# Bureau of Land Management Area B
# Unit B-3E-NE
# Munitions and Explosives of Concern
# Remedial Action
# Technical Memorandum
# Former Fort Ord, California, Revision A

**July 2018**

*Prepared for*

**U.S. Army Corps of Engineers**
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## List of Acronyms

| | |
|---|---|
| AR | Administrative Record |
| Army | United States Department of the Army |
| BLM | United States Bureau of Land Management |
| BRA | Basewide Range Assessment |
| DGM | Digital Geophysical Mapping |
| FWV | Field Work Variance |
| KEMRON | KEMRON Environmental Services, Inc. |
| lbs | pounds |
| MD | Munitions Debris |
| MEC | Munitions and Explosives of Concern |
| mm | millimeter |
| MPPEH | Material Potentially Presenting an Explosive Hazard |
| OD | Other Debris |
| RA | Remedial Action |
| RAR | Remedial Action Report |
| RCRA | Resource Conservation and Recovery Act |
| RD/RA | Remedial Design/Remedial Action |
| ROD | Record of Decision |
| RRD | Range-Related Debris |
| SAA | Small Arms Ammunition |
| SOP | Standard Operating Procedure |
| SSWP | Site Specific Work Plan |
| TM | Technical Memorandum |
| QA | Quality Assurance |
| QAPP | Quality Assurance Project Plan |
| QC | Quality Control |
| USACE | United States Army Corps of Engineers |
| UXO | Unexploded Ordnance |

# 1.0 Introduction

This Technical Memorandum (TM) describes the munitions and explosives of concern (MEC) remedial actions (RAs) performed by KEMRON Environmental Services, Inc. (KEMRON), with Gilbane as a subcontractor, within Bureau of Land Management (BLM) Area B, Unit B-3E-NE (Figure 1). The RAs within BLM Area B, Unit B-3E-NE occurred under the following:

- *Final, Record of Decision, Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California* (ROD; United States Department of the Army (Army), 2017);
- *Final Work Plan, Remedial Design (RD)/Remedial Action (RA) Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California* (RD/RA WP; KEMRON, 2017a); and
- *Final, Site-Specific Work Plan Munitions and Explosives of Concern Remedial Action BLM Area B, Former Fort Ord, California* (BLM Area B SSWP; KEMRON, 2017b).

Surface MEC removal and digital geophysical mapping (DGM) are complete within Unit B-3E-NE. This document evaluates and presents a review of the results of the surface MEC removal as well as the DGM data. Based upon an evaluation of the results of RAs performed to date and the Army - BLM joint inspection (Appendix A), this document provides recommendations concerning additional RA.

## 1.1 Site Location

Unit B-3E-NE (approximately 25.35 acres) is located in the eastern portion of Remedial Work Area B-3E within BLM Area B. This unit lies to the east of Addington Road, west of Barloy Canyon Road, and north of East Machine Gun Flats Road (Figure 1).

# 2.0 Work Completed

KEMRON initiated field work in Unit B-3E-NE in August 2017 in accordance with BLM Area B SSWP (KEMRON, 2017b). To date, work completed in Unit B-3E-NE includes vegetation clearance, technology-aided surface MEC removal (surface MEC removal), and DGM survey. Table 1 shows cumulative results for the surface MEC removal and DGM survey. KEMRON implemented quality control/quality assurance (QC/QA) processes in accordance with the BLM Area B SSWP (KEMRON, 2017b).

Table 1. Unit B-3E-NE Cumulative Results of Surface MEC Removal and DGM Survey

| Parameter | Totals |
|---|---|
| Surface MEC removal acreage | 25.35 |
| Digital Geophysical Mapping (DGM) survey acreage* | 23.56 |
| Munitions and Explosives of Concern (MEC) items** | 2 |
| Total Estimated Munitions Debris (MD) Weight (lbs)*** | 1530 |
| Total Estimated Range Related Debris (RRD) and Other Debris (OD) (lbs) | 5164 |

*Approximately 1.79 acres were inaccessible due to the presence of trees and terrain issues.
**Encountered during surface MEC removal.
*** Includes ~450 lbs of blank 5.56 mm Small Arms Ammunition (SAA) in remedial work grid C4F3G6.

## 2.1 Vegetation Clearance

Vegetation clearance to support RAs occurred between August and September 2017. Manual (approximately 2 acres) and mechanical (approximately 23 acres) mastication occurred as shown in Figure 2.

## 2.2 Technology-Aided Surface MEC Removal

Surface MEC removal followed vegetation clearance and utilized remedial work grids based on the Fort Ord Master Grid System. Figure 3 shows the remedial work grids.

Surface MEC removal occurred between September and October 2017. Unexploded ordnance (UXO) personnel with Schonstedt magnetometers used search lanes approximately five feet in width. Surface MEC removal occurred in all remedial work grids in Unit B-3E-NE (Figure 4) and met the QC/QA measurement quality objectives. The QC results are included in Appendix B. The QA results are included in Appendix C.

## 2.3 Digital Geophysical Mapping Survey

Field personnel conducted the DGM survey with a vehicle-towed EM61-MK2A between December 2017 and January 2018. Figure 6 depicts the DGM survey results. Due to the presence of trees and terrain issues, approximately 1.79 acres were inaccessible to DGM survey. The DGM survey met the QC/QA measurement quality objectives. The DGM QC results are included in Appendix D. Appendix E includes the United States Army Corps of Engineers (USACE) DGM QA Approval and Discussion.

## 2.4 Summary of MEC/MD Removed

UXO personnel managed items encountered and removed during RAs in a manner consistent with the BLM Area B SSWP and *Final, Quality Assurance Project Plan, Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action* (MEC QAPP; KEMRON, 2016). UXO personnel recovered two MEC items (Table 2 and Figure 4) during the RA conducted under the BLM Area B SSWP. The MEC items and munitions debris (MD) recovered did not indicate presence of munitions with sensitive fuzes. Unit B-3E-NE does not have any additional records of MEC items recovered. Table 1 provides a summary of MD as well as Range-Related Debris (RRD) and Other Debris (OD) removed as part of the RA. Figure 5 shows MD weights per remedial work grid.

Table 2. Unit B-3E-NE MEC Items Recovered

| Date Found | Item Number | Item Type | Qty | Description | Operation |
|---|---|---|---|---|---|
| 10/19/2017 | C4F3A1-1-1 | UXO | 1 | Projectile, 37mm, low explosive, MK I | Surface MEC Removal |
| 10/18/2017 | C4F3B1-1-1 | UXO | 1 | Projectile, 37mm, low explosive, MK I | Surface MEC Removal |

Small arms ammunition (SAA) weight is included in the MD weight per grid shown in Figure 5. One remedial work grid (C4F3G6) exhibited a high MD weight due to the presence of approximately 450 pounds of blank 5.56 mm SAA. As stated in Section 7.4.2 of *Attachment B Standard Operating Procedure for MEC and MPPEH Management* (UXO SOP 5) of the MEC QAPP, SAA is stored at the Explosive Storage Location and subsequently transported to an

approved state and/or Resource Conservation and Recovery Act (RCRA) authorized off-site facility for treatment and/or recycling.

## 3.0 Field Work Variance(s)

During execution of field work, unforeseen circumstances or events may arise that require modification to field work procedures. Field Work Variances (FWVs) document these modifications. The RAs in Unit B-3E-NE did not require FWVs to the BLM Area B SSWP.

## 4.0 Observations of Evidence of Potential Soil Contamination

During field operations, UXO field personnel noted no features or items that might indicate small arms training (e.g., mounds, berms, structures, concentrations of expended bullets, concentrations of other munitions-related items). However, one remedial work grid (C4F3G6) contained an estimated 450 pounds of blank 5.56 millimeters (mm) SAA found during surface MEC removal. The Basewide Range assessment (BRA) personnel are currently evaluating this information as part of the BRA program.

## 5.0 Subsurface MEC Remediation

The BLM Area B SSWP identified subsurface MEC removal will occur in portions of BLM Area B to address the risk associated with specific reuse, such as proposed or existing roads, fuel breaks, proposed or existing trails in the BLM trail network, and future habitat restoration sites. The Army and BLM adjusted the subsurface removal footprints (Figure 7) based on a joint inspection that occurred after the completion of DGM (Appendix A).

No additional areas of subsurface MEC remediation is recommended in B-3E-NE. This recommendation is based on evaluation of the following: (a) the types and amounts of MEC recovered during the technology-aided surface MEC removal; (b) DGM survey results; and (c) reasonably anticipated or known reuse activities that will occur.

### 5.1 Trails

Unit B-3E-NE contains segments of four existing trails. The BLM Area B SSWP identified the following existing trails within Unit B-3E-NE:

- Trail 15
- Trail 16
- Trail 23
- Trail 57

In December 2017, a joint inspection by the Army and BLM occurred. BLM identified segments of existing trails they plan to realign, and segments to be abandoned as result of trail realignment (Figure 7). The existing alignment of Trail 57 and a segment of Trail 16 will be abandoned. Subsurface MEC removal will not be conducted in the abandoned trail segments.

The Army-BLM joint inspection noted erosion issues along Trail 15 and a segment of Trail 16. The Army will conduct grading, with appropriate UXO safety support, to address current erosion issues on a segment of Trail 16 (Figure 7). The DGM survey results indicate relatively high density of subsurface anomalies in the vicinity of Trail 15. The Army will evaluate grading or an alternative method to address the erosion concerns along Trail 15 (approximately 50-foot wide area). BLM will identify a new alignment for Trail 15. The Army will conduct subsurface MEC removal in the new Trail 15 alignment (12-foot width).

## 6.0 Recommendation & Conclusion

The surface MEC removal (Figure 4) and DGM survey (Figure 6) are complete within Unit B-3E-NE. Based on an evaluation of work completed to date, no additional subsurface MEC removal beyond the areas identified on Figure 7 is recommended. The Remedial Action Report (RAR) will document all RAs conducted.

# 7.0 References

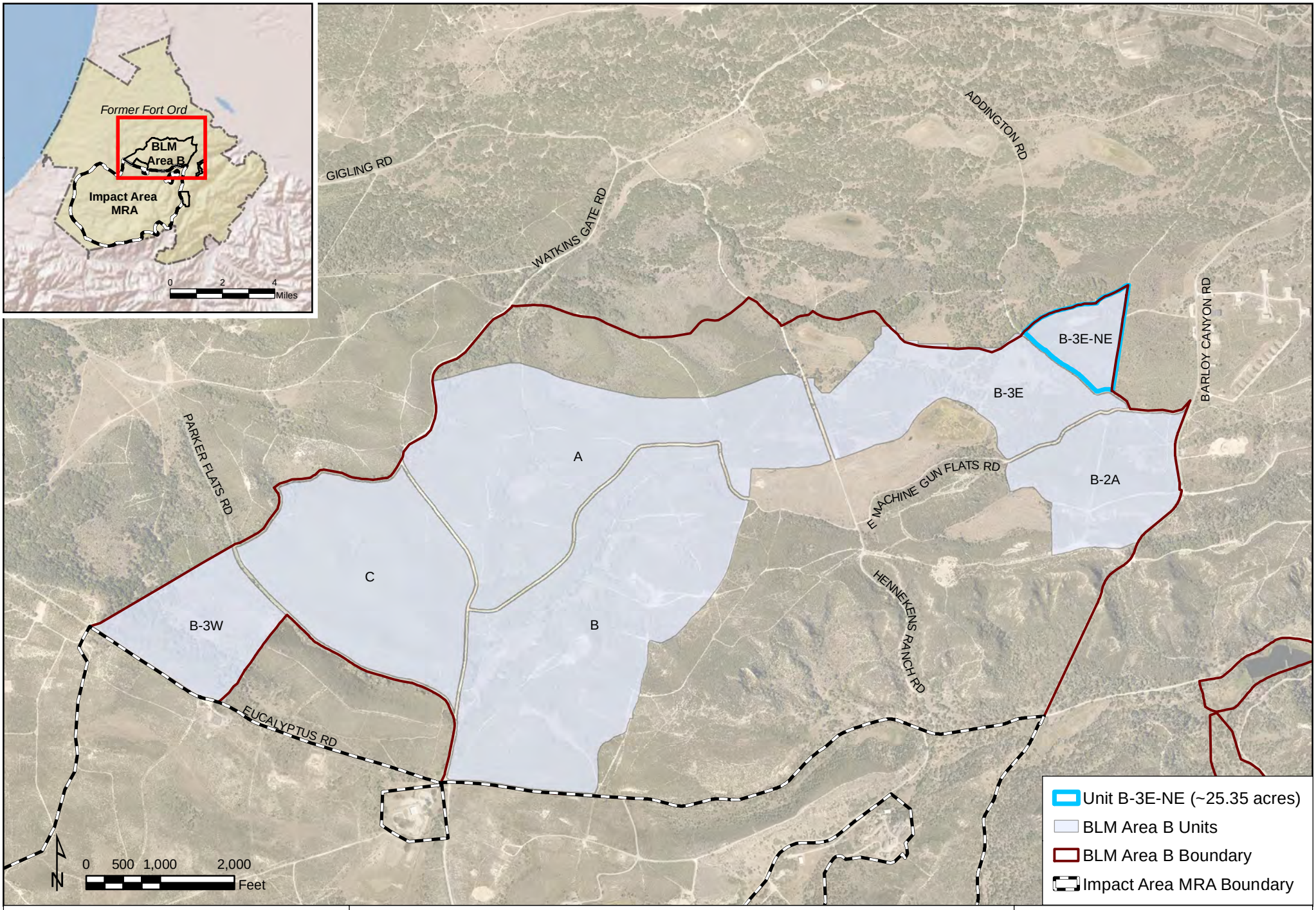
KEMRON Environmental Services, Inc. (KEMRON) 2016. *Final, Quality Assurance Project Plan, Former Fort Ord, California, Volume II, Appendix A, Munitions and Explosives of Concern Remedial Action*. (Administrative Record [AR]# OE-0884A)

KEMRON 2017a. *Final Work Plan, Remedial Design (RD)/Remedial Action (RA) Track 2 Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California*. (AR# OE-0899B)

KEMRON 2017b. *Final Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action, BLM Area B, Former Fort Ord, California*. (AR# OE-0900B)

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

*Figures*




BLM Area B - Unit B-3E-NE
MEC Remedial Action Technical Memorandum
BLM Area B
Former Fort Ord, California

**Figure 1**

Location

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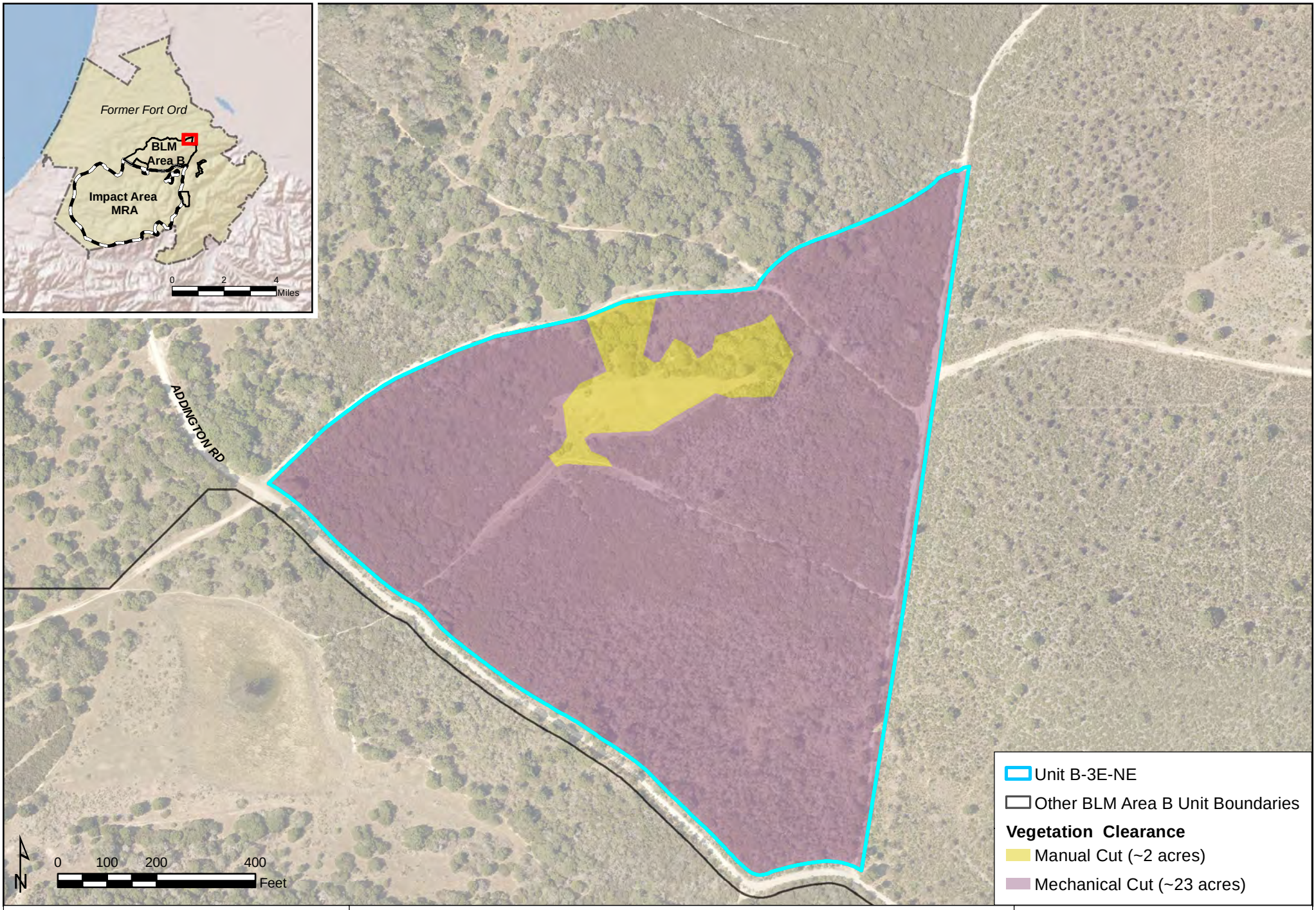


BLM Area B - Unit B-3E-NE
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**Figure 2**

Unit B-3E-NE Vegetation Clearance

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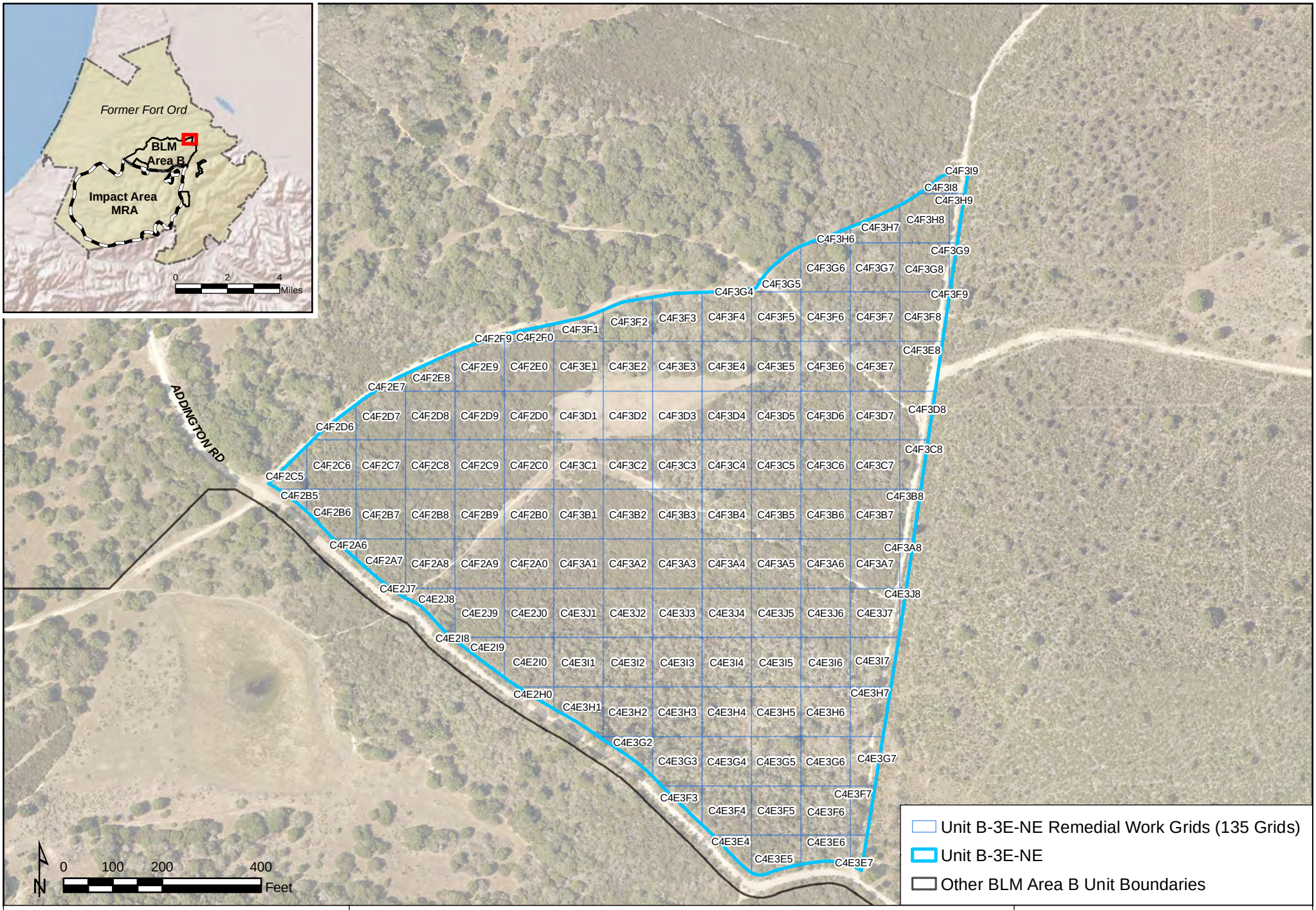


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**Figure 3**

Unit B-3E-NE Remedial Work Grids

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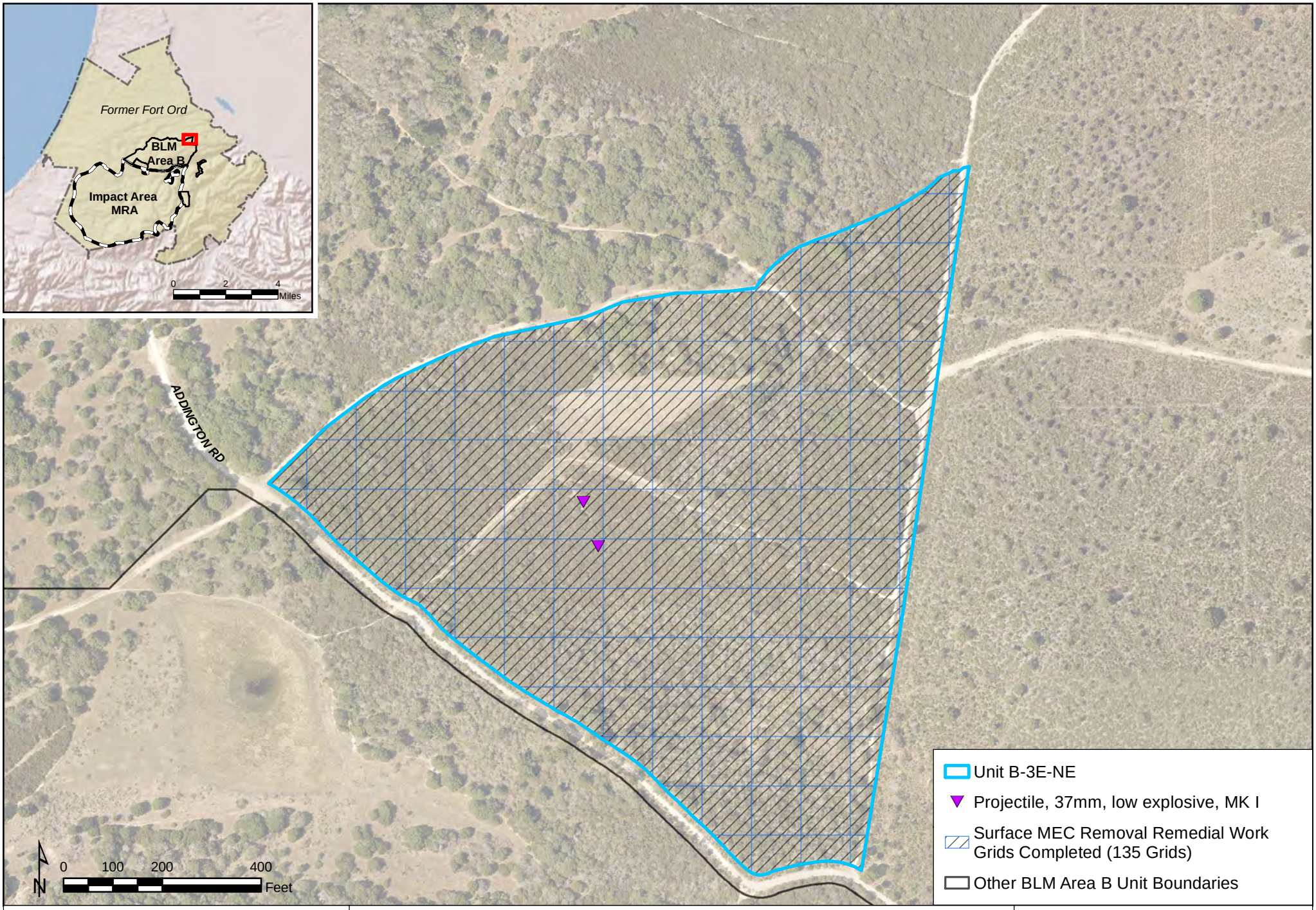


BLM Area B - Unit B-3E-NE
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**Figure 4**

Surface MEC Removal & MEC Recovered

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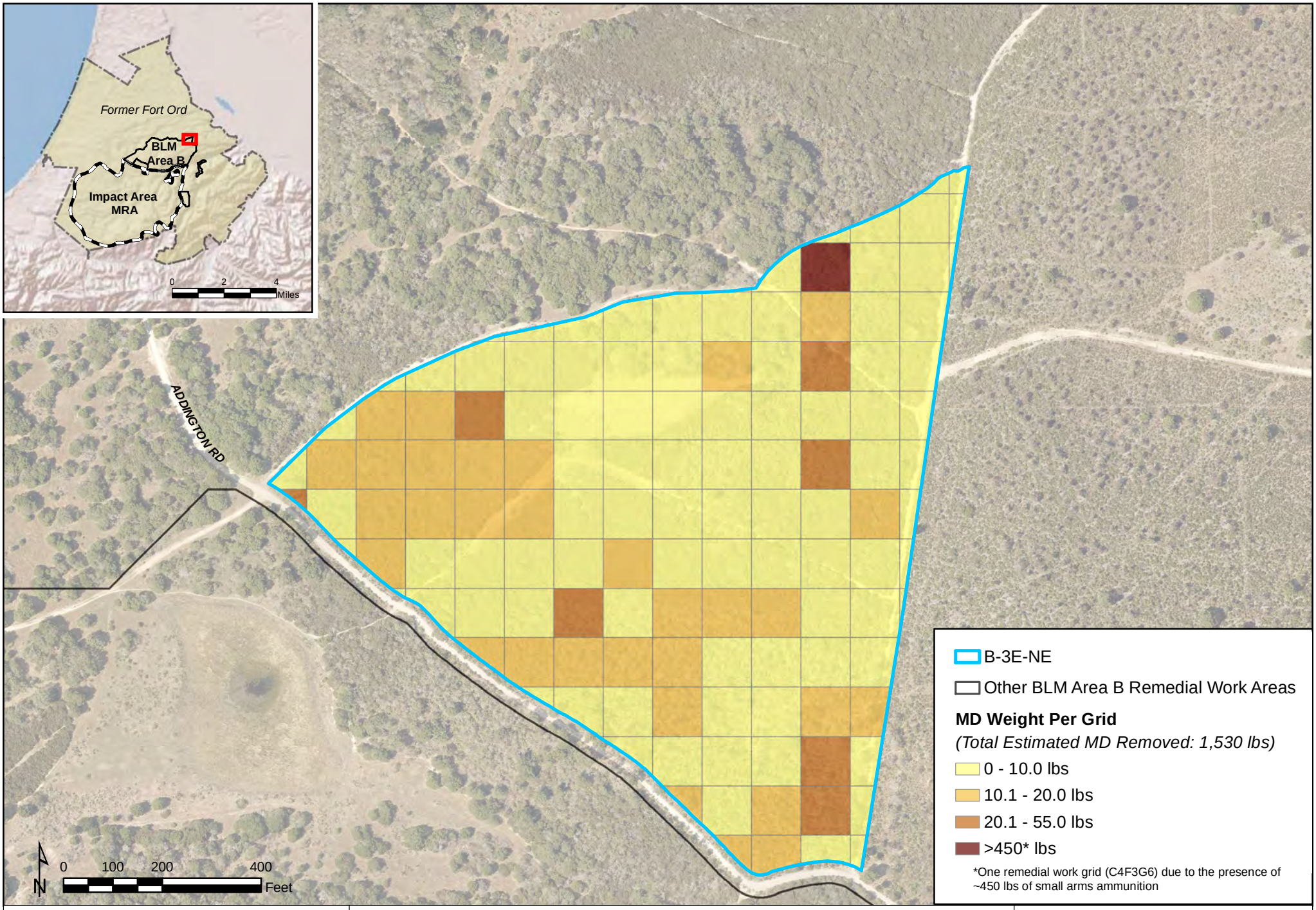


BLM Area B - Unit B-3E-NE
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**Figure 5**

Munitions Debris Weight per Grid

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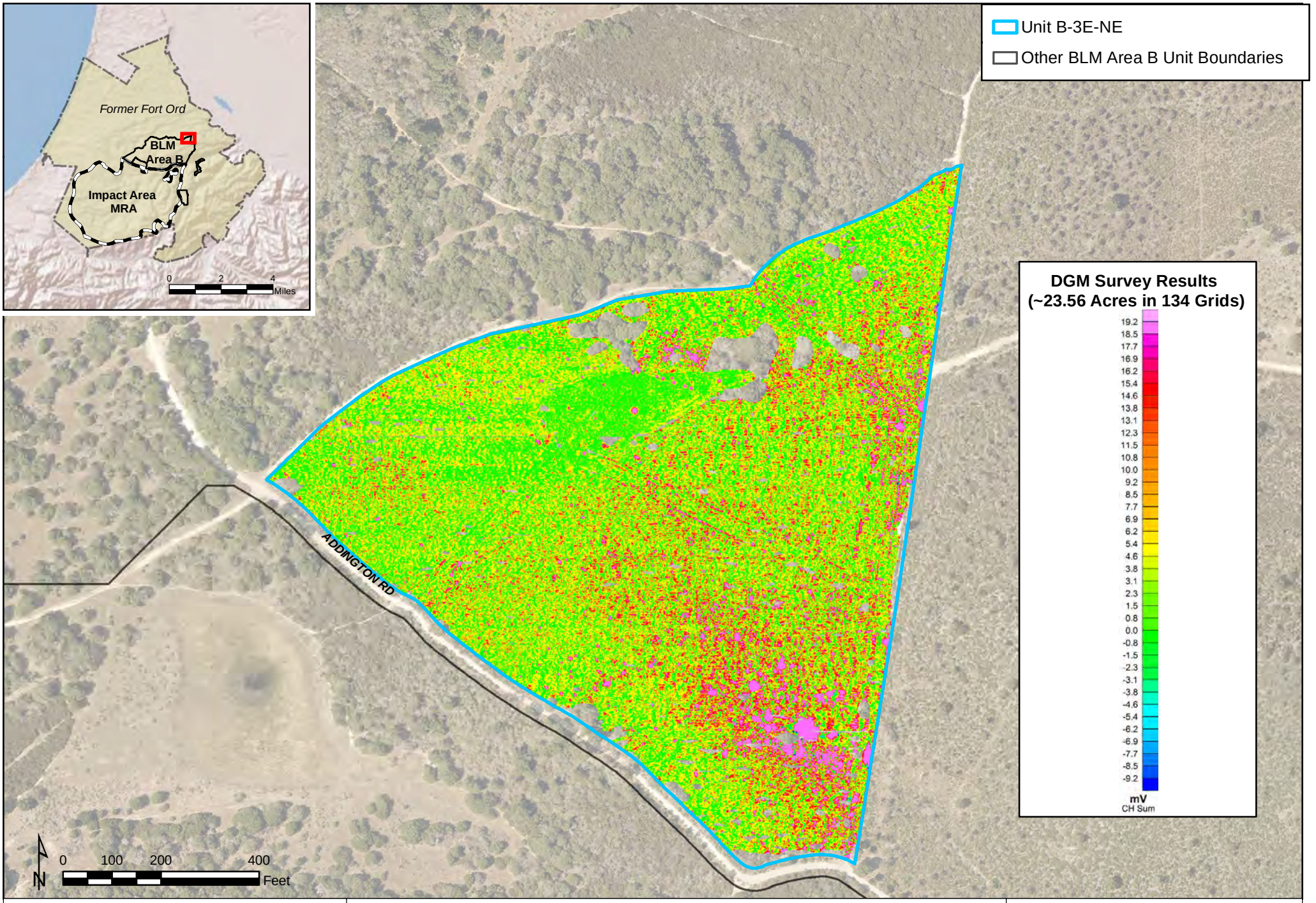


BLM Area B - Unit B-3E-NE
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BLM Area B
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**Figure 6**

DGM Survey Results

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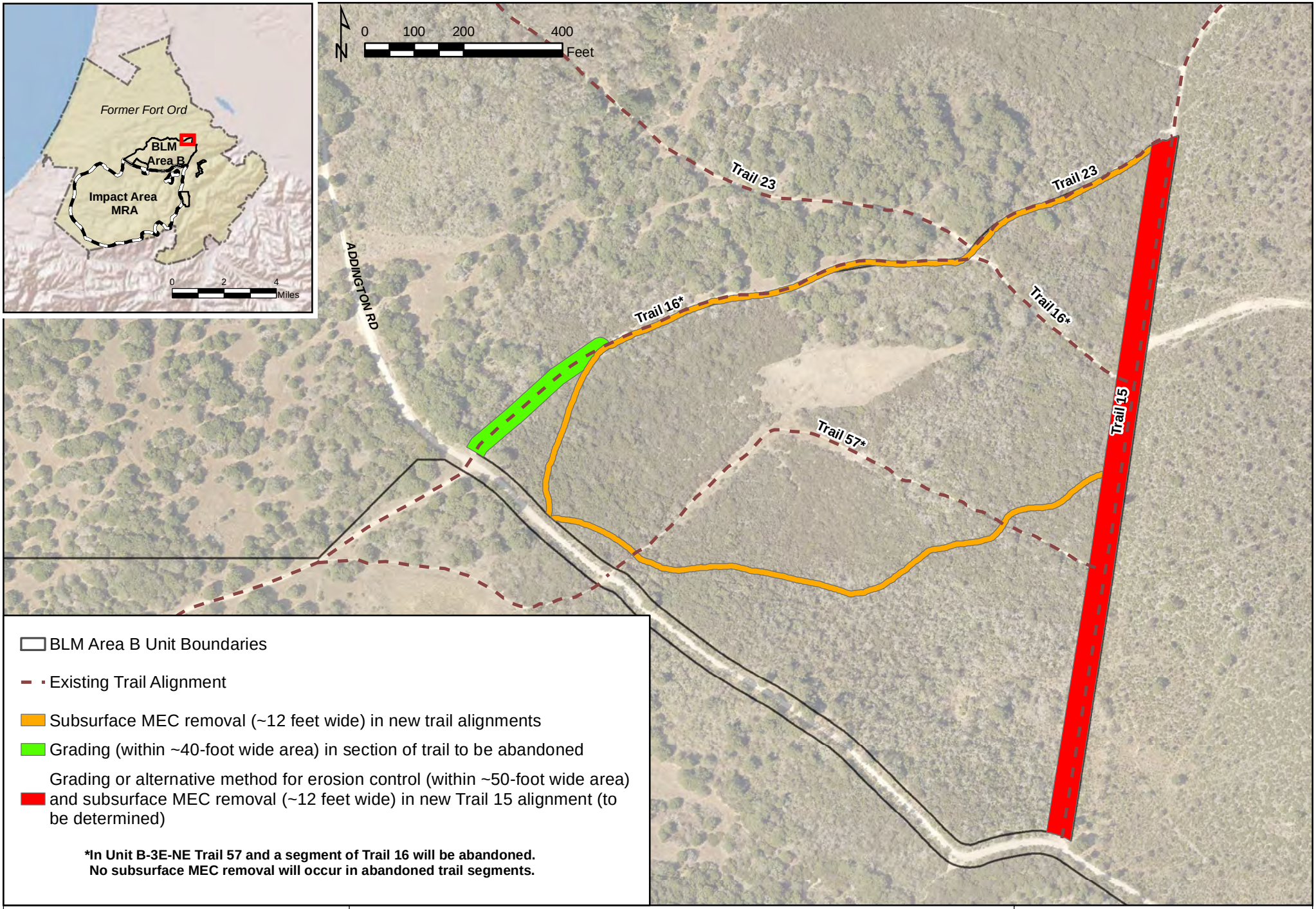


BLM Area B - Unit B-3E-NE
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**Figure 7**

Planned Subsurface MEC Removal

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# *Appendix A*

## *Army-BLM Joint Inspection Summary*

# Remediation Interim Inspection Summary

**Subject:** Joint Mid-Remediation Inspection by the Army and Bureau of Land Management (BLM) of BLM Area B Unit B-3E

**Area of Inspection:** East of Addington Road "Dorito" (see Figure 1)

**Date:** 9 March 2018

**Attendees:** Eric Morgan, BLM; Dave Eisen - Program Manager, United States Army Corps of Engineers (USACE); Natalie Gordon, Military Munitions Program Manager, Chenega Support Services, Fort Ord Base Realignment and Closure (BRAC)

**References:**

1. *Final Site-Specific Work Plan, Munitions and Explosives of Concern Remedial Action BLM Area B, Former Fort Ord, CA (Kemron, 2017)(AR#OE-0900B).*
2. *Final Record of Decision (*ROD*), Track 2, Bureau of Land Management Area B and Munitions Response Site 16, Former Fort Ord, California* (United States Department of the Army [Army], 2017)(AR#OE-0897).

**Background:** The Army conducted surface munitions and explosives of concern (MEC) removal and Digital Geophysical Mapping (DGM) of Unit B-3E in the portion east of Addington Road (see Figure 2). An inspection by the Army in conjunction with BLM, who owns and manages the land, of Army's completed MEC removal actions to date was conducted to discuss the extent of subsurface MEC removal required to support BLM's proposed trail construction and erosion restoration work. It is an Army responsibility to conduct remedial actions that prepare the property for BLM's safe management and use. The Army will provide MEC removal and/or construction support for BLM's ground disturbing activities as jointly agreed upon. The inspection examined existing and proposed trail alignments and areas of erosion concern that would require subsurface MEC removal action based on BLM's planned use. All trails will have a subsurface MEC removal (to-depth) at a minimum width of 12 feet as previously agreed upon by BLM and the Army.

**Objective:** A site visit and evaluation of the subsurface MEC removal along the proposed trail alignments and areas of erosion concern was conducted on 5 December 2017. This written summary documents that site visit and evaluation. The joint inspection provided an on-site assessment of the section of Unit B-3E east of Addington Road, an area also referred to as the "Dorito". This portion of Unit B-3E is bounded by Trail 23 and Trail 16 to the north, Trail 15 to the east and Addington Road to the south and west. The inspection included a visual assessment of the area along the unit perimeter and from Trail 16 within the unit. The visual

assessment involved a discussion of the actions necessary to attain MEC safety conditions suitable for use and maintenance of the existing trails and the construction of new trails at the proposed locations. The trails in Unit B-3E east of Addington Road requiring subsurface MEC removal are:

1. Trail 15
2. Trail 16
3. Trail 23
4. Trail 57

**Discussion:**

1. Trail 15: BLM requests subsurface MEC removal at a width of approximately 50 feet from the eastern edge of the unit just east of existing trail (former road trace) (see Figure 3). This level of subsurface MEC removal would support erosion repair and erosion control measures along the existing trail footprint. It would also allow for organic trail development.

2. Trail 23: Trail 23 forms the northern boundary for a portion of Unit B-3E (see Figure 3). The existing trail in Unit B-3E will require a 12-foot wide subsurface MEC removal to depth to support route development and maintenance.

3. Trail 16:

    a) BLM plans to abandon the section of Trail 16 between Trail 15 and Trail 23 (marked 'A' on Figure 4). Per BLM, it appears this trail segment may restore itself passively without active management and ripping, in which case no subsurface MEC removal would be required.

    b) Trail 16's proposed new starting point begins at Trail 23 (see Figure 4, section B). The trail will follow its existing alignment and requires a 12-foot wide subsurface removal to depth to support route development and maintenance.

    c) BLM is proposing to abandon the last approximately 100 feet of the existing Trail 16 where significant erosion has developed (see Figure 4, section C). This segment will require cross-ripping to remove severe gullying and aid in restoration. To support these erosion repairs, BLM requests a 40-foot wide subsurface removal to depth.

    d) Trail 16 is proposed to be realigned and will meet Addington Road south of the proposed erosion restoration area (see Figure 4, section D). This proposed alignment will require a 12-foot wide subsurface removal to support route development and maintenance.

4. Trail 57: The entirety of the existing Trail 57 will be abandoned (see Figure 1). BLM stated that, based on current conditions, the existing Trail 57 footprint may restore itself passively without active management, and would not require subsurface MEC removal. A new Trail 57 alignment proposed by BLM (Figure 1) will require a 12-foot wide subsurface removal to support route development and maintenance. The continuation of Trail 57 that extends west of Addington Road will be eliminated.

Subsurface MEC removal associated with Addington Road will be a part of the fuel break clearance work and will require a 45-foot wide subsurface removal along its existing path, to support future road development and maintenance.

Main issues identified during the site visit:

1. To allow for a more natural and interesting trail path, it may be desirable in some instances (e.g. Trail 15) to conduct subsurface MEC removal along a wider footprint than the 12 feet required for trail construction and maintenance.

2. Erosion restoration along existing or abandoned trail footprints may require subsurface MEC removal along a wider footprint than 12 feet to allow for cross-ripping.

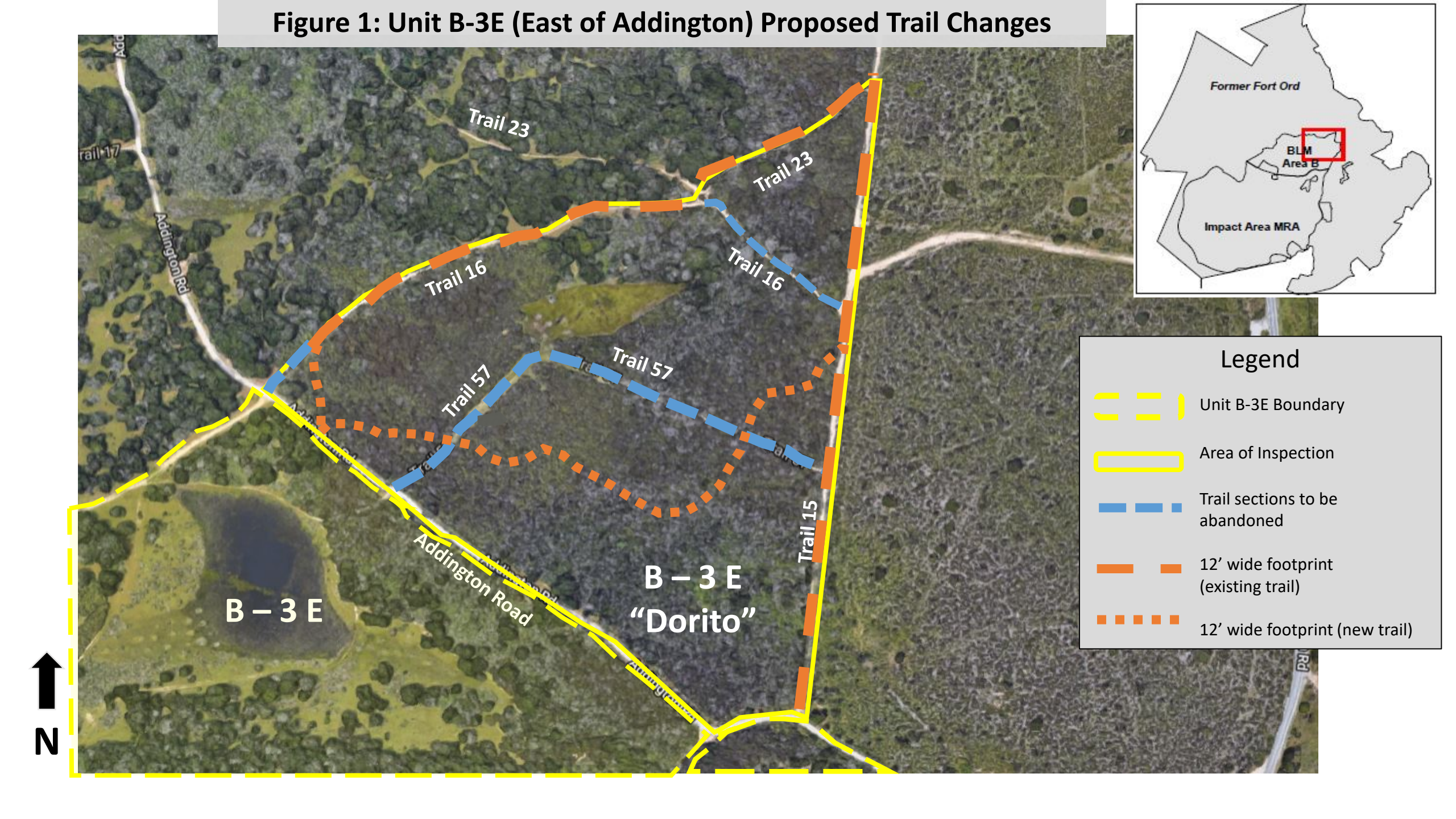
3. Allowing public access to a unit before trail realignments and construction are completed by BLM may result in unwanted trail alignments or new, unsanctioned trails created by repeated public use. This will be a concern until the vegetation grows back to a level suitable to impede access off-trail.

4. BLM may need additional time to construct trails depending on weather conditions and ground moisture levels. This could result in extended trail/area closure timelines, to be managed by BLM.

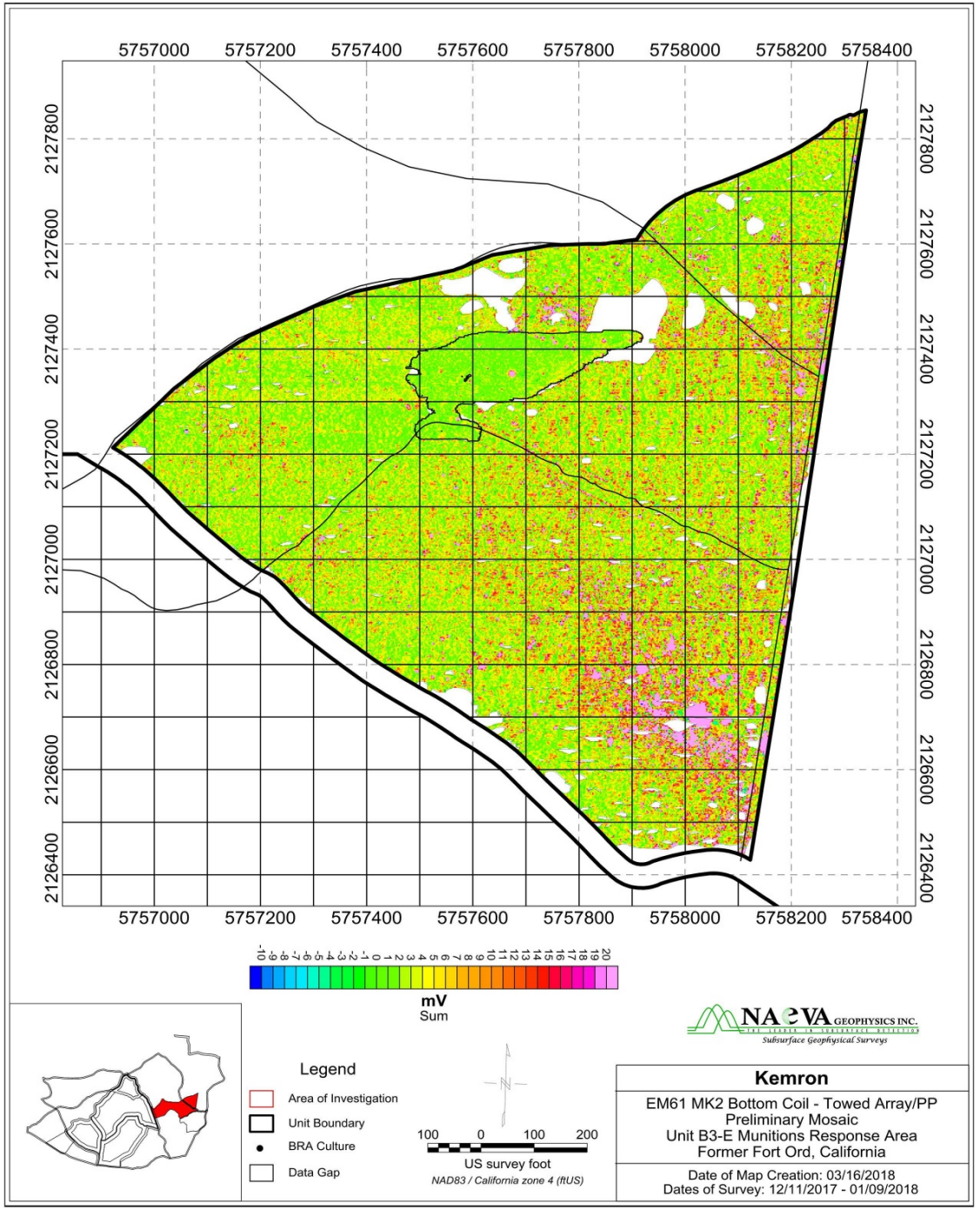
Additional discussion is forthcoming.

This joint site inspection summary is intended to document BLM requests for additional subsurface MEC removal to support their intended future use. The joint inspection summary is to be used to guide discussion only. All final decisions and the actual work conducted will be documented in an After Action Report. All figures are representative and for illustration purposes only.

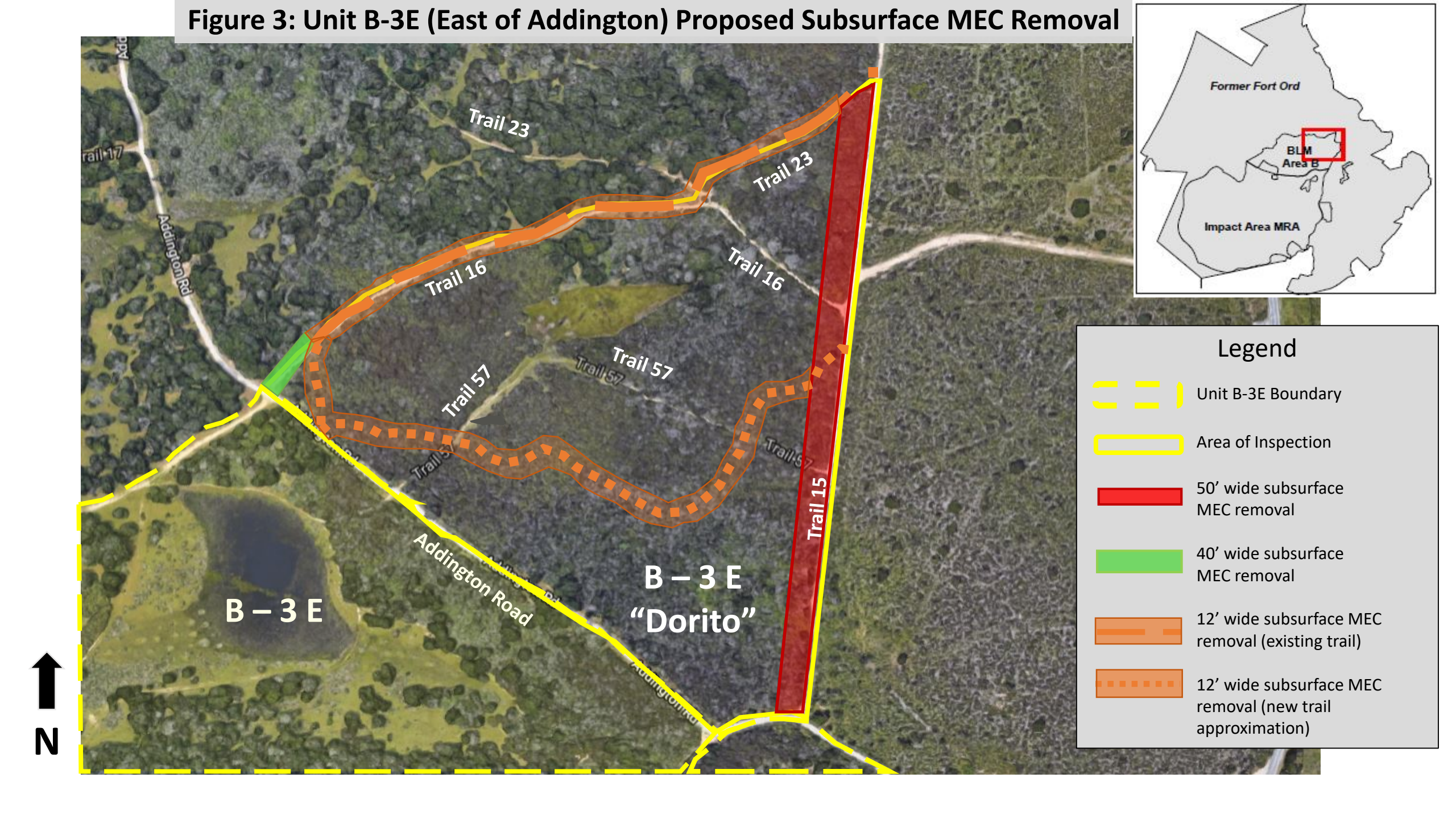
# Figure 1: Unit B-3E (East of Addington) Proposed Trail Changes



# Figure 2: Unit B-3E (East of Addington) DGM Density



# Figure 3: Unit B-3E (East of Addington) Proposed Subsurface MEC Removal



# Figure 4: Unit B-3E (East of Addington) Trail 16





## Legend

- Unit B-3E Boundary
- Area of Inspection
- Trail section to be abandoned
- 40' wide subsurface MEC removal
- 12' wide subsurface MEC removal (existing trail)
- 12' wide subsurface MEC removal (new trail)

# *Appendix B*

## *Surface MEC Removal QC Results*

| Unit ID | Grid ID | Acreage | QC Complete | QC Objectives Met |
|---|---|---|---|---|
| B-3E-NE | C4E3E7 | 0.04 | Yes | Yes |
| B-3E-NE | C4E3F7 | 0.10 | Yes | Yes |
| B-3E-NE | C4E3G7 | 0.13 | Yes | Yes |
| B-3E-NE | C4E3H7 | 0.17 | Yes | Yes |
| B-3E-NE | C4E3I7 | 0.21 | Yes | Yes |
| B-3E-NE | C4E3J6 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J7 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J8 | 0.01 | Yes | Yes |
| B-3E-NE | C4F3A6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A8 | 0.05 | Yes | Yes |
| B-3E-NE | C4F3B6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B8 | 0.08 | Yes | Yes |
| B-3E-NE | C4F3C6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C8 | 0.11 | Yes | Yes |
| B-3E-NE | C4F3D6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D8 | 0.15 | Yes | Yes |
| B-3E-NE | C4F3E6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E8 | 0.18 | Yes | Yes |
| B-3E-NE | C4F3F6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3F7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3F8 | 0.22 | Yes | Yes |
| B-3E-NE | C4F3F9 | 0.00 | Yes | Yes |
| B-3E-NE | C4F3G6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3G7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3G8 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3G9 | 0.02 | Yes | Yes |
| B-3E-NE | C4F3H6 | 0.03 | Yes | Yes |
| B-3E-NE | C4F3H7 | 0.12 | Yes | Yes |
| B-3E-NE | C4F3H8 | 0.22 | Yes | Yes |
| B-3E-NE | C4F3H9 | 0.06 | Yes | Yes |
| B-3E-NE | C4F3I8 | 0.03 | Yes | Yes |

| Unit ID | Grid ID | Acreage | QC Complete | QC Objectives Met |
|---|---|---|---|---|
| B-3E-NE | C4F3I9 | 0.04 | Yes | Yes |
| B-3E-NE | C4F2B0 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2B5 | 0.03 | Yes | Yes |
| B-3E-NE | C4F2B6 | 0.20 | Yes | Yes |
| B-3E-NE | C4F2B7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2B8 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2B9 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2C0 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2C5 | 0.09 | Yes | Yes |
| B-3E-NE | C4F2C6 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2C7 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2C8 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2C9 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2D0 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2D6 | 0.08 | Yes | Yes |
| B-3E-NE | C4F2D7 | 0.22 | Yes | Yes |
| B-3E-NE | C4F2D8 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2D9 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2E0 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2E7 | 0.03 | Yes | Yes |
| B-3E-NE | C4F2E8 | 0.13 | Yes | Yes |
| B-3E-NE | C4F2E9 | 0.22 | Yes | Yes |
| B-3E-NE | C4F2F0 | 0.06 | Yes | Yes |
| B-3E-NE | C4F2F9 | 0.01 | Yes | Yes |
| B-3E-NE | C4E2H0 | 0.11 | Yes | Yes |
| B-3E-NE | C4E2I0 | 0.22 | Yes | Yes |
| B-3E-NE | C4E2I8 | 0.18 | Yes | Yes |
| B-3E-NE | C4E2I9 | 0.12 | Yes | Yes |
| B-3E-NE | C4E2J0 | 0.23 | Yes | Yes |
| B-3E-NE | C4E2J7 | 0.15 | Yes | Yes |
| B-3E-NE | C4E2J8 | 0.14 | Yes | Yes |
| B-3E-NE | C4E2J9 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3E4 | 0.11 | Yes | Yes |
| B-3E-NE | C4E3E5 | 0.16 | Yes | Yes |
| B-3E-NE | C4E3E6 | 0.13 | Yes | Yes |
| B-3E-NE | C4E3F3 | 0.11 | Yes | Yes |
| B-3E-NE | C4E3F4 | 0.22 | Yes | Yes |

| Unit ID | Grid ID | Acreage | QC Complete | QC Objectives Met |
|---|---|---|---|---|
| B-3E-NE | C4E3F5 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3F6 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3G1 | 0.17 | Yes | Yes |
| B-3E-NE | C4E3G2 | 0.12 | Yes | Yes |
| B-3E-NE | C4E3G3 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3G4 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3G5 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3G6 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3H1 | 0.17 | Yes | Yes |
| B-3E-NE | C4E3H2 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3H3 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3H4 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3H5 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3H6 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I1 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I2 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I3 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I4 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I5 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3I6 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J1 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J2 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J3 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J4 | 0.23 | Yes | Yes |
| B-3E-NE | C4E3J5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2A0 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2A6 | 0.12 | Yes | Yes |
| B-3E-NE | C4F2A7 | 0.18 | Yes | Yes |
| B-3E-NE | C4F2A8 | 0.23 | Yes | Yes |
| B-3E-NE | C4F2A9 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A1 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A2 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A3 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3A5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B1 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B2 | 0.23 | Yes | Yes |

| Unit ID | Grid ID | Acreage | QC Complete | QC Objectives Met |
|---|---|---|---|---|
| B-3E-NE | C4F3B3 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3B5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C1 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C2 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C3 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3C5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D1 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D2 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D3 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3D5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E1 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E2 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E3 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3E5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3F1 | 0.11 | Yes | Yes |
| B-3E-NE | C4F3F2 | 0.18 | Yes | Yes |
| B-3E-NE | C4F3F3 | 0.22 | Yes | Yes |
| B-3E-NE | C4F3F4 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3F5 | 0.23 | Yes | Yes |
| B-3E-NE | C4F3G4 | 0.00 | Yes | Yes |
| B-3E-NE | C4F3G5 | 0.13 | Yes | Yes |

# *Appendix C*

## *Surface MEC Removal QA Results*

| Date Analog Surface Op QA Complete | Acreage | Survey Type | Unit ID | Grid ID | Analog Surface Op QA Team | Complete |
|---|---|---|---|---|---|---|
| 10/18/2017 | 0.04 | Analog | B-3E-NE | C4E3E7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.10 | Analog | B-3E-NE | C4E3F7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.13 | Analog | B-3E-NE | C4E3G7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.17 | Analog | B-3E-NE | C4E3H7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.21 | Analog | B-3E-NE | C4E3I7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4E3J6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4E3J7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.01 | Analog | B-3E-NE | C4E3J8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3A6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3A7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.05 | Analog | B-3E-NE | C4F3A8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3B6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3B7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.08 | Analog | B-3E-NE | C4F3B8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3C6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3C7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.11 | Analog | B-3E-NE | C4F3C8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3D6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3D7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.15 | Analog | B-3E-NE | C4F3D8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3E6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3E7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.18 | Analog | B-3E-NE | C4F3E8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3F6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3F7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.22 | Analog | B-3E-NE | C4F3F8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.00 | Analog | B-3E-NE | C4F3F9 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3G6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3G7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.23 | Analog | B-3E-NE | C4F3G8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.02 | Analog | B-3E-NE | C4F3G9 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.03 | Analog | B-3E-NE | C4F3H6 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.12 | Analog | B-3E-NE | C4F3H7 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.22 | Analog | B-3E-NE | C4F3H8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.06 | Analog | B-3E-NE | C4F3H9 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.03 | Analog | B-3E-NE | C4F3I8 | UXO_QA_1 | Yes |
| 10/18/2017 | 0.04 | Analog | B-3E-NE | C4F3I9 | UXO_QA_1 | Yes |

| Date Analog Surface Op QA Complete | Acreage | Survey Type | Unit ID | Grid ID | Analog Surface Op QA Team | Complete |
|---|---|---|---|---|---|---|
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2B0 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.03 | Analog | B-3E-NE | C4F2B5 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.20 | Analog | B-3E-NE | C4F2B6 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2B7 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2B8 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2B9 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2C0 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.09 | Analog | B-3E-NE | C4F2C5 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2C6 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2C7 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2C8 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2C9 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2D0 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.08 | Analog | B-3E-NE | C4F2D6 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.22 | Analog | B-3E-NE | C4F2D7 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2D8 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2D9 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.23 | Analog | B-3E-NE | C4F2E0 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.03 | Analog | B-3E-NE | C4F2E7 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.13 | Analog | B-3E-NE | C4F2E8 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.22 | Analog | B-3E-NE | C4F2E9 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.06 | Analog | B-3E-NE | C4F2F0 | UXO_QA_1 | Yes |
| 10/30/2017 | 0.01 | Analog | B-3E-NE | C4F2F9 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.11 | Analog | B-3E-NE | C4E2H0 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.22 | Analog | B-3E-NE | C4E2I0 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.18 | Analog | B-3E-NE | C4E2I8 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.12 | Analog | B-3E-NE | C4E2I9 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E2J0 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.15 | Analog | B-3E-NE | C4E2J7 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.14 | Analog | B-3E-NE | C4E2J8 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E2J9 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.11 | Analog | B-3E-NE | C4E3E4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.16 | Analog | B-3E-NE | C4E3E5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.13 | Analog | B-3E-NE | C4E3E6 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.11 | Analog | B-3E-NE | C4E3F3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.22 | Analog | B-3E-NE | C4E3F4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3F5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3F6 | UXO_QA_1 | Yes |

| Date Analog Surface Op QA Complete | Acreage | Survey Type | Unit ID | Grid ID | Analog Surface Op QA Team | Complete |
|---|---|---|---|---|---|---|
| 11/2/2017 | 0.17 | Analog | B-3E-NE | C4E3G1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.12 | Analog | B-3E-NE | C4E3G2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3G3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3G4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3G5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3G6 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.17 | Analog | B-3E-NE | C4E3H1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3H2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3H3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3H4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3H5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3H6 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3I6 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3J1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3J2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3J3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3J4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4E3J5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F2A0 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.12 | Analog | B-3E-NE | C4F2A6 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.18 | Analog | B-3E-NE | C4F2A7 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F2A8 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F2A9 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3A1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3A2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3A3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3A4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3A5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3B1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3B2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3B3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3B4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3B5 | UXO_QA_1 | Yes |

| Date Analog Surface Op QA Complete | Acreage | Survey Type | Unit ID | Grid ID | Analog Surface Op QA Team | Complete |
|---|---|---|---|---|---|---|
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3C1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3C2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3C3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3C4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3C5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3D1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3D2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3D3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3D4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3D5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3E1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3E2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3E3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3E4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3E5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.11 | Analog | B-3E-NE | C4F3F1 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.18 | Analog | B-3E-NE | C4F3F2 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.22 | Analog | B-3E-NE | C4F3F3 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3F4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.23 | Analog | B-3E-NE | C4F3F5 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.00 | Analog | B-3E-NE | C4F3G4 | UXO_QA_1 | Yes |
| 11/2/2017 | 0.13 | Analog | B-3E-NE | C4F3G5 | UXO_QA_1 | Yes |

# *Appendix D*

## *DGM QC Results*

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | C4E2H01 | C4E2H0 | 0.11 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H1 | 0.17 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H2 | 0.23 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H3 | 0.23 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H4 | 0.23 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H5 | 0.23 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H6 | 0.23 | A | 12/19/2017 | 1/5/2018 | Y | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2H01 | C4E3H7 | 0.17 | A | 12/19/2017 | 1/5/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E2I0 | 0.22 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E2I8 | 0.18 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E2I9 | 0.12 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I1 | 0.23 | A | 12/19/2017 | 1/4/2018 | Y | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I2 | 0.23 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I3 | 0.23 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I4 | 0.23 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I5 | 0.23 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I6 | 0.23 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2I91 | C4E3I7 | 0.21 | A | 12/19/2017 | 1/4/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E2J0 | 0.23 | A | 12/18/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E2J7 | 0.15 | A | 12/19/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E2J8 | 0.14 | A | 12/20/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E2J9 | 0.23 | A | 12/21/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J1 | 0.23 | A | 12/22/2017 | 1/2/2018 | Y | 2/22/2018 | 3 | AZK |
| B-3E-NE | C4E2J81 | C4E3J2 | 0.23 | A | 12/23/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J3 | 0.23 | A | 12/24/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J4 | 0.23 | A | 12/25/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J5 | 0.23 | A | 12/26/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J6 | 0.23 | A | 12/27/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J7 | 0.23 | A | 12/28/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E2J81 | C4E3J8 | 0.01 | A | 12/29/2017 | 1/2/2018 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3E4 | 0.11 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | C4E3E41 | C4E3E5 | 0.16 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3E6 | 0.13 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3E7 | 0.04 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3F3 | 0.11 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3F4 | 0.22 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3F5 | 0.23 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3F6 | 0.23 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3F7 | 0.10 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3G2 | 0.12 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3G3 | 0.23 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3G4 | 0.23 | A | 12/21/2017 | 1/9/2018 | Y | 3/3/2018 | 1 | AZK |
| B-3E-NE | C4E3E41 | C4E3G5 | 0.23 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3G6 | 0.23 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4E3E41 | C4E3G7 | 0.13 | A | 12/21/2017 | 1/9/2018 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F2A0 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F2A6 | 0.12 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F2A7 | 0.18 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F2A8 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F2A9 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A1 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A2 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A3 | 0.23 | A | 12/14/2017 | 12/20/2017 | Y | 3/3/2018 | 2 | AZK |
| B-3E-NE | C4F2A71 | C4F3A4 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A5 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A6 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A7 | 0.23 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2A71 | C4F3A8 | 0.05 | A | 12/14/2017 | 12/20/2017 | N | 3/3/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F2B0 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F2B5 | 0.03 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F2B6 | 0.20 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F2B7 | 0.23 | A | 12/13/2017 | 1/16/2018 | Y | 3/4/2018 | 0 | AZK |

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | C4F2B61 | C4F2B8 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F2B9 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B1 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B2 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B3 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B4 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B5 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B6 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B7 | 0.23 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2B61 | C4F3B8 | 0.08 | A | 12/13/2017 | 1/16/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C0 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C5 | 0.09 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C6 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C7 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C8 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C9 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C1 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C2 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C3 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C4 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C5 | 0.23 | A | 1/2/2018 | 1/8/2018 | Y | 3/2/2018 | 2 | AZK |
| B-3E-NE | C4F2C61 | C4F3C6 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C7 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C8 | 0.11 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C0 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C5 | 0.09 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C6 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C7 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C8 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F2C9 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C1 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | C4F2C61 | C4F3C2 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C3 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C4 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C5 | 0.23 | A | 1/2/2018 | 1/8/2018 | Y | 3/2/2018 | 2 | AZK |
| B-3E-NE | C4F2C61 | C4F3C6 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C7 | 0.23 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2C61 | C4F3C8 | 0.11 | A | 1/2/2018 | 1/8/2018 | N | 3/2/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F2D0 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F2D6 | 0.08 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F2D7 | 0.22 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F2D8 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F2D9 | 0.23 | A | 1/4/2018 | 1/30/2018 | Y | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D1 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D2 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D3 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D4 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D5 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D6 | 0.23 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2D61 | C4F3D7 | 0.23 | A | 1/4/2018 | 1/30/2018 | Y | 3/4/2018 | 2 | AZK |
| B-3E-NE | C4F2D61 | C4F3D8 | 0.15 | A | 1/4/2018 | 1/30/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2E0 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2E7 | 0.03 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2E8 | 0.13 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2E9 | 0.22 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2F0 | 0.06 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F2F9 | 0.01 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E1 | 0.23 | A | 1/9/2018 | 1/19/2018 | Y | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E2 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E3 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E4 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E5 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | C4F2E71 | C4F3E6 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E7 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3E8 | 0.18 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F1 | 0.11 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F2 | 0.18 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F3 | 0.22 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F4 | 0.23 | A | 1/9/2018 | 1/19/2018 | Y | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F5 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F6 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F7 | 0.23 | A | 1/9/2018 | 1/19/2018 | Y | 3/4/2018 | 1 | AZK |
| B-3E-NE | C4F2E71 | C4F3F8 | 0.22 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3F9 | 0.00 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G4 | 0.00 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G5 | 0.13 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G6 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G7 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G8 | 0.23 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3G9 | 0.02 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3H6 | 0.03 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3H7 | 0.12 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3H8 | 0.22 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3H9 | 0.06 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3I8 | 0.03 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | C4F2E71 | C4F3I9 | 0.04 | A | 1/9/2018 | 1/19/2018 | N | 3/4/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F2D0 | 0.02 | A | 12/12/2017 | 12/19/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3C1 | 0.04 | A | 12/13/2017 | 12/20/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3C2 | 0.00 | A | 12/14/2017 | 12/21/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3D1 | 0.22 | A | 12/15/2017 | 12/22/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3D2 | 0.22 | A | 12/16/2017 | 12/23/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3D3 | 0.14 | A | 12/17/2017 | 12/24/2017 | Y | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3D4 | 0.02 | A | 12/18/2017 | 12/25/2017 | N | 2/22/2018 | 0 | AZK |

| Unit | Dataset ID | GridID | Size Acre | Category | DGM Date | Geo Data Processed & Submitted | Selected for QC Reprocessing | Date Geo Data QC Complete | Number of QC Targets | QC Complete Initials |
|---|---|---|---|---|---|---|---|---|---|---|
| B-3E-NE | Pond731P | C4F3E1 | 0.02 | A | 12/19/2017 | 12/26/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3E2 | 0.07 | A | 12/20/2017 | 12/27/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3E3 | 0.07 | A | 12/21/2017 | 12/28/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3E4 | 0.06 | A | 12/22/2017 | 12/29/2017 | N | 2/22/2018 | 0 | AZK |
| B-3E-NE | Pond731P | C4F3E5 | 0.01 | A | 12/23/2017 | 12/30/2017 | N | 2/22/2018 | 0 | AZK |

# *Appendix E*

## *USACE DGM QA Approval and Discussion*

**FORMER FORT ORD, CALIFORNIA**
**UNIT B-3E-NE**
**QUALITY ASSURANCE REPORT:**
**DIGITAL GEOPHYSICAL OPERATIONS**

PREPARED BY
GEOLOGY SECTION
SACRAMENTO DISTRICT
U.S. ARMY CORPS OF ENGINEERS

PREPARED FOR
FORT ORD BASE REALIGNMENT AND CLOSURE (BRAC) OFFICE

APRIL 2018

# 1.0 INTRODUCTION

This report covers the Quality Assurance (QA) processes conducted by the U.S. Army Corps of Engineers (USACE) with respect to the collection, processing, and evaluation of digital geophysical data collected by KEMRON Environmental Services, Inc (KEMRON). The field work was performed in Unit B-3E-NE. Work was performed under WERS contract No. W912DY-10-D-0027, Site-Specific Work Plan, BLM Area B. The field protocols, database management, and QA reviews were based on a combination of methods previously used in other units and described in the UFP-QAPP Volume II Appendix A, along with additional procedures necessary for ensuring compliance with the WERS MMRP contract and the standard operating procedures performed by KEMRON's subcontractors GILBANE and NAEVA. USACE QA verified that KEMRON had an adequate Quality Control (QC) program in place and that data collected in Unit B-3E-NE were in accordance with project Data Quality Objectives (DQOs) and Measurement Quality Objectives (MQOs), as established in the UFP-QAPP (KEMRON, 2016). Unit B-3E-NE included areas recommended for subsurface removal and were collected in their entirety to meet Category A data.

## 1.1 Site details

Unit B-3E-NE is on the eastern edge of BLM Area B, as depicted in Figure 1. The area is bounded by a fuel break on the west and BLM trails on the remaining sides. BLM trails 57 and 23 run through the center and northern areas of Unit B-3E-NE, respectively. Vernal pond 73 is located in the north-central area of the unit. Unit B-3E-NE encompasses a total of approximately 25 acres. Due to the presence of large trees and steep terrain in Unit B-3E-NE, approximately 1.79 acres was inaccessible to DGM operations.

Clean-up operations pertinent to DGM activities were initiated with a vegetation clearance followed by an instrument aided surface removal. During vegetation clearance and surface clearance, a total of two MEC items were removed.

According to the Installation-Wide Multispecies Habitat Management Plan (HMP) for Fort Ord (USACE 1997), the site will be used as an undeveloped habitat reserve. BLM Area B is mostly covered by maritime chaparral and grassland habitats. The terrain in the Impact Area is dominated by rolling hills with elevations ranging from 720-900 ft. above sea level (ASL). These hills are composed of sand associated with Pleistocene aged sand dunes that may be as thick as 250 ft.

# 2.0 QA ACTIVITES

## 2.1 Data Collection Methods

Production geophysical data were collected using Geonics EM-61MKII electromagnetic sensors in a multi-coil configuration (towed array) throughout most of the site. The EM-61MKII is a time-domain electromagnetic sensor that generates an electromagnetic pulse, inducing eddy currents within the subsurface. During the off period of the EM pulse, the

eddy current decay produces secondary electromagnetic fields within both ferrous and non-ferrous metallic objects. These secondary electromagnetic fields are received and recorded over four averaged time gates per data collection interval (10Hz).

Data were collected either as individual grids or in grid blocks of variable size consisting of multiple grids. All data collected met Category A line spacing requirements, with 95% not to exceed a lane spacing of 2 ft. and 100% not to exceed a lane spacing of 3 ft. As stated in the MEC Procedures Supplement, the purpose and objective for the Category A DGM surveys is to obtain high quality DGM data in order to pick targets for subsurface removal. Unit B-3E-NE DGM was collected using the Category A data protocols due to the potential for a subsurface removal in support of re-routing BLM trails in the unit.

Obstacles and issues with terrain precluded 100% coverage and approximately 1.6 acres of Unit B-3E-NE were either inaccessible due to the presence of large trees or determined by UXO Safety to be inaccessible to DGM survey due to steep terrain. All data gaps were appropriately documented in the obstacle files submitted with DGM packages. Figure 2 of this QA report depicts the full DGM dataset for Unit B-3E-NE.

BLM trails were identified for subsurface removal in Unit B-3E-NE. Subsurface removal has not been conducted in Unit B-3E-NE and therefore no USACE QA DGM data were collected. In the future, the USACE will collect a minimum of 3-5% QA DGM data over the intrusive investigation areas post-excavation to confirm no anomalies remain.

## 2.2 Field Oversight

Field oversight was performed intermittently throughout the project by both the USACE Project Geophysicist and the OESS. Appropriate field procedures were reviewed and found to be in compliance. Under the WERS Contract No. W912DY-10-D-0027, NAEVA is subcontracted to collect the geophysical data.

## 2.3 Geophysical System Verification

Under the WERS contract, USACE and KEMRON fully incorporated the physics based Geophysical System Verification (GSV) approach as described in the July 2009 ESTCP report (ESTCP, 2009) and supported by EM 200-1-15. GSV includes two methods for providing QA/QC: blind seeding and the instrument verification strip (IVS). IVS data results were recorded on daily QC submittals attached as PDF files to the grid blocks. Data were reviewed by the QA Geophysicist to ensure all MQOs were achieved. The QA data review process is described in section 2.4 and a summary of MQOs for towed array DGM operations is given in Table 1. Examples of daily IVS data results for Unit B-3E-NE are shown in Figures 3-4. Further details regarding MQOs are provided in the UFP-QAPP (KEMRON, 2016).

Production data required the GSV blind seeds placed throughout Unit B-3E-NE, as documented in the UFP-QAPP. By placing blind seeds at an average rate of one per day, the instrument functionality can be tested on a daily basis. Any failures to detect a blind seed

could be indicative of an issue with data collection. All blind seeds were small industry standard objects buried at six inches below ground surface. The blind seeds were placed by the QC Geophysicist. All blind QC seeds were detected and both the responses and positioning were within the requirements of the MQOs and SOPs. Table 2 summarizes the QC seed results for Unit B-3E-NE.

## 2.4 Digital Data Review

A review of digital geophysics data by the USACE was performed to monitor the effectiveness of data processing and consistency of data delivery. Issues that were reviewed in these data included:

1) Missing survey lines within a grid (interline gaps)
2) Point-to-point data gaps along survey lines
3) Bowing out of survey lines beyond 50% of survey line spacing, unless otherwise collected
4) Unreasonable data "spikes"
5) Data incongruity across survey grids (Data levels in one grid are not reasonably compatible with data levels in neighboring grids)
6) Inadequate data density along survey traverse
7) Lack of accurate, precise locations; survey line orientation
8) Inadequate/incomplete site survey coverage
9) Missing, incomplete, or noncompliant instrument standardization checks
10) Completeness of file header information and supporting documentation
11) Consistent IVS and GSV results supporting the data quality objectives

To accomplish this, all raw and processed data files were checked by the USACE to ensure that KEMRON followed an appropriate and informative naming convention reflecting the grids surveyed as outlined in the EM 200-1-15. The USACE checked that KEMRON managed the field and processed data in a professional manner, including organization, daily maintenance, and complete documentation. This focused on a review of header files on the pre-processed data (data that has been merged into a single file and synchronized with the GPS data) and processed data to verify that dates were consistent, systems and system sampling parameters were identified, project name and contractor was listed, and all column headers were included and defined. KEMRON also delivered supporting summary sheets that further documented field parameters and processing. All of the summary sheets were reviewed for completeness, verification of calibration data, and consistency to the electronic data file headers.

In order to make the above process more efficient, a grid tracking spreadsheet located in the Unit B-3E-NE folder on the FTP site was updated weekly and allowed for the QC Geophysicist and USACE QA Geophysicist to document their verification of each deliverable. Minor issues such as corrupt or incomplete zip files were addressed within the table, major issues were addressed as corrective action requests. The final excel file will be maintained within the Final Data Submittal QC folder on the Fort Ord server.

The procedure for reprocessing and projecting the pseudo-color maps of the DGM Category A data included starting with a 100% review of the data in Geosoft Oasis Montaj to include re-leveling and re-gridding. These digital data were imported into Geosoft for the generation of pseudo-color maps that were then exported as a georeferenced geotif.

Overall, the general QA digital data review consisted at a minimum of:

1) Creating a processed database
2) Importing XYZ data
3) Calculation of sum channel
4) Generating a grid (0.25 ft. cell size and blanking distance of 2 ft.) of sum channel
5) Plotting the sum channel
6) Plotting a symbol cover for the track lines (view coverage)
7) Exporting the plots to geotifs
8) Importing the geotifs into a GIS

## 2.5 Corrective Action Request

No corrective action requests were issued for data collected in Unit B-3E-NE, however one topic is worth discussion. Although data were collected to meet Category A criteria, QC seeds were placed at a rate of one seed per 4 acres, in accordance with the Category B seeding rate defined in the UFP-QAPP (KEMRON, 2016). At the time of work, BLM trails were planned to be re-routed, and it was unknown which areas will be upgraded to Category A and intrusively investigated. This situation is identified in WS #22 of the UFP-QAPP (see Note below Table 1) and does not constitute a QC failure

However, given the area identified for subsurface removal is likely to be relatively small (0-5 acres), the number of blind QC seeds placed in Unit B-3E-NE is likely sufficient to meet the Category A seeding requirements (1 blind seed per dig team per day). This will be evaluated in a future QA report documenting the QA DGM survey over areas selected for intrusive investigation.

# 3.0 CONCLUSIONS

QA activities by the Government verified KEMRON had an adequate QC program in place and that data collected within Unit B-3E-NE are sufficient and in accordance with the project DQOs and MQOs. Furthermore, all data in Unit B-3E-NE meet Category A standards.

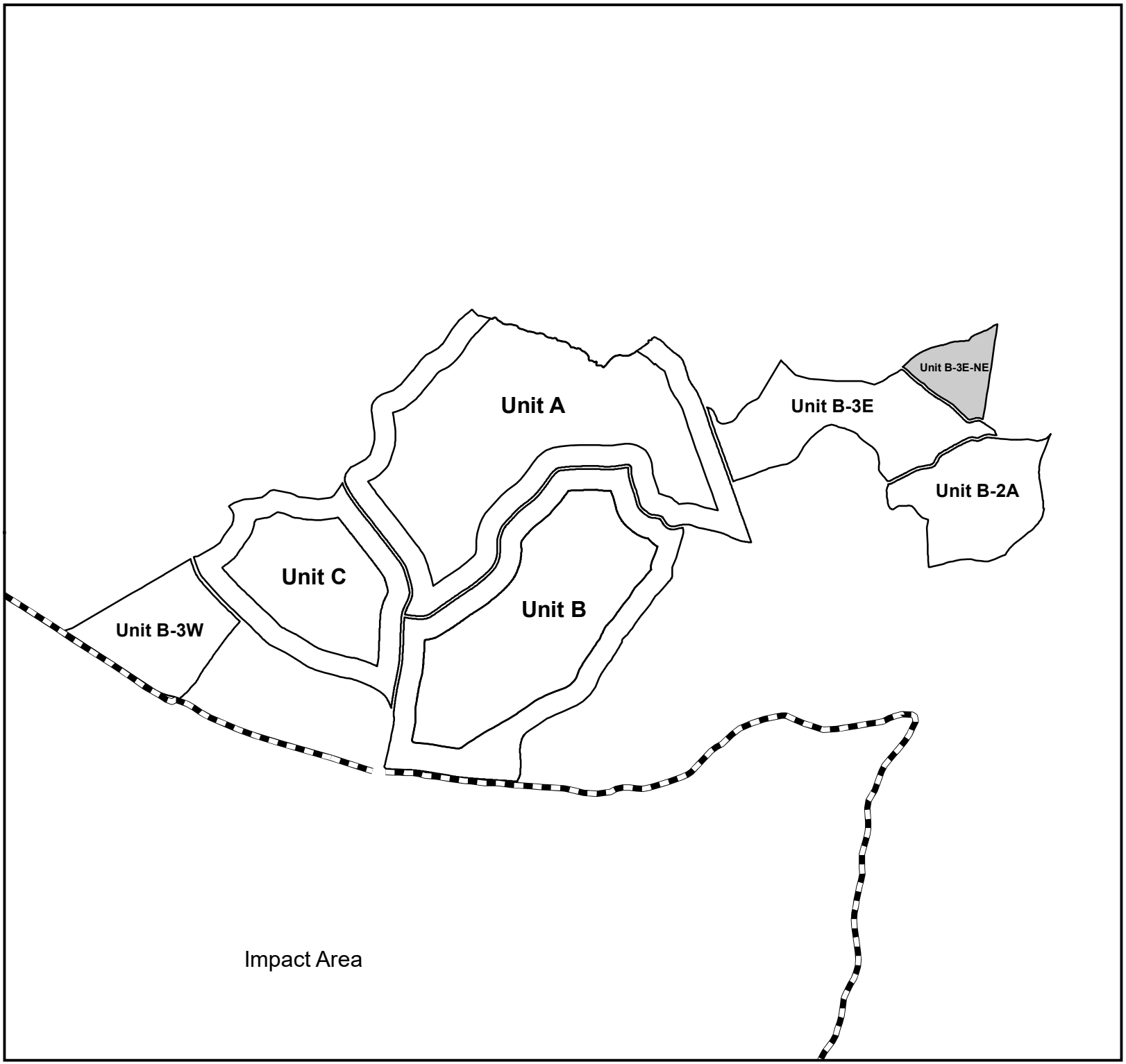
## 4.0 REFERENCES

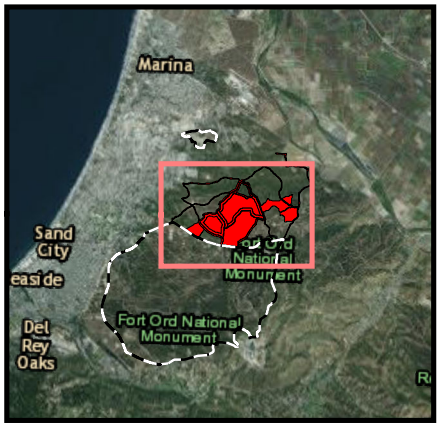
ESTCP, 2009. *Geophysical System Verification (GSV): A Physics-Based Alternative to Geophysical Prove-Outs for Munitions Response.* July.

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

USACE, 1997. *Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California (HMP).* April. With technical assistance from Jones and Stokes, Sacramento, California. (BW-1787)

## 5.0 FIGURES




## Legend

Unit B-3E-NE

Impact Area boundary

N

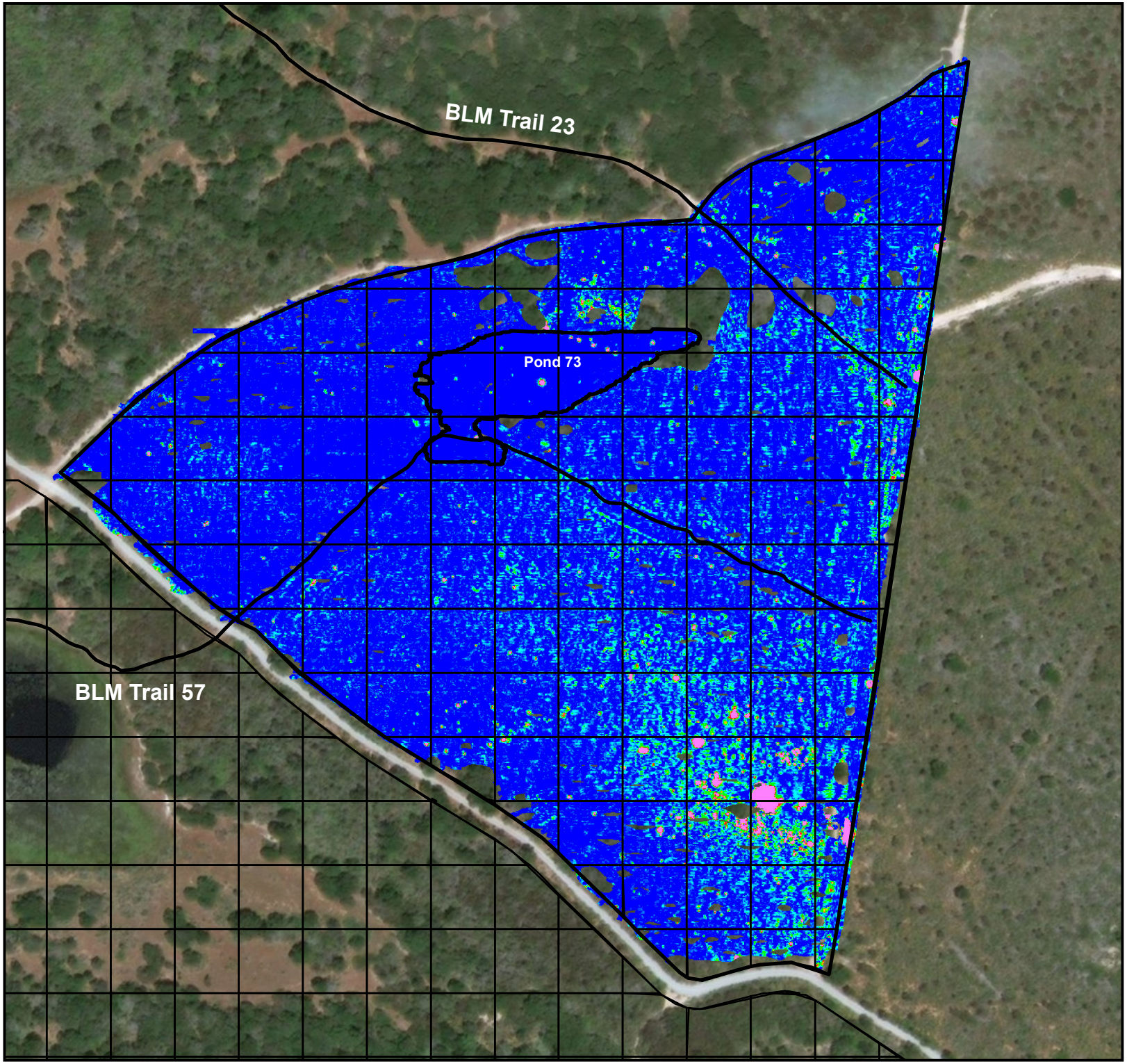
Feet

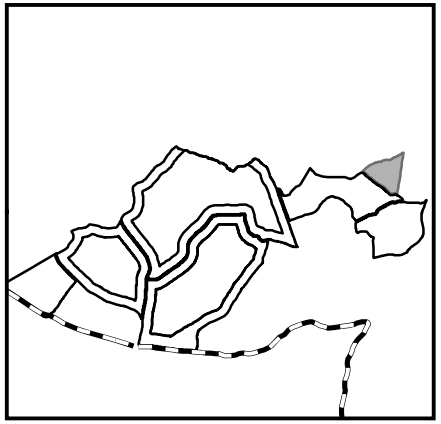
0 2,000

U.S. Army Corps of Engineers
Sacramento District

# Figure 1

BLM Area B Remedial Work Areas
Former Fort Ord, CA



95.0
90.0
85.0
80.0
75.0
70.0
65.0
60.0
55.0
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
mV
Sum Channel

N

0 100 200 300 400 Feet

U.S. Army Corps of Engineers
Sacramento District

**Figure 2**

Unit B-3E-NE DGM data
Former Fort Ord, CA

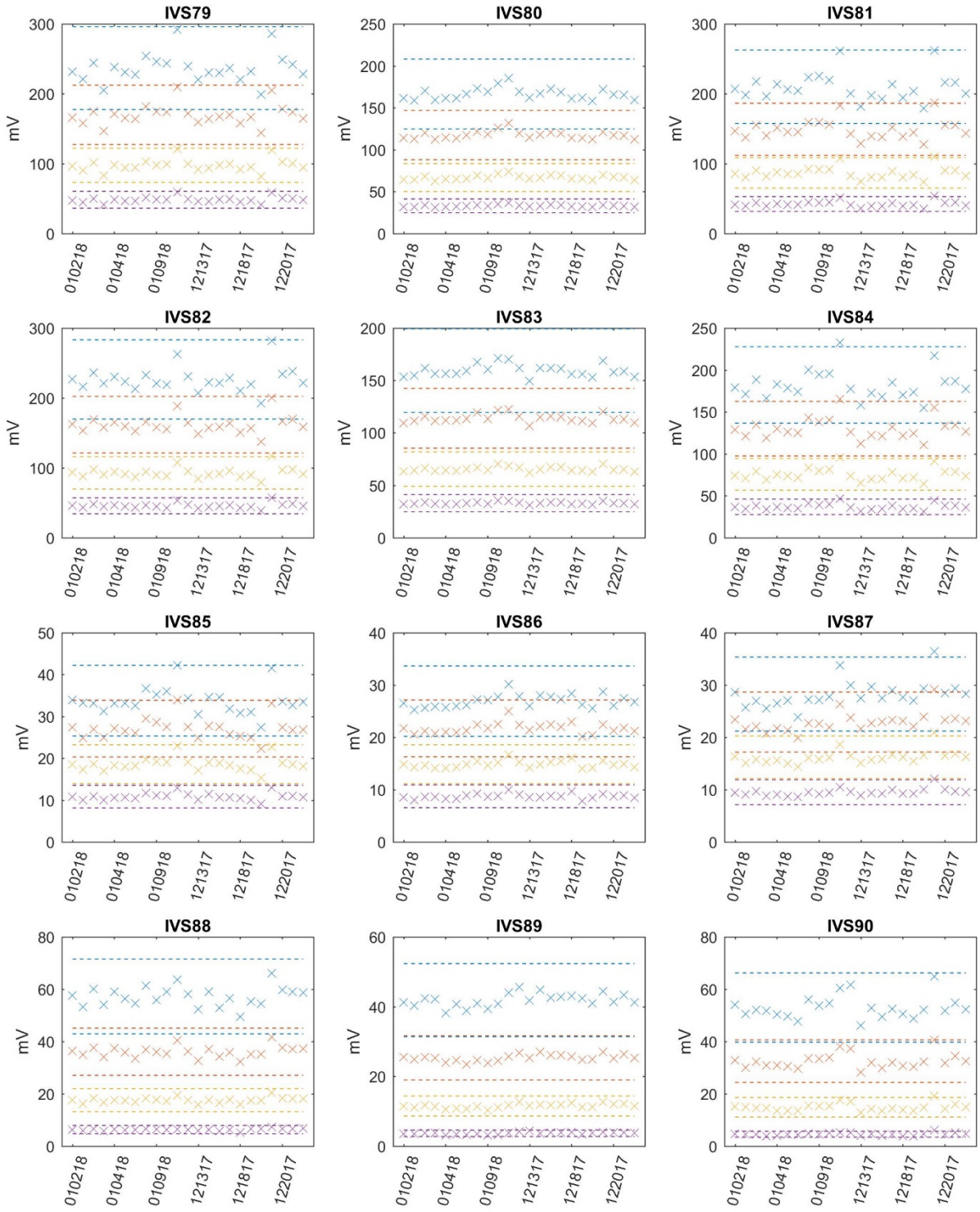



*Figure 3. DGM response of IVS items for Unit B-3E-NE for each survey day. X symbols represent peak anomaly response for Channel 1 (blue), Channel 2 (red), Channel 3 (yellow), and Channel 4 (purple) for each IVS item. Dashed lines represent the allowable variability (+/- 25% of predicted response) established in WS #22.*

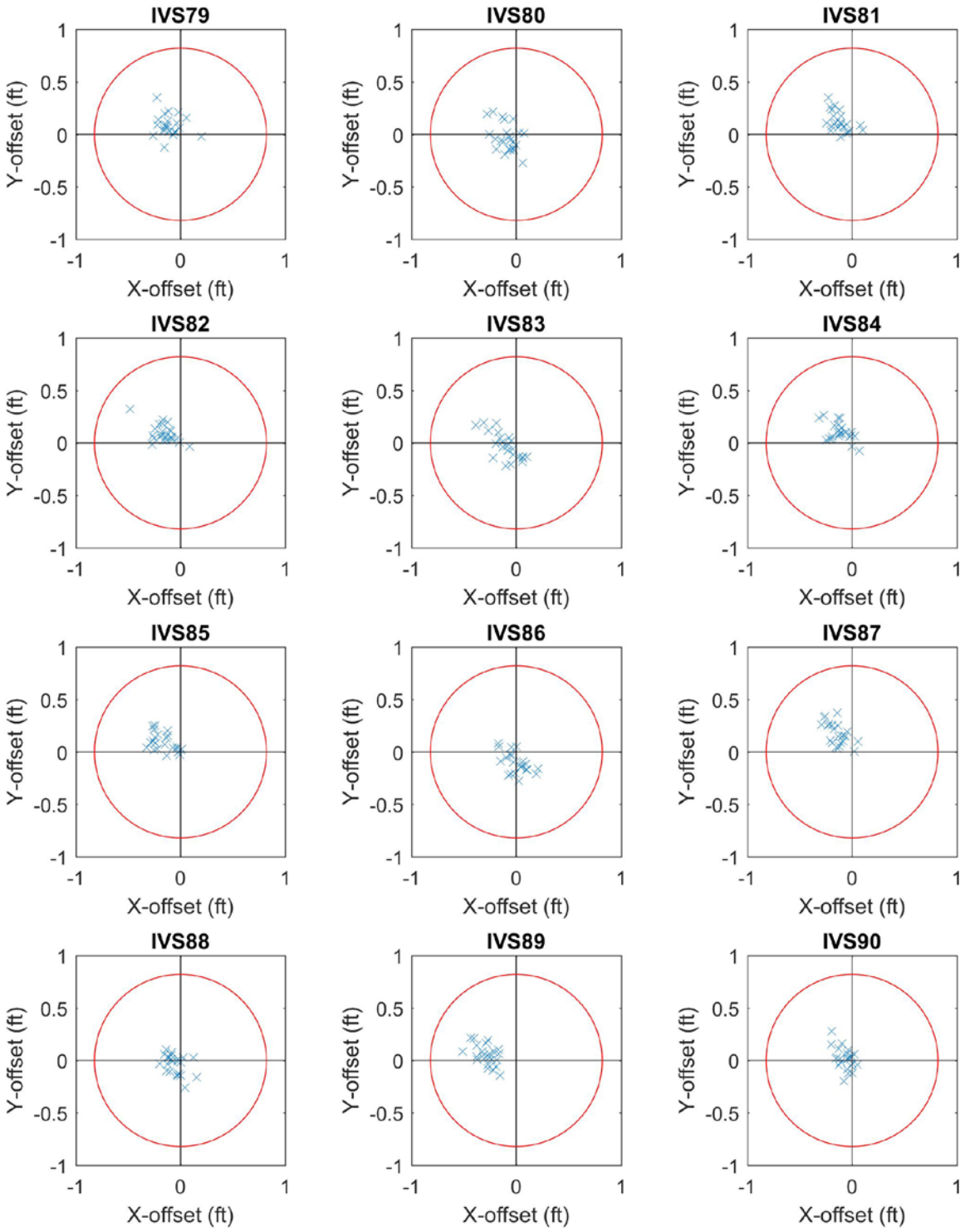



*Figure 4. Daily IVS positioning results for Unit B-3E-NE. Blue X's show the offset between picked DGM anomaly and the IVS ground truth. Red circle shows maximum acceptable offset (0.82 ft.) established in WS #22.*

# 6.0 TABLES

| Data Type | Data Quality Indicator (DQI) | QC Sample and/or Activity to Assess Measurement Performance | Measurement Quality Objective (MQO) | Frequency | Consequence of Failure (a) |
|---|---|---|---|---|---|
| Cable Shake Test | Sensitivity | Instrument Response Tests at the IVS | Cable shake test: 98% of response values will not excseed +/- 2 mV when system cables are moved (for all EM61MK2 channels) | Once Daily (AM) | Do not proceed with DGM field activities until failure is resolved and cable shake test has passed. |
| Personnel Test | Sensitivity | Instrument Response Tests at the IVS | Personnel test (PP): 98% of response values (due to proximity of data collection personnel) will not exceed +/- 2 mV (for all EM61MK2 channels). | Once Daily (AM) | Do not proceed with DGM field activities until failure is resolved and personnel test has passed. |
| Tow Vehicle Test | Sensitivity | Instrument Response Tests at the IVS | Tow vehicle test (towed array): 98% of response values (due to elevated two vehicle RPM) will not exceed +/- 2 mV (for all EM61MK2 channels). | Once Daily (AM) | Do not proceed with DGM field activities until failure is resolved and tow vehicle test has passed. |
| Static repeatability (instrument functionality) (b) | Accuracy/Precision | Instrument Response Tests at the IVS | 98% of the daily static background response values (no test object) will not exceed +/- 2 mV of expected baseline response (for all EM61MK2 channels). (d)<br><br>98% of the response values to the standard spike test item (a small ISO fixed at an orientation and distance from the sensor to provide an approximately 100 mV response on channel 2 of the EM61MK2) will not exceed +/- 10% of the expected baseline response (for all EM61MK2 channels). (d) | Twice Daily (AM/PM) | If failure occurs during the AM static test, do not proceed with DGM field activities until failure is resolved and AM static test(s) have passed.<br><br>If failure occurs during PM static test, the day's data fails unless BSI is mapped that day with repeatable anomaly characteristics (see dynamic detection repeatability (GSV blind seeding)). |

| | | | | | |
|---|---|---|---|---|---|
| Along track sampling | Completeness | DGM Data Set or Grid | 98% <= 0.65 ft. (20 cm) | By grid or dataset (c) | Submittal fails. |
| Coverage | Completeness | DGM using GPS Positioning: DGM Data Set or Grid | Category A (towed array): A lane spacing of 2 ft is to be used for the twoed array. 95% (or greater) of the lane spacing is to be at the project design lane spacing of 2 ft. 100% of the lane spacing is to be at 3 ft. No unexplained data gaps.<br><br>Category B (towed array): A lane spacing of 2 ft is to be used for the towed array. 95% (or greater) of the lane spacing is to be at the project design lane spacing of 2 ft. 98% (or greater) of the lane spacing is to be at 3 ft. | By grid or dataset (c) | Data gaps must be filled in before submittal is accpted. |
| Dynamic detection repeatability (IVS) | Accuracy/Precision | Instrument Response Tests at the IVS | 98% of the dynamic background response values during the daily IVS survey will not exceed +/- 3 mV of expected baseline response (for all EM61MK2 channels). (d)<br><br>Instrument response to each IVS item will be within +/- 25% or +/- 2 mV( whichever is greater) of the expected baseline response (for all EM61MK2 channels). The baseline response for each IVS item will be the average of the instrument responses to that item measured during the first week of IVS surveys. (d) | Twice Daily (AM/PM) | If failure occurs during the AM IVS test, do not proceed with DGM field activities until failure is resolved and AM dynamic IVS test(s) have passed.<br><br>If failure occurs during PM IVS test, the day's data fails unless BSI is mapped that day with repeatable anomaly characteristics (see Dynamic Detection Repeatability (GSV blind seeding)). |
| Dynamic detection repeatability (GSV blind seeding) | Sensitivity/Accuracy/Precision/Completeness | DGM Data Set or Grid | All BSIs must be located. Peak response >75% of maximum expected BSI response. (d) | 1 per day per team (# per acre to be based on production rate) | Submittal fails. |

| | | | | | |
|---|---|---|---|---|---|
| Dynamic positioning repeatability (IVS) | Accuracy/Precision | Instrument Response Tests at the IVS | Position offset of IVS targets < 25 cm. | Twice Daily (AM/PM) | If failure occurs during the AM IVS test, do not proceed with DGM field activities until failure is resolved and AM dynamic IVS test(s) have passed.<br><br>If failure occurs during PM IVS test, the day's data fails unless BSI is mapped that day with repeatable anomaly characteristics (see Dynamic Positioning Repeatability (GSV blind seeding)). |
| Dynamic positioning repeatability (GSV blind seeding) | Sensitivity/Accuracy/Precision/Completeness | DGM Data Set or Grid | 90% positioning offset is <= 25 cm + 1/2 line/sensor spacing and 100% is <= 35 cm + 1/2 line/sensor spacing for digital positioning systems.<br><br>For Towed Array DGM using 2 ft line spacing (Category A and Category B) and RTK-GPS:<br>90% <= 22 inches<br>100% <= 26 inches | 1 per team per day (# per acre to be based on production rate - same as dynamic detection repeatability (GSV blind seeding)). | Submittal fails. |
| Velocity | Completeness | DGM Data Set or Grid | 95% of all geophysical measurements with the EM61MK2 will be collected at a speed not to exceed 4 miles per hour (1.8 meters per second) | By grid or dataset (c) | Submittal fails. |
| Target Selection | Completeness | DGM Data Set or Grid | All dig list targets are selected according to project design as detailed in the SSWP | By grid or dataset (c) | Submittal fails. |
| Geodetic equipment functionality | Accuracy/Precision | GPS Function check at IVS | GPS position checks will not exceed +/- 3 inches (7.6 cm) from the established baseline position. | Once Daily (AM) | Do not proceed with DGM field activities until failure is resolved and positional check has passed. |

| | | | | | |
|---|---|---|---|---|---|
| Geodetic accuracy | Accuracy/Precision | GPS Function Check of Positional monuments used for RTK-GPS base station(s) | Project control points that are used more than once must be repeatable to within 5 cm (e). | For points used more than once, occupation will be repeated (f) for each point used, either monthly (for frequently used points) or before re-use (if used infrequently) (g). | Reset points not located at original locations or resurvey point. |
| Verify Field Work Methods | Accuracy/Precision | QC Geophysicist will monitor field team work methods. | Verify work methods are being performed in accordance with MEC QAPP, SOPs, and SSWP. | Daily | Stop work. Generate an RCA, CAR, and CAP (as necessary). Implement corrective actions. |
| DGM Data Reprocessing | Sensitivity/Accuracy/Precision/Completeness | 10% of DGM Data Set or Grid | DGM data will be reprocessed by the QC Geophysicist in accordance with GEO SOP 8 (Geophysical QC). | Daily | Stop work. Generate an RCA, CAR, and CAP (as necessary). Implement corrective actions. |

*Table 1. DGM MQO table for the towed array system.*

(a) All failures require an RCA.

(b) Duration of data collection is 1 minute for background, 1 minute for spike and 1 minute for second background measurement. All static repeatability is to be compared to original readings to ensure instrument is consistent throughout the project.

(c) The terms grid and dataset refer to logical groupings of data or data collection event. Logical groupings of data are contiguous areas mapped by the same instrument and in the same relative timeframe. These can be grids, acres, or some other unit of area. A data collection event is similar to logical groupings of data but refers to data collected over a contiguous timeframe, such as morning, afternoon, battery life, or some other measure of contiguous time.

(d) For static background, the expected baseline mV response is to be based on an average of all the static background readings collected during the first four days (or first week). For static spike the expected baseline peak mV response is to be based on an average of all the static spike readings collected during the first four days (or first week). For the IVS background, the expected baseline mV response is to be based on an average of all the IVS background readings for the first four days (or first week). For the IVS spike, the expected baseline mV response is to be based on an average of all the IVS spike readings for the first four days (or first week). For GSV BSI items the baseline mV response will be determined by recording an additional survey line that is offset ½ of the planned survey line spacing (1 ft) from the center of the seeded IVS line. This offset line will be recorded twice daily (am/pm) during the first four days (or first week) of DGM operation with the PP system(s) and the baseline mV response to be used for BSIs (for PP and towed array systems) will then be calculated by averaging all of the peak readings for each ISO at this 1 ft offset. Note that separate baselines will be generated and used for the PP and towed-array system static and IVS tests.

(e) GPS base station coordinates that are currently being used are provided by USACE/BRAC.

(f) Repeat occupation means demonstrate the control points being used can be recovered and reoccupied and that they have not moved more than the requirement specification. This can be accomplished using the same methodology used to initially tie the local network to a HARN, CORS, OPUS, or other recognized network, or it can be accomplished by other means that achieve this requirement.

(g) An example of frequently used control points would be points used as RTK DGPS base stations. Infrequently used points could be those used during GPS operations where the control point was used during mapping and then again at some later time for reacquisition and QC statistical sampling. Infrequently used points also could include grid corners; they are used for line and fiducial positioning and then reused for reacquisition or QC statistical sampling.

Note: Although it is highly unlikely, should an area originally categorized and seeded for Category B (i.e. seeded for DGM at a rate of approximately 1 Blind Seed Item (BSI) for every 4 acres and not planned for intrusive investigation) then be upgraded to Category A after DGM has been completed (i.e. should be seeded at a rate of 1 BSI per dig team per day and planned for intrusive investigation), that if the dig team does not have 1 BSI per dig team per day that this would not constitute a QC failure because the density of BSIs installed would have been based on the original selection of this area as Category B. The rationale for stating this scenario is that once the DGM data has been collected, it is impossible to add additional BSIs (i.e. add additional anomalies to the previously collected DGM data). If this scenario does occur, it has been identified in the QAPP and discussed in relation to QC objectives and their pass/fail criteria.

| Seed ID | Grid | Reported Response | Response Passes? | Total Offset (in) | Positioning Passes? |
|---|---|---|---|---|---|
| B3E007G | C4E3H6 | 584.44 | Yes | 10.29695975 | Yes |
| B3E006G | C4F3C5 | 211.27 | Yes | 4.936961014 | Yes |
| B3E008G | C4E3G4 | 269.60 | Yes | 8.506002581 | Yes |
| B3E010G | C4F3A3 | 378.31 | Yes | 1.522865728 | Yes |
| B3E009G | C4E3I1 | 266.69 | Yes | 1.982325907 | Yes |
| B3E002G | C4F2D9 | 362.86 | Yes | 9.649828192 | Yes |
| B3E001G | C4F2B7 | 504.23 | Yes | 6.284266064 | Yes |
| B3E003G | C4F3E1 | 256.94 | Yes | 12.67734546 | Yes |
| B3E004G | C4F3F4 | 610.82 | Yes | 11.06553569 | Yes |
| B3E005G | C4F3F7 | 429.41 | Yes | 15.88037128 | Yes |

*Table 2. Blind QC seed response and positioning results.*