seed
55	10075	A2H8G0	5743441.22	2109648.74	20	1	0.9863	Category 1	3/6/2019	5743441.22	2109648.74	18	45	QC Seed	None	Yes	QC Seed
56	10357	A2J0H0	5745438.91	2111759.76	24	1	0.9863	Category 1	3/25/2019	5745438.91	2111759.76	24	90	MD	projo, 155mm	Yes	MD
57	10067	B2A8A8	5743217.67	2112079.46	18	1	0.9859	Category 1	3/4/2019	5743217.67	2112079.46	18	180	QA Seed	None	Yes	QA Seed
58	11236	A3I3G5	5747943.62	2110641.07	17	1	0.9857	Category 1	3/12/2019	5747943.62	2110641.07	18	45	QC Seed	None	Yes	QC Seed
59	20017	A3I2H5	5746996.55	2110787.60	22	1	0.9855	Category 1	3/26/2019	5746996.55	2110787.60	24*	90	MD	projo, 155mm	Yes	MD
60	10946	A3J2B0	5747499.72	2111121.31	21	1	0.9854	Category 1	3/13/2019	5747499.72	2111121.31	12	180	MD	projo, 155mm	Yes	MD
61	11256	A3I3I7	5748104.12	2110832.56	20	1	0.9854	Category 1	3/12/2019	5748104.12	2110832.56	12	180	QA Seed	projo, 155mm	Yes	QA Seed
62	10565	A3J2I2	5746643.29	2111875.31	17	1	0.9851	Category 1	3/21/2019	5746643.29	2111875.31	18	120	QC Seed	None	Yes	QC Seed
63	11187	A3H3E4	5747823.63	2109404.80	22	1	0.9850	Category 1	3/7/2019	5747823.63	2109404.80	18	180	MD	projo, 155mm	Yes	MD
64	20015	A3I2H4	5746823.08	2110789.44	17	1	0.9847	Category 1	3/26/2019	5746823.08	2110789.44	18*	45	QA Seed	projo, 155mm	Yes	QA Seed
65	20004	A3J1C4	5745896.53	2111217.21	12	1	0.9845	Category 1	3/26/2019	5745896.53	2111217.21	18*	120	MD	projo, 155mm	Yes	MD
66	10535	A3J2H1	5746542.43	2111730.40	25	1	0.9842	Category 1	3/21/2019	5746542.43	2111730.40	24	90	MD	projo, 155mm	Yes	MD
67	10654	A3J2H4	5746844.35	2111749.09	27	1	0.9839	Category 1	3/20/2019	5746844.35	2111749.09	18	90	MD	projo, 155mm	Yes	MD
68	10422	B3A1F4	5745811.72	2112567.97	25	1	0.9839	Category 1	1/10/2019	5745811.72	2112567.97	24	0	QC Seed	None	Yes	QC Seed
69	10719	A3H2B6	5747001.36	2109126.98	19	1	0.9835	Category 1	3/7/2019	5747001.36	2109126.98	12	180	QC Seed	None	Yes	QC Seed
70	10707	A3J2F5	5746970.59	2111543.94	24	1	0.9832	Category 1	3/19/2019	5746970.59	2111543.94	18	90	MD	projo, 155mm	Yes	MD
71	11169	A3J3B3	5747788.05	2111118.20	19	1	0.9827	Category 1	3/12/2019	5747788.05	2111118.20	18	45	QC Seed	None	Yes	QC Seed
72	10583	A3J2F2	5746694.06	2111508.70	23	1	0.9827	Category 1	3/19/2019	5746694.06	2111508.70	18	120	MD	projo, 155mm	Yes	MD
73	10157	B2A9I6	5744076.68	2112848.55	16	1	0.9825	Category 1	3/4/2019	5744076.68	2112848.55	12	45	MD	projo, 75mm		
74	10538	A3J2J1	5746553.97	2111903.36	15	1	0.9824	Category 1	3/21/2019	5746553.97	2111903.36	18	90	QA Seed	projo, 155mm	Yes	QA Seed
75	10161	B2A9G7	5744117.06	2112659.83	25	1	0.9823	Category 1	3/4/2019	5744117.06	2112659.83	18	45	MD	projo, 4.2 in		
76	11073	A3J3E2	5747610.03	2111423.01	24	1	0.9822	Category 1	3/13/2019	5747610.03	2111423.01	18	180	MD	projo, 155mm	Yes	MD
77	11003	A3J3B1	5747545.16	2111195.05	26	1	0.9821	Category 1	3/13/2019	5747545.16	2111195.05	24	45	QC Seed	projo, 155mm	Yes	QC Seed
78	10731	A3J2H6	5747083.45	2111740.50	25	1	0.9820	Category 1	3/20/2019	5747083.45	2111740.50	18	180	MD	projo, 155mm	Yes	MD
79	10447	B3A1A5	5745978.14	2112063.46	28	1	0.9819	Category 1	1/9/2019	5745978.14	2112063.46	24	0	MD	Assorted MD Components;projo, 155mm	Yes	MD
80	11194	A3I3E4	5747831.80	2110482.96	17	1	0.9816	Category 1	3/11/2019	5747831.80	2110482.96	18	90	QA Seed	projo, 155mm	Yes	QA Seed
81	10805	A3J2D8	5747242.25	2111348.97	21	1	0.9809	Category 1	3/14/2019	5747242.25	2111348.97	18	180	MD	projo, 155mm	Yes	MD
82	10989	A3J3F1	5747537.42	2111501.11	21	1	0.9807	Category 1	3/18/2019	5747537.42	2111501.11	18	45	MD	projo, 75mm		
83	10570	A3J2G2	5746647.37	2111640.67	17	1	0.9807	Category 1	3/19/2019	5746647.37	2111640.67	18	90	MD	projo, 155mm	Yes	MD
84	10670	A3J2F4	5746885.61	2111520.69	25	1	0.9806	Category 1	3/19/2019	5746885.61	2111520.69	18	45	MD	projo, 155mm	Yes	MD
85	10803	A3J2D8	5747239.64	2111368.29	23	1	0.9805	Category 1	3/14/2019	5747239.64	2111368.29	18	45	MD	projo, 155mm	Yes	MD
86	10115	B2A9F4	5743840.65	2112598.24	22	1	0.9805	Category 1	3/4/2019	5743840.65	2112598.24	18	90	QC Seed	None	Yes	QC Seed
87	11139	A3J3D3	5747736.03	2111323.33	22	1	0.9804	Category 1	3/13/2019	5747736.03	2111323.33	18	90	MD	projo, 155mm	Yes	MD
88	10231	A2H0E3	5744748.66	2109431.59	17	1	0.9802	Category 1	3/7/2019	5744748.66	2109431.59	12	180	MD	projo, 155mm	Yes	MD
89	10529	A3J2I1	5746520.56	2111813.35	14	1	0.9801	Category 1	3/21/2019	5746520.56	2111813.35	12	90	MD	projo, 155mm	Yes	MD
90	10659	A3J2H4	5746862.24	2111709.55	26	1	0.9795	Category 1	3/20/2019	5746862.24	2111709.55	24	45	MD	projo, 155mm	Yes	MD
91	10854	A3J2E9	5747343.14	2111454.29	29	1	0.9795	Category 1	3/13/2019	5747343.14	2111454.29	24	45	MD	projo, 155mm	Yes	MD
92	10868	A3J2G9	5747367.88	2111657.98	23	1	0.9789	Category 1	3/18/2019	5747367.88	2111657.98	24	45	MD	projo, 155mm	Yes	MD
93	11016	A3I3E1	5747561.88	2110440.08	22	1	0.9786	Category 1	3/11/2019	5747561.88	2110440.08	18	45	MD	projo, 155mm	Yes	MD
94	10750	A3J2F7	5747154.48	2111562.06	24	1	0.9785	Category 1	3/20/2019	5747154.48	2111562.06	24	90	MD	projo, 155mm	Yes	MD
95	10473	B3A1D7	5746186.41	2112354.64	17	1	0.9784	Category 1	1/10/2019	5746186.41	2112354.64	12	90	MD	Assorted MD Components;projo, 155mm	Yes	MD
96	20010	A3I1B9	5746344.81	2110199.57	14	1	0.9784	Category 1	3/26/2019	5746344.81	2110199.57	18*	45	MD	projo, 155mm	Yes	MD
97	20003	A3J1C2	5745690.41	2111208.52	19	1	0.9783	Category 1	3/26/2019	5745690.41	2111208.52	18*	180	QA Seed	None	Yes	QA Seed
98	10319	B2A0A7	5745192.71	2112039.37	18	1	0.9779	Category 1	3/5/2019	5745192.71	2112039.37	12	45	MD	projo, 155mm	Yes	MD
99	10766	A3J2F7	5747182.16	2111538.31	26	1	0.9768	Category 1	3/20/2019	5747182.16	2111538.31	24	180	MD	projo, 155mm	Yes	MD
100	10994	A3J3F1	5747540.68	2111573.23	24	1	0.9758	Category 1	3/18/2019	5747540.68	2111573.23	24	45	MD	projo, 155mm	Yes	MD
101	10738	A3J2H7	5747112.90	2111707.22	26	1	0.9758	Category 1	3/20/2019	5747112.90	2111707.22	24	180	MD	projo, 155mm	Yes	MD
102	10825	A3J2G8	5747278.16	2111652.52	17	1	0.9757	Category 1	3/18/2019	5747278.16	2111652.52	12	45	UXO	Projectile, 155mm, shrapnel, MK 1	Yes	UXO
103	10633	A3J2I3	5746799.76	2111812.53	22	1	0.9756	Category 1	3/21/2019	5746799.76	2111812.53	24	120	MD	projo, 155mm	Yes	MD
104	10832	A3J2H8	5747294.40	2111720.68	25	1	0.9755	Category 1	3/20/2019	5747294.40	2111720.68	24	45	MD	projo, 155mm	Yes	MD
105	10966	A3J3E1	5747519.17	2111413.16	25	1	0.9754	Category 1	3/13/2019	5747519.17	2111413.16	24	45	MD	projo, 155mm	Yes	MD
106	10026	A2I8E3	5742768.92	2110453.59	20	1	0.9751	Category 1	3/6/2019	5742768.92	2110453.59	18	45	QC Seed	None	Yes	QC Seed
107	10249	B2A0A4	5744840.31	2112034.02	13	1	0.9749	Category 1	3/6/2019	5744840.31	2112034.02	12	180	MD	projo, 75mm		
108	10468	B3A1D7	5746131.26	2112357.73	14	1	0.9749	Category 1	1/10/2019	5746131.26	2112357.73	12	90	MD	Assorted MD Components;projo, 155mm	Yes	MD
109	10629	A3J2F3	5746785.42	2111592.75	22	1	0.9748	Category 1	3/19/2019	5746785.42	2111592.75	18	90	MD	projo, 155mm	Yes	MD
110	11057	A3I3H1	5747599.47	2110709.90	17	1	0.9747	Category 1	3/12/2019	5747599.47	2110709.90	12	180	MD	projo, 155mm	Yes	MD
111	10490	B3A1B9	5746319.67	2112102.86	32	1	0.9741	Category 1	3/25/2019	5746319.67	2112102.86	24	90	MD	projo, 155mm	Yes	MD
112	10742	A3J2F7	5747122.32	2111503.70	19	1	0.9735	Category 1	3/20/2019	5747122.32	2111503.70	18	180	SameAnom	None		
113	10760	A3J2E7	5747177.56	2111496.63	23	1	0.9732	Category 1	3/14/2019	5747177.56	2111496.63	18	180	MD	projo, 8inch	Yes	MD
114	10480	B3A1B8	5746266.53	2112199.76	25	1	0.9731	Category 1	3/25/2019	5746266.53	2112199.76	2					

Ranked Dig List Intrusive Investigation Results

Dig Rank	Flag ID	Grid ID	Modeled X ¹	Modeled Y ¹	Modeled Depth (in.)	UXA Category ²	Decision Statistic	Dig Type	Dig Date	Recovery X ¹	Recovery Y ¹	Recovery Depth (in.)	Recovery Orientation	OE Type ^{2,3}	OE Item Description ⁵	Recovered TOI	TOI Type
121	10440	B3A1D5	5745922.57	2112359.20	18	1	0.9710	Category 1	1/10/2019	5745922.57	2112359.20	18	90	MD	Assorted MD Components;proj, 155mm	Yes	MD
122	10438	B3A1E4	5745897.68	2112411.99	22	1	0.9703	Category 1	1/10/2019	5745897.68	2112411.99	18	45	MD	Assorted MD Components;proj, 155mm	Yes	MD
123	10273	A2J0I6	5745019.80	2111887.61	12	1	0.9703	Category 1	3/5/2019	5745019.80	2111887.61	6	180	MD	proj, 155mm	Yes	MD
124	11165	A3J3A3	5747781.44	2111083.40	29	1	0.9701	Category 1	3/12/2019	5747781.44	2111083.40	24	90	MD	proj, 155mm	Yes	MD
125	10725	A3J2F6	5747061.54	2111560.78	25	1	0.9695	Category 1	3/20/2019	5747061.54	2111560.78	24	45	MD	proj, 155mm	Yes	MD
126	10208	A2H0E2	5744615.18	2109460.77	27	1	0.9690	Category 1	3/7/2019	5744615.18	2109460.77	24	90	QC Seed	proj, 155mm	Yes	QC Seed
127	10737	A3J2E7	5747112.59	2111439.56	31	1	0.9689	Category 1	3/14/2019	5747112.59	2111439.56	24	90	SameAnom	proj, 155mm	Yes	MD
128	10012	A2H7H0	5742468.59	2109771.63	20	1	0.9682	Category 1	3/6/2019	5742468.59	2109771.63	18	180	QC Seed	None	Yes	QC Seed
129	20008	A3J1A7	5746178.35	2111041.18	19	1	0.9682	Category 1	3/26/2019	5746178.35	2111041.18	18*	90	QA Seed	None	Yes	QA Seed
130	10413	B3A1E3	5745754.25	2112488.55	11	1	0.9679	Category 1	1/10/2019	5745754.25	2112488.55	12	45	MD	Assorted MD Components;proj, 155mm	Yes	MD
131	10724	A3J2H6	5747050.44	2111740.43	31	1	0.9671	Category 1	3/20/2019	5747050.44	2111740.43	24	45	MD	proj, 155mm	Yes	MD
132	10360	A2J0H0	5745455.73	2111772.43	24	1	0.9667	Category 1	3/25/2019	5745455.73	2111772.43	18	45	MD	proj, 155mm	Yes	MD
133	10534	A3J2I1	5746537.35	2111806.38	25	1	0.9664	Category 1	3/21/2019	5746537.35	2111806.38	18	120	MD	proj, 155mm	Yes	MD
134	11143	A3J3B3	5747739.28	2111185.29	25	1	0.9643	Category 1	3/12/2019	5747739.28	2111185.29	18	45	MD	proj, 155mm	Yes	MD
135	10188	B2A9A9	5744373.56	2112025.91	33	1	0.9632	Category 1	3/5/2019	5744373.56	2112025.91	24	90	MD	proj, 155mm	Yes	MD
136	10518	B3A1A0	5746474.86	2112036.00	26	1	0.9621	Category 1	3/25/2019	5746474.86	2112036.00	24	180	MD	proj, 155mm	Yes	MD
137	11034	A3H3F1	5747578.64	2109505.26	31	1	0.9620	Category 1	3/11/2019	5747578.64	2109505.26	24	90	QC Seed	proj, 155mm	Yes	QC Seed
138	10271	A2J0J6	5745009.93	2111942.44	25	1	0.9618	Category 1	3/5/2019	5745009.93	2111942.44	24	90	MD	proj, 155mm	Yes	MD
139	11100	A3J3C2	5747647.13	2111223.32	27	1	0.9613	Category 1	3/13/2019	5747647.13	2111223.32	24	180	MD	proj, 155mm	Yes	MD
140	10850	A3J2G9	5747333.11	2111677.13	27	1	0.9612	Category 1	3/18/2019	5747333.11	2111677.13	18	90	MD	proj, 155mm	Yes	MD
141	11223	A3J3B5	5747913.90	2111181.96	27	1	0.9607	Category 1	3/12/2019	5747913.90	2111181.96	24	90	MD	proj, 155mm	Yes	MD
142	10790	A3J2H8	5747227.40	2111733.42	23	1	0.9585	Category 1	3/20/2019	5747227.40	2111733.42	18	45	MD	proj, 155mm	Yes	MD
143	10435	B3A1G4	5745891.77	2112658.01	26	1	0.9556	Category 1	1/10/2019	5745891.77	2112658.01	24	45	MD	Assorted MD Components;proj, 105mm		
144	11060	A3I3D2	5747600.87	2110396.81	23	1	0.9547	Category 1	3/11/2019	5747600.87	2110396.81	24	45	MD	proj, 155mm	Yes	MD
145	10434	A3H1C4	5745889.55	2109272.00	18	1	0.9540	Category 1	3/7/2019	5745889.55	2109272.00	18	90	QC Seed	None	Yes	QC Seed
146	10393	B3A1D2	5745657.43	2112330.90	15	1	0.9533	Category 1	1/10/2019	5745657.43	2112330.90	6	45	MD	Assorted MD Components;proj, 155mm		
147	10326	A2J0J8	5745205.75	2111911.69	17	1	0.9533	Category 1	3/5/2019	5745205.75	2111911.69	12	45	MD	proj, 75mm		
148	10683	A3J2E5	5746909.84	2111465.32	17	1	0.9529	Category 1	3/19/2019	5746909.84	2111465.32	12	180	MD	Assorted MD Components;proj, 75mm		
149	10187	A2H9B9	5744358.79	2109187.65	29	1	0.9522	Category 1	3/7/2019	5744358.79	2109187.65	24	90	QC Seed	proj, 155mm	Yes	QC Seed
150	10261	A2J0I5	5744945.75	2111866.46	15	1	0.9520	Category 1	3/5/2019	5744945.75	2111866.46	6	45	MD	proj, 75mm		
151	10145	B2A9F5	5743974.82	2112559.80	25	1	0.9512	Category 1	3/4/2019	5743974.82	2112559.80	18	45	MD	proj, 4.2 in		
152	10744	A3J2G7	5747130.80	2111622.79	39	1	0.9493	Category 1	3/18/2019	5747130.80	2111622.79	24	0	Unknown	None		
153	10050	A2I8I6	5743013.25	2110826.73	19	1	0.9464	Category 1	3/6/2019	5743013.25	2110826.73	12	45	MD	proj, 75mm		
154	11075	A3I3J2	5747615.94	2110996.49	28	1	0.9430	Category 1	3/12/2019	5747615.94	2110996.49	24	45	MD	proj, 155mm	Yes	MD
155	10556	A3J2I2	5746615.05	2111880.36	23	1	0.9429	Category 1	3/21/2019	5746615.05	2111880.36	18	180	UXO	Projectile, 75mm, high explosive, MK I		
156	10548	A3J2H1	5746589.07	2111705.14	28	1	0.9413	Category 1	3/21/2019	5746589.07	2111705.14	24	45	MD	proj, 4.2 in		
157	10595	A3J2E3	5746724.21	2111497.65	16	1	0.9372	Category 1	3/19/2019	5746724.21	2111497.65	12	180	MD	Assorted MD Components		
158	10944	A3J2C0	5747496.71	2111235.96	26	1	0.9361	Category 1	3/13/2019	5747496.71	2111235.96	24	90	MD	proj, 155mm	Yes	MD
159	11237	A3J3C5	5747946.48	2111281.23	22	1	0.9360	Category 1	3/12/2019	5747946.48	2111281.23	18	180	RRD	None		
160	10635	A3J2I4	5746810.73	2111824.35	16	1	0.9338	Category 1	3/21/2019	5746810.73	2111824.35	18	45	MD	proj, 75mm		
161	10973	A3I3E1	5747522.36	2110478.38	35	1	0.9323	Category 1	3/11/2019	5747522.36	2110478.38	24	90	MD	proj, 155mm	Yes	MD
162	10853	A3J2F9	5747339.56	2111593.07	15	1	0.9317	Category 1	3/18/2019	5747339.56	2111593.07	12	180	MD	proj, 75mm		
163	10276	A2J0J6	5745045.93	2111907.02	14	1	0.9314	Category 1	3/5/2019	5745045.93	2111907.02	6	45	MD	proj, 155mm		
164	10735	A3J2E7	5747112.48	2111439.27	29	1	0.9299	Category 1	3/14/2019	5747112.48	2111439.27	24	90	MD	proj, 155mm	Yes	MD
165	10511	A3J1G0	5746427.77	2111678.98	23	1	0.9244	Category 1	3/21/2019	5746427.77	2111678.98	24	45	MD	proj, 4.2 in		
166	10930	A3I2D0	5747470.04	2110392.44	18	1	0.9238	Category 1	3/11/2019	5747470.04	2110392.44	12	45	MD	proj, 75mm		
167	11061	A3J3D2	5747600.26	2111301.31	31	1	0.9197	Category 1	3/13/2019	5747600.26	2111301.31	24	45	MD	proj, 155mm	Yes	MD
168	10931	A3I2D0	5747470.30	2110344.28	24	1	0.9179	Category 1	3/11/2019	5747470.30	2110344.28	24	180	MD	Assorted MD Components		
169	10667	A3J2F4	5746881.91	2111595.92	12	1	0.9171	Category 1	3/19/2019	5746881.91	2111595.92	12	90	MD	proj, 75mm		
170	10620	A3J2E3	5746767.60	2111496.21	11	1	0.9134	Category 1	3/19/2019	5746767.60	2111496.21	6	45	UXO	Projectile, 105mm, high explosive, M1		
171	10331	A2J0J8	5745215.35	2111902.62	25	1	0.9134	Category 1	3/5/2019	5745215.35	2111902.62	12	180	MD	Assorted MD Components		
172	10891	A3J2C0	5747411.23	2111244.15	13	2	0.9125	Category 2	3/13/2019	5747411.23	2111244.15	12	45	MD	proj, 75mm		
173	10778	A3J2F8	5747204.50	2111598.41	29	2	0.9111	Category 2	3/18/2019	5747204.50	2111598.41	18	45	MD	Assorted MD Components		
174	11015	A3J3F1	5747561.90	2111532.21	31	2	0.9098	Category 2	3/18/2019	5747561.90	2111532.21	24	180	MD	proj, 155mm	Yes	MD
175	10368	B2A0C0	5745495.73	2112240.62	25	2	0.9064	Category 2	3/25/2019	5745495.73	2112240.62	18	180	MD	Assorted MD Components		
176	11171	A3I3I3	5747791.61	2110889.82	27	2	0.9052	Category 2	3/12/2019	5747791.61	2110889.82	18	45	MD	proj, 75mm		
177	10104	B2A9F3	5743729.91	2112512.53	11	2	0.9049	Category 2	3/4/2019	5743729.91	2112512.53	12	45	MD	proj, 75mm		
178	10710	A3J2F5	5746973.97	2111523.38	18	2	0.9030	Category 2	3/19/2019	5746973.97	2111523.38	12	45	MD	Assorted MD Components;proj, 75mm		
179	10523	A3J1J0	5746494.45	2111919.67	19	2	0.9014	Category 2	3/21/2019	5746494.45	2111919.67	18	90	MD	proj, 4.2 in		
180	10951	A3J3C1	5747504.82	2111270.60	16	2	0.8990	Category 2	3/13/2019	5747504.82	2111270.60	12	180	MD	proj, 75mm		
181	10532	A3J2I1	5746527.38	2111868.21	31	2	0.8986	Category 2	3/21/2019	5746527.38	2111868.21	18	45	MD	proj, 4.2 in		
182	10220	B2A0B2	5744681.49	2112165.90	18	2	0.8974	Category 2	3/6/2019	5744681.49	2112165.90	12	45	MD	proj, 75mm		
183	10096	B2A9E2	5743626.63	2112437.06	16	2	0.8947	Category 2	3/4/2019	5743626.63	2112437.06	12	45	MD	proj, 75mm		
184	11043	A3J3F1	5747582.20	2111526.74	20	2	0.8941	Category 2	3/18/2019	5747582.20	2111526.74	12	90	MD	proj, 75mm		
185	10855	A3J2C9	5747344.95	2111272.30	15	2	0.8898	Category 2	3/13/2019	5747344.95	2111272.30	12	180	MD	proj, 75mm		
186	10603	A3J2G3	5746745.88	2111652.76	18	2	0.8885	Category 2	3/19/2019	5746745.88	2111652.76	12	180	MD	proj, 75mm		
187	10541	A3J2G1	5746560.12	2111612.68	15	2	0.8873	Category 2	3/21/2019	5746560.12	2111612.68	18	90	MD	proj, 75mm		
188	20011	A3J1E9	5746355.82	2111411.98	9	2	0.8860										

Ranked Dig List Intrusive Investigation Results

Dig Rank	Flag ID	Grid ID	Modeled X ¹	Modeled Y ¹	Modeled Depth (in.)	UXA Category ²	Decision Statistic	Dig Type	Dig Date	Recovery X ¹	Recovery Y ¹	Recovery Depth (in.)	Recovery Orientation	OE Type ^{2,3}	OE Item Description ⁵	Recovered TOI	TOI Type
194	10999	A3I3E1	5747543.12	2110476.89	29	2	0.8782	Category 2	3/11/2019	5747543.12	2110476.89	12	180	OD	None		
195	10809	A3J2H8	5747245.98	2111738.59	18	2	0.8775	Category 2	3/20/2019	5747245.98	2111738.59	12	90	MD	projo, 155mm		
196	10554	A3J2I2	5746614.81	2111880.89	20	2	0.8771	Category 2	3/21/2019	5746614.81	2111880.89	18	180	SameAnom	None		
197	10508	A3J1H0	5746417.89	2111772.11	14	2	0.8769	Category 2	3/21/2019	5746417.89	2111772.11	18	90	MD	projo, 75mm		
198	11215	A3J3C4	5747874.06	2111246.54	14	2	0.8756	Category 2	3/12/2019	5747874.06	2111246.54	18	180	MD	Assorted MD Components		
199	10640	A3J2I4	5746826.78	2111891.93	14	2	0.8754	Category 2	3/21/2019	5746826.78	2111891.93	12	90	MD	projo, 75mm		
200	10584	A3J2I3	5746700.41	2111883.44	13	2	0.8749	Category 2	3/25/2019	5746700.41	2111883.44	12	45	MD	projo, 75mm		
201	10786	A3J2H8	5747221.23	2111731.87	20	2	0.8727	Category 2	3/20/2019	5747221.23	2111731.87	12	120	MD	Assorted MD Components		
202	10310	B2A0A7	5745168.32	2112020.87	28	2	0.8720	Category 2	3/5/2019	5745168.32	2112020.87	18	120	MD	Assorted MD Components		
203	10373	B3A1D1	5745531.89	2112356.59	19	2	0.8716	Category 2	3/25/2019	5745531.89	2112356.59	24	180	MD	Assorted MD Components		
204	10718	A3J2H5	5746996.87	2111798.01	17	2	0.8710	Category 2	3/21/2019	5746996.87	2111798.01	12	180	MD	projo, 75mm		
205	10001	A2H7I9	5742380.69	2109857.96	14	2	0.8709	Category 2	3/6/2019	5742380.69	2109857.96	12	180	MD ⁴	projo, 75mm, HE, M48 (expended)		
206	10321	A2J0J7	5745197.32	2111944.45	10	2	0.8678	Category 2	3/5/2019	5745197.32	2111944.45	10	45	MD	projo, 75mm		
207	10288	B2A0A6	5745098.00	2112053.03	27	2	0.8667	Category 2	3/6/2019	5745098.00	2112053.03	12	180	MD	Assorted MD Components		
208	10927	A3J2F0	5747468.10	2111538.49	26	2	0.8660	Category 2	3/18/2019	5747468.10	2111538.49	18	180	MD	Assorted MD Components		
209	10263	B2A0A5	5744957.35	2112002.37	14	2	0.8646	Category 2	3/6/2019	5744957.35	2112002.37	12	90	MD	projo, 75mm		
210	10755	A3J2H7	5747167.60	2111775.33	22	2	0.8639	Category 2	3/20/2019	5747167.60	2111775.33	12	180	MD	Assorted MD Components		
211	10759	A3J2H7	5747177.72	2111755.03	25	2	0.8633	Category 2	3/20/2019	5747177.72	2111755.03	18	45	MD	Assorted MD Components		
212	10240	B2A0B4	5744800.32	2112147.91	15	2	0.8632	Category 2	3/6/2019	5744800.32	2112147.91	6	45	MD	projo, 75mm		
213	10160	B2A9E6	5744083.31	2112483.52	7	2	0.8627	Category 2	3/4/2019	5744083.31	2112483.52	12	45	MD	projo, 75mm		
214	10784	A3J2F8	5747220.26	2111548.68	19	2	0.8586	Category 2	3/18/2019	5747220.26	2111548.68	18	45	MD	Assorted MD Components		
215	10170	B2A9H7	5744186.41	2112797.44	15	2	0.8585	Category 2	3/4/2019	5744186.41	2112797.44	12	45	MD	projo, 75mm		
216	10524	B3A2B1	5746510.62	2112101.15	23	2	0.8550	Category 2	3/25/2019	5746510.62	2112101.15	18	180	MD	Assorted MD Components		
N/A	11083	A3J3E2	5747629.47	2111499.48	16	3	0.7976	Validation Dig	3/28/2019	5747628.44	2111499.69	18	45	MD	Assorted MD Components		
N/A	10700	A3J2E5	5746950.60	2111408.68	19	3	0.7591	Validation Dig	4/1/2019	5746950.94	2111408.13	12	180	MD	Assorted MD Components		
N/A	10743	A3J2H7	5747123.26	2111750.87	20	3	0.7334	Validation Dig	4/1/2019	5747123.13	2111751.25	18	90	MD	projo, 75mm		
N/A	10309	A2J0J7	5745162.02	2111983.14	12	3	0.6739	Validation Dig	3/27/2019	5745161.88	2111982.50	12	45	MD	projo, 75mm		
N/A	10798	A3J2D8	5747234.65	2111336.67	21	3	0.6656	Validation Dig	4/1/2019	5747235.00	2111336.56	12	180	MD	Assorted MD Components		
N/A	10217	B2A0D2	5744656.97	2112338.26	15	3	0.6617	Validation Dig	3/27/2019	5744657.50	2112338.12	18	90	MD	projo, 75mm		
N/A	10893	A3I2A0	5747413.18	2110095.78	6	3	0.6582	Validation Dig	3/28/2019	5747412.81	2110095.62	12	90	MD	projo, 75mm		
N/A	10215	B2A0D2	5744652.17	2112305.78	17	3	0.6192	Validation Dig	3/27/2019	5744652.19	2112305.94	12	180	MD	Assorted MD Components		
N/A	10793	A3J2E8	5747230.54	2111467.33	11	3	0.5795	Validation Dig	4/1/2019	5747230.63	2111466.88	18	45	MD	projo, 75mm		
N/A	10197	B2A9B0	5744485.25	2112192.86	12	3	0.5794	Validation Dig	3/27/2019	5744486.56	2112193.44	18	45	MD	projo, 75mm		
N/A	10986	A3J3E1	5747535.19	2111497.27	10	3	0.5577	Validation Dig	3/28/2019	5747535.00	2111497.19	12	90	MD	Assorted MD Components		
N/A	10146	B2A9G5	5743984.11	2112680.15	12	3	0.5499	Validation Dig	3/27/2019	5743983.75	2112679.37	18	120	MD	projo, 75mm		
N/A	10926	A3J2D0	5747467.84	2111333.56	8	3	0.4606	Validation Dig	4/1/2019	5747466.88	2111333.75	12	45	MD	projo, 75mm		
N/A	10941	A3J2E0	5747494.13	2111479.73	17	3	0.4545	Validation Dig	4/1/2019	5747494.38	2111480.00	12	180	MD	Assorted MD Components;projo, 75mm		
N/A	10022	A2I8E3	5742724.01	2110435.23	7	3	0.3800	Validation Dig	3/27/2019	5742724.38	2110436.25	18	45	MD	projo, 75mm		
N/A	10962	A3J3F1	5747517.10	2111593.72	13	3	0.3494	Validation Dig	3/28/2019	5747516.25	2111593.44	18	180	MD	Assorted MD Components		
N/A	10764	A3J2G7	5747181.77	2111621.13	14	3	0.2712	Validation Dig	4/1/2019	5747181.25	2111620.31	12	180	MD	Assorted MD Components		
N/A	10856	A3J2E9	5747345.86	2111488.86	4	3	0.2466	Validation Dig	4/1/2019	5747345.31	2111489.69	12	45	MD	Assorted MD Components		
N/A	10851	A3J2H9	5747335.46	2111706.03	12	3	0.2343	Validation Dig	4/1/2019	5747334.69	2111706.88	18	180	MD	Assorted MD Components		
N/A	10302	B2A0B7	5745143.37	2112114.04	6	3	0.1691	Validation Dig	3/27/2019	5745144.38	2112114.69	6	180	OD	None		
N/A	11002	A3I3E1	5747545.61	2110402.70	11	3	0.1477	Validation Dig	3/28/2019	5747545.31	2110403.13	6	180	MD	Assorted MD Components		
N/A	11255	A3I3I6	5748094.24	2110898.04	13	3	0.1262	Validation Dig	3/28/2019	5748093.13	2110898.12	12	180	MD	Assorted MD Components		
N/A	10407	A3H1E3	5745725.25	2109400.89	6	3	0.1085	Validation Dig	3/28/2019	5745725.00	2109401.88	6	45	MD	projo, 37mm		
N/A	10606	A3J2I3	5746747.75	2111831.02	9	3	0.0000	Validation Dig	4/1/2019	5746747.81	2111831.25	12	90	MD	Assorted MD Components		
N/A	10400	B3A1F2	5745691.94	2112545.07	7	3	0.0000	Validation Dig	3/28/2019	5745692.50	2112543.44	6	180	MD	Assorted MD Components		

¹ Coordinates reported in NAD83, California State Plane, Zone 4, U.S. survey feet

² An OE Type entry of "Unknown" represents a target with a source that has not been resolved because it is deeper than the risk reduction excavation depth threshold.

³ An OE Type entry of "SameAnom" represents a target flag location that shares a single anomaly source with another target flag location.

⁴ This OE Type entry of MD represents an item that was initially classified as material potentially presenting an explosive hazard. The item has been assessed and documented as not presenting an explosive hazard. The chain of custody for the item has been established and maintained.

⁵ In the case of recovered UXO items, OE Item Description is the final item description verified through demolition and positive identification. For non-UXO, the description first recorded by the intrusive investigation team is listed.

* Marked recovery depths were deeper than the risk reduction depth threshold of 12 inches below ground surface for the inner zone of Unit 23.

Appendix D

Geophysical Classification Validation Plan – Unit 23 Risk Reduction, Former Fort Ord, California

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DATE: May 15, 2019

This Geophysical Classification Validation Plan has been developed to describe procedures for verifying and validating the classification results of the MEC risk reduction activities being performed in preparation for prescribed burn operations in Unit 23 at the former Fort Ord. The risk reduction is being conducted by KEMRON Environmental Services, Inc (KEMRON) for the United States Army Corps of Engineers (USACE) under Contract W912DY-10-D-0027, Task Order number CM01.

The risk reduction is being completed in accordance with the *Final Quality Assurance Project Plan, Superfund Response Actions Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action* (KEMRON, 2016a); the *Final Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume II, Munitions Response, Appendix B, Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan* (AGCMR-QAPP; KEMRON, 2016b), the *Final Work Plan, Remedial Design (RD)/Remedial Action (RA), Track 3 Impact Area Munitions Response Area (MRA), Munitions and Explosives of Concern (MEC) Removal, Former Fort Ord, California* [RD/RA WP, (USACE, 2009)]; the *Final Track 3 Record of Decision (ROD), Impact Area Munitions Response Area, Track 3 Munitions Response Site, Former Fort Ord, California* (Track 3 ROD; United States Department of the Army, 2008); *Field Work Variance No. 008, Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California* (FWV 008; KEMRON, 2017a), and the procedures and measurement performance criteria included in *Field Work Variance 012 for Final, Work Plan, Munitions with Sensitive Fuzes Field Study, Former Fort Ord, California* (FWV 012; KEMRON, 2018).

The intent of the verification and validation process is to provide assurance that targets of interest (TOI) shallower than the risk reduction depth thresholds have been correctly classified and identified for removal and that no TOI have been classified as non-TOI. The verification and validation process will involve the following quality demonstrations:

- selection and intrusive investigation of verification and validation digs from the population of anomalies classified as non-TOI to demonstrate that anomalies have been correctly classified
- verification of modeled TOI depths

This plan presents the rationale for the verification and validation approach and the description of the verification and validation process. The identity, quantity, and distribution of intrusive investigations necessary to verify and validate the classification process has been determined during the course of classification activities and is based on specific details of the classification approach, intrusive investigation results, and the classification performance demonstrated by quality control (QC) and quality assurance (QA) seed item identification.

1. Background

The Unit 23 MEC risk reduction activity, as described in *Field Work Variance No. 008, Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California* (FWV 008; KEMRON, 2017a) involves the following tasks, both of which are to be completed prior to prescribed burn operations:

- Removal of anomalies that are classified as 155mm projectiles, 8-inch projectiles, or unexpected larger MEC items to 2-foot depth in the outer zone of Unit 23, which exists within 436 feet of the perimeter of the 45-foot wide fuel break. This reduces the horizontal hazardous fragmentation distance for firefighters and prescribed burn personnel on the fuel break during burn operations.
- Removal of anomalies that are classified as 155mm projectiles, 8-inch projectiles, or unexpected larger MEC items to 1-foot depth in the inner zone of Unit 23, which exists 436 feet or more from the perimeter of the 45-foot wide fuel break. This reduces the vertical hazardous fragmentation distance for safe overhead helicopter flight during burn operations.

The outer and interior zones described above are shown on **Figure 1**.

The MEC risk reduction activity involves identification of anomalies from an initial detection DGM survey, followed by a static geophysical classification survey of those identified anomalies.

The initial detection survey, which was conducted in three phases between 2012 and 2016, can be seen as the first step in the classification process where anomalies are selected or rejected based upon a detection threshold. Once an anomaly is identified and a static MetalMapper 2x2 (MM2x2) measurement is acquired, the anomaly can be classified as a potential TOI if it meets any of the following criteria:

1. Its derived polarizabilities (β s) match those of any TOI in the classification library
2. It is a member of a cluster or group of anomalies with similar (β s) that are identified as TOI through intrusive investigation
3. Its derived β s indicate features that are typical of TOI (large, axial symmetry, and thick-walled)

The goal of the verification and validation process is to demonstrate that no TOI shallower than the risk reduction depth thresholds are classified as non-TOI. The above criteria can be restated in terms of how anomalies are classified as non-TOI. An anomaly is classified as a non-TOI if it meets any of the following criteria:

1. Its derived polarizabilities do not match those of any TOI in the classification library
2. It does not belong to an identified cluster of anomalies with similar β s that are identified as TOI through intrusive investigation
3. Its derived β s indicate that it is not large, axially symmetric, and thick-walled

The following discussion presents the approach to classification verification and validation with emphasis on describing what thresholds will be tested and the rationale for these tests. Any verification and validation failures will require a root cause analysis and appropriate corrective action developed and implemented in consultation with the USACE.

2. Anomaly Selection Verification

Anomalies for the static MM2x2 survey are selected from the existing DGM data acquired during previous Fort Ord MEC remediation activities. The DGM data were acquired in three separate survey events between 2012 and 2016, using a vehicular towed array consisting of three EM61-MK2 sensors with a 2-foot transect spacing. The detection DGM surveys are detailed in the *MRS-BLM Units 4, 11 and 12, MEC Remedial Action Report, Former Fort Ord, California* (Gilbane, 2014), the *MRS-BLM Units 6, 7, and 33 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (Gilbane, 2015), and the *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California* (KEMRON 2017b). The

detection survey data were processed, but anomalies potentially representing subsurface MEC were not initially selected.

For the three-coil EM61-MK2 system used at Fort Ord, the Naval Research Laboratory response calculator identifies response value thresholds for static MM2x2 investigation anomalies of 114 mV on the third EM61-MK2 channel in the outer zone of Unit 23 and 446 mV on the third EM61-MK2 channel in the interior zone of Unit 23.

Verification of the anomalies selected for the static MM2x2 investigation is demonstrated by the generous level of conservatism built into the target selection threshold applied to the DGM detection data. Extensive planning was conducted by the Project Geophysicist and the USACE QA Geophysicist regarding the appropriate target selection thresholds prior to the target selection process. The conservatism in the selected thresholds is based on the following two factors:

1. The target selection thresholds were determined using the NRL EM61 response calculator for the least favorable (horizontal) orientation of the item. In the horizontal orientation, large cylindrical targets result in double-peaked EM signatures with higher values at each end of the response footprint along the long axis of the target. The NRL response values, however, are based on the lower response directly over the center of the item. The predicted response values (and the target selection thresholds) are therefore considerably lower than the peak responses seen in the EM61 DGM data. Targets were selected from the DGM data based on all peak responses without merging large double-peaked responses, so the higher responses over the ends of a TOI are captured in the selection process. In all orientations other than horizontal, the response for a TOI is significantly greater than that of the horizontal orientation.
2. The depths used in the NRL response calculator included an additional 3 inches beyond the 1 and 2 foot target depths to measure to the center of mass of a horizontal 155mm projectile when its upper edge is at the 1 or 2 foot target depth. The upper edge of most sensitive part of a horizontal 155mm projectile, the fuze, is therefore 2.5 inches below the maximum targeted depth, adding an additional degree of safety to the risk reduction activity. Again, in all other orientations, the response is much higher than that of the horizontal orientation.

3. Library Match Threshold Verification

Classification is based primarily on the fit metrics generated by the Geosoft Oasis Montaj UX-Analyze module during a comparison of the polarization (β) values estimated for each surveyed anomaly and the β values in the classification library developed for the project. The fit metric indicates the fit correlation between an anomaly and the item in the library that best matches

it. The fit metric ranges from 0 to 1, with a fit metric of 1 being a perfect match. The library fit analysis matches the following combinations of β s to those of the classification library TOIs:

1. $\beta_1, \beta_1/\beta_2, \beta_1/\beta_3$
2. $\beta_1, \beta_1/\beta_2$
3. $\beta_1/\beta_2, \beta_1/\beta_3$
4. β_1

The confidence metrics for each fit combination are averaged to derive a decision metric. The library matching process is performed for each single-target model and every target in each of the multi-target models. For each measured anomaly, the highest value decision metric (i.e., most-likely TOI) from the combined set of single-solver and multi-solver targets is used as the decision metric for that anomaly.

Cut-off thresholds are determined based upon review of the decision metrics derived for known targets (QC seeds, bench measurements and training dig results) and are used to rank and classify the target list. Decision metric values above the thresholds are classified as potential TOI, and values below the decision metric thresholds are classified as non-TOI. The TOI library match decision metric thresholds are shown in **Table 1**.

Table 1
Target of Interest Library Match Decision Metric Thresholds

Category	Description	Decision Metric Lower Boundary	Additional Condition
1	High-confidence TOI	0.925	
2	Inconclusive	0.825	
2	Inconclusive	0.750	Low amplitude signal

Verification of the library match thresholds will involve sampling through intrusive investigation of anomalies beyond the selected Category 2 threshold. The number of digs required to achieve verification depends to a large degree on intrusive investigation results – in particular the results for the lowest-ranked anomalies that result in the recovery of TOI. Partial receiver operating characteristic (ROC) curves showing a steep ascent early in the prioritized list (indicating most targets are TOI), followed by a small section of no vertical (Y direction) gain indicating the absence of TOI in the latter part of the prioritized list are indicative of successful

classification. Partial ROC curves that do not display a distinct inflection point between the TOI and non-TOI sections, and have TOI in close proximity (on the prioritized list) to the library match threshold require more verification digs. To adequately verify the library match thresholds, the next 25 targets with library match decision metrics below the final TOI recovered from the ranked dig list will be intrusively investigated.

The lowest-ranked target that resulted in the recovery of a TOI was flag ID 11015, which was ranked #200 on the dig list. 42 targets classified as Category 2 TOI were ranked lower on the dig list and were intrusively investigated during normal production activities. This satisfied the requirement for intrusive investigation of 25 anomalies ranked immediately below the lowest-ranked recovered TOI.

4. Cluster Analysis Verification

The cluster analysis is designed to detect unanticipated TOI at the site. Unanticipated TOI include any MEC items that meet the safety concerns described in the AGCMR-QAPP and are larger than 155mm projectiles at depths shallower than those defined for the two zones of the risk reduction area.

The cluster analysis is designed to detect unanticipated TOI by identifying existing groups of anomalies with similar β s that do not match any of the classification library TOI, and intrusively investigating anomalies within these clusters to determine if the clusters are comprised of TOI or non-TOI. Within any such cluster, the individual items will all be very similar in size, shape and composition. The β signature of any cluster that is identified as TOI is added to the classification library, and the items in the cluster are classified as TOI.

Due the small list of TOI for the risk reduction activity and their large, distinct sizes and shapes, it is anticipated that all TOI will be identified with signatures in the library and that cluster analysis will be unnecessary. Cluster analysis will nevertheless be performed during MM2x2 data analysis, but verification of the cluster analysis through additional intrusive investigation beyond the library match threshold verification and the QA validation will not be required.

5. Feature Analysis Verification

Similar to the cluster analysis, the feature analysis is designed to detect unanticipated TOI at the site. Unanticipated TOI include any MEC items that meet the safety concerns described in the AGCMR-QAPP and are larger than 155mm projectiles at depths shallower than those defined for the two zones of the risk reduction area.

The feature analysis is designed to detect unanticipated TOI by identifying individual anomalies with β s indicating features that are typical of TOI but do not match any of the classification library items, and intrusively investigating those anomalies to determine if their sources are TOI or non-TOI. For the current risk reduction activities in Unit 23, specific attention will be placed

on the large amplitudes and slow decay rates of the signatures expected from large, shallow items. The β signature of any item that is identified as a TOI is added to the classification library, and the item is classified as a TOI.

Verification of the feature analysis will be accomplished through the library match verification and cluster analysis verification processes described in Sections 3 and 4. The intrusive investigation of at least 25 targets ranked below the final recovered TOI verifies that targets with features consistent with large, shallow MEC items have been identified and classified as TOI. Due to the small list of TOI for the risk reduction activity and their large, distinct sizes and shapes, it is anticipated that all TOI will be identified with signatures in the library and that feature analysis will be unnecessary. Feature analysis will nevertheless be performed during MM2x2 data analysis, but verification of the feature analysis through additional intrusive investigation beyond the library match threshold verification and the QA validation will not be required.

6. Modeled Depth Verification

The classification process results in a modeled depth of each classified target. Verification of modeled TOI depths is built into the processing and classification scheme. Recovery depths of all recovered items are recorded by the intrusive investigation team and compared to the modeled depths from the classification results to verify that recovered TOI depths match the modeled depths.

7. Quality Assurance Validation

In addition to the verification and validation investigations described above, the USACE QA Geophysicist will select 25 non-TOI targets from the final ranked classification list for intrusive investigation. A validation failure will result if any TOI is recovered in the set of QA validation investigations.

8. Summary of Verification and Validation Investigations

The final identity, quantity, and distribution of intrusive investigations necessary to verify and validate the classification process has been determined during the course of classification activities and is based on specific details of the classification approach, intrusive investigation results, and the classification performance demonstrated by quality control (QC) and quality assurance (QA) seed item identification. The library match verification process (Section 3) will result in 25 verification investigations, all of which are included in Category 2 of the ranked dig list; and the cluster and feature analysis verification processes (Sections 4 and 5), will not result in the addition of any verification investigations. The USACE QA Geophysicist will add 25 validation investigations. Results of verification and validation investigations will be presented in the final Unit 23 Risk Reduction Technical Memorandum.

9. References

- Gilbane, 2014. *Final MRS-BLM Units 4, 11 and 12, MEC Remedial Action Report, Former Fort Ord, California*. (OE-0799B)
- Gilbane, 2015. *MRS-BLM Units 6, 7, and 33 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (OE-0842)
- KEMRON Environmental Services (KEMRON), 2016a. *Final Quality Assurance Project Plan Superfund Response Actions Former Fort Ord, California Volume II Appendix A Munitions and Explosives of Concern Remedial Action*. (OE-0884A)
- KEMRON, 2016b. *Final Quality Assurance Project Plan Superfund Response Action Former Fort Ord, California Volume II Munitions Response Appendix B Advanced Geophysical Classification for Munitions Response Quality Assurance Project Plan*. (OE-0868B)
- KEMRON, 2017a. *Field Work Variance No. 008, Final, Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, MRS-BLM Unit 23 and in support of Units 11 and 12 Prescribed Burns (Includes portions of 5A, 9, 25, 28, and 31), Former Fort Ord, California*. (OE-0862B.5)
- KEMRON, 2017b. *MRS-BLM Unit 23 MEC Remedial Action, Technical Memorandum, Former Fort Ord, California*. (OE-0893A)
- KEMRON, 2018. *Field Work Variance 012 for Final, Work Plan, Munitions with Sensitive Fuzes Field Study, Former Fort Ord, California*. (OE-0888B.2)
- United States Army Corps of Engineers (USACE), 2009. *Final Work Plan Remedial Design (RD)/Remedial Action (RA) Track 3 Impact Area Munitions Response Area (MRA) Munitions and Explosives of Concern (MEC) Removal Former Fort Ord, California*. (OE-0660K)
- United States Department of the Army (Army), 2008. *Final Record of Decision, Impact Area Munitions Response Area, Track 3 Munitions Response Site, Former Fort Ord, California*. (OE-0647)



Geophysical Classification Validation Plan
Unit 23 Risk Reduction
Former Fort Ord, California

Figure 1
Risk Reduction Zones

