FINAL
NON-TIME CRITICAL REMOVAL ACTION
LAND USE CONTROL PLAN

FOR
Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01)
Small Arms Range – 2 (FTSW-006-R-01)
Hero Road Trench Area (FTSW-008-R-01)
Anti-Aircraft Range – 4-A (FTSW-009-R-01)
Anti-Aircraft Range – 4-B (FTSW-009-R-02)
Anti-Tank Range 90-MM – 2 (FTSW-010-R-01)
Grenade Launcher Range (FTSW-011-R-01)

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MILITARY MUNITIONS RESPONSE PROGRAM

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LIST OF ACRONYMS AND ABBREVIATIONS

AEDB-R	Army Environmental Database - Restoration
AM	Action Memorandum
CA	Corrective Action
CAIS	Chemical Agent Identification Set
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMI(C)	Corrective Measures Implementation (Construction)
CMS	Corrective Measures Study
CS	Confirmatory Sampling
CSM	Conceptual Site Model
DoD	Department of Defense
DPW	Department of Public Works
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
FY	Fiscal Year
GA	Georgia
GIS	Geographic Information System
IBCT	Infantry Brigade Combat Team
IRP	Installation Restoration Program
LTM	Long Term Management
LUC	Land Use Control
LUCP	Land Use Control Plan
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
mm	millimeter
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFA	No Further Action
NPL	National Priorities List
NTCRA	Non-Time-Critical Removal Action

O&M	Operations and Maintenance
PRG	Preliminary Remedial Goal
QA	Quality Assurance
QC	Quality Control
RA(C)	Remedial Action (Construction)
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
ROD	Record of Decision
TAL	Target Analyte List
U.S.	United States
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command
USEPA	United States Environmental Protection Agency
UXO	Unexploded Ordnance

GLOSSARY OF TERMS

Closed Range – A military range that has been taken out of service as a range and that either has been put to new uses that are incompatible with range activities, or is not considered by the military to be a potential range area. A closed range is still under the control of a Department of Defense (DoD) component.

Defense Site – All locations that were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions.

Discarded Military Munitions (DMM) – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded explosive ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S. Code [U.S.C.] 2710(e)(2)).

Engineering Evaluation/Cost Analysis (EE/CA) – An EE/CA is prepared for all non-time-critical removal actions as required by Section 300.415(b)(4)(i) of the National Contingency Plan. The goals of the EE/CA are to identify the extent of a hazard, to identify the objectives of the removal action, and to analyze the various alternatives that may be used to satisfy these objectives for cost, effectiveness, and implementability. (EP 75-1-3; citation taken from EM 1110-1-4009, *Engineering and Design: Military Munitions Response Actions,* USACE, 2007a)

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance by a military response unit. It may also include explosive ordnance that has become hazardous by damage or deterioration.

Explosives Safety – A condition where operational capability and readiness, personnel, property, and the environment are protected from unacceptable effects of an ammunition or explosives mishap.

Land Use Controls (LUCs) – Physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institutional controls (ICs) as discussed in the National Contingency Plan. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions. (*DoD Management Guidance for the DERP,* DoD, 2001c).

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the U.S. Coast Guard, the Department of Energy, and the Army

National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under 42 U.S.C. 2011 (Atomic Energy Act) have been completed. (10 U.S.C. 2710(e)(3)(A) and (B)).

Military Range – "Active range" and "inactive range" as these terms are defined in 40 CFR §226.201.

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means unexploded ordnance, DMM, or munitions constituents (e.g., trinitrotoluene [TNT] or cyclotrimethylenetrinitramine [RDX]) present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710).

Non-Time Critical Removal Actions – Actions initiated in response to a release or threat of a release that poses a risk to human health, its welfare, or the environment. Initiation of removal cleanup actions may be delayed for 6 months or more (EP 1110-1-24, USACE, 2000c).

Operational Range – A range that is under jurisdiction, custody, or control of the Secretary of Defense and that is used for range activities or, although not currently being used for range activities, is still considered by the Secretary to be a range and has not been put to new use incompatible with range activities. (10 U.S.C. 101(e)(3)(A) and (B)). Also includes "military range," "active range," and "inactive range" as those terms are defined in 40 CFR 266.201.

Other than Operational Range – Includes all property under jurisdiction, custody, or control of the Secretary of Defense that is not defined as an Operational Range.

Range – A designated land or water area that is set aside, managed, and used for range activities of the Department of Defense. Such term includes the following:

(A) Firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access, and exclusionary areas.

(B) Airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration (10 U.S.C. 101(e)(5)).

Removal Action – The cleanup or removal of released hazardous substances from the environment. Such actions may be taken in the event of the threat of release of hazardous substances into the environment, such actions as may be necessary to monitor, assess, and evaluate the release or threat of release of hazardous substances, the disposal of removed material, or the taking of such other actions as may be necessary to prevent, minimize, or mitigate damage to the public health or welfare or to the environment, which may otherwise result from a release or threat of release. The term includes, in addition, without being limited to, security fencing or other measures to limit access, provision of alternative water supplies, temporary evacuation and housing of threatened individuals not otherwise provided for, action taken under Section 9604(b) of this title, and any emergency assistance which may be provided under the Disaster Relief and Emergency Assistance Act [42 U.S.C. 5121 et seq.] The requirements for removal actions are addressed in 40 CFR §§300.410 and 330.415. The three types of removals are emergency, time-critical, and non-time-critical removals. (*DoD Management Guidance for the DERP*, DoD, 2001c).

Time-Critical Removal Action – This is a response to a release or threat of release that poses such a risk to public health (serious injury or death) or the environment that cleanup or stabilization actions must be initiated within 6 months.

Unexploded Ordnance (UXO) – UXO are military munitions that:

(A) Have been primed, fused, armed, or otherwise prepared for action.

(B) Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material.

(C) Remain unexploded, whether by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)).

1 PURPOSE

To address the explosive hazards and the risks from Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC) at active installations and to meet the requirements in the *Fiscal Year (FY) 2010 Program Management Plan: Active Sites Cleanup Program* (2010, United States [U.S.] Army Environmental Command [USAEC]), the USAEC is helping installations prepare and implement interim Land Use Controls (LUCs) for their on-post Munitions Response Sites (MRSs). Only Army-owned MRSs that are recommended for further action beyond the Confirmatory Sampling (CS) phase are included in this requirement. The Army is establishing LUCs as an interim action while the MRSs progress to a final remedy. The Military Munitions Response Program (MMRP) addresses MEC and MC within the framework of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA, 42 United States Code §§ 9601 et seq.) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP, 40 Code of Federal Regulation [CFR] 300.400). While it is the Department of Defense's (DoD's) goal to address MRSs under CERCLA, the Army recognizes that some installations (including Fort Stewart) may be requested to address their sites under the Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) program. For this reason, this LUC Plan (LUCP) uses the RCRA phase designations. The LUCs considered under this phase of the MMRP are interim measures consistent with RCRA. LUCs are considered Non-Time-Critical Removal Actions (NTCRAs) that are required because the conditions at the site support a NTCRA according to the NCP, 40 CFR 400.415(b)(2)(vi), including, but not necessarily limited to, the threat of fire or explosion. MRSs recommended for no further action (NFA) and those not located on Army-owned land are not addressed in this action; they will be addressed as appropriate under the MMRP.

The *Final Military Munitions Response Program, Land Use Controls, Interim Measures Work Plan for Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01), Small Arms Range – 2 (FTSW-006-R-01), Hero Road Trench Area (FTSW-008-R-01), Anti-Aircraft Range – 4-A (FTSW-009-R-01), Anti-Aircraft Range – 4-B (FTSW-009-R-02), Anti-Tank Range 90-MM – 2 (FTSW-010-R-01), Grenade Launcher Range (FTSW-011-R-01), Fort Stewart, Georgia* (USAEC, 2012) outlines recommended LUCs to be established at eligible MRSs at Fort Stewart, Georgia. No field work was conducted for the preparation of the Work Plan and all information included was obtained through review of applicable reports and studies, such as the Final Confirmatory Sampling (CS) Report (Malcolm Pirnie, 2007) and the Final Phase 2 CS Report (ARCADIS/Malcolm Pirnie, 2011). The recommended LUCs selected for each MRS were determined by evaluating a combination of historic munitions use, available MEC and MC data, current security and land use restrictions (LURs), current land use and potential human receptors, and reasonably anticipated future land use and potential human receptors.

The following MRSs at Fort Stewart are eligible for LUCs as interim measures and are addressed in this LUCP:

- Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01)
- Small Arms Range – 2 (FTSW-006-R-01)
- Hero Road Trench Area (FTSW-008-R-01)
- Anti-Aircraft Range – 4-A (FTSW-009-R-01)
- Anti-Aircraft Range – 4-B (FTSW-009-R-02)

- Anti-Tank Range 90-MM – 2 (FTSW-010-R-01)
- Grenade Launcher Range (FTSW-011-R-01)

The NTCRA LUCs presented within this LUCP are interim and MMRP-specific. Other LUCs are in place at the installation, as described in Section 2.8, which are both longer-term and Installation Restoration Program (IRP)-related. The purpose of this LUCP is to provide the guidance for implementing, documenting, managing, and terminating the NTCRA LUCs in use at Fort Stewart. These LUCs are interim actions that will be used until permanent MMRP remedial actions are selected and implemented (anticipated by FY2017), or when an MRS is recommended for NFA.

2 SITE CONDITIONS AND BACKGROUND

2.1 Installation Description

Fort Stewart consists of 279,081 acres and is located north of Hinesville, Georgia (GA), approximately 40 miles southwest of Savannah, GA. Figure 2-1 shows the location of the installation within GA. Fort Stewart is the largest Army installation east of the Mississippi River, spanning portions of Bryan, Evans, Liberty, Long, and Tattnall counties. GA Highway 119, which runs north to south from Pembroke to Hinesville, and GA Highway 144, which runs east to west from Richmond Hill to Glennville, bisect Fort Stewart. Situated south of Interstate 16 and west of Interstate 95, the installation boundaries are roughly defined by the intersection of Interstate 16 and Interstate 95 and the cities of Richmond Hill, Hinesville, Glennville, Claxton, and Pembroke.

National Priorities List (NPL) Status: The installation is not on the NPL. The installation is not operating under a Federal Facility Agreement with U.S. Environmental Protection Agency (USEPA) and Georgia Environmental Protection Division (GAEPD), but rather a CA Permit with GAEPD.

MMRP Overlap with RCRA: This LUCP uses NTCRAs to address munitions-related risks under the MMRP. The MMRP parallels and is conducted in accordance with the ongoing RCRA program at Fort Stewart. In particular, the interim MMRP LUCs presented here are intended to work with and complement the IRP-based LUCs established through prior Records of Decisions (RODs). The existing IRP-based LUCs that are in place could overlap with the MMRP-specific LUCs, including dig permits.

Seven MRSs have been identified at Fort Stewart and are addressed in this LUCP. Table 2-1 summarizes the key data for the MRSs addressed in the LUCP. Their locations are shown in Figure 2-2. MRS descriptions, history, and background information such as the MRS's Munitions Response Site Prioritization Protocol (MRSPP) score are presented below. It should be noted that a RCRA Facility Investigation (RFI) for MEC and, as appropriate, MC is currently being conducted under the MMRP at Fort Stewart for the seven on-post MRSs. It is anticipated that the RFI will be completed by FY2013 and FY2014.

Table 2-1: On-Post MRSs at Fort Stewart

MRS Name	AEDB-R No.	Acres	MEC Present?	MC Present?	MRSPP Score(1)
Anti-Aircraft Range 90-MM – 2	FTSW-002-R-01	77	Yes	Yes	4
Small Arms Range – 2	FTSW-006-R-01	287	Yes	Yes	4
Hero Road Trench Area	FTSW-008-R-01	34.5	Yes	Yes	6
Anti-Aircraft Range – 4-A	FTSW-009-R-01	465	Yes	Yes	3
Anti-Aircraft Range – 4-B	FTSW-009-R-02	663	Yes	Yes	3
Anti-Tank Range 90-MM – 2	FTSW-010-R-01	546	Yes	Yes	5
Grenade Launcher Range	FTSW-011-R-01	132	Yes	Yes	4

Note: (1) The Munitions Response Site Prioritization Protocol (MRSPP) Rating is on a scale of 1 to 8, with 1 being the most hazardous. The MRSPP estimates, from the CS, are used as an indicator of the relative risks of MRSs at Fort Stewart.

AEDB-R – Army Environmental Database - Restoration
MRSPP – Military Response Site Prioritization Protocol

2.2 Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01)

This MRS is a 77-acre parcel, located northwest of the cantonment area, where two different types of munitions uses historically occurred. These uses included anti-aircraft and tank training and occurred on a total of six separate/collocated ranges from 1941 through 1964. The MRS is positioned in the downrange portion of these ranges and does not overlap impact/target areas or firing points. The known munitions associated with this MRS include 40-millimeter (mm) and 90-mm anti-aircraft projectiles. The munitions used on the tank range are unknown. However, archival documents from 1941 indicate that 37-, 40-, and 90-mm HE and 37-, 40-, and 90-mm practice rounds with tracers were issued to Fort Stewart. Therefore, it is assumed that these munitions could have been used on this MRS. Numerous EOD calls involving C-4 plastic explosives (secondary explosives), M-222 Dragon HE anti-tank guided missiles, M-7 grenades (riot control agent), and MK-2 fragmentation hand grenades were reported on this site. This MRS is shown in Figure 2-3. The MRSPP priority for the Anti-Aircraft Range 90-MM – 2 is 4, based on a priority range of 1 through 8 (with 1 being the most hazardous).

2.2.1 MEC and MC

A limited magnetometer-assisted visual survey, consisting of a five-foot wide path to the sample location, was conducted during the Phase 1 CS (November 2007). No MEC or munitions debris was observed along the path to the sample location. It is unlikely for MEC to be present on the surface of the developed portion of the MRS as the site is currently an ammunition supply point and is well maintained (mowed). However, based on historical evidence, MEC may be present in the undeveloped portions of the site.

One composite surface soil sample was collected and analyzed for aluminum, copper, zinc, lead, antimony, and explosives. Based on the results of the metals analysis, the sample exceeded the USEPA Region 4 Ecological Screening Values (ESVs) for lead in surface soil, but was within the Fort Stewart established background value for lead. No other metals were detected in concentrations exceeding regulatory screening values. No explosive compounds were detected above laboratory detection or method reporting limits.

This site was recommended for RCRA Facility Investigation (RFI)/Corrective Measures Study (CMS) for potential MEC/MC due to historical evidence of multiple overlapping range fans and multiple EOD responses.

2.2.2 Current and Future Anticipated Land Use

There are numerous buildings on the MRS that are currently utilized and consist of 40 bunkers that store ammo, a concrete loading dock, open storage building for residue ammo, a forklift and batter storage building, and an in-processing and unserviceable ammo storage building. There is no known change in land use at this time; the potential future land use is assumed to be the same as the current land use (ammunition supply point).

2.2.3 Existing Engineering or Institutional Controls

The MRS is entirely fenced because it includes an ammunition supply point. The ammunition supply point has personnel who control vehicle access in (and out) of this site.

2.3 Small Arms Range – 2 (FTSW-006-R-01)

This 287-acre MRS is located along the western perimeter of the cantonment area and historically was used for small arms training during the 1940s and 1950s. The combined acreage of the overlapping range fans is 2,091 acres, 287 acres of which overlap the other than operational area and make up Small Arms Range – 2. The MRS is composed of the firing points of the four small arms ranges. According to the Phase 2 CS (September 2011), munitions used on the small arms range were .50-caliber (cal) or less; however, the exact calibers are unknown. Archival documents from 1941 document the use of .30-cal and .50-cal machine guns on Fort Stewart. Therefore, it is assumed that .30-cal and .50-cal small arms were used on this MRS. Two documented EOD responses were identified at the site. The first involved a 105-mm projectile and occurred in April 2003. The second occurred in 2008; however, the munitions item encountered was not documented. This MRS is shown in Figure 2-4. The MRSPP priority for the Small Arms Range – 2 is 4, based on a priority range of 1 through 8 (with 1 being the most hazardous).

The berm of a former small arms range, identified as the "Fire Station 5 Berm" due to its proximity to a fire station, was identified within the Small Arms Range – 2 MRS boundary. The USACE Savannah District conducted an investigation of this berm. During this investigation, soil samples were collected from the Fire Station 5 Berm on the August 7 and 8, 2008. In total, 22 samples were collected and analyzed for antimony, copper, and lead. Concentrations of antimony ranged from below the method detection limit to 2.38 mg/kg. Concentrations of copper ranged from 0.247 to 104 mg/kg. Concentrations of lead ranged from 2.19 to 1,000 mg/kg. Three samples exceeded the 400 mg/kg USEPA Region 9 Preliminary Remediation Goals, now referred to as Regional Screening Levels (RSLs), for lead.

A Supplemental Investigation and time critical removal action (TCRA) were completed at the "Fire Station 5 Berm." These activities were conducted to ensure worker safety during the construction of a Fire Station on the site. Soil, surface water and groundwater were investigated for lead, the constituent of concern. The TCRA field activities were completed in September 2010. The berm was subsequently removed under Best Management Practices to refurbish another operational berm.

Because of this Supplemental Investigation, field work was intentionally not conducted during the Phase 2 CS (September 2011) in this area of the MRS.

2.3.1 MEC and MC

No MEC field activities were conducted for this MRS in the Phase 2 CS (September 2011) because historical evidence suggests only small arms were used. However, observations were recorded while conducting the MC sampling. Two munitions debris items were observed during the magnetometer-assisted visual survey: a 9-mm projectile and an expended 25-mm cartridge. The 9-mm projectile was near the southernmost berm of Range N at a presumed firing point. The expended 25-mm cartridge was likely an expended cartridge disposed from a Bradley fighting vehicle located on the opposite side of the adjacent motor pool fence. It is assumed that the expended cartridge was disposed of here, but not fired here.

A total of ten soil samples were collected from the Small Arms Range - 2 and analyzed for lead. The two samples collected at the locations of EOD finds were also analyzed for aluminum, antimony, copper, zinc, and explosives. Based on the results of the metals analysis, metals were

detected in concentrations exceeding USEPA Region 4 ESVs for lead. No explosive compounds were detected above laboratory detection or reporting limits.

Based on the two historical EOD responses on the MRS and two munitions debris discoveries, the Small Arms Range – 2 was recommended for RFI/CMS for MEC. It is recognized that because RFI/CMS is recommended for MEC, MC may also be evaluated as part of the study.

2.3.2 Current and Future Anticipated Land Use

The Small Arms Range – 2 is comprised of the cantonment area, including an industrial area and warehouses, and undeveloped land. Potential future land use for the site is the cantonment area (Installation Support), including an industrial area, warehouses, tactical equipment maintenance facility, company operations facility, and undeveloped land.

2.3.3 Existing Engineering or Institutional Controls

There are no known site-specific controls at this MRS.

2.4 Hero Road Trench Area (FTSW-008-R-01)

The Hero Road Trench Area is a 34.5-acre parcel located within the cantonment area; it was identified in January 2003, when a former Fort Stewart Directorate of Public Works (DPW) staff member reported to the DPW Environmental Office that materials (*i.e.*, mustard gas) had been buried in the DPW Family Housing Maintenance parking lot located on Hero Road. Aerial photographs indicate disturbances from January 1941 to January 1957 that are indicative of possible burial activities. Items were allegedly buried at the MRS, but not used on this MRS. Based on investigations conducted in the Phase 1 CS (November 2007), Chemical Agent Identification Set (CAIS) Detonation, M1, containing 5% solution of mustard, 5% solution of lewisite, 50% solution of chloropicrin, and pure agent phosgene, is allegedly buried at the MRS. No EOD responses have been reported for this MRS. This MRS is shown in Figure 2-5. The MRSPP priority for the Hero Road Trench Area is 6, based on a priority range of 1 through 8 (with 1 being the most hazardous).

2.4.1 MEC and MC

During the Phase 1 CS (November 2007), a limited magnetometer-assisted visual survey was conducted along the perimeter of the fence line in the northern and southern areas of the MRS. No MEC or munitions debris was observed at the Hero Road Trench Area. As a result of the limited magnetometer-assisted visual survey, the MRS acreage was found to be 34.5-acres. The MRS is mostly fenced off with the exception of the parking lot area, which is about one acre.

One composite surface soil sample was collected from the Hero Road Trench Area and analyzed for aluminum, copper, zinc, lead, antimony, and explosives. Based on the results of the metals analysis, no residential preliminary remedial goals, now RSLs, were exceeded and lead was the only metal detected in concentrations exceeding Fort Stewart established background levels and Region 4 ESVs. No explosive compounds were detected above laboratory detection or reporting limits.

This MRS was recommended for RFI/CMS for potential MEC/MC due to alleged burials of CAIS Detonation, M1.

2.4.2 Current and Future Anticipated Land Use

The majority of the Hero Road Trench Area is undeveloped property. A portion of the area is being used as a parking lot. The MRS is currently fenced off, except for the parking lot area, and no use has been identified. There is no known change in land use at this time; the potential future land use is assumed to remain the same as the current land use.

2.4.3 Existing Engineering or Institutional Controls

The Hero Road Trench Area is currently fenced off, except for the parking lot area. Fences and signs are currently in place at the site.

2.5 Anti-Aircraft Range – 4 MRA (FTSW-009-R-01 and FTSW-009-R-02)

This munitions response area (MRA) is a 1,128-acre parcel located in the northern portion of the cantonment area and was used for anti-aircraft range training from 1941 to 1964. Based on the explosive hazard probability designations assigned during previous investigations performed by USACE Baltimore District Explosive Safety in 2011, the Anti-Aircraft Range – 4 MRA was divided into two MRSs. The first MRS, Anti-Aircraft Range – 4-A, includes the construction areas where the investigations / surface clearances were conducted; this area was assigned a low probability for encountering MEC. The second MRS, Anti-Aircraft Range – 4-B, encompasses the undeveloped portion of the site that was assigned a medium to high probability for encountering MEC. The majority of the area (465 acres) within the Anti-Aircraft Range – 4-A MRS is currently developed. The majority of the area (663 acres) within the Anti-Aircraft Range – 4-B MRS is currently undeveloped. A discussion of these USACE Baltimore District Explosive Safety investigations is included in Section 2.5.1. These MRSs are shown in Figure 2-6. The MRSPP priority for both the Anti-Aircraft Range – 4-A and 4-B is 3, based on a priority range of 1 through 8 (with 1 being the most hazardous).

The MRA is composed of the firing points of a total of three separate/collocated ranges. The combined acreage covered by these three historical range fans is 85,325 acres, 1,128 acres of which are not in the operational range area and, thus, overlap the other than operational area and make up Anti-Aircraft Range – 4. Based on historical data, the expected munitions use associated with this MRA includes 40- and 90-mm anti-aircraft projectiles. The following EOD responses are examples of those that have occurred at the site: “40-mm” projectile (along the northern boundary of the site), “mortar round” (western central section of the site), “M67” hand grenade (along the southeast boundary) and “2.75-inch rocket” (southern central section of the site). Additionally, one EOD response [labeled “EOD Response (no information)”] was reported along the southern boundary and northern central section of the site. Details regarding the munitions items encountered were not available. Additional EOD responses beyond those described above have occurred at this MRS.

2.5.1 MEC and MC

A magnetometer-assisted visual survey was conducted during the Phase 2 CS (September 2011) field activities in the accessible undeveloped areas (20 acres) of the MRA, as portions of the MRA were under construction and behind a fence at the time of the investigation. No MEC or munitions debris were observed on the MRA. However, according to Fort Stewart Range Control, a number of EOD responses were reported on the MRA during the construction

activities within the fenced area from 31 August 2009 until work was halted on 1 December 2010. The majority of the EOD responses involved M2 training rockets; however, only limited information was received from Range Control.

During February 2011, the USACE, Baltimore District Explosive Safety Staff conducted a MEC Quality Assurance Investigation to Depth of Detection on areas of interest within the 4th IBCT construction site to address the EOD responses. A MEC removal action was also conducted in two construction sites (10th Engineering Battalion and Dog Kennel) which are adjacent to the 4th IBCT construction site. A total of 7 small arms (.50-cal), 16 munitions debris (15 M2 Target Rockets and one 3.5" rocket motor) and one MEC item (Point Detonating Fuze) were recovered as a result of this investigation (USACE Baltimore District, 2011a).

Following the February 2011 field effort, the USACE Savannah District and Fort Stewart Installation Officials requested that the USACE Baltimore District Explosive Safety Staff conduct a MEC Investigation to Depth of Detection on a five-acre site identified as the AAFES Mini Mart Future Construction Site located in close proximity to the 4th IBCT construction site. This investigation was conducted during April 2011. A total of 54 M2 Target Rockets, 19 M2 Target Rocket Motors and two 81-mm Practice Mortars were recovered. All items were identified as munitions debris and turned over to the local EOD unit for disposal (USACE Baltimore District, 2011b).

Four discrete surface soil samples were collected at Anti-Aircraft Range – 4 MRA and analyzed for aluminum, antimony, copper, lead, zinc, and explosives. Analytical results indicate that none of the metal concentrations exceeded USEPA RSLs or Region 4 ESVs and no explosive compounds were detected above laboratory detection or reporting limits.

The Anti-Aircraft Range – 4 MRA was recommended for RFI/CMS for MEC based on two historic EOD responses and numerous EOD responses during on-going construction activities. It is recognized that because RFI/CMS is recommended for MEC, MC may also be evaluated as part of the study.

2.5.2 Current and Future Anticipated Land Use

The Anti-Aircraft Range – 4 consists of the cantonment area and undeveloped former training areas. The potential future land use of Anti-Aircraft Range – 4 is planned to be the cantonment area (Installation Support, Barracks, and Operations), an Equestrian Club, and garden plots.

2.5.3 Existing Engineering or Institutional Controls

Fences and signs currently exist on the MRA and are associated with the ongoing construction. According to the Final Work Plan Land Use Controls at the 4th IBCT Complex, Fort Stewart, Georgia, dated October 2011, fencing of about 11,300 feet will be installed along the perimeter of four separate wetland areas within the Anti-Aircraft Range – 4B (FTSW-009-R-02).

2.6 Anti-Tank Range 90-MM – 2 (FTSW-010-R-01)

This 546-acre MRS is located in the northwestern portion of the cantonment area and was used for anti-aircraft, anti-tank, grenade launcher, and small arms training during the 1940s. The MRS is composed of eight range fans. The total acreage covered by the eight historical ranges is 17,015 acres, 546 acres of which overlap the other than operational area and make up Anti-Tank

Range 90-MM – 2. The MRS is composed of the firing point of two separate collocated ranges (Anti-Tank Range 90-MM – 2 and a 40-mm anti-aircraft range) and the downrange area of a grenade launcher range and a 120-mm anti-aircraft range. The known munitions use associated with this MRS includes 40-mm and 120-mm anti-aircraft projectiles, 40-mm grenades (practice), and 90-mm anti-tank projectiles. No documentation of EOD responses were identified at this site. This MRS is shown in Figure 2-7. The MRSPP priority for the Anti-Tank Range 90-MM – 2 is 5, based on a priority range of 1 through 8 (with 1 being the most hazardous).

2.6.1 MEC and MC

A magnetometer-assisted visual survey of 10% of the undeveloped area (approximately 33 acres) was conducted during the Phase 2 CS (September 2011) field activities. A line approximately 120' in length of 2.5' by 2.5' concrete pads were found on this MRS. The pads may have been used for a firing line. Additionally, there was a concrete structure, approximately 10' high forming three sides of a box. Metal plates were found nearby the concrete structure. They could have been used as target structures; however, there was no indication that the plates had been fired upon. One munitions debris item, an inert anti-personnel mine, was found during the investigation.

Four surface soil samples were collected at Anti-Tank Range 90-MM - 2 and analyzed for aluminum, antimony, copper, lead, zinc and explosives. Two of the surface soil samples were collected from biased locations based on suspected firing lines. The other two surface soil samples were collected randomly throughout the site. Based on analytical results, no explosive compounds were detected above laboratory detection or reporting limits. Zinc was the only metal detected in concentrations exceeding Fort Stewart background levels and USEPA Region 4 ESVs but below USEPA RSLs. The concentrations of zinc observed at this MRS were less than an order of magnitude above the established background levels; this is likely indicative of naturally occurring conditions and not evidence of an impact of the former land use.

The site was recommended for RFI/CMS for MEC based on the discovery of an inert mine. It is recognized that because RFI/CMS is recommended for MEC, MC may also be evaluated as part of the study.

2.6.2 Current and Future Anticipated Land Use

The Anti-Tank Range 90-MM – 2 is comprised of undeveloped area and the cantonment area. Construction activities are currently ongoing at the MRS.

2.6.3 Existing Engineering or Institutional Controls

The motor pool area within the MRS is fenced with an approximately 8 feet high chain link fence in order to keep unauthorized personnel out of the motor pool. Note that the motor pool area is unrelated to any MRS activities.

2.7 Grenade Launcher Range (FTSW-011-R-01)

This 132-acre MRS is located along the western perimeter of the cantonment area and was historically used as a grenade launcher range (practice), infiltration course, 120-mm anti-aircraft range, and three small arms ranges during the 1940s. The total acreage covered by the six historical ranges is 10,947.6 acres, 132 acres of which overlap the other than operational range

area and make up Grenade Launcher Range MRS. According to previous investigations, munitions used on the Grenade Launcher Range included 40-mm practice grenades, small arms, and TNT. Archival documents from 1941 document the use of .30 cal and .50-cal machine guns on Fort Stewart. Therefore, it is assumed that .30-cal and .50-cal small arms were used on this MRS. Additionally, 120-mm anti-aircraft projectile use occurred on approximately 15 acres of the MRS. No EOD responses have been reported for this MRS. This MRS is shown in Figure 2-8. The MRSPP priority for the Grenade Launcher Range is 4, based on a priority range of 1 through 8 (with 1 being the most hazardous).

2.7.1 MEC and MC

A magnetometer-assisted visual survey of 10% of the undeveloped area (approximately 4 acres) was conducted during the Phase 2 CS (September 2011) field activities. Piles of pop flares (expended), empty ammo cans, and expended small arms cartridges (.30-cal and .45-cal) were observed. The munitions debris appeared to be burned and discarded at the MRS, not from live-fire activities. A concrete backstop wall was also observed at the site.

Fourteen surface soil samples were collected from the Grenade Launcher Range and analyzed for aluminum, antimony, copper, lead, zinc, and explosives. Based on the results of the metals analysis, lead was the only metal detected in concentrations that exceeded USEPA Region 4 ESVs. No metals were detected at or above their respective USEPA RSLs. No explosive compounds were detected above laboratory detection or reporting limits. The concentrations of lead observed at this MRS were less than an order of magnitude above the established background levels; this is likely indicative of naturally occurring conditions and not evidence of an impact of the former land use.

The site was recommended for RFI/CMS for MEC based on range features and observed munitions debris. It is recognized that because RFI/CMS is recommended for MEC, MC may also be evaluated as part of the study.

2.7.2 Current and Future Anticipated Land Use

The Grenade Launcher Range is comprised of the cantonment area, including an industrial area and warehouses, and undeveloped land. In the cantonment area (Installation Support), plans include an industrial area, warehouses, tactical equipment maintenance facility, company operations facility, and undeveloped land.

2.7.3 Existing Engineering or Institutional Controls

There are no known site-specific controls at this MRS.

2.8 Existing Land Use Controls

A LUC program is already in place at Fort Stewart with existing LUCs that are both installation-wide, as well as specific to a particular IRP site. The installation-wide existing LUCs are listed below and the IRP site-specific existing LUCs, which are based on signed RODs, are shown in Table 2-2. Since many of the existing LUCs cover areas that include the MRSs in this LUCP, the interim NTCRA LUCs presented are intended to complement, not replace, the existing LUCs.

- Fort Stewart has restrictions on digging throughout, and permits are required prior to excavation of any type. All digging and excavation activity on the installation requires prior coordination with utilities providers for the purpose of utility avoidance. The Fort Stewart Department of Public Works (DPW), Environmental Prevention and Compliance Branch will review dig permits and specify what safety precautions will be required for the project. This existing LUC includes the MRSs.
- Additionally, fencing (6-foot high galvanized metal chain-link fabric and three stands of heavy gauge metal barbed wire one-foot high extending outward at the top) is in place at the following MRSs: the Anti-Aircraft Range 90-MM – 2, Hero Road Trench Area, and Anti-Aircraft Range – 4-A. Signs also exist at the Hero Road Trench Area MRS.

Table 2-2: Summary of LUC Components in place at Fort Stewart

LUC Component	Number of RODs specifying a LUC
Land Use Restrictions	
· *Mitigation area(s) protection*	1
· *No residential use*	1
Media-Specific Restriction	
· *Prohibit use of groundwater for consumption or domestic purposes*	7
Engineering Controls	
· *Fences*	3
· *Markers/Signs*	7
Institutional Controls - Restriction	
· *Restrictions on groundwater withdrawal*	7
· *Restrictions on land use*	1
· *Restrictive covenants*	7
Institutional Controls - Mechanism	
· *Notations in Master Plan*	7
· *Zoning*	7

2.9 Other MMRP Actions to Date

The MRSs at Fort Stewart have been the subject of the following reports:

- The *Final Phase 1 Historical Records Review, Fort Stewart, Georgia* (September 2006) presents detailed descriptions of the previous investigation conducted at Fort Stewart.
- The *Final Confirmatory Sampling, Fort Stewart, Georgia* (November 2007) provided background information for the areas surrounding the MRSs at Fort Stewart.
- The *Final Preliminary Assessment for the Small Arms Range – 2, Fort Stewart, Georgia* (January 2009) determined that the Small Arms Range – 2 was eligible for the MMRP.
- The *Final Phase 2 Historical Records Review, Fort Stewart, Georgia* (June 2010) identified four additional MRSs eligible for the MMRP.

- The *Final Phase 2 Confirmation Sampling, Fort Stewart, Georgia* (September 2011), a continuation of the initial 2007 CS Report, focused on evaluating the potential presence of historical munitions use on the 4,240-acre re-designated parcel, where additional MRSs are eligible.

Following the CS fieldwork, two MEC investigations were conducted by U.S. Army Corps of Engineers (USACE), Baltimore District Explosive Safety due to explosive ordnance disposal (EOD) responses within the 4th Infantry Brigade Combat Team (IBCT) construction site within the footprint of Anti-Aircraft Range-4. These investigations are described in Section 2.5. Additional data on the MRSs at Fort Stewart can be found in the following document:

- The *Phase II RCRA Facility Investigation Report for 16 Solid Waste Management Units at Fort Stewart, Georgia, Volume I of III* (April 2000) provided background concentrations for metals at Fort Stewart.

The RI (RFI), including geophysical surveys, is complete for FTSW-002-R-01 and FTSW-008-R-01 and underway for FTSW-006-R-01. The RFI/CMS phase has yet to be awarded for the remaining of the MRSs (FTSW-009-R-01; FTSW-009-R-02; FTSW-0010-R-01; FTSW-011-R-01). The LUCs to be implemented as a result of this LUCP are only intended to be interim actions and will be re-evaluated/adjusted as necessary following completion of the RI/Feasibility Study (FS) (RFI/Corrective Measures Study [CMS]) phase. Note that the LUCP and RI (RFI) are being developed concurrently but independently of each other. This LUCP is intended to be a living document and will be reviewed and adjusted in the event the LUC situation at Fort Stewart changes. The projected schedule of the MMRP activities for the three MRSs is shown in Table 2-3. Note, however, that these dates are subject to change due to contract award and/or other unforeseen issues.

Table 2-3: Schedule of RCRA Actions at the On-Post MRSs Eligible for Interim LUCs

	Projected Completion Date of CERCLA (RCRA) Phases			
MRS	**RI/FS (RFI/CMS)**	**RD (DES)**	**RA(C) [CMI(C)]**	**LTM**
Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01)	Mar-2013	Dec-2013	Sep-2015	Jun-2045
Small Arms Range – 2 (FTSW-006-R-01)	Jul-2014	Mar-2015	Sep-2016	Jun-2044
Hero Road Trench Area (FTSW-008-R-01)	Mar-2013	Dec-2013	Sep-2015	Jun-2045
Anti-Aircraft Range – 4-A (FTSW-009-R-01)	Dec-2014	May-2015	Jun-2017	Jun-2047
Anti-Aircraft Range – 4-B (FTSW-009-R-02)	Dec-2014	May-2015	Jun-2017	Jun-2047
Anti-Tank Range 90-MM – 2 (FTSW-010-R-01)	Dec-2014	May-2015	Jun-2017	Jun-2047
Grenade Launcher Range (FTSW-011-R-01)	Dec-2014	May-2015	Jun-2017	Jun-2047

N/A = Not Applicable
RD = Remedial Design
DES = Design
RA(C) = Remedial Action (Construction)
CMI(C) = Corrective Measures Implementation (Construction)
LTM = Long-Term Management

No other actions have taken place.

2.10 Federal, State, and Local Authorities' Role

The State regulators (GAEPD) were engaged to review and comment on the LUCs Interim Measures Work Plan deliverable for Fort Stewart. Public input was not solicited since it is not required under the RCRA CA process.

Enforcement of this NTCRA rests solely with the DoD, as it applies only to Army-owned property.

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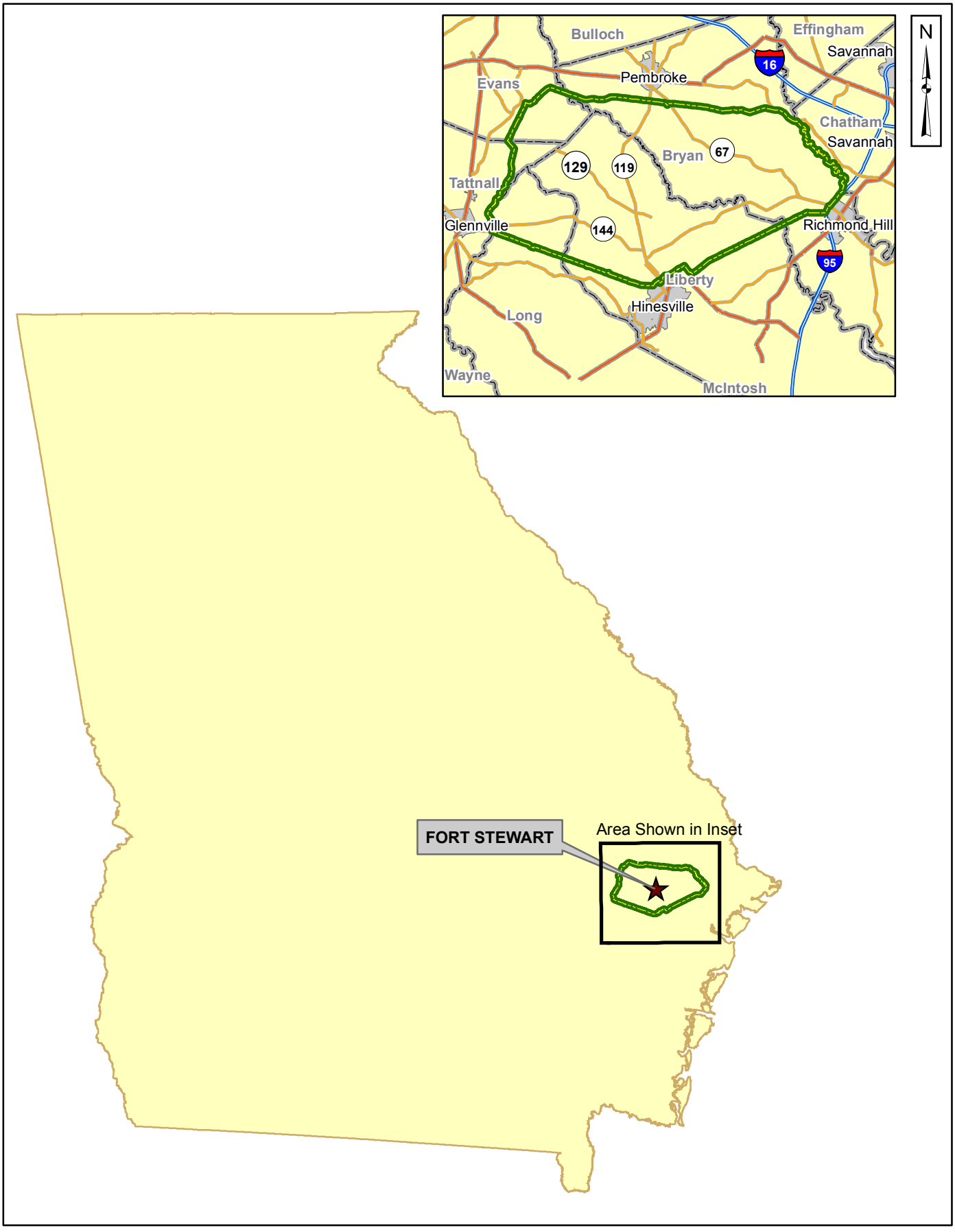
Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-1
Fort Stewart Location



Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-2
Location of MRSs at Fort Stewart

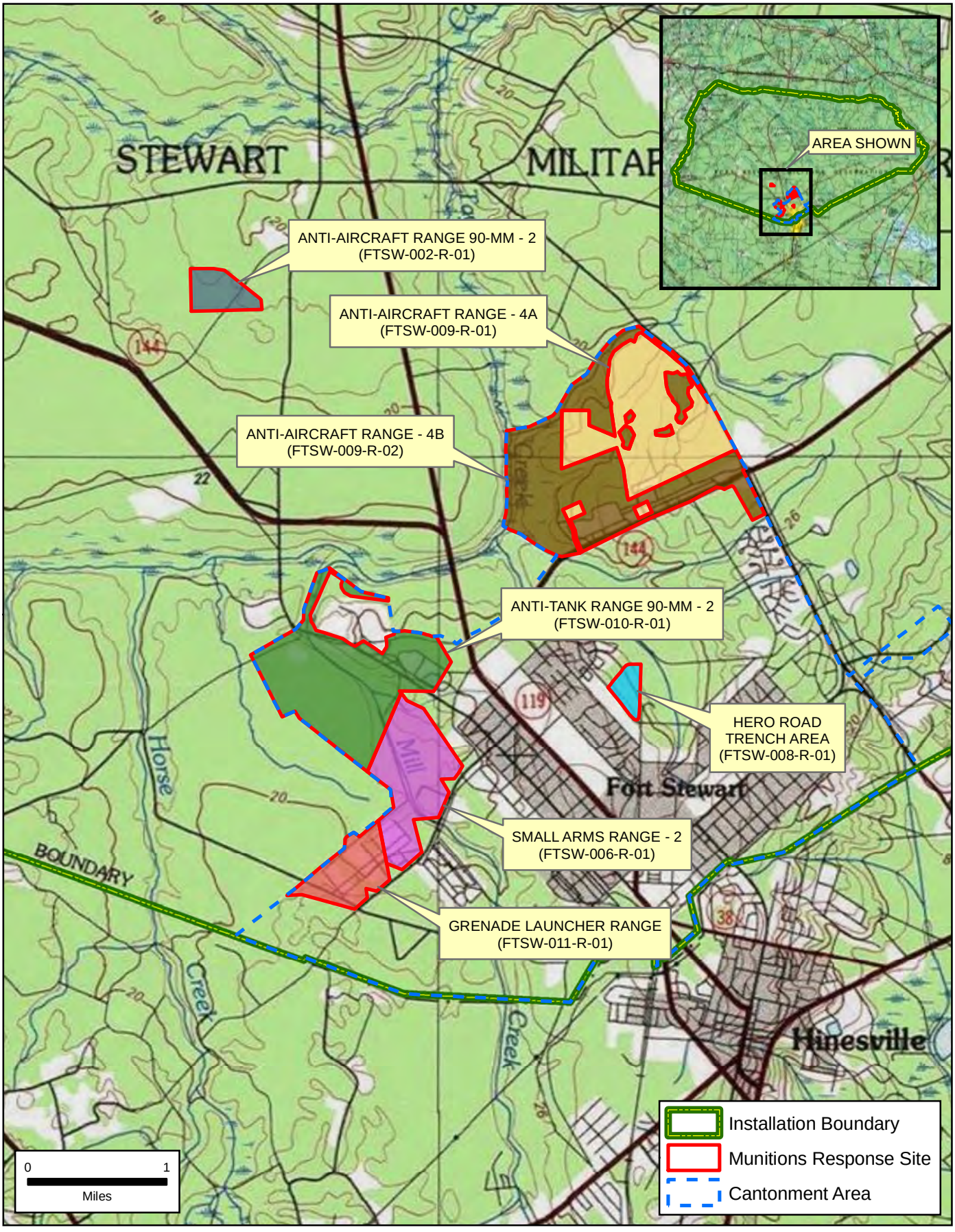


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Figure 2-3
Anti-Aircraft Range 90-MM - 2

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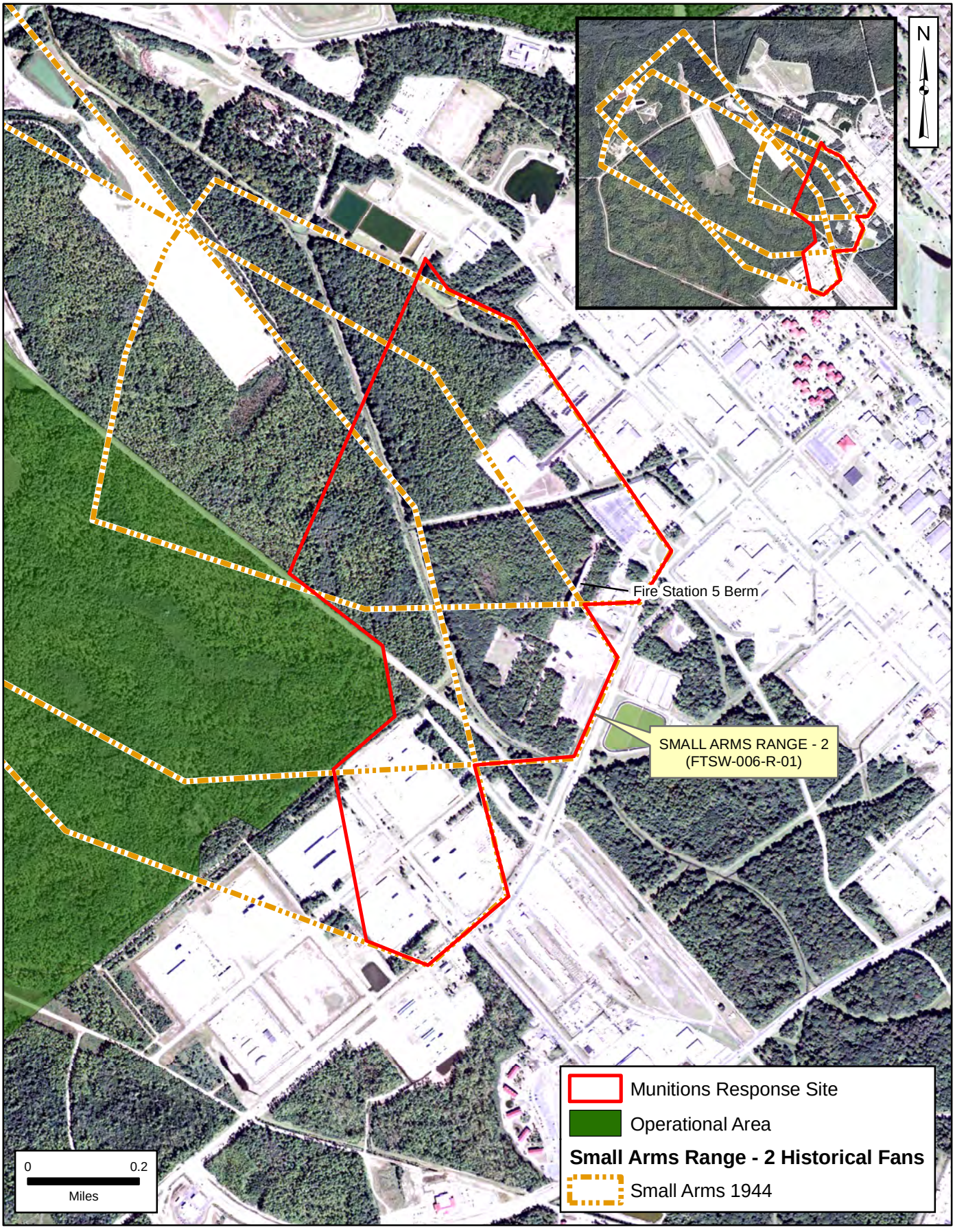
Military Munitions Response Program
Fort Stewart, GA

Figure 2-4
Small Arms Range - 2

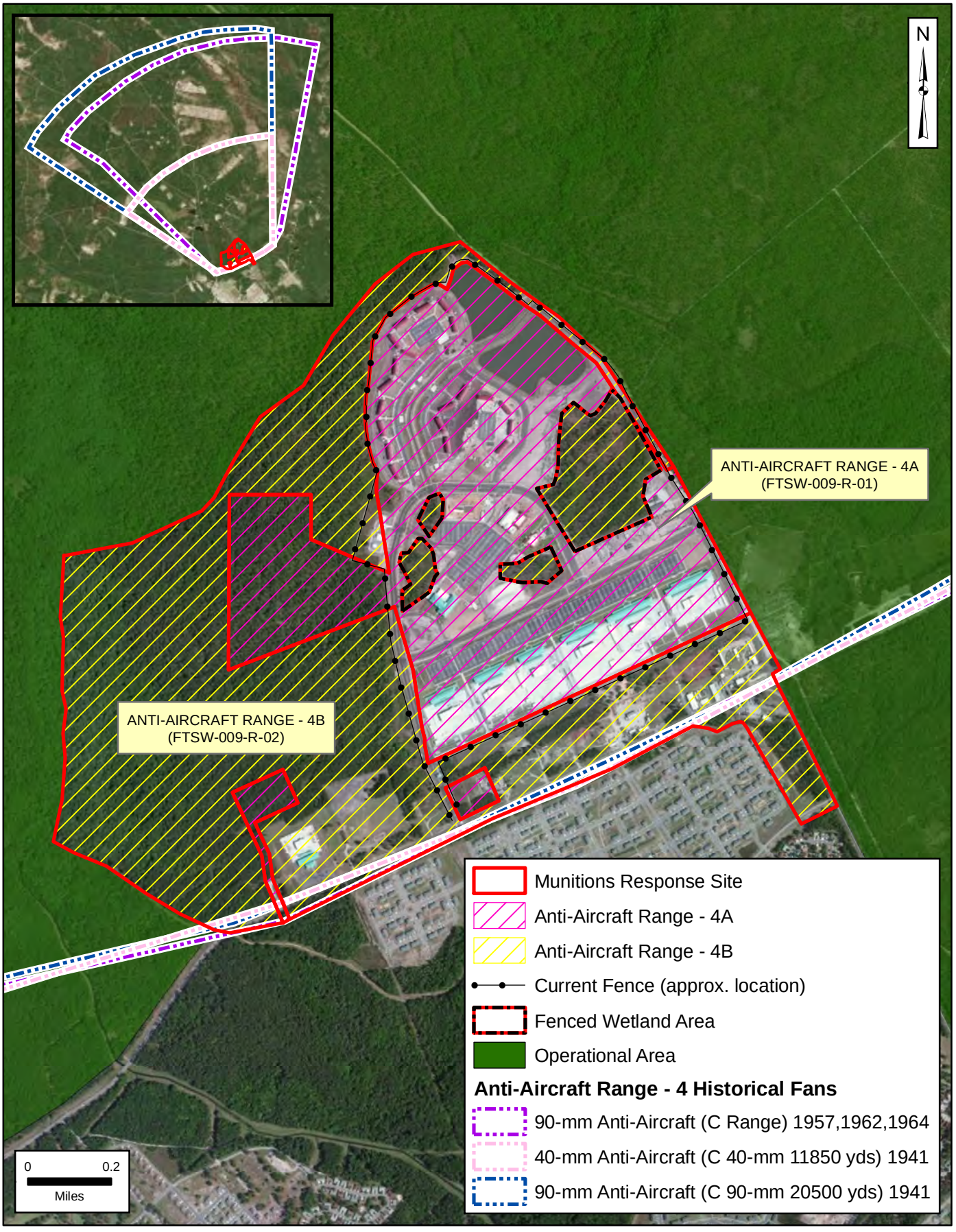


Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-5
Hero Road Trench Area

Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-6
Anti-Aircraft Range - 4 MRA



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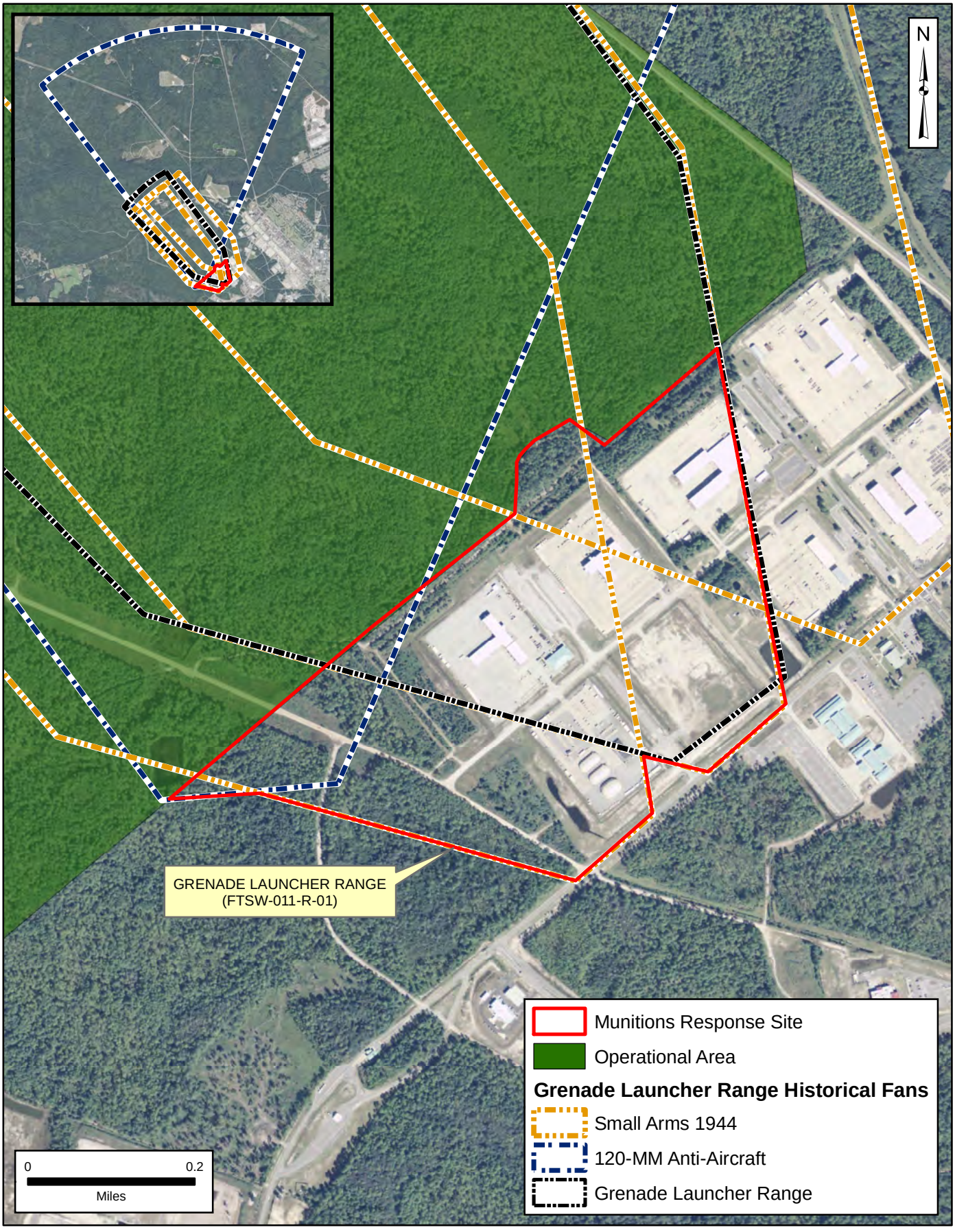
Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-7
Anti-Tank Range 90-MM - 2

Non-Time Critical Removal Action
Land Use Control Plan
Military Munitions Response Program
Fort Stewart, GA

Figure 2-8
Grenade Launcher Range



3 THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

As required under 40 CFR Part 300.415(b)(1), the Army has determined that there is a potential threat to human health or welfare from the following factors resulting from the presence of MEC and/or MC at the seven MRSs on Fort Stewart:

- Threat of fire or explosion [40 CFR Part 300.415(b)(2)(vi)] from MEC potentially remaining on site;
- Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants [40 CFR Part 300.415(b)(2)(i)] from MC in the soil.

Possible exposure is limited to on-site workers who may disturb the sites during utility or construction activities, authorized personnel including residents, and unauthorized trespassers. Possible exposure pathways were assessed using the conceptual site models (CSMs) presented in the Final CS report. MEC exposure is a safety concern, while MC could expose personnel and others to contaminants.

The Army, as lead agency, may therefore "take any appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or the threat of release" [40 CFR Part 300.415(b)(1)].

In addition, the Army is required to take action under DoD Ammunition and Explosive Safety Standards (DoD 6055.09) to deter unauthorized access to areas under DoD control that are known or suspected of containing potential explosives or chemical agent hazards.

3.1 Risk to Human Health and the Environment

The actual or potential presence of MEC and/or MC at Fort Stewart's seven MRSs may present an imminent and substantial endangerment to public health, welfare, or the environment through threat of fire or explosion (40 CFR 300.415(b)(2)(vi)).

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4 SELECTED NTCRA LUC ACTIONS AND ESTIMATED COSTS

4.1 Selection of NTCRA LUC Actions

The removal action objective for the NTCRA LUCs is to protect human health by minimizing human exposure to MEC and MC at the on-post MRSs, including but not limited to the potential for fire and explosion, while further response actions are evaluated and implemented. The proposed interim LUC action consists of the set of measures selected for each MRS, or grouping of similar MRSs, that provide the means of achieving the removal action objective for the installation. Standard LUC components (*i.e.*, those applied for all MRSs at the installation) are supplemented, if necessary, with MRS-specific measures to address conditions at individual MRSs.

The selected NTCRA LUC actions consist of a set of measures for achieving the removal action objective for the installation. The existing LUCs are described in Section 2.8 and summarized below in Table 4-1. The supplemental LUC components needed for an effective NTCRA at Fort Stewart are summarized in Table 4-1.

Table 4-1: On-Post MRSs Existing and Selected LUCs

					LUC Components in Place/Selected? (1)							
MRS Name	**Acres**	**MEC Present?**	**MC Present?**	**MRSPP Score**	**Land Use Restrictions**	**Notations in Master Plan**	**Dig Permits**	**Advisories**	**Monitoring & Enforcement**	**Signs/Markers**	**Fences**	**Access Control Personnel**
Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01)	77	Yes	Yes	4	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	Yes(2)/ **No**
Small Arms Range – 2 (FTSW-006-R-01)	287	Yes	Yes	4	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ No	No/ No	No/ No
Hero Road Trench Area (FTSW-008-R-01)	34.5	Yes	Yes	6	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	Yes/ **Yes**	Yes/ **Yes**	No/ No
Anti-Aircraft Range – 4-A (FTSW-009-R-01)	465	Yes	Yes	3	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ No	Yes/ **Yes**	No/ No
Anti-Aircraft Range – 4-B (FTSW-009-R-02)	663	Yes	Yes	3	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ **Yes**	No/ **Yes**	No/ No
Anti-Tank Range 90-MM – 2 (FTSW-010-R-01)	546	Yes	Yes	5	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ No	No/ No	No/ No
Grenade Launcher Range (FTSW-011-R-01)	132	Yes	Yes	4	No/ **Yes**	No/ **Yes**	Yes/ **Yes**	No/ No	No/ **Yes**	No/ No	No/ No	No/ No

(1) Two-fold entry for each LUC component indicates [*Installation-wide LUC in place*] / [*Supplemental MRS-specific LUC needed*]

(2) During duty hours, access control personnel operate an actuated arm barrier to control vehicles (and personnel) access in and out of the Ammunition Supply Point. Since the MRS site is fenced with a locked gate during non-duty hours, there is NO requirement for access control personnel for the MRS.

4.1.1 NTCRA LUC Action Description

The following is considered the best mix of supplemental LUC components for the MRSs at Fort Stewart. Supplemental LUCs consists of a combination of institutional controls and engineering controls.

Institutional Controls

The supplemental LUCs (*i.e.*, institutional controls) to be established at the Fort Stewart MRSs include:

- **Restrictions on Land Use:** To prevent potential receptors from encountering UXO items, it is recommended that the MRS property not be used for residential purposes, daycares, hospitals, or schools, and that excavation is prohibited or otherwise managed.
  - Media specific restriction – Prohibit, or otherwise manage excavation. This restriction is implemented through the existing dig permit program.
  - Restrict land use – No new residential, daycare, hospital, or school use without prior approval of the Fort Stewart DPW Environmental Prevention and Compliance Branch and appropriate review of the master plan, application of safety requirements, use of dig permits, and/or UXO construction support activities.
- **Notations In Master Plan:** The installation master plan will be updated to include specific notations on the MRSs in the installation.
  - A notation will be added to the Base Master Plan requiring the Master Planning Division to obtain from Range Control all 911 calls involving MEC and MD (within a designated area) prior to any land use changes occurring in order to record these within a GIS database to better delineate installation-wide exposure risk.
- **Dig Permits:** Because there is known ordnance, Fort Stewart has a standing policy requiring dig permits whenever ground is broken. Fort Stewart Safety reviews all dig permits and requires EOD support for areas known or have the potential to have MEC. The dig permit program will be adjusted to include review of the MRSs.
- **Monitoring and Enforcement:** An annual review of the MRSs at Fort Stewart will be conducted to ensure that LUCs remain effective and land usage has not changed. The review will involve site visits and inspections conducted by a project engineer. The results of the annual review will be made available to the Garrison Commander at the installation and a courtesy copy provided to the Environmental Protection Division of the Georgia Department of Natural Resources.

Engineering Controls

Additional LUCs (*i.e.*, engineering controls) were considered by the Army to be necessary or advisable at the Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01), Hero Road Trench Area (FTSW-008-R-01), and Anti-Aircraft Range – 4-B (FTSW-009-R-02) MRSs and include:

- **Fences:** A perimeter fence is used to limit access to select portions of the three MRSs where access restrictions are necessary to prevent encounters with MEC and/or MC. A medium-security, six-foot high galvanized industrial metal chain-link fabric with three strands of heavy-gauge barbed metal wire (one-foot high) angled to the outside is suggested for areas not already fenced. The cost of the fence installation depends on the MRS site conditions and size. Although the existing fencing at these three MRSs meet the suggested specifications, provisions are needed for funding the monitoring of and maintaining its effectiveness on a site-specific basis.
- **Signage:** Signs and markers can be used to warn people of the potential dangers of MEC and MC at the MRSs. It should help clarify to those who must be in the area where the MRSs are and help them avoid intruding. This may limit potential contact, but will do nothing to restrict contact by those who cannot read or chose to ignore the warnings. Signage is currently in place at the Hero Road Trench Area (FTSW-008-R-01), no implementation costs are necessary, only provisions for funding the monitoring of and maintaining its effectiveness.

4.1.2 Contribution to Remedial Performance

The LUCs will reduce the possibility of direct contact with MEC and/or MC, and will thus reduce the exposure and safety risk to humans at the MRSs. However, no action will be taken with this NTCRA to remove or remediate MEC and/or MC at the Fort Stewart MRSs. Therefore, residual risk from MEC and/or MC will remain on site. The LUCs alternative is an NTCRA and is not intended to be permanent or to replace the more permanent solutions developed under the MMRP.

4.1.3 Project Schedule

The major milestones for the LUCs project are summarized in Table 4-2.

Table 4-2: Estimated LUCs Project Schedule

Final LUCP	May 2013
Enact LUCs	August 2013
LUCs Inspections	Annually
Implementation of Final Remedy	FY2017

Note: The completion date for the RA(C) [CMI(C)] phase is currently estimated for FY2017.

4.2 Estimated Costs and LUC Funding

Implementing the NTCRA LUCs at Fort Stewart is estimated to cost *$54,800* in the first year (2013) and $84,200 annually, thereafter. The program is projected to continue through FY2017.

Table 4-3 summarizes the LUCs alternative costs for Fort Stewart. The basis of these estimated costs were updated from the *Final Interim Measures Work Plan* (USAEC, 2013) and is shown in detail within Appendix B.

Table 4-3: Components and cost Summary of NTCRA LUCs at Fort Stewart
(cost in $1,000s)

Selected LUC Components	Capital Cost	Annual Operating Cost (1)	O&M Years (2)	Total Cost	Net Present Value (3)
All MRSs					
Institutional Controls	***$ 43.2***	***$ 15.9***	***4***	***$ 91.0***	***$ 100.0***
Restrictions on land use / Notations in Master Plan	*36.7*	*0.0*	*4*	*36.7*	*35.7*
Dig Permits	*6.5*	*6.5*	*4*	*26.1*	*30.1*
Monitoring and Enforcement	*0.0*	*9.4*	*4*	*28.2*	*34.2*
Engineering Controls	***$ 11.6***	***$ 68.3***	***4***	***$ 888.8***	***$ 914.2***
Signs for FTSW-002-R-01	*2.8*	*0.3*	*4*	*3.7*	*3.7*
Fencing for FTSW-002-R-01	*0.0*	*17.7*	*4*	*230.7*	*237.3*
Signs for FTSW-008-R-01	*0.0*	*0.2*	*4*	*2.8*	*2.9*
Fencing for FTSW-008-R-01	*0.0*	*13.8*	*4*	*178.7*	*183.9*
Signs for FTSW-009-R-02	*8.8*	*0.9*	*4*	*11.4*	*11.7*
Fencing for FTSW-009-R-02	*0.0*	*35.5*	*4*	*461.5*	*474.7*
Total (4)	***$ 54.8***	***$ 84.2***	***4***	***$ 979.8***	***$1,014.2***

Notes: (1) Annual costs include inspections and self-audits of the LUCs.

(2) O&M = Operations and Maintenance. The number of years of LUC maintenance until the RA(C) [CMI(C)] phase for all MRSs is completed and LTM commences.

(3) A 4-year period with a 2.75% discount rate is used, based on the planned completion date of 2017 for the RA(C) [CMI(C)].

(4) Rounding errors affect several of the totals shown in this table.

These NTCRA LUCs cost estimates were developed using DoD-standard remedial cost estimating software and are based on general assumptions about site conditions and institutional issues to be faced in implementing LUCs.

The costs shown above represent a new Fort Stewart funding requirement, in that there has been no prior budgeted allocation for MMRP NTCRA LUCs. USAEC has indicated that funding may be available to support these costs, though at this time no funding arrangements have been made.

5 IMPLEMENTING LAND USE CONTROLS

5.1 Introduction

This section presents the actions necessary to implement in FY2013, maintain from FY2014 through termination, and terminate (in approximately FY2017) the NTCRA LUCs at Fort Stewart. Section 5.1 provides a general overview of LUCs implementation. Section 5.2 specifically describes the actions needed for the implementation and maintenance of individual LUC components. Section 5.3 presents other issues that may arise in LUCs implementation – addressing non-compliance, land use compatibility, and records management issues. Section 5.4 describes the termination or modification of the NTCRA LUCs. These descriptions are based on the guidelines for implementing LUCs found in *DoD Policy on Land Use Controls Associated with Environmental Restoration Activities* (DoD, 2001).

5.1.1 Selected LUCs

The following LUC components were established in the Interim Measures Work Plan (USACE, 2013) and are to be applied to the seven MRSs at Fort Stewart.

1. Restrictions on Land Use
2. Notations in Master Plan
3. Dig Permits
4. Monitoring and Enforcement

Additional LUC components were established in the Interim Measures Work Plan (USACE, 2013) and are to be applied at the Anti-Aircraft Range 90-MM – 2, Hero Road Trench Area, and Anti-Aircraft Range – 4-B.

5. Signage
6. Fences

The NTCRA LUCs will be incorporated with existing LUCs at Fort Stewart. They are interim measures and will be terminated either when the MRS is recommended for NFA or a RA(C) [CMI(C)] is implemented. It is anticipated that the RA(C) [CMI(C)] phase will be implemented at Fort Stewart by FY2017.

5.1.2 Responsible Offices

The Fort Stewart DPW Environmental Prevention and Compliance Branch is responsible for implementing the NTCRA LUCs and will coordinate with other offices to ensure that the NTCRA LUCs are properly implemented. Other offices involved in the implementation of these LUCs include:

- Master Planning,
- GIS,
- Construction,
- Engineering,
- Public Affairs, and
- Safety.

5.1.3 Initial Implementation of LUCs

The following actions will be taken by the DPW Environmental Prevention and Compliance Branch during the first year (FY2013) to implement the selected LUCs. These actions are summarized in Table 5-1.

5.1.4 Maintenance of LUCs

Maintenance of LUCs involves the activities that occur in Year 2 (FY2014) through termination, after set-up of the LUCs (see Table 5-1). The Monitoring and Enforcement program starts in Year 2 (FY2014); all other components will have started in Year 1 (FY2013) and will be maintained thereafter.

Table 5-1: Actions to Implement and Maintain LUCs

LUC Component and Actions	Started	Frequency
1. Restrictions on Land Use 1.1. DPW Environmental Prevention and Compliance Branch notifies Master Planning Office of selected land use restrictions	Year 1	Once
2. Notations in Master Plan 2.1. Master Planning Office incorporates land use restrictions into Master Plan and notifies affected parties of the new land use restrictions	Year 1	Once
3. Dig Permits 3.1. DPW Environmental Prevention and Compliance Branch include NTCRA LUCs in dig permit reviews	Year 1	Ongoing, as needed
4. Signs 4.1. Design and Install about 124 signs at three MRSs (which encompasses approximately 24,500 linear feet) 4.2. Maintain (repair/replace) about 147 signs as needed	Year 1 Year 2	Once Annually, or as needed
5. Fences 5.1. Maintain (repair/replace) the approximately 22,282 linear feet of fencing at Anti-Aircraft Range 90-MM – 2, Hero Road Trench Area, and Anti-Aircraft Range – 4-B	Year 2	Annually, or as needed
6. Monitoring and Enforcement 6.1. Self-Audit – Environmental Prevention and Compliance Branch , Master Planning Office and Public Affairs Office will conduct self-audits on their NTCRA LUCs programs 6.2. Site Inspection – DPW Environmental Prevention and Compliance Branch will perform the document reviews, site visits and interviews 6.3. Monitoring and Inspection Report – DPW Environmental Prevention and Compliance Branch will prepare this report on basis of Self Audit and Inspection	Year 2 Year 2 Year 2	Annual Annual Annual

5.1.5 Documentation

The key documents developed in the establishment of the MMRP NTCRA LUCs at Fort Stewart:

- *Final Military Munitions Response Program, Land Use Controls, Interim Measures Work Plan for Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01), Small Arms Range – 2 (FTSW-006-R-01), Hero Road Trench Area (FTSW-008-R-01), Anti-Aircraft Range – 4-A (FTSW-009-R-01), Anti-Aircraft Range – 4-B (FTSW-009-R-02), Anti-Tank Range 90-MM – 2 (FTSW-010-R-01), Grenade Launcher Range (FTSW-011-R-01), Fort Stewart, Georgia* (USAEC, 2013)
- GIS shapefiles: These are data files providing the shape and coordinates of the MRS subject to the NTCRA LUCs.

The Fort Stewart DPW Environmental Prevention and Compliance Branch will distribute these documents electronically to the participating offices and residents (if applicable) as shown in Table 5-2 to inform them of the program.

Documents that will be generated during NTCRA LUCs implementation include the following.

- Dig Permits: Fort Stewart has an established review process for construction and dig permit applications. Digging on Fort Stewart without a permit is a serious offense. The recommended restrictions on land use and the notations in the master plan will be factors in reviews conducted under the ongoing dig permit process; these will be used to address the munitions related risks posed at the seven Fort Stewart MRSs, without requiring additional revisions to the dig permit process.
- Engineering Controls: Sign and fence specifications and designs will be prepared by the Fort Stewart DPW Environmental Prevention and Compliance Branch for three MRSs (FTSW-002-R-01; FTSW-008-R-01; FTSW-009-R-02). The Fort Stewart DPW Environmental Prevention and Compliance Branch will be responsible for handling sign and fence implementation issues. The specifications and designs will include appropriate warnings about the potential threat of MEC and/or MC, especially at sites where either of these potential hazards was not previously recognized.
- Annual Monitoring and Enforcement Report: The report will be developed by DPW Environmental Prevention and Compliance Branch on the basis of the annual Monitoring and Enforcement actions (self-audit and site inspections).

The reports generated during NTCRA LUCs implementation are shown in Table 5-2.

Table 5-2: Documentation of NTCRA LUCs

Document(s)	Recipient(s)	Purpose	Occurrence
Final EE/CA, Final AM and Final LUCP	Master Planning Admin Record AEDB-R GAEPD	To show location and rationale for LUCs. To be considered in master planning for installation development and activities.	Year 1

Document(s)	Recipient(s)	Purpose	Occurrence
GIS shapefiles	GIS Office	To incorporate LUCs into GIS and Master Plan	Year 1
Dig Permits	Construction Office	To consider LUCs in ongoing and new construction and dig permit application reviews	Upon submittal
Sign and fence design, as-built drawings and annual maintenance documents	Internal Files (DPW Environmental Prevention and Compliance Branch)	To provide a record of the MEC warning signs and fencing placed on the perimeter of Fort Stewarts MRSs	Year 1 and annually
Annual Monitoring and Enforcement Report	Internal Files (DPW Environmental Prevention and Compliance Branch)	To review NTCRA LUCs implementation and effectiveness via two part program **(**Environmental Self-Audit and Site Inspection**)**	Annually starting Year 2

5.2 LUC Component Implementation, Maintenance, and Documentation

Specific considerations for each of the LUC component are discussed in Sections 5.2.1 through 5.2.6 below.

5.2.1 Restrictions on Land Use

The following land use restrictions will be put in place at all seven MRSs at Fort Stewart.

1. Prohibit all excavation activities not associated with UXO clearance activities until after the MMRP is 100% investigated.
2. No new residential, daycare, hospital, or school use without appropriate review and approval of the Fort Stewart DPW Environmental Prevention and Compliance Branch and Safety Office of the master plan, application of safety requirements, use of dig permits, and/or UXO construction support activities.

As discussed in Section 2.8, Fort Stewart has LUCs in place. The MMRP NTCRA LUCs complement the IRP LUCs, but are different in several ways. First, their restrictions are based more on munitions avoidance rather than contaminant avoidance. Second, their location is specific to the seven MRSs, which don't necessarily overlap with the IRP LUCs sites. The DPW Environmental Prevention and Compliance Branch participates in the review and approval process for excavation and construction permits, as well as other land use changes at the installation. They will keep the other offices involved in the reviews informed of the LUCs and MEC issues at the MRSs.

5.2.1.1 Implementation

The DPW Environmental Prevention and Compliance Branch will notify the Master Planning Division that the NTCRA LUCs have been selected and provide the necessary documentation detailing the land use restrictions and the locations to which they apply.

The DPW Environmental Prevention and Compliance Branch and Master Planning Division will determine the appropriate means to notify the affected offices and personnel (military, civilian and residents) of the restrictions.

5.2.1.2 Maintenance

There are no maintenance requirements on the land use restrictions. They will continue to be applied until modified or terminated (see Section 5.4).

5.2.1.3 Documentation

The documents needed to implement the land use restrictions include: the IMWP and LUCP. These documents will provide the background information, decision document, and implementation plan for the NTCRA LUCs. The GIS shapefiles illustrating the MRSs locations will also be submitted by the DPW Environmental Prevention and Compliance Branch to Master Planning Office.

5.2.2 Notations in Master Plan

This LUC component provides the mechanism through which the selected land use restrictions (Section 5.2.1) are incorporated into the Fort Stewart Master Plan. To identify where on the MRS munitions-related items were discovered, notations will be made in the Fort Stewart Master Plan.

5.2.2.1 Implementation

Master Planning Division will incorporate the land use restrictions into the Master Plan and will use these in evaluating planned actions and dig permit applications. The GIS Office may be involved in loading the shapefiles to delineate the MRS boundaries and limits of the land use restrictions at Fort Stewart.

5.2.2.2 Maintenance

The Master Planning Division is responsible for the maintenance and use of the Master Plan and its components, including land use restrictions.

5.2.2.3 Documentation

The IMWP and LUCP and GIS shapefiles provide the reference material for the land use restrictions in the Master Plan.

5.2.3 Dig Permits

The DPW Environmental Prevention and Compliance Branch participates in the review and approval process for excavation and construction permits at Fort Stewart. The DPW Environmental Prevention and Compliance Branch will inform the other offices involved in the reviews (including Master Planning Division, GIS Office, Construction Office, and Safety

Office) of the MEC and MC issues at the MRSs and the selected NTCRA LUCs land use restrictions.

5.2.3.1 Implementation

The permit process is already fully established at Fort Stewart. The DPW Environmental Prevention and Compliance Branch will be responsible for incorporating the consideration of NTCRA LUCs land use restrictions into the permit review process.

5.2.3.2 Maintenance

The NTCRA LUCs land use restrictions will continue as a factor in Fort Stewart's permit review process until they are modified or terminated (See Section 5.4).

5.2.3.3 Documentation

The IMWP and LUCP are the reference material for the land use restrictions in the dig permit reviews.

5.2.4 Signs

Signs are engineering controls that will be added for the NTCRA LUCs at the Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01) and Anti-Aircraft Range – 4-B (FTSW-009-R-02) MRSs and maintained and/or replaced at the Hero Road Trench Area (FTSW-008-R-01). The specifications and designs for signs warning of potential munitions danger at the MRS will be prepared by the Fort Stewart DPW Environmental Prevention and Compliance Branch. Note that as the RI (RFI) progresses and new information is discovered, the MRSs may require new or additional signs.

5.2.4.1 Implementation

The DPW Environmental Prevention and Compliance Branch will work with the Engineering Division to ensure that the warning signs are designed, ordered and installed. The cost estimates (as provided in the *Final Interim Measures Work Plan* [USACE, 2013]) anticipated that signs would be placed at 220 feet intervals around each MRS's perimeter or portions of the MRS's perimeter, resulting in approximately 147 new signs needed and/or replaced for the three MRSs (30 at the Anti-Aircraft Range 90-MM – 2 [FTSW-002-R-01]; 23 at the Hero Road Trench Area [FTSW-008-R-01]; 94 at the Anti-Aircraft Range – 4-B [FTSW-009-R-02]). This represents the maximum number of signs that may need to be added. The final number may be fewer, and will depend on the effectiveness and spacing of signage.

5.2.4.2 Maintenance

The DPW Environmental Prevention and Compliance Branch will inspect the warning signs placed at the three MRSs. It will repair or replace any that are damaged or lost. There is an annual allocation of 10% of the capital cost for the upkeep of these signs.

5.2.4.3 Documentation

The DPW Environmental Prevention and Compliance Branch will keep any necessary design documents, as-built drawings (showing placement of the signs) and annual inspection documents (Section 5.2.6) for the signs, in their internal files.

5.2.5 Fences

Fences will also be maintained and/or replaced as an engineering control for the NTCRA LUCs at the Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01), Hero Road Trench Area (FTSW-008-R-01), and Anti-Aircraft Range – 4-B (FTSW-009-R-02) MRSs to limit access to select portions of the MRSs in order to prevent contact with MEC. While these three MRSs have existing fencing, provisions for funding the monitoring and maintenance of its effectiveness are needed. Note, however, that as the RI (RFI) progresses and/or as new information is discovered during construction support activities, MRSs may require new or additional fencing.

5.2.5.1 Implementation

The Installation Safety Office will work with the Engineering Division to ensure that the perimeter fences are designed, ordered, and installed as necessary for O&M of the existing fences. The cost estimates (as provided in the *Final Interim Measures Work Plan* [USACE, 2013]) assumed approximately 22,282 linear feet of fencing will be needed in order to maintain and/or replace the existing fencing at the three MRSs.

5.2.5.2 Maintenance

The DPW Environmental Prevention and Compliance Branch will inspect the existing fences at the three MRSs. It will repair or replace any that are damaged or lost. There is an annual allocation of 10% of the capital cost for the upkeep of these fences.

5.2.5.3 Documentation

The DPW Environmental Prevention and Compliance Branch will keep any necessary design documents, as-built drawings (showing fence perimeter location) and annual inspection documents (Section 5.2.6) for the fence, in their internal files.

5.2.6 Monitoring and Enforcement

The NTCRA LUCs are expected to continue at Fort Stewart for four years (until FY2017) after the initial implementation while the MMRP RI/FS (RFI/CMS) and subsequent actions proceed. The effectiveness of the implemented LUCs during this period will depend on how well they are incorporated into the existing installation processes. Monitoring and Enforcement concerns the periodic checks and reminders to affected offices, which help to ensure that the LUCs are being properly followed.

The Monitoring and Enforcement review will be conducted in two complimentary phases: an Environmental Self-Audit (Section 5.2.6.4) and a Site Inspection (Section 5.2.6.5).

5.2.6.1 Implementation

Monitoring and Enforcement does not start until Year 2 (FY2014), once other LUC components are in place. The DPW Environmental Prevention and Compliance Branch will conduct the two phases, Self-Audit and Site Inspection, and request inputs from participating offices as described below.

5.2.6.2 Maintenance

Monitoring and Enforcement will be conducted annually, beginning in FY2014 and continuing until the Fort Stewart MRSs commences the RA(C) [CMI(C)]or are determined to require NFA.

5.2.6.3 Documentation

Documents generated during the Self-Audit and Site Inspection will be compiled for internal files. The DPW Environmental Prevention and Compliance Branch will prepare and file an annual Monitoring and Enforcement Report as described in Section 5.2.6.6.

5.2.6.4 Environmental Self-Audit

Directly involved offices will conduct an Environmental Self-Audit as part of the annual Monitoring and Enforcement and in anticipation of the Site Inspection. The audit will involve the following steps:

1) ***Site Approval Process***. The DPW Environmental Prevention and Compliance Branch and Master Planning Division will review the site approval process used to implement Land Use Restrictions, including:
   a) Determine whether land use changes made since the last annual review conflict with any LUCs or other land use assumptions at the MRS.
   b) Ensure that the land use restrictions are being properly followed in construction and dig permit reviews.
   c) Determine what construction and dig permits were granted within the MRS. If any were granted, determine whether safety reviews were conducted and risk mitigations measures were specified. The permit actions will be reviewed during the Site Inspection (discussed below).
2) ***Engineering Controls (Signs and Fences)***. Fort Stewart DPW Environmental Prevention and Compliance Branch will assess the condition of any warning signs and fences added to the base as a result of this LUCP. The condition of the signs and fences will be assessed and any maintenance needs will be identified.

The Environmental Self-Audit will be used as input to the Site Inspection process. If documents are generated from the audit, these will be added into the Monitoring and Enforcement Report.

5.2.6.5 Site Inspections

The DPW Environmental Prevention and Compliance Branch will conduct an annual Site Inspection, which will include the following actions and offices.

1) ***Document Reviews*** This step will include review of the Environmental Prevention and Compliance Branch of the DPW's files (described in Section 5.3.3) to determine activities that occurred or concerns that arose regarding the NTCRA LUCs during the year.
2) ***Site Visits*** Each MRS will be visited and inspected using non-intrusive methods to include:
   a) Review construction and digging activities (if any) to determine if they were permitted and are within the LUC guidelines.
   b) Identify possible violations of LUCs, including unapproved residential, childcare, or hospital construction within the MRS.
   c) Review physical condition of engineering controls (signs and fences) and their apparent effectiveness.

3) ***Interviews*** These will be held with representatives of the affected or implementing offices to determine if there were concerns, required modifications, or other issues relating to LUC implementation and effectiveness during the year.

5.2.6.6 Monitoring and Enforcement Report

The findings from the Environmental Self-Audit and the Site Inspection will be compiled into a Monitoring and Enforcement Report. The report will be placed in the internal files at the DPW Environmental Prevention and Compliance Branch. The results of the annual review will be made available to regulatory stakeholders. The annual Monitoring and Enforcement reports may be used as inputs to the 5-year reviews conducted under RCRA and the MMRP.

5.3 Other Issues in LUC Implementation and Maintenance

The following issues may arise during the implementation of NTCRA LUCs.

5.3.1 Addressing LUC Non-Compliance

The DPW Environmental Prevention and Compliance Branch may become aware of NTCRA LUC non-compliance, such as non-allowed and non-permitted drilling or digging on an MRS. It will be responsible for correcting the situation and may take measures such as those suggested in the following DoD LUCs policy.

"If, during an installation inspection or through some other process, it becomes apparent that a LUC is being violated, the appropriate installation officials will be notified immediately. These officials will take steps to ensure the integrity of the LUC is restored, including any required notifications and corrective actions. In addition, it may be useful to coordinate responsibility for LUC management with installation occupational safety and public safety offices to include LUCs in their regular inspections of, and patrols on, the installation property and activities." (Source: DoD, 2001)

5.3.2 Land Use Compatibility

During the time that the NTCRA LUCs are in place, land use requirements may change at the MRS. In such cases, the DPW Environmental Prevention and Compliance Branch will work with Master Planning Division and other affected offices to determine the best course of action. They may use some of DoD policy's suggestions as follows.

"At active installations such as, the land use of a LUC area may change. If it does, the installation must institute a process to evaluate the effect on human health and the environment of any proposed land use changes and ensure land use remains compatible with the LUC. This process, to be conducted in consultation with the appropriate environmental restoration office, will seek to answer the following questions:

- Is the proposed land use inconsistent with the exposure scenario outlined in the CSM?
- Will the land use change adversely affect the effectiveness of the selected site remedy?
- Will the need for any additional remedial actions arise as a result of implementing the land use change?

If the answer to any of the above questions is yes, the appropriate process required by environmental regulations and guidance to revise the site remedy, which may require consultation with environmental regulatory agencies, must be followed. This includes

reassessing the decision document to determine if an amendment is required for the proposed land use change." (Source: DoD, 2001)

5.3.3 Records Management

The DPW Environmental Prevention and Compliance Branch is responsible for records management of the NTCRA LUCs. The records kept at the DPW Environmental Prevention and Compliance Branch should include:

- *Final Military Munitions Response Program, Land Use Controls, Interim Measures Work Plan for Anti-Aircraft Range 90-MM – 2 (FTSW-002-R-01), Small Arms Range – 2 (FTSW-006-R-01), Hero Road Trench Area (FTSW-008-R-01), Anti-Aircraft Range – 4-A (FTSW-009-R-01), Anti-Aircraft Range – 4-B (FTSW-009-R-02), Anti-Tank Range 90-MM – 2 (FTSW-010-R-01), Grenade Launcher Range (FTSW-011-R-01), Fort Stewart, Georgia* (USAEC, 2013)
- Communications, including concurrence documents, with GAEPD
- Annual Monitoring and Enforcements Reports
- Other communications and reports affecting selected LUCs, including violation reports, land use changes, and modification requests

The DPW Environmental Prevention and Compliance Branch will establish and maintain its internal files of the Fort Stewart NTCRA LUCs program to include final documents, implementation data, and monitoring and enforcement reports. To comply with RCRA requirements, the DPW Environmental Prevention and Compliance Branch will place the NTCRA LUCs primary documents (the Final Interim Measures Work Plan and LUCP) in the Administrative Record. The DPW Environmental Prevention and Compliance Branch will also be responsible for modifying the Army's database of environmental restoration sites, AEDB-R, to include the selected and implemented NTCRA LUCs.

Documentation of the termination of the NTCRA LUCs will be made to the same offices that received the original documents (as shown in Table 5-2) once either the MRS has been determined to require NFA or long-term measures are implemented with a RA(C) [CMI(C)].

5.4 Modifying/Terminating NTCRA LUCs

The NTCRA LUCs are interim actions that will be implemented until either NFA status is achieved or permanent remedial actions are selected and implemented for the seven MRSs at Fort Stewart. It is currently anticipated that this will occur in approximately FY2017.

If the LUCs need to be modified (*e.g.*, a change in land use is anticipated), this LUCP should be revised to reflect these changes. DoD policy on LUCs notes, "LUCs shall be modified or terminated through the same process used to establish the LUC, and if terminated, deleted from the mechanisms discussed in the attached guidance documents. Unless the situation otherwise requires an amendment to the decision document, modification or termination alone does not require amendment to the decision document. Upon termination of a LUC, Components shall undo the system of mutually reinforcing controls, if one was put in place, to avoid future confusion about the status of the property. If the decision document needs to be amended, Components should obtain the same level of applicable review from Federal, state, or local regulatory agencies as the original decision on establishing a use restriction." (DoD, 2001)

It is possible that the selected MMRP remedial actions will include the LUCs described in this LUCP. Even in that case, the affected offices should be notified that the NTCRA LUCs are terminated and should be provided with the documentation for the newly selected LUCs of the final implemented remedy.

GAEPD should to be notified when the NTCRA LUCs are modified or terminated.

The DPW Environmental Prevention and Compliance Branch is responsible for executing the NTCRA LUCs modifications or termination.

APPENDIX A: REFERENCES

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APPENDIX B: COST BREAKDOWNS AND ASSUMPTIONS

LUC Component Costs are shown for the following NTCRA LUC components which were developed in RACER (Version 10.3.0).

Appendix B.1: Institutional Controls

- Notations in Master Plan
- Dig Permits
- Public Advisories
- Monitoring and Enforcement

Appendix B.2: Engineering Controls

- Fences
- Signs
- Access Control Personnel

Appendix B.3: Net Present Value Example

Appendix B.4: Total NTCRA LUC Components and NPV Calculations Summary at Fort Stewart

APPENDIX B: COST BREAKDOWNS AND ASSUMPTIONS

B.1: RACER Institutional Controls

Notations in Master Plan

RACER Administrative Land Use Control Technology
Implementation Tab

Assumptions/RACER Selections

Based on Modify Installation Master Plan task
Low Complexity
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	$36,695	$0

Dig Permits

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Notice Letter task
2 permits issued each year
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	$6,530	$6,530

Public Advisories

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Notice Letter task
10 letters sent each year
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	$6,757	$6,757

Monitoring and Enforcement

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER Selections

Based on Site Visit/Inspections task
1 Inspection, safety level D (default), 1 day, 2 people, no airfare, no mileage
US location multiplier (1.0) (average costs for US as a whole)
Active Government Installation selected on Systems Definition Tab

	First Year	Annual
Cost ** =	$0	$9,404

Notes: * RACER Version 10.3.0
**costs include material, labor, and equipment and markup

B.2: RACER Engineering Controls

Fences and Signs

RACER technology used: Fencing

Assumptions/RACER selections

Linear feet (LF) of fencing assumes the site is square
Boundary fence type (5 foot high, galvanized chain link)
US location multiplier (1.0) (average costs for US as a whole)
Signs are placed on perimeter of sight, approximately every 220 feet
Costs shown are first year costs. Assume 10%/year annual upkeep costs.

		RACER Fencing Technology			
Acres	**LF**	**Fence Cost****	**# Signs**	**Sign Cost****	**Total Cost****
1	835	$ 25,106	5	$ 466	$ 25,572
2	1,181	$ 35,469	6	$ 560	$ 36,029
3	1,446	$ 43,477	8	$ 746	$ 44,223
4	1,670	$ 50,213	9	$ 839	$ 51,052
5	1,867	$ 56,137	10	$ 934	$ 57,071
10	2,640	$ 79,379	14	$ 1,307	$ 80,686
20	3,734	$ 112,272	19	$ 1,773	$ 114,045
30	4,573	$ 137,499	23	$ 2,146	$ 139,645
40	5,280	$ 158,757	27	$ 2,519	$ 161,276
50	5,903	$ 177,488	30	$ 2,799	$ 180,287
100	8,348	$ 251,005	42	$ 3,919	$ 254,924
200	11,806	$ 354,978	60	$ 5,597	$ 360,575
300	14,460	$ 434,778	73	$ 6,811	$ 441,589
400	16,697	$ 502,038	84	$ 7,836	$ 509,874
500	18,668	$ 561,302	94	$ 8,769	$ 570,071
1000	26,400	$ 793,784	132	$ 12,315	$ 806,099
2000	37,335	$ 1,122,573	187	$ 17,446	$ 1,140,019
3000	45,726	$ 1,374,871	229	$ 21,363	$ 1,396,234
4000	52,800	$ 1,587,568	264	$ 24,628	$ 1,612,196
5000	59,032	$ 1,774,949	296	$ 27,613	$ 1,802,562
10000	83,484	$ 2,510,161	418	$ 38,994	$ 2,549,155
20000	118,064	$ 3,549,898	591	$ 55,133	$ 3,605,031

Access Control Personnel (referred to as "Guards" in RACER)

RACER Administrative Land Use Control Technology
Monitoring and Enforcement Tab

Assumptions/RACER selections

24/7 Coverage at one guard post = 168 hr/wk
Hourly rate = $30 (includes RACER markup)
US location multiplier (1.0) (average costs for US as a whole)

	First Year	**Annual**
Cost ** =	**$261,818**	**$261,818**

Notes: * RACER Version 10.3.0
**costs include material, labor, and equipment and markup

B.3: Net Present Value Calculations Example

Inputs and Assumptions	
Site Size (acres)	5
First Year	2012
Years NTCRA LUCs required	7
Annual O&M Eng. Controls	10%
i =	2.75%

NTCRA LUC Costs	Unit	1st Year Cost	Annual Cost	Years Required	Total	NPV
Institutional Controls						
Restrictions on land use / Notations in Master Plan	/installation or major group	$ 36,695	$ -	7	$ 36,695	$ 35,713
Dig Permits	/installation or major group	$ 6,530	$ 6,530	7	$ 45,710	$ 41,070
Public Advisories	/installation or major group	$ 6,757	$ 6,757	7	$ 47,299	$ 42,498
Monitoring and Enforcement	/installation or major group	$ -	$ 9,404	7	$ 56,424	$ 49,993
Engineering Controls						
Signs	/5-acre site	$ 932	$ 93	7	$ 1,491	$ 1,403
Fence	/5-acre site	$ 56,134	$ 5,613	7	$ 89,814	$ 84,473
Guards	/installation or major group	$ 261,818	$ 261,818	7	$ 1,832,726	$ 1,646,680

NPV Calculations	LUC Required?	2012	2013	2014	2015	2016	2017	2018	2019
		TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE
Institutional Controls	**NPV**				**Annual Cost**				
Restrictions on land use / Notations in Master Plan	$ 35,713	$ 36,695	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Dig Permits	$ 41,070	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ -
Public Advisories	$ 42,498	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ 6,757	$ -
Monitoring and Enforcement	$ 49,993	$ -	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ -
Engineering Controls	**NPV**				**Annual Cost**				
Signs	$ 1,403	$ 932	$ 93	$ 93	$ 93	$ 93	$ 93	$ 93	$ -
Fence	$ 84,473	$ 56,134	$ 5,613	$ 5,613	$ 5,613	$ 5,613	$ 5,613	$ 5,613	$ -
Guards	$ 1,646,680	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ 261,818	$ -

B.4: Total NTCRA LUC Components and NPV Calculations Summary at Fort Stewart

Inputs and Assumptions	
Site Size (acres)	2204.5
First Year	2013
Years Interim LUCs Required	5
Annual O&M Eng. Controls	10%
i =	2.75%

Interim LUC Costs	**Unit**	**1st Year Cost**	**Annual Cost**	**Years Required**	**Total**	**NPV**
Institutional Controls - All MRSs						
LURs / Notations in Master Plan	/installation	$ 36,695	$ -	5	$ 36,695	$ 35,713
Dig Permits	/installation	$ 6,530	$ 6,530	5	$ 32,650	$ 30,120
Monitoring and Enforcement	/installation	$ -	$ 9,404	5	$ 37,616	$ 34,224
Subtotal		**$ 43,225**	**$ 15,934**		**$ 106,961**	**$ 100,058**
Engineering Controls						
Fencing for FTSW-002-R-01	~77 acres		$ 17,749	5	$ 248,483	$ 237,332
Signs for FTSW-002-R-01	~77 acres	$ 2,799	$ 280	5	$ 3,919	$ 3,743
Fencing for FTSW-008-R-01	~31 acres		$ 13,750	5	$ 192,499	$ 183,860
Signs for FTSW-008-R-01	~ 35 acres		$ 215	5	$ 3,004	$ 2,870
Fencing for FTSW-009-R-02	~200 acres		$ 35,498	5	$ 496,969	$ 474,666
Signs for FTSW-009-R-02	~663 acres	$ 8,769	$ 877	5	$ 12,277	$ 11,726
Subtotal		**$ 11,568**	**$ 68,368**		**$ 957,151**	**$ 914,195**
Total		$ 54,793	$ 84,302		$ 1,064,112	$ 1,014,253

NPV Calculations		2013	2014	2015	2016	2017	2018	2019	2020
	LUC Required?	*TRUE*	*TRUE*	*TRUE*	*TRUE*	*TRUE*	*FALSE*	*FALSE*	*FALSE*
Institutional Controls	**NPV**					**Annual Cost**			
LURs / Notations in Master Plan	$ 35,713	$ 36,695	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Dig Permits	$ 30,120	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ 6,530	$ -	$ -	$ -
Monitoring and Enforcement	$ 34,224	$ -	$ 9,404	$ 9,404	$ 9,404	$ 9,404	$ -	$ -	$ -
Engineering Controls	**NPV**					**Annual Cost**			
Fencing for FTSW-002-R-01	$ 237,332	$ 177,488	$ 17,749	$ 17,749	$ 17,749	$ 17,749	$ -	$ -	$ -
Signs for FTSW-002-R-01	$ 3,743	$ 2,799	$ 280	$ 280	$ 280	$ 280	$ -	$ -	$ -
Fencing for FTSW-008-R-01	$ 183,860	$ 137,499	$ 13,750	$ 13,750	$ 13,750	$ 13,750	$ -	$ -	$ -
Signs for FTSW-008-R-01	$ 2,870	$ 2,146	$ 215	$ 215	$ 215	$ 215	$ -	$ -	$ -
Fencing for FTSW-009-R-02	$ 474,666	$ 354,978	$ 35,498	$ 35,498	$ 35,498	$ 35,498	$ -	$ -	$ -
Signs for FTSW-009-R-02	$ 11,726	$ 8,769	$ 877	$ 877	$ 877	$ 877	$ -	$ -	$ -