FINAL

CORRECTIVE MEASURES STUDY REPORT

Corrective Measures Study
Anti-Aircraft Range 90-MM-2
Fort Stewart, Georgia
Site FTSW-002-R-01

Contract Number W912HN-18-D-1007
Delivery Order W192HN18F1026

Prepared For:

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12 August 2020

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List of Acronyms and Abbreviations

%	Percent
°F	Degrees Fahrenheit
AEC	U.S. Army Environmental Command
AGC	Advanced Geophysical Classification
AGM	Advanced Geophysical Mapping
AOC	Area of Concern
APP	Accident Prevention Plan
ASP	Ammunition Supply Point
bgs	Below Ground Surface
BMP	Base Master Plan
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAS	U.S. Army Corps of Engineers Savannah District
CFR	Code of Federal Regulations
CHMM	Certified Hazardous Materials Manager
cm	Centimeter
CMA	Corrective Measure Alternative
CMS	Corrective Measures Study
CSM	Conceptual Site Model
CSP	Certified Safety Specialist
CTT	Closed, Transferred, and Transferring
DA	Department of the Army
DAWSON	Dawson Solutions, LLC
DQCR	Daily Quality Control Report
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DESR	Defense Explosives Safety Regulation
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DoD	Department of Defense
DQO	Data Quality Objective
EC	Engineering Control
EM	Electromagnetic
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ERT	ERT, Inc.
FFP	Firm Fixed Price
FTSW	Fort Stewart
GA EPD	Georgia Environmental Protection Division
GPS	Global Position System
GSV	Geophysical System Verification
HRR	Historical Records Review

List of Acronyms and Abbreviations cont.

IC	Institutional Control
IJO	Internal Job Order
IRP	Installation Restoration Plan
ISO	Industry Standard Object
IVS	Instrument Verification Strip
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
LUR	Land Use Restriction
m	meter
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MEC HA	Munitions and Explosives of Concern Hazard Assessment
mm	Millimeter
MMRP	Military Munitions Response Program
Mph	miles per hour
MPPEH	Munitions Presenting a Potential Explosive Hazard
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NOAA	National Oceanic and Atmospheric Administration
NCP	National Contingency Plan
OESS	Ordnance and Explosive Safety Specialist
OSWER	Office of Solid Waste and Emergency Response
PDT	Project Delivery Team
PG	Professional Geologist
PRV	Post-Removal Verification
PWS	Performance Work Statement
QC	Quality Control
QR	Qualitative Reconnaissance
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSL	Regional Screening Level
SERDP	Strategic Environmental Research and Development Program
SUXOS	Senior UXO Supervisor
SWMU	Solid Waste Management Unit
TP	Technical Paper
UE	Unlimited Exposure
UU	Unrestricted Use
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

Contractor Statement of Independent Technical Review, Declaration of Technical Conformity, and Certification

This Corrective Measures Study (CMS) Report has been prepared by Dawson Solutions, LLC (DAWSON) in accordance with the Office of Solid Waste and Emergency Response (OSWER) Directive 9902.3-2A, *Resource Conservation and Recovery Act (RCRA) Corrective Action Plan (Final)*, dated May 1994. This CMS Report is applicable to the Performance Work Statement (PWS) for *Corrective Measures Study at Fort Stewart Anti-Aircraft Range 90-MM-2, Fort Stewart, Liberty County, Georgia, Site FTSW-002-R-01,* which is Delivery Order W192HN18F1026 under Contract Number W912HN-18-D-1007.

Notice is hereby given that an independent technical review has been conducted by DAWSON that is appropriate to the level of risk and complexity inherent in this project. During the independent technical review, compliance was verified with established policies, principles, and procedures that utilized justified and valid assumptions. This process included review of the technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used, and level of data obtained; and reasonableness of the results, including whether the product meets the level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs in a manner that is consistent with law and existing United States Army Corps of Engineers (USACE) policy.

DAWSON hereby declares that, to the best of our knowledge and belief, the technical data delivered herewith under Contract W912HN-18-D-1007, Delivery Order W192HN18F1026 is complete, accurate, and complies with all requirements of the contract. DAWSON is committed to providing our clients with Kūpono Ka Hana (the Hawaiian phrase for *Excellence in Service*). This commitment is a pledge each DAWSON team member, including subcontractors, makes to our clients to ensure that our daily efforts are aligned with our client's requirements. The way we achieve this is to fully engage with our clients to determine what is really important to them and what defines outstanding service and quality.

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Contractor Statement of Independent Technical Review, Declaration of Technical Conformity, and Certification

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1.0 INTRODUCTION

Dawson Solutions, LLC (DAWSON) conducted a Corrective Measures Study (CMS) on behalf of the United States Army Corps of Engineers (USACE), Savannah District (CESAS) at a Military Munitions Response Program (MMRP) site at Fort Stewart (FTSW), Georgia. CESAS issued a performance-based firm fixed price (FFP) Task Order to conduct a CMS for the Anti-Aircraft Range 90-millimeter (MM)-2 Munitions Response Site (MRS) (Site FTSW-002-R-01) located on FTSW, Georgia. The work was performed under Contract Number W912HN-18-D-1007, Delivery Order W192HN18F1026.

The United States Congress established the MMRP under the Defense Environmental Restoration Program (DERP) to address munitions and explosives of concern (MEC) which includes unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC), located on current and former military installations. Sites are considered MMRP eligible (other than operational ranges) where UXO, DMM, or MC are known or suspected and where the release/activities occurred prior to 30 September 2002. Properties not eligible for the MMRP are classified as operational ranges, permitted munitions disposal facilities, or operating munitions storage or manufacturing facilities.

DAWSON performed all work in accordance with the Resource Conservation and Recovery Act (RCRA), applicable portions of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the National Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. All activities in work areas potentially containing MEC hazards were conducted in full compliance with USACE, Department of the Army (DA), and Department of Defense (DoD) safety regulations. Anomaly avoidance was practiced during the field investigation portion of the CMS in accordance with installation guidance and procedures described in the site-specific Work Plan (DAWSON, 2019b) and Accident Prevention Plan (APP) (DAWSON 2019a).

The DoD Explosives Safety Board (DDESB) Defense Explosives Safety Regulation (DESR) Regulation 6055.09, Edition 1 was adhered to in the investigation and remediation of MRSs as CERCLA does not encompass the risks presented by munitions. Specific requirements concerning explosives safety under the active MMRP are further clarified in USACE Engineering Manual 385-1-97 (*Explosives - Safety and Health Requirements Manual*).

The Project Delivery Team (PDT) consists of DAWSON, CESAS, Georgia Environmental Protection Division (GA EPD), FTSW personnel, and the U.S. Army Environmental Command (AEC).

1.1 PURPOSE AND SCOPE

The purpose of this CMS is to identify and evaluate the potential remedial corrective action measure objectives and alternative(s) to address the potential MEC and MEC impacts located at the Anti-Aircraft Range 90-MM-2 MRS (Site FTSW-002-R-01). DAWSON developed the CMS in accordance with RCRA and U.S. Environmental

Protection Agency (EPA) Office of Solid Waste and Emergency Response (OSWER) May 1994 Directive 9902.3-2A, *RCRA Corrective Action Plan (Final)*.

1.2 PROPERTY DESCRIPTION AND PROBLEM IDENTIFICATION

FTSW Garrison Area is located approximately 40 miles southwest of Savannah, Georgia, and borders the northern edge of Hinesville, Georgia. The City of Pembroke is located approximately 19 miles north of Hinesville, Georgia. The City of Richmond Hill is located approximately 22 miles east of Hinesville, Georgia. Situated south of Interstate 16 and west of Interstate 95, FTSW boundaries are roughly defined by the intersection of Interstate 16 and Interstate 95 and the cities of Richmond Hill, Hinesville, Glennville, Claxton, and Pembroke (Figure 1) (DAWSON, 2019a). FTSW is an active installation that currently occupies approximately 280,000 acres.

The MRS that is the subject of this CMS is the Anti-Aircraft Range 90-MM-2 MRS (Site FTSW-002-R01). Figure 2 shows the location of the MRS as well as surrounding features. The Anti-Aircraft Range 90-MM–2 MRS is a 77-acre area located within a former 90-mm anti-aircraft range fan; six other former anti-aircraft and tank ranges also overlap this MRS shown in Figure 3 (ERT, Inc. [ERT], 2014). This MRS is approximately 2.5 miles northwest of the cantonment area. An ammunition supply point (ASP) is located within this MRS; the MRS is subject to additional security comprised of a secured, gated fence surrounding most of the MRS.

The MRS is considered an Area of Concern (AOC) and is covered by the FTSW Hazardous Waste Facility Permit #HW-045(S)-4, issued 15 August 2017. The MRS is identified as AOC 2 in the permit and is listed as an “Active MMRP Site under Installation Restoration Plan (IRP) Program.” The permit requires FTSW to properly manage the storage of hazardous wastes and to investigate and conduct corrective action at solid waste management units (SWMUs) and AOCs.

According to the permit, AOCs include “any area having a probable Release of a Hazardous Waste, Hazardous Constituent, and/or Hazardous Waste Constituent, which is not from a SWMU and is determined by the Director to pose a current or potential threat to human health of the environment. Such areas of concern may require investigations or remedial action as required under Georgia Hazardous Waste Management Act §12-8-60, et. seq. and 40 CFR 270.32 (b)(2) in order to ensure adequate protection of human health and the environment.”

Based upon previous investigations at the MRS, small amounts of MEC may be present. A RCRA Facility Investigation (RFI) was conducted to characterize the nature and extent of impacts to human health and the environment, which recommended a CMS be conducted for the MRS (ERT, 2014).

1.3 HISTORICAL INFORMATION

FTSW has been utilized since 1940 for training and as a deployment platform. Training activities have included tank, field artillery, helicopter gunnery, small arms, and various

infantry training. Construction of the reservation that was to become FTSW began on 10 September 1940, on what was formerly the Camp Savannah Anti-Aircraft Firing Center. On 18 November 1940, the reservation's name was changed from Camp Savannah to Camp Stewart in honor of the Revolutionary War Brigadier General Daniel Stewart. The reservation was established as an anti-aircraft center with facilities to prepare artillery troops for overseas deployment. The reservation's mission of training anti-aircraft units ended on 20 November 1944 and all training terminated in December 1944. U.S. Army ground forces units were to have departed by 30 April 1945. A prisoner-of-war camp that was operated at the reservation was also closed. The reservation's mission was reestablished as a separation center for redeployed troops from 6 August 1945 until 2 September 1945. On 30 September 1945, Camp Stewart was inactivated, and the reservation became a training location for the Georgia National Guard (Malcolm Pirnie, 2006).

With the outbreak of hostilities in Korea in June 1950, Camp Stewart was reactivated on 9 August 1950 and was designated the 3rd U.S. Army Anti-Aircraft Artillery Training Center. In 1953, armor and tank training were added to the mission of the reservation. On 21 March 1956 Camp Stewart was re-designated as FTSW and was designated a permanent U.S. Army installation. In 1959, FTSW became an armor and artillery firing center. Troop training at FTSW peaked in 1961 and 1962 in response to the Berlin and Cuban crises, respectively. The 1st Armored Division was relocated to the reservation during the Cuban crisis (ERT, 2014).

In response to a need for more helicopter and light fixed wing aircraft in support of the Vietnam conflict, an element of the U.S. Army Aviation School at Fort Rucker, Alabama, was transferred to FTSW in 1966. Helicopter pilot training and helicopter gunnery courses became the new mission for FTSW. In 1967, the main mission for FTSW was to train U.S. Army aviators. The reservation was also used to maintain readiness for other active duty, Reserve, and National Guard personnel. In 1970, Vietnamese helicopter pilots began training at FTSW. Aviation training at FTSW was phased out in 1973, when all aviation training was consolidated at Fort Rucker. By 1974, FTSW had become a training and maneuver area, providing tank, field artillery, helicopter gunnery, and small arms training for regular U.S. Army and National Guard units. FTSW supported training by providing facilities, conducting training opportunities, and assisting in the mobilization and deployment troops (ERT, 2014).

The use of the Anti-Aircraft 90-MM–2 range began in 1941 and ceased in 1944. The six historical anti-aircraft and tank ranges (Figure 3) that overlap this MRS were used from 1941 through 1964 (ERT, 2014). These include two 90-mm anti-aircraft ranges, two 40-mm anti-aircraft ranges, a 90-mm tank range, and a tank range where the munitions used are unknown. The Anti-Aircraft Range 90-MM–2 MRS is positioned downrange of these ranges and does not overlap impact/target areas or firing points. The ASP has been active within this MRS since the early 1980s.

1.4 PREVIOUS INVESTIGATIONS

Previous investigations were summarized in the 2014 RFI Report (ERT, 2014). Information related to the MRS presented below.

1.4.1 FINAL CLOSED, TRANSFERRED, AND TRANSFERRING INVENTORY REPORT

The Final Closed, Transferred, and Transferring (CTT) Inventory report presented the results of the Phase 3 CTT range inventory (Malcolm Pirnie, 2003). In addition to identifying the MRS that is being investigated under this task, the report also noted that FTSW occupies approximately 279,081 acres, 274,988 of which are classified as operational range area and 4,093 acres are non-range areas. The Phase 3 inventory identified seven closed ranges totaling 483 acres within FTSW boundaries. No transferred or transferring ranges were identified.

1.4.2 HISTORICAL RECORDS REVIEW

The Historical Records Review (HRR) identified specific secondary explosives and munitions removed from the Anti-Aircraft Range 90-MM-2 MRS through Explosive Ordnance Disposal (EOD) call responses, including C-4 plastic explosives, an M-222 Dragon anti-tank missile, M-7 grenades, and MK-2 grenades (Malcolm Pirnie, 2006). Munitions documented at the Anti-Aircraft Range 90-MM–2 MRS include 40-mm and 90-mm anti-aircraft projectiles and unknown tank munitions. Additionally, 37-mm rounds are documented to have been issued to FTSW.

The HRR also developed a preliminary conceptual site model (CSM) for the MRS.

1.4.3 CONFIRMATORY SAMLING REPORT

A limited magnetometer-assisted visual survey was performed as part of the Confirmatory Sampling in the Anti-Aircraft Range 90-MM–2 MRS. No material potentially presenting an explosive hazard (MPPEH) or munitions debris (MD) was identified during this survey. A single composite soil sample was collected and analyzed for aluminum, copper, zinc, lead, antimony, and explosives. Only zinc was found to be above FTSW background levels, though it was below EPA Region 4 screening values (Malcom Pirnie, 2007).

1.4.4 RCRA FACILITIES INVESTIGATION REPORT

An RFI was conducted by ERT on behalf of USACE in 2012 (ERT, 2014). The purpose of the RFI was to adequately characterize the nature and extent of potential MC contamination and MPPEH hazards; determine the potential risks posed to human health and the environment from MC; and to collect or develop additional data for a CMS, as appropriate, to determine corrective measures, including no further action.

The scope of the RFI included digital geophysical mapping (DGM); intrusive investigation to identify location, density, and types of MPPEH; and environmental sampling to

determine the distribution and concentrations of several MC (select metals and explosives) in soil, sediment, and surface water.

Biased and random surface and subsurface soil samples were collected from the MRS, including background samples. Two sediment samples were collected at the north and south ends of the drainage ditch located within the MRS. Standing water was present at the north end of the drainage ditch where a sediment sample was collected; a surface water sample was also collected at this location. Groundwater was not collected. All MRS samples were analyzed for select metals and explosives; background samples were collected for select metals only.

No explosives compounds were detected in the soil samples. Residential soil regional screening levels (RSLs) were used as screening criteria. Aluminum was detected at concentrations exceeding the residential RSL in two surface and six subsurface samples – the concentrations were also above the background concentration for aluminum. No explosives were detected in the sediment or surface water samples collected from the MRS. The concentrations of metals in the sediment samples were below the applicable residential RSLs.

Comprehensive, statistically based DGM followed by intrusive investigation for MPPEH was conducted. A total of 1,199 targets were excavated in 24 grids and on 45 transects within the MRS. During the RFI, three MEC items (40-mm projectiles) were recovered from the subsurface at the MRS. Per previous DoD guidance (DoD, 2010) and the results of the RFI, the probability of encountering MPPEH at the MRS was deemed to be “moderate to high.”

Based on the Human Health Risk Assessment and the Screening Level Risk Assessment performed at the MRS, there are no human health or ecological risks associated with potential human contact with surface or subsurface soil, surface water, or sediment. The SLERA indicated that a detailed ecological risk assessment was not warranted.

A MEC Hazard Assessment (MEC HA) was used to assess potential explosive hazards to human receptors. The MRS scored as a 4, indicating low potential hazard potential at the MRS. The MRS was given a Munitions Response Site Prioritization Protocol (MRSPP) rating of 4.

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US Army Corps of Engineers
Savannah District

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Feet

Legend

MRS Location

Fort Stewart Installation

Figure 1 - Site Location

Corrective Measures Study

Fort Stewart Anti-Aircraft Range 90-MM-2

Site: FTSW-002-R-01 Contract: W912HN-18-D-1007

December 2019

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

US Army Corps of Engineers
Savannah District

DAWSON

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0 200 400

Feet

Legend

- Fence
- MRS Boundary
- IVS Location
- Structure

Figure 2 - Site Layout

Corrective Measures Study
Fort Stewart Anti-Aircraft Range 90-MM-2
Site: FTSW-002-R-01 Contract: W912HN-18-D-1007
December 2019

US Army Corps of Engineers. BUILDING STRONG.

ERT

Legend

0 1 2 Miles

MRS Boundary

Historical Range Fan

Operational Range Area

Other than Operational Range Area

Figure 3
Historical Range Fans

Fort Stewart, Georgia

Date: March 2013

Imagery Source: Google Earth 2008 Historical Range Fan Source: USAEC 2011

2.0 CURRENT CONDITIONS

2.1 SITE DESCRIPTION

The majority of the Anti-Aircraft Range 90-MM–2 MRS is located within the fenced and gated ASP, with only a small buffer zone lying outside the fence line. The MRS is relatively flat and covered with maintained grass, buildings, paved roads, and parking areas. Forty munitions storage bunkers are located on the middle to western portion of the fenced in area within the MRS (Figure 2). Several storage buildings and paved staging areas are spread throughout the southeastern portion of the fenced area of the MRS. There are several culverts located in the MRS as well as a large drainage channel that runs through the center portion. Portions of the buffer zone consist of landscaped maintained grass while some areas are covered with vegetation consisting of large pine trees and low-lying vegetation. Standing water is present in portions of the buffer zone located to the north and to the east.

Access to the MRS is restricted. All personnel, workers, and visitors requesting to enter the MRS area must check-in to the ASP building for approval prior to entering. Once entry has been permitted, personnel must provide the approval documents acquired at the ASP security building to the guard at the security gate for access to the MRS.

There is one dirt “Tank Road” that bypasses the initial security building allowing access to the MRS buffer zone, but remains outside the fenced, gated portion of the MRS.

2.1.1 SURFACE FEATURES

FTSW is in the Coastal Marine Flatlands region of the Atlantic Coastal Plain physiographic province, which is characterized by flat land areas with an average slope of less than three percent (%). The Coastal Marine Flatlands region’s land surface consists of rolling terraces gently rising east to west. These terraces are separated by broad, low-lying areas with poor drainage. Elevations at FTSW average 33 feet above sea level east of the Canoochee River with a peak elevation of 183 feet above sea level near the western boundary (DAWSON, 2019b). The MRS itself is relatively flat, with transient standing water in portions of the buffer zone (outside of the ASP fence line) to the north and east.

2.1.2 METEOROLOGY

The climate of FTSW is considered humid subtropical. Average temperatures range from 40 degrees Fahrenheit (°F) in January to 92°F in July. The FTSW area receives approximately 50 inches of precipitation annually. November and December are typically the driest months and August the wettest month of the year (National Oceanic and Atmospheric Administration [NOAA], 2019). The prevailing wind direction is to the northwest and averages zero to five miles per hour (mph). Thunderstorms, hurricanes, and tropical storms occur most frequently from May through September and can produce gusty surface winds well above five mph (DAWSON, 2019b).

2.1.3 SURFACE WATER AND HYDROLOGY

Four watersheds occur within FTSW's boundaries: the Altamaha, Canoochee, Lower Ogeechee, and Ogeechee Coastal watersheds. Most of FTSW is in the Canoochee River Watershed. FTSW has about 265 miles of freshwater rivers and streams and an additional 12 miles of brackish water streams (U.S. Army, 2010). Permanent surface water features were not encountered at the MRS.

2.1.4 GEOLOGY

The bedrock in the area surrounding FTSW is composed primarily of rock formations ranging from the Precambrian (greater than 570 million years old) to Triassic (205 to 240 million years old) ages. This local bedrock is overlain with thick wedges of unconsolidated and partially consolidated sediments (U.S. Army, 2010).

2.1.5 SOILS

Most of the soil at FTSW is classified as sandy and infertile. Soils in low-lying, poorly drained areas are high in organic matter and can remain saturated with water for eight months or more every year (U.S. Army, 2010). Near FTSW, the parent material for all soils is water-lain sediments deposited prior to and during the Pleistocene Age (2.6 million to 11,700 years ago). The soil at the Anti-Aircraft Range 90-MM–2 MRS is classified as sand-silt/sand-clay (DAWSON, 2019b).

2.1.6 HYDROGEOLOGY

The principal artesian aquifer in the FTSW region lies 300 to 500 feet below surface and is isolated from the surface aquifer by a confining unit (ERT, 2014). The surface aquifer is composed of a relatively thin layer of sands, gravels, and clays and is recharged directly from rainfall percolating through the sediments. Primary recharge to the principal artesian aquifer occurs approximately 50 to 90 miles northwest of FTSW. Deep groundwater wells are used as drinking water sources for FTSW. There are 31 groundwater wells located on FTSW, five of which are used to supply drinking water to the cantonment area. The cantonment area wells range in depth from 500 to 800 feet and are cased to depths of 400 to 470 feet. The potable water capacity from the five active wells is approximately 10.4 million gallons per day (Malcolm Pirnie, 2006).

There are no known monitoring wells located within or in the immediate vicinity of the MRS. Specific groundwater information related to MRS is not known but is expected to be reflective of the regional groundwater conditions found at FTSW.

2.1.7 DEMOGRAPHY and LAND USE

In the 2010 U.S. Census, the FTSW population was listed as 4,942; primary residents are members of the 3rd Infantry Division.

The Anti-Aircraft Range 90-MM–2 MRS is located within the operational range at FTSW and consists of an ASP within a fenced area that covers a majority of the MRS acreage. A cleared buffer area surrounding the fence is also included in this MRS. The ASP is a gated, secured area; entry to this area is controlled and monitored. This MRS is expected to continue as an ASP for the foreseeable future. No activities occur in the buffer area surrounding the fence line.

2.1.8 ECOLOGY

FTSW is a large, mostly undeveloped installation with more than 87% (243,000 acres) of land classified as upland forest or forested wetlands, with the remaining 13% (37,000 acres) comprised of open areas, including the cantonment area, ranges, and impact areas. The cantonment area is the “living and working” portion of FTSW (U.S. Army, 2010).

On a very broad scale, there are four types of ecosystems on FTSW: sandhills, pine flatwoods, upland forests, and wetlands (Malcolm Pirnie, 2006). Wetlands are mainly of the bottomland hardwood variety, with mixed types of vegetation and only occasional flooding. Isolated cypress ponds also occur. No threatened or endangered species or species of concern are present within the MRS (ERT, 2014.

2.2 CURRENT LAND USE

An active ASP is currently located on the Anti-Aircraft Range 90-MM-2 MRS, complete with 40 storage bunkers and several maintained buildings. The Final Land Use Control Implementation Plan (LUCIP) for FTSW (USACE, 2019) classifies the current land use as part of the active U.S. Army facility, industrial-type and military training use only. There are currently no engineering controls (ECs) for the site. Institutional controls (ICs) include restrictions on groundwater withdrawal, restrictive covenants, and zoning (USACE, 2019).

2.3 FUTURE LAND USE

It is anticipated that the Anti-Aircraft Range 90-MM-2 MRS land use will remain classified as industrial type and for military training use only (USACE, 2019). At this time there are no plans to repurpose land use at the MRS.

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3.0 CMS INVESTIGATION RESULTS

This section defines the nature and extent of the Qualitative Reconnaissance (QR) field investigation efforts and discusses the current CSM. The CSM is intended to be representative of the site conditions based on inputs from the QR field investigation. The CSM represents the potential site receptors, potential MC/MEC hazards, and exposure pathways at the MRS. The QR is intended to confirm the presence and nature of receptors, contamination, and/or exposure pathways. The presence or absence of any element is discussed and updated in the revised CSM as presented in the following sections.

3.1 MUNITIONS AND EXPLOSIVES OF CONCERN

A team of qualified UXO technicians completed a detector-assisted QR of approximately 57 acres of the 77-acre Anti-Aircraft Range 90-MM-2 MRS. The MRS covers a total of 77 acres including structures, storage bunkers, and paved areas (57 acres excluding structures, storage bunkers and paved areas). The detector assisted QR identified a total of 4,293 subsurface anomalies that were marked and recorded with a Trimble Geo-XH 6000 Explorer Global Positioning System (GPS) for an average of approximately 75 anomalies per acre (Figure 4). No MPPEH or MD items were located on the surface within the 57-acre investigation area.

3.1.1 INFORMATION FROM PREVIOUS INVESTIGATIONS

An RFI was completed in 2014 for the Anti-Aircraft Range 90-MM-2 MRS; investigations were completed for MEC in soil, and for MC in soil, surface water, and sediment. Comprehensive, statistically based DGM followed by intrusive investigation for MPPEH was conducted. A total of 1,199 targets were excavated in 24 grids and on 45 transects within the MRS. During the RFI, three MEC items (40-mm projectiles) were recovered from the subsurface at the MRS. Based on DGM and UXO Estimator results, it is estimated that approximately 59 MEC items may be present at the MRS at depths of 6 inches to 2 feet below ground surface (bgs) (ERT, 2014).

3.1.2 DATA GAPS FROM PREVIOUS INVESTIGATIONS

Based on the previous RFI conducted in 2014, a CMS of the Anti-Aircraft Range 90-MM-2 MRS was recommended to address the nature and extent of MPPEH throughout the entire MRS. The previous RFI was limited to 7.102 acres or approximately 12.5% of the 57-acre searchable area of the MRS. The QR of the entire MRS was performed to address the data gap, to address the nature and extent of MPPEH throughout the entire MRS, and to assist in validating the findings of the previous RFI.

3.1.3 CMS FIELD INVESTIGATION APPROACH

Prior to the start of the QR an Instrument Verification Strip (IVS) was implemented by using Industry Standard Objects (ISOs) in the form of steel pipe nipples to mimic the size and shape of munitions expected at the MRS. The ISOs were placed on the ground

surface and covered with sandbags to a representative “mock depth.” These ISOs were of various sizes and placed at different mock depths/orientations to establish a diverse test strip. The IVS was used daily prior to the start of field activities to ensure all hand-held magnetometers functioned correctly.

A grid system was established using GPS by marking each corner of a 100-foot by 100-foot grid with a pin flag using the southwest corner for grid determination. In areas where the establishment of 100-foot by 100-foot grid was not applicable due to structures or the uneven boundary of the MRS, the grid size was reduced, and the boundaries were marked as applicable. Lanes approximately five feet in width were created using rope lines. Lanes were moved from grid to grid as search areas were completed.

Working staggered, with one person per lane, UXO technicians systematically swept each lane utilizing a hand-held detector and marked anomalies by placing a yellow pin flag at the location of each subsurface anomaly. Once a section of the MRS was completed, the location of each anomaly was recorded with a Trimble GEO XH 6000 GPS System using a consistent naming convention for identification. The recorded data was downloaded daily and provided in the Daily Quality Control Report (DQCR) (see Appendix B). Although the GPS data was collected with accuracy below the required three meters (m), the data was post processed daily using Pathfinder Office software to conform to +/- 10-centimeter accuracy standards.

3.1.4 DESCRIPTION OF FIELD ACTIVITIES

Prior to the start of daily field activities, a field safety meeting took place where daily safety topics were discussed by the UXO Safety Officer (UXOSO).

Each SubSurface Instruments ML-3 hand-held detector was tested daily using the IVS, ensuring the functionality of each detector. The batteries of each detector were replaced at the beginning of each week to ensure the detector functioned at full capacity.

A grid system was then established using the GPS by marking each corner of a 100-foot by 100-foot grid with a pin flag using the southwest corner for grid determination. In areas where the establishment of a 100 foot by 100-foot grid was not applicable due to structures or the uneven boundary of the MRS, the grid size was reduced, and the boundaries were marked as applicable.

Rope lanes approximately 5 feet in width were established within each grid. The team of UXO Technicians swept each rope lane in a staggered formation to provide overlap of hand-held detectors ensuring that all areas were adequately investigated. Each anomaly detected had a yellow pin flag placed at its location. Rope lanes were moved from grid to grid as search areas were completed. The UXO Quality Control Specialist (UXOQCS) performed a QC check on 25% of the QR investigation area to ensure all anomalies were located and recorded.

The Trimble GEO XH 6000 GPS System was tested each day utilizing a fixed, known point to verify that the accuracy of this system was less than 3 meters. Once this QC point

was verified, the Trimble GPS system was used to record all anomalies that were found in each grid. At the end of each day this recorded data was downloaded and provided in the DQCR (Appendix B) and was post-processed using Pathfinder Office software to conform to +/-10 cm accuracy standards.

Upon completion of field activities, all pin-flags were removed from the site and discarded as municipal waste. The IVS was deconstructed and the area was left in the same condition it was found.

3.1.5 NON-INTRUSIVE INVESTIGATION RESULTS

The detector assisted QR identified a total of 4,293 subsurface anomalies that were marked and recorded with the Trimble Geo-XH 6000 Explorer GPS for an average of 75 anomalies per acre (Figure 4). At the location of the largest subsurface anomalies, the edges were marked, and polygons of the anomalies were created with the GPS. These polygons are noted as “High Density Areas” shown in Figure 5. There were no MPPEH or MD items discovered on the surface within the 57-acre investigation area.

The USACE UXO Estimator is a statistical tool for MEC characterization to ensure sufficient data is collected to characterize the MRS. This tool determines a level of confidence, presented as a percentage, based on the likelihood of encountering MEC at the MRS. The UXO estimator was used to characterize the data compiled during the previous RFI in 2014. Based on those results, it was estimated that approximately 59 MEC items may be present at the MRS at depths of six inches to two feet bgs (ERT, 2014). Because subsurface anomalies were not intrusively investigated and no UXO were located on the surface during the QR, the UXO estimator tool was not used for evaluation of data during the QR. However, it is possible that of the 4,293 subsurface anomalies located, 59 may be subsurface MEC items.

3.2 MUNITIONS CONSTITUENTS

MC sampling and analysis was not performed as part of this CMS. The following MC data was compiled using information gathered during previous investigations.

3.2.1 INFORMATION FROM PREVIOUS INVESTIGATIONS

An RFI was completed in 2014 for the Anti-Aircraft Range 90-MM-2 MRS. Investigations were completed for MEC in soil, and for MC in soil, surface water, and sediment. During the RFI, 22 random samples (10 surface, 10 subsurface, and two duplicates) were collected at the Anti-Aircraft Range 90-MM–2 MRS and analyzed for explosives and select metals. Of these 22 samples, no MCs (explosives or metals) were identified as potential contaminants of concern in any environmental media (ERT, 2014).

3.3 REVISED CONCEPTUAL SITE MODEL

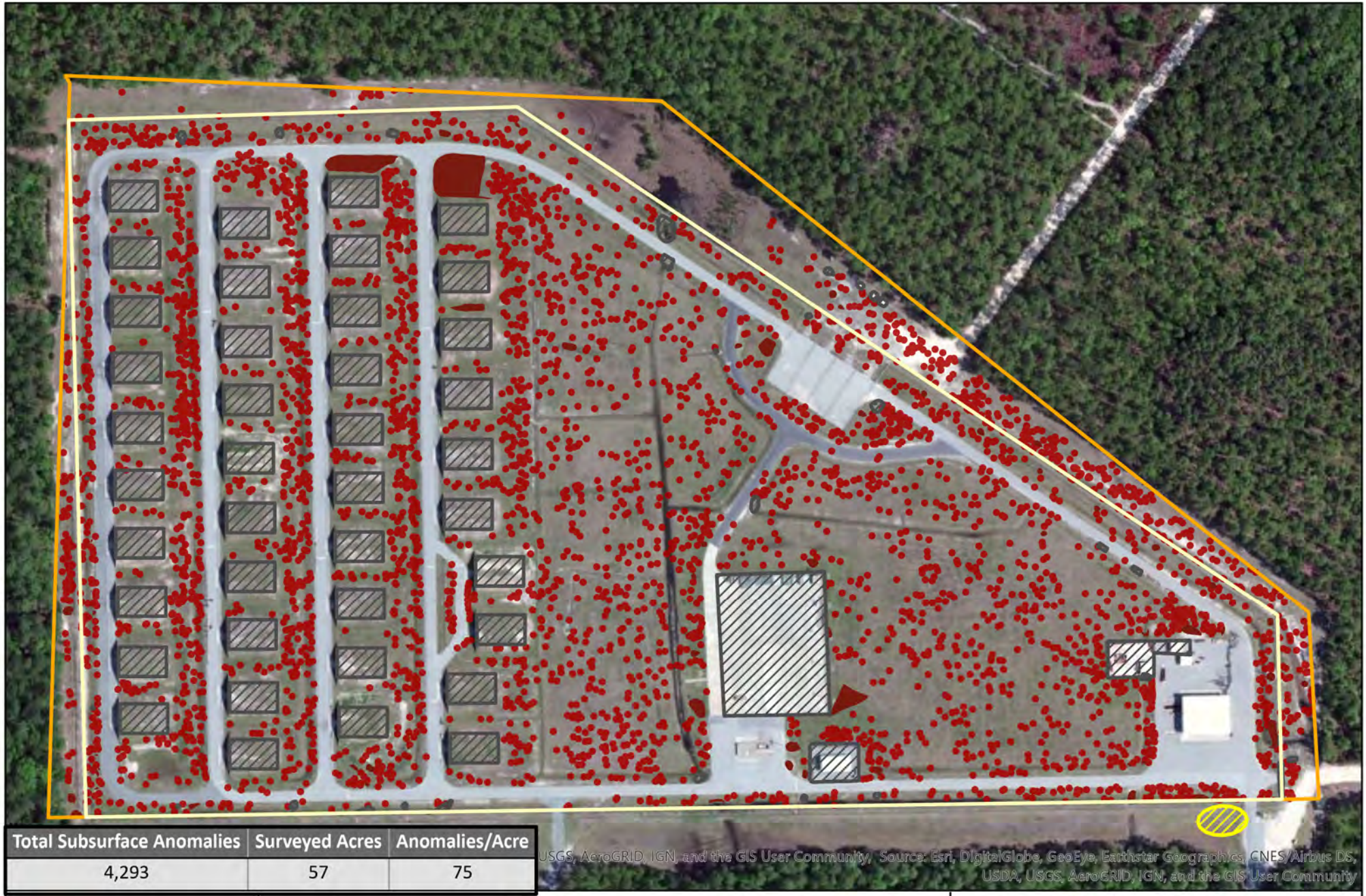
The CSM is intended to be representative of the current site conditions based on inputs from the QR field investigation. The CSM represents the potential site receptors, potential

MC/MPPEH hazards, and exposure pathways at the MRS. The QR is intended to confirm the presence and nature of receptors, contamination, and/or exposure pathways.

The 2014 RFI CSM identified only one potentially complete pathway: contact of a future construction worker or trespasser with a subsurface MPPEH item during intrusive activities (ERT, 2014). A revised CSM was developed for the Anti-Aircraft Range 90-MM-2 MRS based on the results of the QR. The 2014 CSM confirms the current CSM, indicating that there is one potentially complete pathway: exposure to MPPEH in subsurface soil by a construction worker or trespasser during intrusive activities. Exposure pathways to MPPEH exist through direct contact by current and future users to the potential explosive hazard and potential localized MC contamination.

The ecological receptors generally associated with potential MC contamination are not typically considered to be at risk to explosive hazards associated with MEC in CERCLA evaluations. Consequently, ecological receptors are not indicated to be associated with any complete MEC exposure pathways on the updated CSM (Figure 6).

The combined observations and results from the RFI and CMS indicate that the data quality objectives (DQOs) for the Anti-Aircraft Range 90-MM-2 MRS have been achieved and the nature and extent and risk to human health and the environment from MPPEH and MC have been characterized. A potentially complete exposure pathway to current and future receptors has been identified; MPPEH and MC exposure pathways at the MRS are considered potentially complete and require action be taken to protect potential human receptors.



Total Subsurface Anomalies	Surveyed Acres	Anomalies/Acre
4,293	57	75

US Army Corps of Engineers
Savannah District

DAWSON

N

0 200 400 Feet

Legend

- Detected Subsurface Anomaly
- High Density Subsurface Anomaly Area
- Fence
- MRS Boundary
- IVS Location
- Structure

Figure 4 - Subsurface Anomalies
Corrective Measures Study
Fort Stewart Anti-Aircraft Range 90-MM-2
Site: FTSW-002-R-01 Contract: W912HN-18-D-1007
December 2019

Figure 5 - Estimated Subsurface Anomaly Density

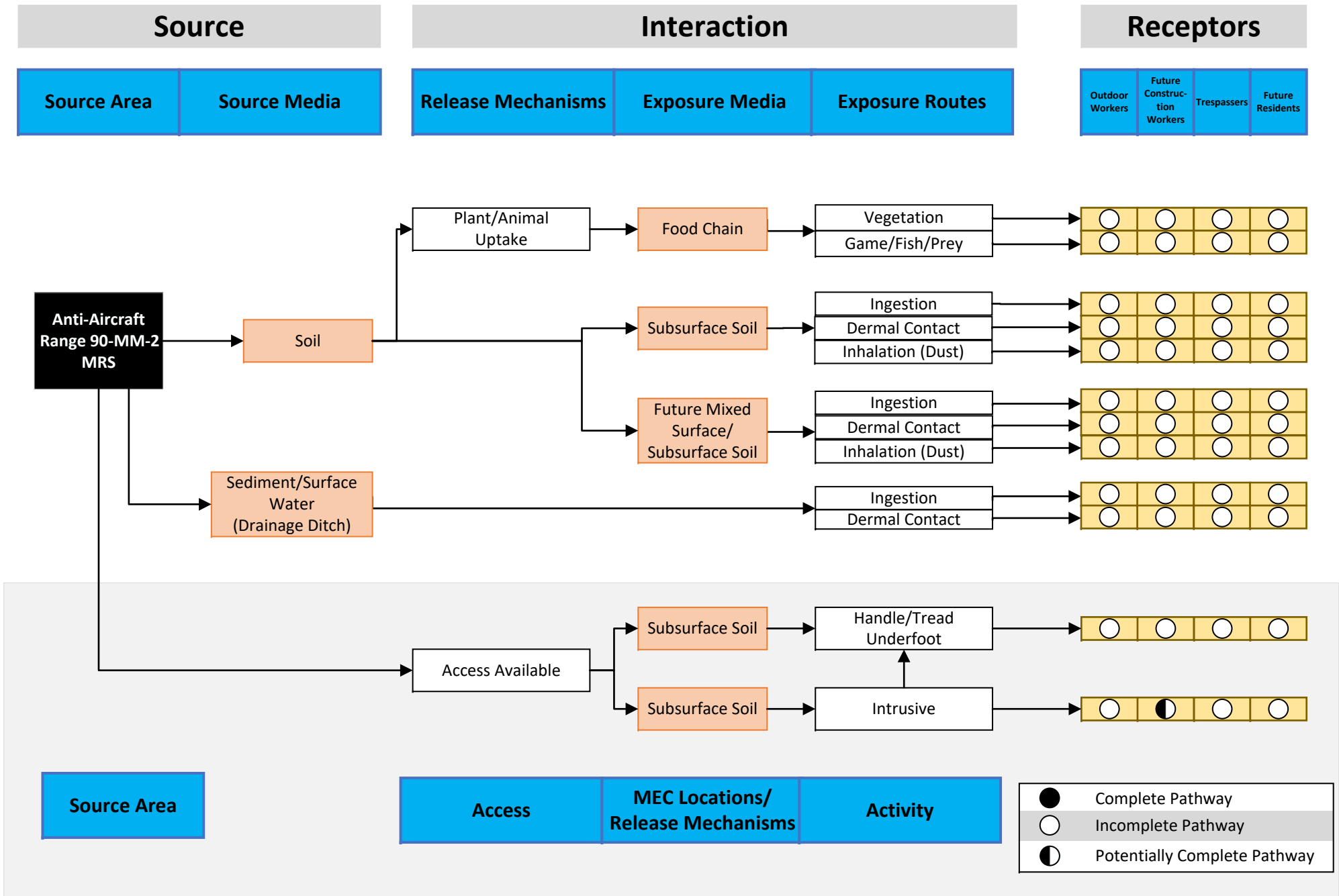
Corrective Measures Study

Fort Stewart Anti-Aircraft Range 90-MM-2

Site: FTSW-002-R-01 Contract: W912HN-18-D-1007

December 2019

Anti-Aircraft Range 90-MM-2 – Conceptual Site Model (MPPEH and MC)



4.0 MEDIA CLEANUP STANDARDS

A key consideration in the management of site conditions due to the presence of environmental contamination from MPPEH or MC is how to address potential risks and hazards to human health and the environment. Management decisions must consider the evaluation of baseline conditions at the site, as well as potential impacts given the reasonably anticipated future uses of the site. Assessing these site conditions and potential impacts to human health and the environment requires consideration of a variety of inputs relating to potential interactions of the site users with the MPPEH that may be present and exposure scenarios for the MC in the impacted environmental media.

4.1 MUNITIONS AND EXPLOSIVES OF CONCERN

Based on the RFI conducted in 2014, DGM, and UXO Estimator results, it is estimated that approximately 59 MEC items may be present at the MRS at depths of six inches to two feet bgs. The QR conducted over the approximately 57 searchable acres located 4,293 subsurface anomalies or an average of 75 subsurface anomalies per acre. No MPPEH or MD were located on the surface of the MRS during the QR. Based on the previous RFI and the QR it is possible that 59 of the 4,293 subsurface anomalies detected may be subsurface MEC items.

4.2 MUNITIONS CONSTITUENTS

During the 2014 RFI, no MC (explosives or metals) were identified as potential contaminants of concern in any environmental media. No additional MC sampling was conducted as part of the QR.

4.3 RISK ASSESSMENT SUMMARY

The assessment of explosives hazards associated with MEC and MPPEH includes the consideration of three components of the risk:

- Severity of an outcome should a MEC/MPPEH item detonate – This category of input parameters characterizes the potential consequences of a detonation on the basis of the classification and size of the MEC found in the area.

- Accessibility of the area – This category of input parameters characterizes the likelihood that a person will access the site and come into contact with a MEC/MPPEH item.

- Sensitivity of the MEC/MPPEH item present – This category of input parameters characterizes the likelihood that the item will function or detonate if contacted.

Based on the previous RFI and the QR it is possible that subsurface MEC items may be present at the MRS. Due to the potential for subsurface MPPEH within the MRS, the accessibility of the area, and the active use of the MRS, there is a potentially complete

pathway: contact with a subsurface MPPEH item by a future construction worker or trespasser during intrusive activities.

5.0 IDENTIFICATION, SCREENING, AND DEVELOPMENT OF CORRECTIVE MEASURES

The purpose of the CMS is to identify and evaluate potential remedial alternatives that address contamination at a facility. Technologies and process options undergo an initial screening to eliminate those that are not technically feasible or likely to be effective. Those that are carried through are then assembled into remedial alternatives that are potentially capable of meeting the media cleanup standards. The alternatives are then compared and evaluated against specific standards:

- Protection of human health and the environment;
- Ability to attain cleanup standards;
- Control of release source(s);
- Compliance with applicable waste management standards;
- Long-term reliability and effectiveness;
- Reduction in waste toxicity, mobility, or volume;
- Short-term effectiveness;
- Implementability; and
- Cost.

A recommendation for a final Corrective Measure Alternative (CMA) will be made based on this analysis. Evaluation of a single or limited number of alternatives may be appropriate for less complex sites (OSWER, 1994).

5.1 IDENTIFICATION OF CORRECTIVE MEASURES ALTERNATIVES

Potential technologies and process options that may be used to address hazards at the Anti-Aircraft Range 90-MM-2 MRS have been identified and are described in the sections below.

5.1.1 LAND USE CONTROLS

Land Use Controls (LUCs) are physical, legal, or administrative measures designed to limit potential exposures associated with potential MEC or MC. LUCs are often used in combination with other alternatives to mitigate any hazard remaining following a response action. The selected LUCs must be compatible with current and future land use and must be clearly defined, established in coordination with the landowner or manager, be agreeable to all stakeholders, and must be enforceable. LUCs can be divided into ICs and ECs.

Definition and enforcement LUCs may be accomplished through notations in a Master Plan, a LUCIP, and/or administrative procedures (e.g., permits, workflows).

LUCs are advantageous because of relative simplicity, fast implementation times, and lower implementation costs. Effective LUCs can limit direct exposure to MEC. The limitations of LUCs are that no contaminant removal is performed, and stakeholders must coordinate the implementation of LUCs for the anticipated life cycle of the MRS.

5.1.1.1 Institutional Controls

ICs are legal and administrative requirements designed to minimize the potential for exposure of receptors to hazards. The effectiveness of ICs depends on the proper definition of requirements, regular review to ensure proper implementation and maintenance, and engagement of all stakeholders. Land Use Restrictions (LURs), permits, education/training, and signage are all examples of ICs.

5.1.1.1.1 Land Use Restrictions

LURs define allowable land use in order to prevent exposure of sensitive receptors to contamination left in place at levels above which unrestricted use (UU)/unlimited exposure (UE) is not allowed. An LUR at the MRS would limit use to industrial, prohibiting redevelopment for residential purposes, daycares, hospitals, or schools.

5.1.1.1.2 Permits

Permit processes prevent inadvertent exposure to contamination by controlling access to contaminated media. FTSW has a robust Dig Permit process in place; any intrusive activities conducted on base must first be reviewed and approved by the FTSW Department of Public Works and requires FTSW Safety to employ EOD Unit support for locations that potentially contain MEC.

5.1.1.1.3 Education and Training

Education and training provide individuals with information on the potential hazards existing at a site and how to avoid exposure to those hazards. Education may be provided to the public as part of public engagement for areas where trespassing is a possibility. Training is provided to workers who may be in areas where hazards are potentially present. A training program should include new employees as they are added and provide regular updates for existing employees.

5.1.1.1.4 Signage

Signage identifies potential hazards through wording and/or symbols and the mitigation measures to be taken that are protective of human health. Placement of signs is chosen based on locations of potential hazards and access to those locations (e.g., along roads or fence lines). Language and literacy must be considered when designing signage.

Signage can be useful in raising receptor awareness to the presence of a hazard, can act as a deterrent for potential receptors, and may help to ensure long-term protectiveness. The U.S. Army employs “3R” messaging (Recognize, Retreat, and Report) to assist long term protectiveness.

5.1.1.2 Engineering Controls

ECs are physical measures designed to act as a barrier (e.g., a fence) between a hazard and a potential receptor. The effectiveness of ECs depends on proper design, implementation, maintenance, and awareness.

5.1.1.2.1 Fencing

Fencing physically restricts access to hazardous areas and limits the number of potential receptors. Design of a fence line is influenced by topography, land ownership, access requirements, and land use. Access points may be controlled using gates, locks, and/or guards. Regular inspection and maintenance are required to ensure the barrier remains secure.

5.1.2 SURFACE CLEARANCE

A surface clearance is performed to detect, identify, record, and remove MEC from the surface of a MRS. This can be used as a stand-alone process or as a precursor to geophysical mapping and subsurface MEC removal. A surface clearance can range from a simple visual site walkover to a highly controlled hand-held detector assisted series of 100% survey lane or survey grid inspections. The specific process option considered herein is a hand-held detector aided visual surface clearance and removal.

A hand-held detector-assisted visual survey uses handheld metal detectors (either ferrous detectors such as the Schonstedt GA -52cX or SubSurface Instruments ML-3 or ferrous and non-ferrous detectors such as the Minelab CTX 3030) to locate anomalies at the ground surface. The detector-assisted clearance is performed using established lanes no greater than 5 feet wide within pre-determined 100 foot by 100-foot grids. The locations and characteristics of surface anomalies are recorded using Trimble GEO-XH 6000 Explorer GPS units (or equivalent) with 2-cm accuracy. Based on the design of the survey, the identified anomalies will be investigated (exposed and visually identified), then removed or disposed of in accordance with approved work plan. MPPEH and MD are handled based on installation-specific requirements.

All surface clearances are performed by UXO Technicians qualified in accordance with Technical Paper (TP) 18 (DDESB, 2016). Team compositions can vary based on the overall area, density of MEC, or schedule requirements, but generally consist of a Senior UXO Supervisor (SUXOS), UXOQCS, UXOSO, UXO Technician III team leaders, and UXO Technician II and UXO Technician I team members. QC is achieved through installation of an IVS, which is used daily to test functionality of analog metal detectors and provides remedial training for the UXO Technician in recognizing and discerning the sensor response of munitions items potentially present at a MRS. Blind seeding (i.e.,

installing inert ISOs on the ground surface) may also be used to ensure UXO teams are achieving the required coverage rates and detecting all items of concern. Verification lanes or grids, performed by QC personnel, also ensure that project objectives are met.

The advantages of an instrument-aided visual surface survey and removal are that MEC items found during the clearance activities are removed, thus the MEC hazard is reduced through reduction of volume through treatment; surface clearance is relatively low-tech and can be implemented using commonly available technologies and personnel; and time to implement is comparatively short. Potential limitations include high labor costs for large or dense areas; limited access based on terrain, vegetation, or safety considerations; and that subsurface MEC is not addressed.

5.1.3 SUBSURFACE CLEARANCE

A subsurface clearance is performed to detect, identify, record, and remove MEC from beneath the ground surface of a MRS. Depending on project goals, a subsurface clearance can range from a targeted removal to a specified depth within a defined area to a complete removal of all detected MEC from beneath the ground at depths up to the limits of detection technologies.

The specific process options considered include analog geophysical mapping (AGM) (mag and dig operations), DGM, and advanced geophysical classification (AGC). Removal is completed by UXO dig teams after potential MEC locations have been identified using an analog, DGM, and/or AGC technology. UXO technicians intrusively investigate and remove MPPEH from surface or subsurface soil by earth moving machinery and hand excavation. Upon removal, the MPPEH is identified and logged for tracking and can be treated to confirm and dispose of as MEC through controlled detonation.

When screening subsurface clearance technologies, the following considerations are used:

- Probability of detection will be prioritized over ease of use;
- More than one method may be employed; and
- Less capable methods may be considered in localized areas provided the project objectives are still met.

5.1.3.1 Analog Geophysical Mapping (Mag and Dig Operations)

Analog techniques using hand-held detectors are used to perform AGM (mag and dig) subsurface clearances. AGM (mag and dig) is a common method for detecting metal on the ground surface or buried in the subsurface using established lanes no greater than 5 feet wide within pre-determined 100 foot by 100-foot grids. The handheld detector rings off an audible tone when swept over metal on or buried in the ground. A qualified UXO technician, practiced in recognizing the response of a ferrous material found at a site,

places a flag in the ground when the sensor registers an appropriate response. The location is then investigated intrusively by a follow-on dig team. Following a clearance, a defined portion of the area (generally 10%) is re-examined independently by a UXOQCS. A USACE Ordnance and Explosives Safety Specialist (OESS) provides Quality Assurance.

Analog geophysical techniques are known to perform well in difficult and variable terrain, due mainly to a higher capability to access areas with a small, lightweight handheld sensor and implement surveys. Analog geophysical techniques cannot be performed in areas where steep slopes or dangerous terrain preclude safe access to sensor operators. Overall, the probability of detection (approximately 50% to 70% overall) for analog techniques is generally substantially lower than DGM techniques, and false alarms are also generally higher than DGM. Effective QC of an analog sweep is also inherently more difficult, as sensor data are not recorded and mapped, and it is hard to measure the ability of the UXO technician to interpret the analog detector's signal (DoD Strategic Environmental Research and Development Program [SERDP], 2007).

5.1.3.2 Digital Geophysical Mapping

DGM technologies use industry standard electromagnetic (EM) sensors and are commonly used to perform subsurface surveys to detect and map ferrous and non-ferrous metal. EM sensors have been tested and deployed on a variety of platforms that are selected based on accessibility/terrain and data quality requirements. Platforms include towed arrays, carried litter, or man-portable cart configurations. Towed arrays are pulled behind an all-terrain vehicle and are best suited to large, generally flat, and obstruction-free environments. Man-portable wheeled carts are pulled along the ground surface and are suitable to smaller, flat, and obstruction-free environments. Carried litters are best suited to environments which can be safely accessed by a walking sensor operator, but where terrain and topography or obstructions preclude even wheeled carts. DGM techniques cannot be performed in areas where steep slopes or dangerous terrain preclude safe access to sensor operators, regardless of the sensor form factor selected.

EM sensors detect metallic objects with high spatial resolution and accuracy. Surveys can be designed to achieve up to 100% coverage of selected areas, given available access. EM sensor data is recorded in conjunction with real time kinematic GPS in open areas or robotic total station in areas with canopy to achieve accurate positioning of survey data. Following data processing, analysis, and quality control, a dig list is developed to identify anomalies to be reacquired and excavated. In the event a MEC item is found during the intrusive investigation, the item will be treated and disposed of in accordance with established procedures.

Detection thresholds are established by burying ISOs representative of MEC potentially present at the site in an IVS. Sensors complete multiple passes over each ISO to determine a detection threshold for each ISO. The processes to establish detection thresholds and blind seeding are implemented in accordance with the Geophysical System Verification (GSV): A Physics-Based Alternative to Geophysical Prove-Outs for

Munitions Response, Addendum (Environmental Security Technology Certification Program, 2015). Survey parameters and DQO's are designed in accordance with established guidance. Post-removal verification (PRV) is conducted whereby a percentage, generally 10% of the area cleared, is re-surveyed after the subsurface clearance has been completed to confirm that no subsurface anomalies above project goals remain. Qualified geophysicists and UXO technicians perform the DGM, anomaly reacquisition, excavation, and PRV.

5.1.3.3 Advanced Geophysical Classification

AGC deploys advanced EM sensors on a variety of platforms, processes sensor responses using a series of physics-based models and compares the responses to a library of known MEC items to classify anomalies to the closest match (USACE, 2015). This advanced classification is used to develop a prioritized dig list that identifies anomalies most likely to represent MEC.

Platforms include towed arrays, carried litter, or man-portable cart configurations. Towed arrays are pulled behind an all-terrain vehicle and are best suited to large, generally flat, and obstruction-free environments. Man-portable wheeled carts are pulled along the ground surface and are suitable to smaller flat and obstruction-free environments. Carried litters are best suited to environments which can be safely accessed by a walking sensor operator, but where terrain and topography or obstructions preclude even wheeled carts. AGC techniques cannot be performed in areas where steep slopes or dangerous terrain preclude safe access to sensor operators, regardless of the sensor form factor selected.

AGC may be used as a stand-alone option or in combination with other technologies to refine and prioritize the dig list.

5.1.4 EXCAVATION

Excavation of impacted soil is performed to remove existing contamination and prevent further transport of contamination. In areas potentially containing MEC, excavation is performed in lifts only after surface/subsurface clearance. Areas are cleared to a predetermined depth (based on site conditions and instrument limitations) using surface and subsurface clearance techniques. If any MEC is present, it is treated and removed based on established procedure. Once it is determined that no MEC is present to a certain depth, that soil can be removed. The process is then repeated (clearance, address any MEC, excavate) until the total excavation depth is reached.

Excavated soil is disposed of at an approved on- or off-site location. The excavation site is backfilled and graded based on planned use.

5.2 SCREENING OF CORRECTIVE MEASURES ALTERNATIVES

Potential technologies and process options identified in Section 5.1 have been screened to evaluate limitations of specific technologies and identify which may be unfeasible based on site-specific conditions (OSWER, 1994). Potential technologies and process

options are screened based on effectiveness, implementability, and cost. Effectiveness is the degree to which a technology or process option would achieve the intended outcome. Implementability is a measure of the technical and administrative feasibility of deploying a given technology. Cost plays a limited role at this stage in the alternative development process; relative costs are used rather than detailed estimates.

5.2.1 LAND USE CONTROLS

LUCs are advantageous because of relative simplicity, fast implementation times, and lower implementation costs. Effective LUCs can limit direct exposure to MEC and MC. The limitations of LUCs are that there is no contaminant removal, and stakeholders must coordinate the implementation of LUCs for the anticipated life cycle of the MRS.

5.2.1.1 Institutional Controls

ICs are administrative and legal controls that help minimize the potential for human exposure to any contamination on a property, or to protect the integrity of any environmental remedy already completed.

5.2.1.1.1 Land Use Restrictions

LURs limiting use to industrial prohibiting redevelopment for residential purposes are a potentially applicable technology for the MRS. Properly implemented and maintained LURs can effectively limit exposure of sensitive populations to potential hazards remaining at the MRS. The administrative mechanisms used to implement LURs (Master Plans, LUCIPs) are relatively simple and low cost. The long-term effectiveness of LURs is dependent on purposeful implementation, regular review, and engagement of stakeholders.

LURs are included in the Interim Action currently in place for the MRS (USACE, 2013b) and is carried through for inclusion in a CMA.

5.2.1.1.2 Permits

A permit process to prevent inadvertent exposure to subsurface MEC items is a potentially applicable technology for the MRS. FTSW has a robust Dig Permit process in place; the requirements of the dig permit would be triggered by the DPW Environmental review of the Internal Job Order (IJO) for the proposed construction activities. FTSW also has an administrative mechanism through their IJO review system to assure that prior to any construction action all sites are reviewed to determine if the proposed area is within an active or former remedial site (USACE, 2019).

The administrative mechanisms used to implement the Dig Permit and IJO program are relatively simple and low cost. The long-term effectiveness of the process is dependent on engagement of stakeholders and maintenance of Geographic Information System databases.

Dig permits and construction support are included in the Interim Action currently in place for the MRS (USACE, 2013b) and is carried through for inclusion in a CMA.

5.2.1.1.3 Education/Training

Education and training to inform potential receptors and prevent inadvertent exposure to subsurface MEC items are potentially applicable technologies for the MRS. A portion of the MRS contains an active ASP that is accessible to authorized personnel. Areas of the MRS outside of the ASP fence line are potentially accessible to trespassers. Public education and worker training may be used to inform potential receptors about hazards at the MRS.

The administrative mechanisms used to implement education and training programs are relatively simple and low cost. The long-term effectiveness of education and training is dependent on regular updates and engagement of stakeholders.

Education/training are carried through for inclusion in a CMA.

5.2.1.1.4 Signage

Signage to inform potential receptors and prevent inadvertent exposure to subsurface MEC items is a potentially applicable technology for the MRS.

Design, installation, and maintenance of signage is relatively simple and low cost. The long-term effectiveness of signage is dependent on design considerations (language, literacy, consistency), sign placement (along roads and fence lines), and regular inspection and maintenance.

Signage requirements are included in the Interim Action currently in place for the MRS (USACE, 2013b) and are carried through for inclusion in a CMA.

5.2.1.2 Engineering Controls

ECs are designs or modifications to equipment, industrial plants, processes, or systems that reduce the risk of worker exposure to a hazard. They operate on a “hazard isolation principle,” either by removing a hazardous workplace condition or by placing a barrier between the worker and the hazard. These methods control hazards either at the source of the hazard or in transmission, rather than protecting the worker at the point of exposure to the hazard.

5.2.1.2.1 Fencing

Fencing to prevent access to hazardous areas is a potentially applicable technology for the MRS. Some fencing already exists at the MRS; the ASP is completely enclosed in a fence and has several access control measures in place (locks, traffic calming barriers, guards).

Installing additional fencing is not easily implemented at the MRS. Although the entire MRS is located on land owned/controlled by FTSW, areas outside of the ASP are heavily wooded and/or regularly contain standing water (drainage ditches).

A requirement to maintain the existing ASP fence line is included in the Interim Action currently in place for the MRS (USACE, 2013b) and is carried through for inclusion in a CMA.

5.2.2 SURFACE CLEARANCE

Surface clearance to identify MPPEH items at the ground surface is a potentially applicable technology for the MRS. The advantages of an instrument-aided visual surface survey and removal are that MEC items found during the clearance activities are removed, reducing the overall MEC hazard; surface clearance is relatively low-tech and can be implemented using commonly available technologies and personnel; and time to implement is comparatively short. Potential limitations include high labor costs for large or dense areas; access may be limited based on terrain, vegetation, or safety considerations; and subsurface MEC is not addressed.

Multiple comprehensive surface clearances have been performed at the MRS as part of the RFI (ERT, 2014) and as part of the QR performed in support of this CMS in 2019. Additional surface clearance activities are not likely to provide actionable data and the technology is not carried forward for inclusion in a CMA.

5.2.3 SUBSURFACE CLEARANCE

Subsurface clearance to identify MEC items is a potentially applicable technology for the MRS. When screening subsurface clearance technologies and assembling CMAs, probability of detection will be prioritized over ease of use, multiple methods may be employed, and less capable methods may be used in localized areas (based on access or other constraints) provided the project objectives are still met.

In order to achieve UU/UE conditions, a subsurface clearance of 100% of the MRS is required. If a subsurface clearance of 100% of the MRS is not performed, additional controls after clearance would be required to prevent inadvertent exposure to a potential subsurface explosive hazard. Site constraints that could prevent 100% coverage of the MRS include detector interference, the large MRS size, and natural features, such as wetland areas. These constraints also impact overall effectiveness, implementability, and cost.

Potential sources of detector interference hinder the effectiveness and implementability of subsurface clearance and can significantly increase the cost. The MRS contains an active ASP; there are no plans to alter or move ASP operations. The ASP contains numerous storage bunkers and an extensive network of underground utilities. These present a significant source of potential detector interference. In addition, previously completed surface clearance activities identified a large number of metallic trash items such as tin cans and metal strapping over much of the MRS, another potential source of

detector interference. These potential sources of detector interference may increase the number of anomalies that are intrusively investigated, increase the time required to complete the survey, and increase the potential that a MEC item will be missed.

The size of the area adversely affects the effectiveness and implementability of subsurface clearance and can significantly increase the cost. The MRS covers a total of 77 acres including structures, storage bunkers, and paved areas (57 acres excluding structures, storage bunkers and paved areas). The subsurface clearance for the 2014 RFI covered approximately 7.102 acres or approximately 12.5% of the 57-acre searchable area of the MRS. In order to achieve total subsurface clearance, 100% coverage of the MRS area would be required. Anything less than 100% subsurface clearance would require additional controls upon completion.

Access constraints also impact effectiveness, implementability, and cost. The ASP contains multiple bunkers with steep slopes that limit which detectors may be used. Areas outside of the ASP may be heavily wooded and/or regularly saturated with standing water, restricting access for all types of detectors. These factors decrease the total percentage of the MRS that can be included in screening transects, which would preclude achievement of UU/UE conditions.

Based on the site-specific constraints, only localized subsurface clearance is carried forward for inclusion in a CMA. Although site-wide subsurface clearance is not likely to be effective based on the site constraints, localized subsurface clearance to support construction or other intrusive activities would be an effective method to prevent inadvertent contact of receptors with a potential subsurface explosive hazard. AGM (mag and dig), DGM, and AGC are all potentially applicable localized subsurface clearance technologies for the MRS.

5.2.3.1 Analog Geophysical Mapping (Mag and Dig Operations)

Subsurface MEC identification through AGM (mag and dig) is potentially applicable for the MRS. It is a common method for detecting metal on the ground surface or buried in the subsurface. The hand-held detectors are small and light, allowing the technology to perform well in difficult and variable terrain, as well as in smaller areas with access constraints (although it is limited by extreme topography and safe access concerns for technicians). It does have a lower overall probability of detection (approximately 50% to 70%) and higher incidence of false alarms than other technologies. In addition, effective QC of an analog sweep is also inherently more difficult, as sensor data are not recorded and mapped, and it is challenging to measure the ability of the UXO technician to interpret the analog detector's signal (DoD, 2007).

AGM (mag and dig) technology is not effective at differentiating MEC from other metallic items. Each anomaly located using this technique needs to be investigated for identification by UXO technicians, therefore the number of anomalies investigated is relatively higher.

Based on the site-specific constraints, localized AGM (mag and dig) (for intrusive activity support) is carried forward for inclusion in a CMA.

5.2.3.2 Digital Geophysical Mapping

Subsurface MEC identification through DGM is potentially applicable for the MRS. It is a common method for detecting metal in the subsurface. The overall probability of detection is approximately 90% to 100%, when detecting metallic objects with high spatial resolution and accuracy and allowing for a high level of QC. DGM technology can be deployed on a variety of platforms based on the terrain but is not feasible in areas with steep slopes or otherwise inaccessible/unsafe terrain.

The number of intrusive anomaly investigations is generally lower for DGM based on the ability to better differentiate between metallic non-MEC items.

Based on the site-specific constraints, localized DGM (for intrusive activity support) is carried forward for inclusion in a CMA.

5.2.3.3 Advanced Geophysical Classification

Subsurface MEC identification through AGC is potentially applicable for the MRS. It is a common method for detecting metal in the subsurface. The overall probability of detection is approximately 99%, and the technology is able to prioritize anomalies that are most likely MEC with accuracy not available when using other technologies. AGC compares detected anomalies with a database of known MEC items to find the closest match. The complexity of this technology results in a higher equipment cost, but the cost can be offset by the lower number of intrusive anomaly investigations.

Similar to DGM, AGC technology can be deployed on a variety of platforms based on the terrain but is not implementable in areas with steep slopes or otherwise inaccessible/unsafe terrain.

Based on the site-specific constraints, localized AGC (for intrusive activity support) is carried forward for inclusion in a CMA.

5.2.4 EXCAVATION

Excavation is not a potentially applicable technology for the MRS. The nature of contamination, MRS area, land use and existing infrastructure, and natural features adversely affect the effectiveness, implementability, and cost of excavation.

MC have not been identified as contaminants of potential concern at the MRS. There may be localized MC contamination in soil associated with MEC items in the subsurface that have not yet been located and treated/removed. However, widespread contamination in soil (including contamination that would adversely impact groundwater or surface water) has not been identified. Excavation would result in removal of a significant amount of soil that is not contaminated, resulting in unnecessary complexity and cost.

Excavation would require extensive subsurface clearance to ensure no MEC was encountered during intrusive activities. The implementability of site-wide subsurface clearance would be significantly limited by access (active ASP, wooded areas, areas with standing water) and interference (ASP infrastructure).

The MRS is approximately 77 acres and it is estimated that MEC items may be present at depths down to approximately three feet bgs (based on type of munitions and firing strategies). Excavation would result in a prohibitively large volume of soil removal, approximately 372,680 cubic yards.

A portion of the MRS is occupied by an active ASP. For excavation to occur, ASP operations would need to be relocated (either permanently or temporarily) and the existing associated infrastructure (bunkers and underground utilities) would need to be addressed.

Excavation is also hindered by the areas with standing water and heavily wooded areas outside the ASP fence line.

Based on these considerations, excavation is not carried forward for inclusion in a CMA.

5.3 RETAINED CORRECTIVE MEASURES ALTERNATIVE

Potentially applicable technologies and process options are assembled into CMAs for further analysis. Evaluation of a single or limited number of alternatives may be appropriate for less complex sites (OSWER, 1994).

For the Anti-Aircraft Range 90-MM–2 MRS, the retained CMA is a series of LUCs including: LURs, permits, construction support, education/training, signage, and fencing. Most of these measures are already in place as part of the Interim Measures defined in the Non-Time Critical Removal Action Land Use Control Plan (USACE, 2013b).

LURs will restrict current and future land use to industrial only; future redevelopment for residential purposes, daycares, hospitals, or schools will be prohibited. MRS LURs will also prohibit unsupervised excavation. LURs will be established in the Base Master Plan (BMP) and the FTSW LUCIP.

Permits will be required for intrusive activities at the MRS. This will be managed under the existing FTSW Dig Permit program. The FTSW Dig Permit policy requires FTSW Safety to employ EOD support for locations that potentially contain MPPEH (USACE, 2019).

Construction support will be required at the MRS to prevent inadvertent contact with MPPEH during construction activities. UXO personnel trained in accordance with DDESB TP 18 will be required to be on-site to perform construction support services for the duration of any planned intrusive activities. Any identified MPPEH will be investigated and treated/removed as appropriate. Once the designated area has been cleared to a specified depth (determined by site conditions and limitations of the detectors used for

clearance), excavation will be performed to the cleared depth only. The process will be repeated (clearance then excavation) until the total required excavation depth has been reached. Construction support requirements will be established in the BMP and FTSW LUCIP. If applicable, potential MC in surrounding soil will also be addressed.

Education and training will be used to inform potential receptors of MRS hazards and prevent inadvertent exposure to subsurface MEC items. Education will be provided as part of public engagement. Training will be provided to FTSW workers who access the ASP. Education will include an awareness-level discussion of potential hazards at the MRS and discourage trespassing. All educational materials will be maintained as part of the FTSW Administrative Record. Worker training will define potential hazards at the MRS, identify required procedures designed to prevent exposure to hazards (LURs, dig permit, and construction support), and identify applicable points of contact. Training will be provided to new workers and refreshers will be conducted on an annual basis. Education and training requirements will be established in the FTSW LUCIP.

Signage will be required to identify potential hazards at the MRS and prevent inadvertent exposure. Signs will include both pictographs and written warnings and will be posted along the roads approaching the MRS and along the ASP fence line. Regular inspection and maintenance will be required to ensure effectiveness. Signage requirements will be defined in the BMP and FTSW LUCIP.

Existing fencing around the ASP will be maintained. Regular inspection and maintenance will be required to ensure effectiveness. Fencing requirements will be defined in the BMP and FTSW LUCIP.

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6.0 EVALUATION OF THE FINAL CORRECTIVE MEASURE

The retained CMA (LUCs) and a No Action alternative are evaluated for protection of human health and the environment, attainment of media cleanup standards, control of current and future releases, compliance with applicable standards for management of waste, reduction in toxicity, mobility, and volume, effectiveness, implementability, and cost.

6.1 ALTERNATIVE 1 – NO FURTHER ACTION

Under the No Action alternative, no additional investigation or remediation will be performed at the MRS, and no additional controls will be implemented.

At the current time, there are installation-wide and site-specific interim measure LUCs that provide some protection for receptors from the potential subsurface explosion hazard at the MRS. The MRS is controlled by FTSW and is therefore covered by the BMP. The FTSW Dig Permit program defines oversight activities for intrusive activities. Access to the ASP is controlled by fencing, a gate, guards, and signage. Additional hazard signage is present on the approach to the ASP (USACE, 2013b). Ongoing implementation of LUCs is dependent on U.S. Army control of the land occupied by FTSW; however, several layers of protections will remain in place in the case of a property transfer, as required under statute and regulation.

6.1.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This alternative provides limited protection of human health and the environment through prevention of inadvertent exposure of receptors to MEC items that may be present in the subsurface. LURs prevent use of the site by sensitive populations and require oversight for intrusive activities. Dig permits define the oversight for intrusive activities. Access control at the ASP prevents entry by unauthorized personnel. Signage defines authorized personnel for the area and warns potential receptors of the explosive hazard at the ASP, but does not define the hazard for the entire MRS.

There is no specific definition of the potential hazard at the MRS as it is not included in the LUCIP; LUCs are defined through installation-wide programs and site-specific interim measures (USACE, 2013b).

6.1.2 ATTAINMENT OF MEDIA CLEANUP STANDARDS

The existing limited FTSW LUCs can attain remediation goals for the MRS. The nature of contamination at the MRS is subsurface MEC. The MRS remediation goal is prevention of human contact with potential explosive hazards. Human health is protected through prevention of inadvertent exposure of receptors to MEC items that may be present in the subsurface.

6.1.3 CONTROL OF CURRENT AND FUTURE RELEASES

The existing limited FTSW LUCs control current and future releases at the MRS. The nature of contamination at the MRS is subsurface MEC; previous investigations indicated that widespread contamination in soil (including contamination that would adversely impact groundwater or surface water) is not present. Dig permits ensure that MPPEH in the subsurface that may be disturbed as part of intrusive activities will be identified, treated, and removed as appropriate. This includes addressing surrounding soil potentially impacted with MCs.

6.1.4 COMPLIANCE WITH APPLICABLE STANDARDS FOR MANAGEMENT OF WASTES

The existing limited FTSW LUCs will only generate waste as part of controlled intrusive activities. Dig permits and construction support ensure that UXO experts are involved in intrusive activities at the MRS. Investigation, treatment, removal, and disposal of MEC and associated MC contaminated soil (if applicable) will be performed by qualified personnel in accordance with applicable guidance and regulations.

6.1.5 OTHER FACTORS

The existing limited FTSW LUCs are reliable and effective, easily implementable, and relatively low cost.

6.1.5.1 Long -Term Reliability and Effectiveness

The long-term reliability and effectiveness of LUCs is dependent on purposeful implementation, regular review, and engagement of stakeholders. Implementation of the limited FTSW LUCs is based on the installation needs and is not linked to any specific condition at the MRS. Ongoing implementation of those LUCs is dependent on U.S. Army control of the land occupied by FTSW; however, several layers of protections will remain in place in the case of a property transfer, as required under statute and regulation.

6.1.5.2 Reduction in the Toxicity, Mobility, or Volume of Wastes

The existing limited FTSW LUCs prevent inadvertent exposure of receptors to the explosive hazards potentially present at the MRS. When properly implemented, they provide layers of redundant controls to ensure receptors are not exposed to MEC in the subsurface.

Based on site conditions and the types of munitions used at the MRS, it is not anticipated that MEC would be pushed to the surface from the subsurface, or that erosion would result in formerly buried items becoming exposed. In addition, previous investigations indicated that widespread MC contamination in soil (including contamination that would adversely impact groundwater or surface water) is not present at the MRS.

LUCs would reduce volume of waste only in the event subsurface clearance performed during supervised intrusive activities (under dig permit requirements) identified MEC items for treatment and removal.

6.1.5.3 Short-Term Effectiveness

The limited FTSW LUCs are currently in place.

6.1.5.4 Implementability

Implementation of the limited FTSW LUCs is managed through the BMP and existing administrative processes. Site-specific measures are defined in the interim action plan (USACE, 2013b).

6.1.5.5 Cost

LUCs are relatively low cost, requiring updates to and review of the BMP, management of permit mechanisms, and inspection and maintenance of signs and fences. These costs will exist for the life cycle of the installation.

6.2 ALTERNATIVE 2 – LAND USE CONTROLS

The retained CMA defines LUCs for the MRS to include: LURs; Permits; Construction Support; Education/Training; Signage; and Fencing. This alternative includes expanded LUCs compared to the No Action Alternative and designates final LUCs specifically for the MRS (rather than relying on interim measures and generic base-wide LUCs).

6.2.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

LUCs are protective of human health and the environment. Human health is protected through prevention of inadvertent exposure of receptors to MEC items that may be present in the subsurface. LURs prevent use of the site by sensitive populations and require oversight for intrusive activities. Dig permits define the oversight for intrusive activities. Construction support ensures that potential MEC items in the subsurface are addressed prior to intrusive construction activities. Education and training provide information on MRS hazards to potential receptors, preventing accidental exposure. Signage defines hazardous areas for potential receptors, preventing accidental access to hazardous areas. Fencing provides a physical barrier between potential receptors and a portion of the hazardous area. All these LUCs provide layers of redundant controls that ensure prevention of inadvertent exposure.

Current conditions are considered protective of the environment. Previous investigations indicated that widespread MC contamination in soil (including contamination that would adversely impact groundwater or surface water) is not present at the MRS.

6.2.2 ATTAINMENT OF MEDIA CLEANUP STANDARDS

LUCs attain remediation goals for the MRS. The nature of contamination at the MRS is subsurface MEC. The MRS remediation goal is prevention of human contact with potential explosive hazards. Human health is protected through prevention of inadvertent exposure of receptors to MEC items that may be present in the subsurface.

6.2.3 CONTROL OF CURRENT AND FUTURE RELEASES

LUCs control current and future releases at the MRS. The nature of contamination at the MRS is subsurface MEC; previous investigations indicated that widespread contamination in soil (including contamination that would adversely impact groundwater or surface water) is not present. Dig permits and construction support ensure that MPPEH in the subsurface that may be disturbed as part of intrusive activities will be identified, treated, and removed as appropriate. This includes addressing surrounding soil potentially impacted with MCs.

6.2.4 COMPLIANCE WITH APPLICABLE STANDARDS FOR MANAGEMENT OF WASTES

LUCs will only generate waste as part of controlled intrusive activities. Dig permits and construction support ensure that UXO experts are involved in intrusive activities at the MRS. Investigation, treatment, removal, and disposal of MEC and associated MC contaminated soil (if applicable) will be performed by qualified personnel in accordance with applicable guidance and regulations.

6.2.5 OTHER FACTORS

LUCs are reliable and effective, easily implementable, and relatively low cost.

6.2.5.1 Long -Term Reliability and Effectiveness

The long-term reliability and effectiveness of LUCs is dependent on purposeful implementation, regular review, and engagement of stakeholders. Implementation of LUCs must be conducted for the anticipated life cycle of the MRS. Most of the LUCs in the proposed CMA are already in place as part of the Interim Measures defined in the Non-Time Critical Removal Action Land Use Control Plan (USACE, 2013b). These measures have been maintained through the BMP and will be added to the FTSW LUCIP.

6.2.5.2 Reduction in the Toxicity, Mobility, or Volume of Wastes

LUCs prevent inadvertent exposure of receptors to the explosive hazards potentially present at the MRS. When properly implemented, they provide layers of redundant controls to ensure receptors are not exposed to MEC in the subsurface.

Based on site conditions and the types of munitions used at the MRS, it is not anticipated that MEC would be pushed to the surface from the subsurface, or that erosion would

result in formerly buried items becoming exposed. In addition, previous investigations indicated that widespread MC contamination in soil (including contamination that would adversely impact groundwater or surface water) is not present at the MRS.

LUCs would reduce volume of waste only in the event subsurface clearance performed during supervised intrusive activities (under dig permit or construction support requirements) identified MEC items for treatment and removal.

6.2.5.3 Short-Term Effectiveness

Full implementation of LUCs can occur relatively quickly. Most of the LUCs in the proposed CMA are already in place as part of the Interim Measures defined in the Non-Time Critical Removal Action Land Use Control Plan (USACE, 2013b).

6.2.5.4 Implementability

Implementation of LUCs is straightforward and relatively simple. LUCs for the MRS and other sites at FTSW are managed through the BMP and FTSW LUCIP. Most of the LUCs in the proposed CMA are already in place as part of the Interim Measures defined in the Non-Time Critical Removal Action Land Use Control Plan (USACE, 2013b).

6.2.5.5 Cost

LUCs are relatively low cost, requiring updates to and review of the BMP and FTSW LUCIP; management of permit mechanisms; provision of UXO expertise for intrusive activity support; development and implementation of education and training programs, and inspection and maintenance of signs and fences. These costs will exist for the life cycle of the MRS.

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7.0 FINAL CORRECTIVE MEASURE ALTERNATIVE

The recommended CMA for Anti-Aircraft Range 90-MM-2 MRS is LUCs: LURs; Permits; Construction Support; Education/Training; Signage; and Fencing. LUCs prevent inadvertent exposure of receptors to the explosive hazards potentially present at the MRS. When properly implemented, they provide layers of redundant controls to ensure receptors are not exposed to MEC in the subsurface. Most of these measures are already in place as part of the Interim Measures defined in the Non-Time Critical Removal Action Land Use Control Plan (USACE, 2013b).

LURs will restrict current and future land use to industrial only and prohibit unsupervised excavation. Dig permits will be required for intrusive activities at the MRS under the existing FTSW Dig Permit program. Construction support from UXO personnel will be required at the MRS during construction activities. Education and training will be used to inform potential receptors (site workers and potential trespassers) of MRS hazards. Signage will be maintained along approaches to the MRS and along the ASP fence line to identify potential hazards at the MRS. Existing ASP fencing will be maintained to control access to portions of the MRS. These LUCs will be defined and enforced through the BMP and FTSW LUCIP.

This CMA is protective of human health and the environment; attains the remediation goal of protecting receptors from potential explosive hazards; controls current and future releases; complies with waste management standards; is reliable and effective in both the short- and long-term; is relatively simple to implement (through established administrative mechanisms); and is cost effective.

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APPENDIX A – SCREENING DEVELOPMENT WORKSHEET

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Remediation Goals:
Nature of contamination MEC in subsurface MCs not COPCs No widespread soil contamination (including contamination potentially impacting groundwater) Remediation goal: Prevent exposure of human receptors to potential explosive hazards associated with MEC in the subsurface.

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Technologies:							
Response Action Category	**Potential Technology**	**Process Options**	**Description**	**Effectiveness**	**Implementability**	**Cost**	**Rationale**
Land Use Controls	Institutional Controls	Land Use Restrictions	Restrictions on land use implemented by the land owner to control exposure to potential hazards.	Only controls exposure, not sources. Depends on implementation and maintenance.	High	Low	Land controlled by FTSW. Active ASP located on MRS (no land use changes anticipated). LURs included in existing Interim Action (2013). Restricted to industrial use and no unsupervised intrusive activities. Confirm appropriate notations in BMP and add to LUCIP.
		Permits	Permit requirements may be used to control activities that may result in exposure to potential hazards.	Only controls exposure, not sources. Depends on implementation and maintenance.	High	Low	FTSW has a robust Dig Permit process in place. BMP requires GIS database to record locations of potential MEC and MD (in support of Dig Permit process). DWP involves Safety and EOD in locations where MEC/MD may be present. Included in existing Interim Action (2013). All intrusive activities required to go through Dig Permit process (connected to LURs). Confirm appropriate notations in BMP and add to LUCIP.
		Education/Training	Hazard awareness education/training for potential receptors.	Only controls exposure, not sources. Depends on implementation and maintenance.	High	Low	Only a portion of the MRS is within a fence line (ASP). Approach roads can be accessed from public roads. Public engagement to discourage trespassing as part of public outreach. Develop materials (consider FTSW templates and guidelines) and retain as part of Admin Rec. Add to LUCIP.
		Signage	Signage identifies potential hazards through wording or symbols and the mitigation measures to be taken that are protective of human health.	Only controls exposure, not sources. Depends on implementation and maintenance.	High	Low	Warning signs already present on approach roads and along ASP fence. Review to ensure they are adequate (language and pictograms, consider audiences [workers and trespassers]) and locations are appropriate. Included in existing Interim Action (2013). Inspection and maintenance requirements. Confirm notations in BMP, add to LUCIP.
	Engineering Control	Fencing	Fencing restricts access to hazardous areas.	Only controls exposure, not sources. Depends on maintenance.	High	Medium	A portion of the MRS (the ASP) is surrounding by fencing and has access control measures (gate, guard, traffic calming measures). Installation of additional fence (to completely surround the MRS) would be difficult b/c of wetlands and dense woods. Included in existing Interim Action (2013). Inspection and maintenance requirements. Confirm notations in BMP, add to LUCIP.

Response Action Category	Potential Technology	Process Options	Description	Effectiveness	Implementability	Cost	Rationale
Surface Clearance	MEC Removal	Instrument-Aided Visual Survey	An UXO dig team uses hand-held analog equipment to assist in the surface identification of MEC in real time.	No intrusive activities; identify potential items only, no ability to classify or attempts to remove.	High	Medium	Surface clearances using instrument aided visual surveys are common, and can be designed around site-specific factors. Access limitations: wetlands and dense woods. Underground utilities and bunkers on the ASP are a significant source of detector interference. Several surface clearances have been completed (2014 RFI, 22019 DAWSON effort). Additional surface clearances would not provide useful information.
Subsurface Clearance	MEC Removal (near surface, 0-1 ft)	Mag and Dig with Analog Metal Detectors	A UXO dig team uses hand-held analog equipment to locate MEC in real time for removal.	Probability of Detection is approximately 50%-70%.	High	Medium	Mag and Dig is a useful process option for accessible areas not conducive to DGM and/or AGC based on topography, terrain, vegetation, or other localized factors. The implementability of Mag and Dig is low for unfavorable topography (slopes > 30 degrees). Lower probability of detection, lower quality data, more intrusive investigations (does not differentiate). Access limitations: wetlands and dense woods. Underground utilities and bunkers on the ASP are a significant source of detector interference.
		Digital Geophysical Mapping	A team uses geophysical detection equipment with GPS to digitally map anomaly locations for removal.	Probability of Detection is approximately 90%-100%.	Medium	High	DGM to identify subsurface anomalies is commonly used and can generally be designed around site specific factors that affect accessibility. Probability of detection high, higher quality data, shorter dig lists than M&D (better at differentiating). Access limitations: wetlands and dense woods. Underground utilities and bunkers on the ASP are a significant source of detector interference.
		Advanced Geophysical Classification	A team uses AGC geophysical detection equipment with GPS to select anomalies likely to be UXO for intrusive investigation.	Probability of Detection is approximately 100%.	Medium	Medium	AGC to identify subsurface anomalies is commonly used and can be designed around site specific factors. The implementability of AGC is dependent upon on accessibility (vehicular-based and man-portable units based on terrain). Highest probability of detection, high quality data, excellent differentiation resulting in smallest dig lists. Costs are considered medium, because AGC results in fewer physical intrusive investigations than DGM. Access limitations: wetlands and dense woods. Underground utilities and bunkers on the ASP are a significant source of detector interference.
Excavation	Excavation	Excavation	Soil and items contained in soil are removed and replaced with clean fill. Depth of excavation based on goal to remove MEC and address contamination in soil.	Would remove all sources.	Not implementable	High	Large area (77 acres). Contains an active ASP with bunkers and underground utilities. Would have to excavate in lifts only after clearance to identify/treat/remove MPPEH. Estimated depth of MEC (based on types fired) may be up to 4 ft (confirm). Wetland and dense wooded areas. Based on the results of the RFI (2014) MCs are not COPCs and the focus of excavation would be MEC removal. Excavation would remove a large amount of clean soil.
Disposal	Disposal	Disposal	Final disposition of excavated material in an appropriate landfill.	Transfers the contamination to another location where it is managed.	Not implementable	High	In the event the 77 acre MRS were excavated at a depth of approximately 4 feet for disposal (based on estimated depths of potential MEC items), the amount of soil generated for disposal would be prohibitively high.

Corrective Measures Alternatives:												
Alternative	**Included Technologies**	**Description**	**Protection of Human Health and the Environment**	**Ability to Attain Cleanup Standards**	**Control Source of Releases**	**Compliance with Applicable Waste Management Standards**	**Long-term Reliability and Effectiveness**	**Reduction in Waste Toxicity, Mobility, or Volume**	**Short-term Effectiveness**	**Implementability**	**Cost**	**Rationale**
Land Use Controls	Land Use Restrictions Fencing Signage Education	1. Land Use Restrictions will restrict current and future land use to industrial and require a permit for intrusive activities. 2. Dig Permits/Construction Support 3. Education/Training 4. Signage 5. Fencing	Medium	Low	Low	High	Medium	Low	High	High	Low	1. Effectiveness based on implementation and maintenance of institutional controls. 2. No waste generated.
No Further Action	Land Use Restrictions Fencing Signage currently in place in accordance with the 2013 Interim Measures	1. Land Use Restrictions will restrict current and future land use to industrial and require a permit for intrusive activities. 2. Dig Permits/Construction Support 3. Education/Training 4. Signage 5. Fencing	Medium	Low	Low	High	Medium	Low	High	High	Low	1. Effectiveness based on implementation and maintenance of current institutional controls. 2. No waste generated.
NOT INCLUDED												
Surface and Subsurface Clearance (Entire MRS)	Surface and Subsurface Clearance	1. Identification, investigation, and removal of all anomalies using DGM or AGC. The entire MRS will be addressed.	High	High	High	Medium	High	High	High	Low	High	1. Generates waste for disposal. 2. Number of anomalies is very high. 3. Risk to UXO Technicians during investigation and removal. 4. Impacts to operations during clearance.
Surface and Subsurface Clearance (Outside Fence Only) and Land Use Controls (Inside Fence Only)	Surface and Subsurface Clearance using Land Use Restrictions Fencing Signage Education	1. Identification, investigation, and removal of all anomalies using DGM or AGC. The portion of the MRS outside the existing fence will be addressed; no additional identification and removal will occur inside the fence. 2. Land Use Restrictions will restrict current and future land use inside the fence to industrial and require a permit for intrusive activities. 3. Fencing will be maintained to prevent inadvertent access. 4. Signs will be maintained to inform workers and the public about potential hazards. 5. Training will be provided for workers to inform them of potential hazards.	High	High	High	Medium	High	High	High	Low	High	1. Generates waste for disposal. 2. Number of anomalies is very high. 3. Risk to UXO Technicians during investigation and removal. 4. Impacts to operations during clearance.
Surface Clearance (Entire MRS) and Land Use Controls	Surface Clearance using Land Use Restrictions Fencing Signage Education	1. Land Use Restrictions will restrict current and future land use to industrial and require a permit for intrusive activities. 2. Fencing will be maintained to prevent inadvertent access. 3. Signs will be maintained to inform workers and the public about potential hazards. 4. Training will be provided for workers to inform them of potential hazards.	High	High	High	Medium	High	Medium	High	High	Medium	1. Number of anomalies is very high. 2. No waste generated. 3. Risk to UXO Technicians during investigation and removal. 4. Impacts to operations during clearance.

Multiple surface clearances have been performed. It is not anticipated that additional surface clearance would provide addition useful data or result in any MEC removal.

LUCs are already in place as part of the 2013 Interim Measures.

Subsurface clearance included only for Construction Support. Subsurface clearance over the entire MRS has very low implementability and effectiveness b/c of the active ASP operations, ASP bunkers, ASP underground utilities, wetlands (drainage ditch), and dense woods.

References:			
Date	**Title**	**Author/Owner**	**Information**
2013 (October)	Final Non-Time Critical Removal Action Land Use Control Plan	USACE	Interim measures put in place for Anti-Aircraft Range 90-mm-2 (FTSW-002-R-01): LUCs.
2014 (August)	Final Revised MMRP RCRC Facility Investigation Report	USACE	Clearance results, MEC density estimates. MCs not COPS in soil, sediment, or surface water.
2017 (August)	Hazardous Waste Facility permit HW-045(S)-4	GAEPD	
2016 (September)	Fort Stewart Installation Action Plan	DERP	Exit strategy for FTSW-002-R-01: excavation and off-site disposal.
2019 (January)	Final Land Use Control Implementation Plan	USAEC/USACE	Implementation of LUCs on FTSW.
1994 (May)	RCRA Corrective Action Plan (OSWER Directive 9902.0-2A)	OSWER	Options for addressing less complex sites could be relatively straight-forward and may only require evaluation of a single or limited number of alternatives.

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APPENDIX B – DAILY QUALITY CONTROL REPORTS

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DAWSON

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	29-Oct-19	**001**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	70	MPH	6	Precip. (In/Dy.)	1
				High	85	Dir	SSW	Humidity (%)	85

Additional Weather Comments

Rain from 0900- 1700. Lightning hold for 30 minutes.

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Kaalekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	
TOTAL Work-Hours from Start of Construction	**60.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	29-Oct-19	**001**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Reviewed APP and Work Plan. Attended UXO brief at Department of Public Works (DPW) Fort Stewart. Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. Set up the IVS as per the work plan. The GPS team laid the baseline of the corner stakes. Completed 8.75 acres of surface sweeps, recorded 295 anomalies and 32 polygons in the GPS. 7 acres were recorded by the GPS Team.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Conducted onsite training on all activity hazard analyses (AHAs), the Quality Assurance Project Plan (QAPP), Accident Prevention Plan (APP), and the hospital route.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	29-Oct-19	**001**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted Preliminary and Initial QC inspections. The Instrument verification strip (IVS) was installed and documented and meets the site specific standards. 10% of the 8.75 acres completed today was QC checked. All work is being accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

Notifications between DPW and the ASP we ineffective. Our presence came a complete surprise. After a 30 minute discussion and pairing the two entities via land line, access to the ASP was granted for operations.

SITE PHOTOS

Description of photographs

Images FS-IVS-01 thru FS-IVS-10 shows the setup of the Instrument Verification Strip. Images FS-QR-001- FS-QR-006 shows some results from the mag and flag operation.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	29-Oct-19	

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Suite 200
East Rutherford, NJ 07073

DAWSON

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	30-Oct-19	**002**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	74	MPH	5	Precip. (In/Dy.)	0
				High	85	Dir	SSW	Humidity (%)	80

Additional Weather Comments

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Ka'alekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	**60.0**
TOTAL Work-Hours from Start of Construction	**120.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	30-Oct-19	**002**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. The ASP guard was over an hour late for duty. Team checked detectors and worked sweeping outside the fence while waiting for access. Algeana Stevenson (FS/NAAF), Zsolt Haverland (USACE-SAU), and Dale Kiefer (FS/H) conducted a site visit from 1200-1220. During the visit, the hard copies of the QAPP and APP were requested and presented. Completed 17.5 acres of surface sweeps (bunkers included), recorded 979 anomalies and 22 polygons in the GPS. 12.5 acres were recorded by the GPS Team.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Prior to the start of work, personnel were briefed on hydration and electrolytes, proper use of sunscreen, and of slips trips and fall hazards. All personnel were present and attentive for the safety briefing. Personnel are properly using and maintaining PPE. Trucks are equipped with serviceable safety related gear. Everyone is operating with a safety first mindset.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	30-Oct-19	**002**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted QC checks on 20% of the 17.5 acres completed today. Observed personnel checking detectors at the Instrument Verification Strip. One ML-3 Short detector, serial number 14040688, is not functioning correctly and has been removed from service. All work is being accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

The guard at the ASP point of entry was over an hour late to open the gate today. This did not deter the Team from working on the area outside of the fence, however, this may create an issue later due to the ASP's short operating hours of 0730-1530.

SITE PHOTOS

Description of photographs

Images FS-QR-007- FS-QR-014 shows some results from today's mag and flag operation.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	30-Oct-19	

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East Rutherford, NJ 07073

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	31-Oct-19	**003**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	74	MPH	5	Precip. (In/Dy.)	0
				High	87	Dir	SSW	Humidity (%)	95

Additional Weather Comments

HOT & HUMID

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Ka'alekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	**120.0**
TOTAL Work-Hours from Start of Construction	**180.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	31-Oct-19	**003**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. Team checked detectors and worked sweeping outside the fence while waiting for access. Completed 12 acres of surface sweeps (including bunkers), recorded 821 anomalies and 7 polygons in the GPS. 18 acres were recorded by the GPS Team.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Prior to the start of work, personnel were briefed on safe driving, hydration, tick checks, bugspray usage, and slips trips and fall hazards. All personnel were present and attentive for the safety briefing. Conducted safety inspection on PPE, trucks, and mag and flag operations. Everyone is operating with a safety first mindset.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	31-Oct-19	**003**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted QC checks on 20% of the 12 acres completed today. Observed personnel checking detectors at the Instrument Verification Strip. An additional ML-3 Short detector, serial number 160041, is not functioning correctly and has been removed from service. All work is being accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

None

SITE PHOTOS

Description of photographs

Images FS-QR-015- FS-QR-020 shows some results from today's mag and flag operation and GPS point acquisition.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	31-Oct-19	

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East Rutherford, NJ 07073

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	04-Nov-19	**004**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	44	MPH	5	Precip. (In/Dy.)	0
				High	74	Dir	SSW	Humidity (%)	75

Additional Weather Comments

Pleasant all day

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Ka'alekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	**180.0**
TOTAL Work-Hours from Start of Construction	**240.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	04-Nov-19	**004**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. Team checked detectors and worked sweeping outside the fence while waiting for access. Completed 10 acres of surface sweeps, recorded 1261 anomalies and 27 polygons in the GPS. 9 acres were recorded by the GPS Team.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Prior to the start of work, personnel were briefed on continued focus on safety, proper PPE usage and maintenance, and hygiene at work. All personnel were present and attentive for the safety briefing.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	04-Nov-19	**004**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted QC checks on 30% of the acres completed today. Observed personnel checking detectors at the Instrument Verification Strip. All work is being accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

None

SITE PHOTOS

Description of photographs

Images FS-QR-021- FS-QR-025 shows today's mag and flag operation and GPS point acquisition.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	4-Nov-19	

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East Rutherford, NJ 07073

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	05-Nov-19	**005**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	68	MPH	3	Precip. (In/Dy.)	0
				High	78	Dir	W	Humidity (%)	85

Additional Weather Comments

Warm

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Ka'alekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	**240.0**
TOTAL Work-Hours from Start of Construction	**300.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	05-Nov-19	**005**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. Team checked detectors and worked sweeping outside the fence while waiting for access. Completed 15.5 acres of surface sweeps, recorded 1050 anomalies and 50 polygons in the GPS. 14 acres were recorded by the GPS Team.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Prior to the start of work, personnel were briefed on repetitive motion injury prevention, exergency evacuation procedures, and rally point location. All personnel were present and attentive for the safety briefing.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	05-Nov-19	**005**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted QC checks on 30% of the work completed today. Observed personnel checking detectors at the Instrument Verification Strip. Observed GPS flagging acquisition. All work is being accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

None

SITE PHOTOS

Description of photographs

Images FS-QR-026- FS-QR-031 shows today's mag and flag operation and GPS point acquisition.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	5-Nov-19	

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East Rutherford, NJ 07073

DAWSON

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	06-Nov-19	**006**

PROJECT POINTS OF CONTACT

Position	Name	E-Mail Address	Phone No.
Project Manager	Loren Casale	lcasale@dawson8a.com	(973) 219-8592
Program Manager	Michelle Caruso	mcaruso@dawson8a.com	(973) 943-3070
QC Manager	Chris Cicerale	ccicerale@dawson8a.com	(973) 803-2128
Site Manager/SUXOS	Mike Fay	mfay@dawson8a.com	(774) 722-1207
UXOQCS/UXOSO	Brandon Denson	bdenson@dawson8a.com	(205) 369-6123

WEATHER CONDITIONS

Conditions				Temp (F)		Wind		Add'l Readings	
AM		PM		Low	62	MPH	5	Precip. (In/Dy.)	0
				High	74	Dir	SW	Humidity (%)	80

Additional Weather Comments

Pleasant

ON-SITE PERSONNEL- DAWSON

Name	Job Code	Trade / Work Performed	Hrs	Signed APP
Mike Fay	10456-001-001-002	SUXOS	10.0	Y
Brandon Denson	10456-001-001-002	UXOSO/UXOQCS	10.0	Y
Kaipo Ka'alekahi	10456-001-001-002	UXO Tech II	10.0	Y
Trevor Yacopino	10456-001-001-002	UXO Tech II	10.0	Y
Carol Elliott	10456-001-001-002	UXO Tech II	10.0	Y
Sean Lindsey	10456-001-001-002	UXO Tech I	10.0	Y
		Total Dawson Man-Hours	**60.0**	

Total Work-Hours on Site This Day	**60.0**
Cumulative Total Work-Hours From Previous Report	**300.0**
TOTAL Work-Hours from Start of Construction	**360.0**

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	06-Nov-19	**006**

ON-SITE EQUIPMENT

Equipment	Vendor / Tag No.	Work Performed	On-Site Hours			
			Used	Idle	Repair	Total
Ford F-250	Enterprise Trk Rentl/1NED64	SUXOS	1.0	9.0	-	10.0
Dodge Ram 1500	Enterprise Trk Rentl/LHLP84	UXOSO/UXOQCS	1.0	9.0	-	10.0
Ford F-150	Enterprise Trk Rentl/LDBF42	UXO Tech II	1.0	9.0	-	10.0

MATERIAL HANDLING (ON-SITE DELIVERY / REMOVAL)

Material	Vendor	QTY	UOM	Purpose	Delivery Verification		
					Condtn	Qty	P.O Number
N/A							

WORK COMPLETED

Description of Work Executed Today

Coordinated with Fort Stewart Ammunition Supply Point (ASP) for vehicle passes and access. Team checked detectors and worked sweeping outside the fence while waiting for access. Completed 13.25 acres of surface sweeps, recorded 459 anomalies and 14 polygons in the GPS. 16.50 acres were recorded by the GPS Team. Field Work completed today.

HEALTH & SAFETY

Description of Health & Safety Actions Taken Today / Safety Inspections Conducted

Prior to the start of work, personnel were briefed on safe driving, slips trips and falls, and hydration. All personnel were present and attentive for the safety briefing. Final vehicle checksheets were completed.

DAILY PRODUCTION & QUALITY CONTROL REPORT

Project No./Contract No.	Project Title / Location	Day of Report	Report No.
W912HN-18-D-1007 Task Order W192HN-18-F-1026	Corrective Measures Study (CMS) Anti-Aircraft Range 90-MM-2, Fort Stewart, Georgia Munitions Response Site (MRS) Fort Stewart-002-R-001	06-Nov-19	**006**

QUALITY CONTROL

Description of Quality Control Actions Taken Today / Quality Inspections Conducted

Conducted QC checks on 30% of the work completed today. Observed personnel checking detectors at the Instrument Verification Strip. Observed sweep and GPS flagging acquisition. All work has been accomplished in accordance with the QAPP.

ISSUES AND/OR ITEMS OF DISCUSSION

Discussion of Issues / Concerns / Conversations / Topics

None

SITE PHOTOS

Description of photographs

Images FS-QR-032- FS-QR-056 shows today's mag and flag operation and GPS point acquisition.

Contractor Verification: On behalf of DAWSON, I certify this report is complete and correct, and all work performed and materials and equipment used during this reporting period are in compliance with the contract requirements, specifications, and standards, to the best of my knowledge, except as noted herein.

Report Prepared By - Title	Date Prepared	Signature
Mike Fay - SUXOS	6-Nov-19	

APPENDIX C – DAILY SAFETY MEETING ATTENDANCE LOGS

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DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 10/29/19

Person Briefing: Brandon Denson

Weather: 70-78 Rain 60%

Safety Brief Topic: Initial Site Brief, DAWSON Safety Culture

DAWSON Emergency Numbers	
Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON			
Brandon Denson	DAWSON			
Kaipo Kaalekahi	DAWSON			
Trevor Yacopino	DAWSON			
Carol Elliott	DAWSON			
Sean Lindsey	DAWSON			

Summary of Briefing: Maintain firm footing, ask for help lifting heavy items, switch hands with detector periodically, watch out for each other. Initial Brief covered the work plans and AHA's

Signature: [signature] **Date:** 29 OCT 19

DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 10/30/19

Person Briefing: Brandon Denson

Weather: 70-82 Mostly Cloudy and Humid

Safety Brief Topic: Hydration, Sunscreen, Slips Trips Falls

DAWSON Emergency Numbers

Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON	0630		
Brandon Denson	DAWSON	0630		
Kaipo Ka'alekahi	DAWSON	0630		
Trevor Yacopino	DAWSON	0630		
Carol Elliott	DAWSON	0630		
Sean Lindsey	DAWSON	0630		
Algeara Stevenson	FS/NAAF	12:18	12:20	
2SGT HAVERLAND	USACE-SAV	12:18	12:20	
Dale Kiefer	FS/H	12:18	12:20	

Summary of Briefing: Drink water and also gatorade to replenish electrolytes. Wear sunscreen to protect from effects of the sun. Maintain firm footing on slippery wet surfaces.

Signature: [signature] **Date:** 10/30/19

DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 10/31/19

Person Briefing: Brandon Denson

Weather: 73-85 Humid, Afternoon T-Storm

Safety Brief Topic: Safe Driving, HAPPY HALLOWEEN!!

DAWSON Emergency Numbers

Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON	0630		
Brandon Denson	DAWSON	0630		
Kaipo Ka'alekahi	DAWSON	0630		
Trevor Yacopino	DAWSON	0630		
Carol Elliott	DAWSON	630		
Sean Lindsey	DAWSON	0630		

Summary of Briefing: Drive defensively and obey the speed limits. Hydrate and replenish electrolytes. Alternate hands while sweeping to avoid repetitive motion injury. Check for ticks. Use bugspray for mosquitos. Maintain firm footing on wet slippery sloped surfaces. Don't eat too much candy or your tummy will hurt and ruin your supper.

Signature: [signature] **Date:** 10/31/19

DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 11/04/19

Person Briefing: Brandon Denson

Weather: 44-74 Cloudy

Safety Brief Topic: Safety Focus, PPE, Work Hygiene

DAWSON Emergency Numbers	
Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON	0630		
Brandon Denson	DAWSON	0630		
Kaipo Ka'alekahi	DAWSON	0630		
Trevor Yacopino	DAWSON	0630		
Carol Elliott	DAWSON	0630		
Sean Lindsey	DAWSON	0630		

Summary of Briefing: Remain Safety orientated. Use proper PPE and maintain accordingly. Use sanitizing wipes and clean hands before eating. Don't slip on wet grass. Hydrate.

Signature: _____ **Date:** 04 NOV 19

DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 11/05/19

Person Briefing: Brandon Denson

Weather: 63-75 Mostly Cloudy

Safety Brief Topic: Repetitive Motion Injuries, Evac Rally Point

DAWSON Emergency Numbers

Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON	0630		
Brandon Denson	DAWSON	0630		
Kaipo Ka'alekahi	DAWSON	0630		
Trevor Yacopino	DAWSON	0630		
Carol Elliott	DAWSON	0630		
Sean Lindsey	DAWSON	0630		

Summary of Briefing: Hydrate, Maintain firm footing. Use buggypacy. Switch hands with defester to prevent repetitive motion injuries. If we need to evacuate, rally at HWY 119 and 144.

Signature: _____ **Date:** 11/05/19

DAWSON

DAILY SAFETY MEETING ATTENDANCE LOG

CORRECTIVE MEASURES STUDY ANTI AIRCRAFT RANGE 90-MM-2
FORT STEWART, LIBERTY COUNTY GEORGIA
CONTRACT NUMBER: W912HN-18-D-1007

Date: 11/06/19

Person Briefing: Brandon Denson

Weather: 59-74 Sunny

Safety Brief Topic: Slips Trips Falls, Safe Driving, Hydration

DAWSON Emergency Numbers	
Brandon Denson	(205) 369-6123
Mike Fay	(774) 722-1207
Loren Casale	(973) 219-8592
Michelle Caruso	(973) 943-3039

NAME	COMPANY	TIME IN	TIME OUT	SIGNATURE
Mike Fay	DAWSON	0630		
Brandon Denson	DAWSON	0630		
Kaipo Ka'alekahi	DAWSON	0630		
Trevor Yacopino	DAWSON	0630		
Carol Elliott	DAWSON	0630		
Sean Lindsey	DAWSON	0630		

Summary of Briefing: Maintain firm footing on slippery surfaces. Watch out for crazy drivers and adjust accordingly. Drink water and replenish electrolytes also to avoid heat casualties.

Signature: [signature] **Date:** 11/6/19

APPENDIX D – PHOTOGRAPHIC LOG

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Photo 1 – IVS

IVS Item #1 - 1"x 4" steel pipe nipple, vertical at 6" with sandbags measured.

Photo 2 - IVS

IVS Item #1 - 1"x 4" steel pipe nipple, vertical at 6". Sandbags in place on top of the item.

Photo 3 - IVS

IVS Item #2 - 2"x 6" steel pipe nipple, horizontal at 12" with sandbags measured.

Photo 4 - IVS

IVS Item #2 - 2"x 6" steel pipe nipple, horizontal at 12". Sandbags in place on top of the item.

Photo 5 - IVS

IVS Item #3 - 2"x 10" steel pipe nipple, horizontal at 18" with sandbags measured.

Photo 6 - IVS

IVS Item #3 - 2"x 10" steel pipe nipple, horizontal at 18". Sandbags in place on top of the item.

Photo 7 - IVS

Completed IVS.

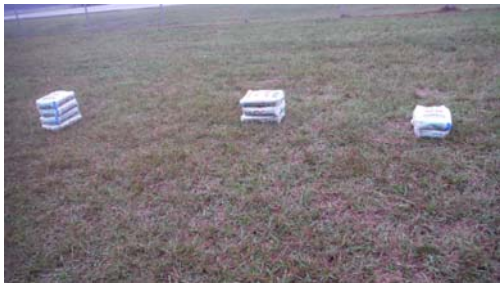

Photo 8 - IVS

Completed IVS.

Photo 9 – Magazine 24

Flags in place from previous day's work.

Photo 10 - Magazine 24

Flags in place from previous day's work.

Photo 11 – Magazine 22

Torrential rain on first day of work.

Photo 12 – SE corner of fence near IVS

Flags in place from morning. Prior to ASP opening.

Photo 13 - SE Corner of Fence near IVS

Flags in place from morning. Prior to ASP opening.

Photo 14 - SE Corner of Fence near IVS

Flags in place from morning. Prior to ASP opening.

Photo 15 – Magazine 1

Flags in place with red as poly's. Looking WNW

Photo 16 – Near Magazine 24

Flags in place between Magazines. Looking between Magazines.

Photo 17 – Front of Magazine 14

Flags in place.

Photo 18 - Front of Magazine 14

Flags in place.

Photo 19 - Front of Magazine 14

GPS point flag acquisition.

Photo 20 - Front of Magazine 14

Flags in place, UXO Team sweeping in distance.

Photo 21 - Front of Magazine 19

Team Sweeping.

Photo 22 – Southern Fence Boarder

Flags outside fence.

Photo 23 – Between Magazines 4 and 5

Flags in place.

Photo 24 – SE Corner of Magazine 5

Flags in place with sweep Team in line.

Photo 25 - SE Corner of Magazine 5

Flags in place with sweep Team in line.

Photo 26 – In Between Magazines 6 and 6

Flags in place.

Photo 27 – Road ENE of Magazine 10

Flags in place with GPS acquisition in distance. Corner Flag visible in foreground.

Photo 28 – Behind Magazine 6

Flags in place with red edge markers.

Photo 29 – Road SE of Magazines

Flags in place in field.

Photo 30 – Road SE of Magazines

Flags in place in field.

Photo 31 - Road SE of Magazines

Flags in place in field.

Photo 32 - Road NE of Magazines

Flags in place in field, trucks on far end.

Photo 33 - Road NE of Magazines

Flags in place in field, GPS acquisition in progress.

Photo 34 – Near NE corner Inside ASP Fence

Flags in place, multiple anomalies.

Photo 35 - Near NE corner Inside Fence

Pallets and Drums.

Photo 36 - Near NE corner Inside Fence

Conex Boxes and Dumpster.

Photo 37 - Near NE Corner Inside Fence

Flags in field.

Photo 38 – Eastern Edge of Field Near Front Gate

Flags in field.

Photo 39 - Eastern Edge of Field Near Front Gate

Flags in field.

Photo 40 – NE Corner Outside of Fence

GPS point acquisition.

Photo 41 - NE Corner Outside of Fence

Flags between tree line and fence.

Photo 42 - NE Corner Outside of Fence

Flags between tree line and fence.

Photo 43 - NE Corner Outside of Fence

Flags between tree line and fence progressing West.

Photo 44 - NE Corner Outside of Fence

Flags between tree line and fence progressing West.

Photo 45 – North Fence Boundary

Flags in place, approaching wetland.

Photo 46 - North Fence Boundary

Flags in place, approaching wetland, progressing East.

Photo 47 - North Fence Boundary

Approaching wetland, progressing SE.

Photo 48 - North Fence Boundary

Wetland in view, progressing SE.

Photo 49 - North Fence Boundary

Wetland in view, progressing SE.

Photo 50 - North Fence Boundary

Wetland in view, progressing SE.

Photo 51 - North Fence Boundary

Wetland in view, progressing SE.

Photo 52 - North Fence Boundary

Wetland in view, progressing SE.

Photo 53 - North Fence Boundary

Wetland in view, progressing SE.

Photo 54 - North Fence Boundary

Wetland in view, progressing SE.

Photo 55 - North Fence Boundary

Wetland in view, progressing SE.

Photo 56 – Northeastern Fence Boundary

Flags in place, Polygon in view.

Photo 57 - North Fence Boundary

Flags in place, Polygon in view.

Photo 58 - North Fence Boundary

Large asphalt pad inside ASP.

Photo 59 - North Fence Boundary

Large polygon in middle of field.

Photo 60 – Southern Road Looking at Eastern Field

Flags in place, GPS point acquisition in progress.

Photo 61 – Corner of Paved Area

Building and asphalt pad polygon.

Photo 62 - Corner of Paved Area

Large concrete pad polygon.

Photo 63 – Southern Edge Paved Area

Large concrete pad.