

PROPOSED PLAN FOR MILITARY MUNITIONS RESPONSE PROGRAM

FIVE MUNITIONS RESPONSE SITES

INTRODUCTION

This Proposed Plan identifies the Preferred Remedial Alternatives for five Munitions Response Sites (MRSs) at Fort Belvoir (FTBL) in Fairfax County, Virginia:

- T-16 Range (FTBL-027-R-01)
- Demolition Area-01 (FTBL-018-R-01)
- Demolition Area-USACE (FTBL-025-R-01)
- Grenade Court (FTBL-007-R-01)
- Booby Trap Site (FTBL-024-R-01)

The locations of these five MRSs within the FTBL main post area are shown on **Figure 1**.

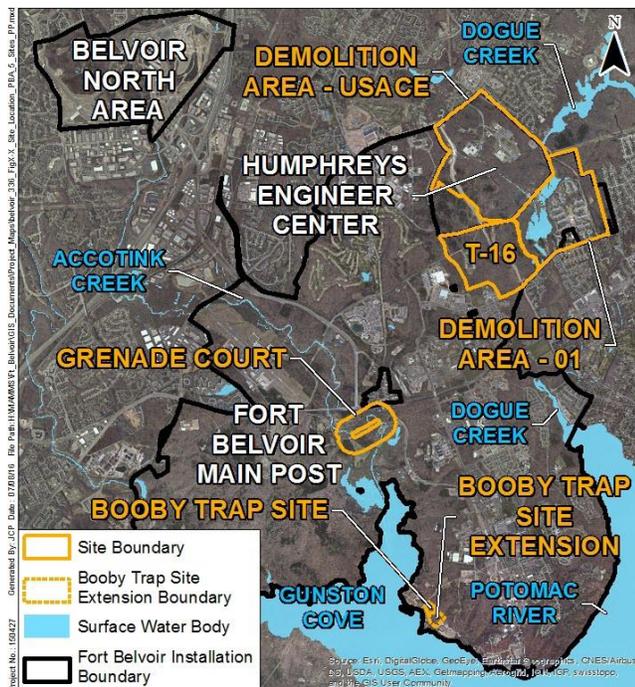


Figure 1 – Location of the Five MRSs

The U.S. Army Corps of Engineers (USACE) is conducting this work under the Military Munitions Response Program (MMRP). The U.S. Department of Defense (DoD) has established the MMRP under the Defense Environmental Response Program (DERP) to address DoD sites suspected of containing Munitions and Explosives of Concern (MEC) and/or Munitions Constituents

Dates to Remember:

A) Public Comment Period

October 17, 2016 to November 17, 2016

B) Public Meeting

7:00 PM, October 20, 2016

The Army will accept written comments on the Proposed Plan during a 30-day public comment period. The Army will hold a public meeting to explain the Proposed Plan and the alternatives in the Feasibility Study. Oral and written comments will also be accepted at the meeting. The meeting will be held at 7:00 PM on October 20, 2016, at the Fairfax County South County Center, 8350 Richmond Highway, Alexandria, VA.

For more information, see the Administrative Record File, which is located at the Lorton and Kingstowne Libraries, and the Fort Belvoir Directorate of Public Works, Environmental Division, Room 201.

(MC) on current and former military installations. This document is issued by the U.S. Army as the owner of the FTBL Facility and lead agency. The Virginia Department of Environmental Quality (VADEQ) is the lead regulatory agency.

The Army, as the lead agency, is issuing this Proposed Plan as part of the public participation responsibilities under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This Proposed Plan provides the public with the information necessary to participate with the Army and the regulators in determining the acceptability of the proposed remedial alternatives.

This Proposed Plan summarizes information detailed in the Remedial Investigation (RI) and Feasibility Study (FS) Reports and other documents in the FTBL Administrative Record File (see above). The Administrative Record contains the information that was considered in determining the preferred alternatives presented in this Proposed Plan, and offers a comprehensive

description of the site investigations and the proposed remediation activities.

FTBL is located in southeastern Fairfax County, Virginia, approximately 18 miles southwest of Washington, D.C. FTBL began as Camp A.A. Humphreys and was first used for military purposes in 1915 as part of the ramp-up for World War I. Past FTBL military training activities have resulted in areas where leftover explosive items, referred to as MEC, may be present and pose a safety hazard. Additionally, the chemical components of munitions, referred to as MC, may pose a concern to human health and the environment.

In March 2006, FTBL completed a Historical Records Review to compile a wide variety of information on known MMRP sites. A total of 19 MMRP eligible sites, or MRSs were carried forward to the next phase, the Site Inspection (SI). The purpose of the SI was to collect a sufficient amount of information necessary to determine whether further investigation, immediate response, or No Further Action was required for each MRS. The T-16 Range, Demolition Area-01, Demolition Area-USACE, Grenade Court, and Booby Trap Site all required further investigation through an RI and FS.

RIs were performed at the five MRSs between 2010 and 2011. The RIs determined the nature and extent of MEC and MC at each MRS. The FS, finalized in January 2016, identified and evaluated alternatives for remedial actions to address unacceptable risks present at the site.

SITE BACKGROUND AND CHARACTERISTICS

Each of the five MRSs addressed in this Proposed Plan are described here.

T-16 Range (FTBL-027-R-01)

The T-16 Range is located in the northeastern portion of FTBL Main Post and occupies approximately 232 acres (Figure 2). The T-16 Range was reportedly used from 1926 to 1987 for unconfirmed, historical, munitions training

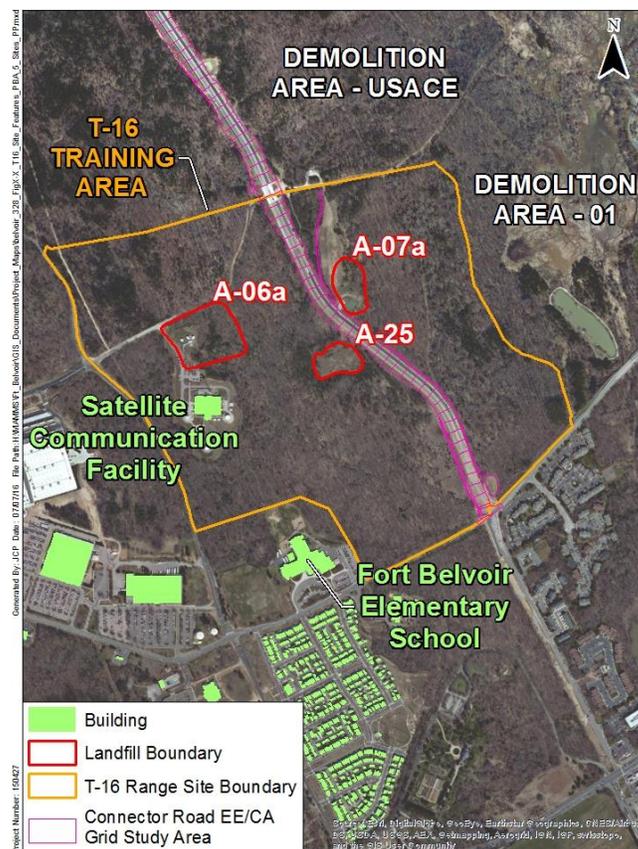


Figure 2 – T-16 Range Site Features

activities. Training activities were believed to be limited to ground-based training of soldiers.

An Engineering Evaluation/Cost Analysis (EE/CA) was conducted to determine the most appropriate MEC response action (if needed) to support construction of Jeff Todd Way that traverses the MRS. During the EE/CA site investigation, no MEC items were identified in the T-16 Range. However, approximately 100 rounds of 5.56-millimeter (mm) small arms rounds were recovered and munitions debris (MD) observed included an M2 Anti-Personnel (AP) mine (inert), two M16A1 AP mines (inert), an expended 3.6-inch rocket motor, and an M19 smoke rifle grenade (expended).

The use of the T-16 Range for ground training and maneuvers was confirmed during the course of the RI field effort. During the RI, no MEC was observed at the MRS; however, a number of MD items were found, primarily on the ground surface. The MD items included expended signal flares, expended smoke canisters, discarded

possible that training mines with intact fuzing remain at the site, as well as signal flares or smoke grenades that failed to function. Therefore, MEC may be present at the MRS.

Since preparation of the RI and FS, a removal action has been performed at Demolition Area-01. This removal action consisted of a focused MEC/MD removal, consistent with the alternatives presented in the FS, and the preferred alternative recommended in this Proposed Plan. A removal action was performed in advance of the final remedial action provided in this Proposed Plan because portions of the MRS are being leased for redevelopment and clearance was determined to be necessary for an area where additional housing construction is planned. The property will remain under control of FTBL.

Demolition Area-USACE was also investigated, along with the T-16 Range, during the Connector Road EE/CA. During the EE/CA site investigation, multiple practice and inert wax-filled landmines were recovered from Demolition Area-USACE, particularly in the northern area near Telegraph Road. The nomenclature of the mines recovered were the M1 Anti-Tank (AT) mine with the M1 fuze, M2 AP mines with the M6A1 fuze, M3 AP mines with the M7A1 fuze, and the M12 series AT practice mines with the M604 fuze. A number of these mines were deemed to contain explosive laden fuzing, although there is no positive confirmation of this characterization available. Also recovered within the Demolition Area-USACE boundaries was one M18A1 Star Cluster that was partially expended and required disposal by detonation.

During the RI at Demolition Area-USACE, 26 MD items were found during the surface reconnaissance, and an additional 26 MD items were uncovered during the intrusive subsurface anomaly investigation of a randomly selected 4.58 acres. These items included inert training mines with inert fuzing and expended illumination and smoke signaling devices.

A significant portion of the Demolition Area-USACE was redeveloped to create the HEC, with no reported finds of MEC. The lack of reported

MEC finds during development of the HEC, in the years since, and during the RI supports the conclusion that the MEC density in this MRS is low.

Sampling of surface soils during the RI at the Demolition Area-USACE was conducted at locations identified by historical aerial photographs where explosives may have been used. No explosives were detected above minimum SLs.

Based on the findings of the RI, it was recommended that an FS be performed to evaluate remedial options associated with the low potential for MEC to be encountered at the two Demolition Area MRSs.

Grenade Court (FTBL-007-R-01)

The Grenade Court is located near the center of FTBL Main Post and consists of two parts: 1) the inner rectangular Grenade Court and 2) the outer surface danger zone, with both areas combined occupying approximately 100 acres (**Figure 4**).

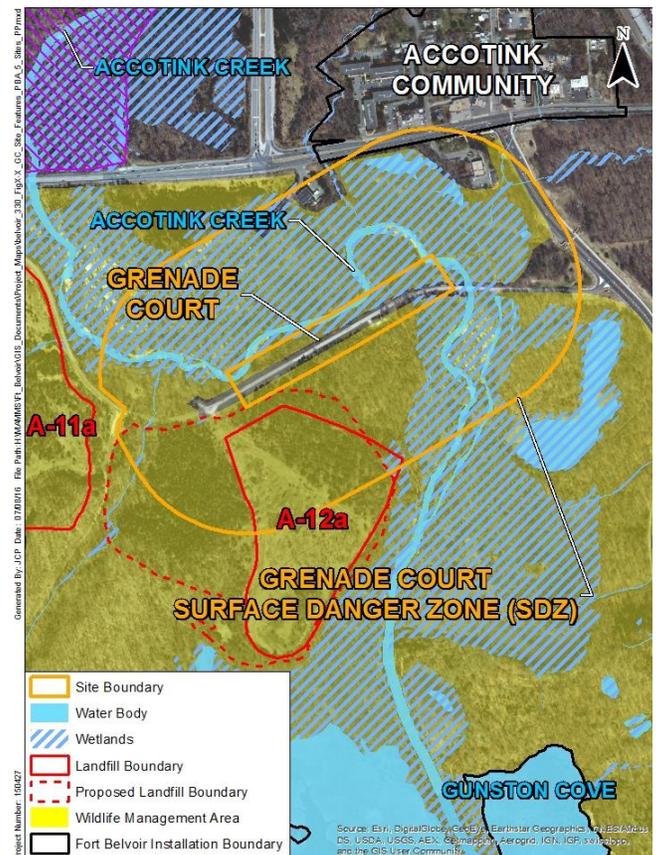


Figure 4 – Grenade Court Site Features

The Grenade Court was operational from approximately 1941 to 1949, although it is not identified on aerial photography until 1944. No MEC source was identified during the SI and RI characterization of the site, as no evidence of HE grenade use was found. A group of inert training landmines were found and removed during the RI, that appear to have been placed sometime after the Grenade Court training. Due to the documented use of practice mines and grenades, there is a potential for hazardous items such as fuzes and spotting charges remaining at the MRS.

Since no MEC was identified, no MC sampling was warranted at the Grenade Court. The RI Report evaluated all data collected and deemed the probability of encountering MEC to be low.

Based on the findings of the RI, it was recommended that an FS be performed to evaluate remedial options associated with the low potential for MEC to be encountered at the Grenade Court.

Booby Trap Site (FTBL-024-R-01)

The Booby Trap Site is located in the southern portion of FTBL Main Post and covers approximately 4 acres (Figure 5).

The Booby Trap Site was reportedly used for 24 days in 1983 for training purposes. The historical records review interpreted activities in the area to have included arming and disarming practice with common firing devices and/or the installation and removal of booby traps. In December 2009, a MEC removal action was performed at the MRS. No MEC items were discovered; however, numerous inert training/practice items were recovered.

Many of these items were found outside the Booby Trap Site boundary within the Booby Trap Extension. Also identified were six small burial pits which were less than 2 feet deep. Three contained expended firing devices, two contained small arms brass casings, and one contained spent practice rockets from an M24 AT mine.

During the Booby Trap Site RI, subsurface soil samples were collected from three open small disposal pits and analyzed for explosives and

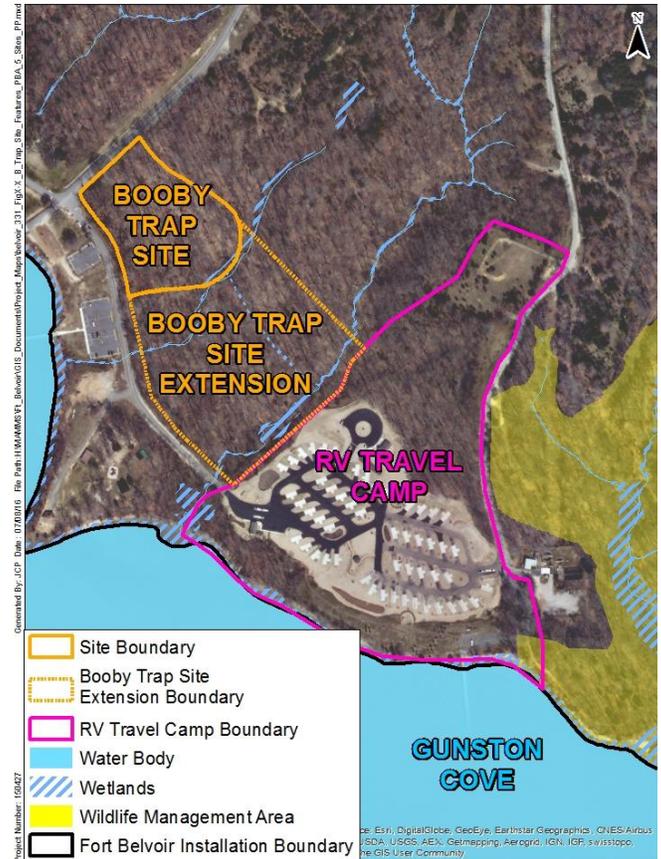


Figure 5 – Booby Trap Site Features

select metals. No explosives were detected above minimum SLs in any of the three sample locations. Chromium, copper, lead, manganese, and zinc were detected in exceedance of minimum SLs. A risk assessment determined that none of these metals pose an unacceptable human health or ecological risk or hazard. Furthermore, aluminum, chromium, and iron in soil at the Booby Trap Site are likely related to background levels in soils. No background data were available for manganese.

Based on the RI, there is a potential for hazardous items such as landmines and firing devices to be present in the subsurface if missed during the 2009 MEC removal action. The RI Report evaluated all data collected and deemed the probability of encountering MEC to be low. It was recommended that an FS be performed to evaluate remedial options associated with potential MEC at the Booby Trap Site.

SCOPE AND ROLE OF RESPONSE ACTION

This Proposed Plan addresses the T-16 Range, Demolition Area-01, Demolition Area-USACE, Grenade Court, and Booby Trap Site. The actions selected will be the final actions for the MRSs. The overall cleanup strategy is to take appropriate action to remedy environmental contamination when there is an unacceptable risk to human health or the environment. Actions are selected after considering remedial alternatives and applying cost-effective solutions.

SUMMARY OF SITE RISKS

The Army evaluated potential risk to determine current and future effects of contaminants on human health and the environment from MEC and MC.

MEC Hazard Assessment

This section describes the processes and findings of the MEC Hazard Assessment (HA) for the Demolition Area-01 and Demolition Area-USACE, using the U.S. Environmental Protection Agency (US EPA) MEC HA methodology. For MEC, there is no acceptable level that may be encountered by persons using the property. All contact should be minimized and prevented if possible. Factors that affect the likelihood for exposure include:

- The amount of MEC present at the site
- The number of people using the site
- The types and degree of activities occurring

The RI determined that there remains a reasonable potential for additional mines to remain at the Demolition Area-01 and Demolition Area-USACE which may pose an explosive hazard. No MEC HA was performed for the T-16 Range, Grenade Court, and Booby Trap Site because the RI determined that the potential for MEC to remain is plausible, but not high enough to generate a meaningful MEC HA score.

The risk posed to human health by the presence of MEC in the Demolition Area-01 and Demolition Area-USACE was assessed by using the MEC HA in the RI. The calculated Hazard Level was 2 for

each MRS. The removal at Demolition Area-01 will decrease the risk, but there is still a potential for isolated MEC to remain on the property. There are four Hazard Levels; a Hazard Level of 2 describes a high potential explosive hazard condition. The MEC HA scoring does not determine whether action is needed; rather, it provides a baseline level of risk against which further action can be compared. Since preparation of the MEC HA, the removal action at Demolition Area-01 has been completed and all items within the area identified with MEC/MD during the RI have been removed.

Overall, the lack of reported MEC finds at the five sites supports the conclusion that MEC density in these MRSs is low. Nevertheless, based on all evidence gathered, there is still a possibility that some hazardous munitions could remain on these sites due to the inability to completely eliminate uncertainty in the investigation. Therefore, exposure pathways remain potentially complete for all receptors under consideration.

It is the Army's belief that the Preferred Alternatives identified in this Proposed Plan, or one of the other active measures considered in the Proposed Plan, are necessary to protect public health or the environment from impacts due to MEC potentially present at the five MRSs.

MC Human Health Risk Evaluation

Human Health Risk Assessments (HHRAs) are performed to evaluate human health effects associated with potential MC contamination.

As there was no potential source for MC at the T-16 Training Range and the Grenade Court, MC samples were not collected. Human health risks were not evaluated as there is an incomplete pathway for all receptors to MC at these two MRSs.

At the Demolition Area-01 and Demolition Area-USACE, some explosives were positively identified during the off-site laboratory analysis, but results were found well below screening levels; therefore, no source was identified and incomplete pathways exist for all receptors. An

HHRA was not required as there were no exceedances of minimum screening values.

At the Booby Trap Site, the HHRA evaluated routine base workers and construction workers to soils for current and future land-use conditions. Adult residents and child residents were evaluated as potential future receptors. Aluminum, chromium, iron, manganese, and zinc were selected as chemicals of potential concern (COPCs). All cumulative lifetime cancer risks were zero as no COPCs with carcinogenic health endpoints were selected as COPCs. All cumulative hazard indices (HIs) were below the acceptable limit of 1, with the exception of future child resident. However, there are no hazard drivers as no individual COPC had a hazard quotient (HQ) above 1 and segregation by target organ did not estimate an HI above 1.

It is the Army's belief that there are no unacceptable risks to human health from MC potentially present at the five MRSs.

MC Ecological Risk Evaluation

Screening Level Ecological Risk Assessments (SLERAs) are performed to determine if unacceptable adverse risks are present or may accrue to ecological receptors as a result of hazardous substance releases.

As discussed above, no sources of MC were identified at the T-16 Training Range, Grenade Court, or Demolition Area-01 and Demolition Area-USACE. As such, a SLERA was not warranted.

A SLERA was performed at the Booby Trap Site to evaluate potential risks to ecological receptors. Copper and zinc were identified as chemicals of potential ecological concern (COPECs) based on RI data. When the RI data were combined with previous site investigation results (to provide a more complete evaluation of the entire site), it was determined that there is adequate information to conclude that ecological risks are negligible and therefore there is no need for further action at the site on the basis of ecological risk. In addition, there are no species present protected by the Endangered Species Act.

A rare northern well amphipod, in groundwater seeps, near the Booby Trap Site is acknowledged; however, COPECs in Booby Trap Site soil are unlikely to impact this amphipod. There is no surface water near the site pits and groundwater is moving in a westerly direction, away from the known location of the amphipods. In addition, this amphipod is not a state- or federally-listed threatened or endangered species, and therefore has no regulatory protected status under the Endangered Species Act.

Remedial measures at the Booby Trap Site to address ecological concerns are not warranted for soil because no threshold was exceeded and because no rare, threatened, or endangered wildlife species have been found at the site. The conclusion regarding ecological conditions at the Booby Trap Site is that ecological risks are negligible, and therefore, there is no need for further action at the site on the basis of ecological risk.

It is the Army's belief that there are no unacceptable risks to ecological receptors from MC potentially present at the five MRSs.

REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) consist of goals for protecting human health and the environment and can be achieved by either removing the contaminant or reducing exposure. RAOs drive the formulation and development of response actions.

RAOs are developed to reduce the potential risk to the probable receptors based on current and future land use. Development of RAOs at these five MRSs was driven by the potential (low probability) for exposure to MEC. Based on US EPA guidance, knowledge of affected media, chemicals of concern, and potential exposure pathways, the following remedial action goals were developed:

- Prevent direct human contact with MEC on the surface and in the subsurface

SUMMARY OF REMEDIAL ALTERNATIVES

In the FS, four remedial alternatives were specifically developed to address MEC hazards at the five MRSs:

- Alternative 1 – No Action
- Alternative 2 – Land-Use Controls (LUCs)
- Alternative 3 – Focused MEC/MD Removal and LUCs
- Alternative 4 – Full MEC Removal and LUCs

These four alternatives are described below along with estimated capital, operations and maintenance (O&M), and present worth costs. Present worth cost is the amount of money that would need to be invested in the current year to sufficiently fund the alternative for its duration with a fixed discount rate.

Alternative 1 – No Action

Estimated Capital Cost: \$0

Total 30-Year O&M Cost: \$0

Total Present Worth Cost: \$0

The No Action alternative assumes no remedial action would be taken to address MEC hazards. This alternative provides no actions to protect human health or the environment at the site. It is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for baseline comparison purposes (40 Code of Federal Regulations [CFR] 300.430[e][6]).

Alternative 2 – Land-Use Controls

Estimated Capital Cost: \$91,000

Total 30-Year O&M Cost: \$313,549

Total Present Worth Cost: \$404,549

The LUCs alternative includes no active remediation of the site. It focuses on reducing human exposure to MEC by managing the activities occurring at the site. LUCs consist of various legal mechanisms, educational approaches, and engineering control measures used to minimize the potential for risk to human receptors from a property impacted with MEC or other hazards. Instead of direct elimination of MEC, LUCs rely on behavior modification and/or access control strategies to reduce or eliminate

risk. LUCs would be implemented to restrict further development of the MRSs, unless appropriate actions are taken to ensure the future use is compatible with the potential hazard from MEC. These restrictions would be implemented by FTBL through the Land Use Control Implementation Plan.

As discussed previously, portions of the Demolition Area-01 MRS will be leased for redevelopment. The leasee will be responsible for following LUCs as specified in the lease. The leasee will be provided with a copy of the Land Use Control Implementation Plan. FTBL will monitor the leased portion of the property to verify LUCs are maintained.

The LUCs alternative would include land-use restrictions, construction support requirements, signage, public education, and long-term monitoring of the site.

Land-Use Restrictions would include zoning restrictions, warning signs, and fencing. Zoning Restrictions would be added to the FTBL Geographic Information System (GIS), which is used in the development of the Land Use Control Plan. This information would be made part of the dig permitting process so that no construction activities occur without facility approval from the environmental office. The dig permitting process will be required in all areas, including any leased portions of the sites. The lease agreement states that any alternations to the land surface will be authorized in writing. Fencing would not be necessary in most areas; however, maintenance of existing fencing around the housing area in the Demolition Area-01 is required as part of this alternative.

Warning Signs would be installed in undeveloped portions of the MRSs where there is a higher potential for MEC to be on the ground surface. The signs would notify site personnel and visitors of the former use of the property and the potential hazards, more as an advisory than an access restriction.

Construction Support would be a requirement for personnel performing ground disturbing construction activities on the property. It would be

required through the use of restrictions established through FTBL’s excavation permitting process.

Public Education would be required to notify the public of the history of the site and its use for military training exercises; locations of potential hazardous areas; the potential hazards associated with MEC; the types of activities that may be especially hazardous; how to recognize potential MEC and how to avoid it; what to do (and what not to do) if potential MEC are discovered; and who to call to notify of potential MEC.

Long-Term Monitoring of the site would be performed to ensure the ongoing safety of the public by overseeing activities at the site to make sure personnel are safe and by periodically assessing that conditions at the site are as anticipated when the remedy was selected. Enhanced Visual Surveys would be required periodically as part of the CERCLA five-year review. The visual survey will evaluate the effectiveness of the remedy and any changes in conditions at the site. FTBL will include any leased portions of the property to verify LUCs are maintained by the lease.

The boundary for the LUCs is the boundary for each site. If the LUCs alternative is selected as the preferred alternative for the sites, additional details concerning LUCs would be specified in the Decision Document (DD) and a Land Use Control Plan.

Alternative 3 – Focused MEC/MD Removal and LUCs

Estimated Capital Cost: \$696,540
Total 30-Year O&M Cost: \$313,549
Total Present Worth Cost: \$1,010,089

Under this alternative, LUCs as discussed under Alternative 2 are the primary remedy to address MEC. A focused surface and subsurface MEC removal would be performed in any area where there is known increased density of MEC/MD. Approximately 45.5 acres of the Demolition Area-01 were identified during the RI to have an increased density of MEC/MD, where historical photography suggests that mine training occurred and RI findings indicate that clusters of mines

were left in place. This area is close to residential housing and, therefore, has a higher potential for current/future receptors coming in contact with MEC. **Figure 6** depicts the Focused MEC Removal Areas.



Figure 6 – Proposed Focused MEC Removal Areas at Demolition Area-01

The removal action was performed in advance of the final remedial action provided in this Proposed Plan because portions of the MRS are being redeveloped and clearance was determined to be necessary for an area where additional housing construction is planned.

Since there are no known areas of elevated density of MEC/MD at the Grenade Court, Booby Trap Site, Demolition Area-USACE, and T-16 Range, a Focused MEC/MD Removal is not proposed at these sites and LUCs would be the remedy.

The MEC removal process involves three basic steps – MEC detection, MEC removal, and MEC disposal.

MEC Detection will be performed on the surface and in the subsurface in all areas not covered by buildings or pavement. Surface MEC detection is the first step in MEC removal, which would be accomplished with instrument-aided techniques. Subsurface MEC detection would be accomplished with metal detectors. Unexploded ordnance (UXO) qualified personnel with analog geophysical equipment (i.e., magnetometer or electromagnetic) will systematically sweep the instrument back and forth in search lanes within grids. When an audible response is encountered, the UXO Technician would immediately excavate and identify the metallic item. This technology is expected to easily detect the training landmines used at the sites which contain a significant amount of steel and are shallowly buried.

Some degree of vegetation removal may be required to clear vegetation to a height necessary to allow for proper operation of MEC detection equipment and to provide the required ground visibility for the safety of the UXO-qualified team.

MEC Removal would be performed with shovels and other hand tools. Mechanically-assisted removal methods using a small back-hoe excavator may be used to clear areas with substantial metal contamination or when a target is identified below the depth accessible with hand tools. Qualified UXO personnel would investigate and identify the source of each target anomaly, and remove all metallic items. Excavations in undeveloped areas would be backfilled without further seeding or other site restoration. Excavations in maintained grass or otherwise landscaped areas will be restored to original condition.

MEC Disposal would be performed on all MEC identified. All material potentially presenting an explosive hazard (MPPEH) would go through the MPPEH inspection process and, if determined to be material documented as an explosive hazard, would be detonated using Department of Defense Explosives Safety Board (DDESB)-approved MEC detonation procedures. This would consist of blow-in-place detonation or consolidated detonations rather than establishing a fixed

demolition area. Material documented as safe would not be detonated.

All MD and other debris would also be collected for disposal so that it does not remain in the environment and interfere with future monitoring sweeps or create a future Explosives Ordnance Disposal (EOD) response.

Remaining risks at the site would be managed through LUCs. The LUCs would include warning signs in undeveloped areas, public education, dig restrictions, construction support requirements, and long-term monitoring as described under Alternative 2. This alternative assumes that the existing fence remains and will be maintained. Five-year reviews would also be required to comply with CERCLA.

Alternative 4 – Full MEC Removal and LUCs

Estimated Capital Cost: \$29,347,572

Total 30-Year O&M Cost: \$3,837,856

Total Present Worth Cost: \$33,185,428

Under this alternative, a surface and subsurface clearance would be performed over the entire MRS except for areas covered by buildings or pavement. This alternative includes the systematic search and removal of all detectable MEC on the surface and in the subsurface. It represents the most effective MEC removal approach of all alternatives considered and therefore relies the least on LUCs. The only more effective method of MEC removal would be excavation of soil/sediment and sifting, which would be unfeasible and completely destroy the natural environment.

A MEC removal action was performed at the Booby Trap Site in 2009. As such, this alternative is not applicable to the Booby Trap Site.

MEC detection, removal, and disposal would be performed in the same manner as specified for the Focused MEC/MD Removal under Alternative 3.

LUCs are still required under this alternative. The LUCs would include dig restrictions, construction support requirements, and enhanced visual surveys as described under Alternative 2. Since most or all MEC would be removed from undeveloped areas, there would be no need for

warning signs, or fencing. Restrictions on development without approval and MEC recognition training are easily implemented and remain as part of the alternative. Five-Year Reviews would be conducted as this alternative does not allow for unrestricted use and exposure.

EVALUATION OF ALTERNATIVES

The Army used the nine NCP Evaluation Criteria, as described under 40 CFR 300.430(e)(9)(iii)(A)-(I), to determine the best alternative for each MRS. A summary of the evaluation of alternatives according to the nine criteria is provided below.

Threshold Criteria:

1. Overall Protection of Human Health and the Environment

Alternative 1 (No Action) does not decrease the potential risks to humans or the environment in any way, because no remedial activities would be implemented at the site. This alternative would not be protective of human health.

Alternative 2 (LUCs) is considered to be protective of human health through behavior controls to prevent contact with potential residual MEC, since the probability of encountering MEC is deemed low at the five FTBL MRSs. While this alternative is protective overall, it may not be as protective as other alternatives that remove MEC, especially for the Demolition Area-01 where clusters of practice landmines are known to be present near base housing. However, the LUCs alone will mitigate the risk.

Alternative 3 (Focused MEC/MD Removal and LUCs) would be protective of human health by removing surface/subsurface MEC in areas of the Demolition Area-01 that are known to exist in a cluster and are accessible to nearby residential receptors.

In the rest of the areas, this alternative would be protective of human health through behavior controls to prevent contact with MEC that may remain. This alternative is not as protective as a full MEC removal; however, the focused MEC removal will remove known clusters of practice landmines and LUCs will further mitigate the risk.

NCP EVALUATION CRITERIA FOR REMEDIAL ALTERNATIVES

Threshold Criteria:

- 1) Overall Protection of Human Health and the Environment:** Does the alternative protect human health and the environment from exposure to risks above acceptable threshold levels?
- 2) Compliance with Applicable or Relevant and Appropriate Requirements (ARARs):** Does the alternative comply with all required laws, statutes, and regulations?

For an alternative to be selected, it must meet the two Threshold Criteria.

Balancing Criteria:

- 3) Long-Term Effectiveness and Permanence:** Is the alternative effective and permanent for the contamination at the site?
- 4) Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment:** Does the alternative reduce the toxicity, mobility, and volume of the contaminants?
- 5) Short-Term Effectiveness:** What is the risk to the community, workers, and the environment during implementation of the response action?
- 6) Implementability:** How difficult is it to implement the alternative?
- 7) Cost:** What are the relative costs associated with the alternative?

Modifying Criteria:

- 8) State / Support Agency Acceptance:** Do the regulatory agencies involved accept the remedy?
- 9) Community Acceptance:** Does the community accept the remedy as viable option?

Modifying criteria will be evaluated in the DD following agency and public comments on the Proposed Plan.

Alternative 4 (Full MEC Removal and LUCs) would be protective of human health by removing as much MEC that is reasonably possible from the surface and subsurface, and through LUCs to mitigate hazards from MEC that may remain.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternative 1 (No Action) includes no active remediation, so no chemical-specific, location-specific, or action-specific ARARs are triggered.

Alternative 2 (LUCs) can be completed in compliance with all location-specific and action-specific ARARs.

Alternative 3 (Focused MEC/MD Removal and LUCs) and Alternative 4 (Full MEC Removal and LUCs) can be performed in a manner that complies with all location-specific and action-specific ARARs. This alternative would have some impacts to natural resources, and appropriate permits would be obtained.

Balancing Criteria:

3. Long-Term Effectiveness and Permanence

Alternative 1 (No Action) would not provide any mechanisms to reduce or mitigate the MEC hazards; therefore, this alternative does not meet the criteria for long-term effectiveness. This alternative does not provide a permanent solution since MEC/MD is not removed.

Alternative 2 (LUCs) does not remove MEC; rather, it relies on LUCs which require continual implementation to be effective. The LUCs included in this alternative are maintained by the government, thus are likely to remain effective in the long term. However, LUCs are not a permanent solution, so the alternative is considered to be less permanent than MEC removal.

Alternative 3 (Focused MEC/MD Removal and LUCs) and Alternative 4 (Full MEC Removal and LUCs) do not remove all MEC hazards, but likely would remove the majority based on the findings of the RI. A portion of Demolition Area-01 is planned for transfer and residential development. Construction activities and residential use increase

the potential for encountering MEC/MD in this MRS. These alternatives rely on LUCs to mitigate exposure to MEC that may remain, which requires continual implementation to be effective. However, LUCs are not a permanent solution, so the alternative is considered to be less permanent than complete MEC removal.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment

Alternative 1 (No Action) and Alternative 2 (LUCs) would not reduce the toxicity, mobility, or volume of MEC remaining in the surface/subsurface.

Alternative 3 (Focused MEC/MD Removal and LUCs) would result in the reduction of the volume of MEC at the Demolition Area-01. The RI concluded that a low MEC density is expected. Since the number of MEC in the MRS is expected to be low, performing the focused MEC removal may not remove a large number of MEC items. However, the focused MEC removal will provide added confidence that the MEC hazard at the MRS is low. Based on the RI, the majority of items anticipated within the MEC removal areas are practice landmines that do not contain live fuzing. Although these items are not anticipated to pose an explosive hazard and are considered MD, removal of these items will reduce the potential for them to be accidentally found in the future, generating concern and EOD calls.

Alternative 4 (Full MEC Removal and LUCs) would result in reduction of the volume of MEC that is on the surface and in the subsurface; however, the RI findings suggest that the amount of MEC at the sites is low.

5. Short-Term Effectiveness

Alternative 1 (No Action) Short-term effectiveness does not apply to the “No Action” alternative because no remedial activities would be implemented. There would be no increased risk in the short term.

Alternative 2 (LUCs) would be effective in the short term because no active work would be performed at the sites beyond the installation of signs, which does not damage the environment or

impact base operations, and can be performed safely with construction support. Estimated time for completion would be 6 months to 1 year.

Alternative 3 (Focused MEC/MD Removal and LUCs) and Alternative 4 (Full MEC Removal and LUCs) would be effective in protecting human health during the remedial action by implementing DDESB-approved procedures, although some risk is always present when dealing with UXO. This alternative includes inspecting the surface and subsurface, and therefore will have impacts to wetland associated with foot traffic and excavations/detonations. The alternative will also have some temporary impact to base personnel and residents associated with evacuations and road closures when working close to roads and buildings. Estimated time for field work completion is 2 years.

6. Implementability

Alternative 1 (No Action) would be technically feasible to implement. However, it is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take No Action may not be obtainable.

Alternative 2 (LUCs) is technically and administratively feasible. A dig permitting process is already in place at FTBL to ensure that environmental concerns are considered during construction projects. The DoD and USACE are expected to own the property indefinitely, and in accordance with their directives to protect the environment, would likely cooperate with any necessary land use restrictions. Portions of the property will be leased. Requirements of the LUC program will be incorporated into the leasing agreement the Land Use Control Implementation Plan, and monitored by FTBL in verify LUCs are maintained by the leasee.

Alternative 3 (Focused MEC/MD Removal and LUCs) and Alternative 4 (Full MEC Removal and LUCs) uses proven technologies and is technically feasible to implement. This alternative is also administratively feasible to implement. Although hand excavation is time consuming for the number of targets identified, it is the safest means

of execution. Hand excavation is also the least disruptive to the natural environment.

7. Cost

The total present worth cost for each alternative for all sites combined is summarized in **Table 1**.

Table 1 - Total Present Worth Cost Summary

Alternatives			
1	2	3	4
\$0	\$405K	\$1M	\$33M

Alternative 1 (No Action) has no capital or O&M costs.

Alternative 2 (LUCs) has relatively low capital costs and ongoing O&M costs for Five-Year Reviews.

Alternative 3 (Focused MEC/MD Removal and LUCs) is characterized by high capital cost and relatively low O&M cost.

Alternative 4 (Full MEC Removal and LUCs) has very high capital costs due to the greater MEC removal acreage.

Modifying Criteria:

The modifying criteria State/Support Agency Acceptance and Community Acceptance will be evaluated in the DD following agency and public comments on this Proposed Plan.

PREFERRED ALTERNATIVES

Based on the evaluation presented in this Proposed Plan, two Preferred Alternatives are recommended for specific sites as presented below.

Alternative 2 (LUCs) is the preferred alternative to address potential MEC at the T-16 Range, Demolition Area-USACE, Grenade Court, and Booby Trap Site. The LUCs remedy was chosen for these sites since there are no known areas of elevated density of MEC/MD. Exposure to MEC is a human health concern, however, exposure is low and can be controlled through LUCs at these sites. Based on the evaluation of NCP criteria, Alternative 2 (LUCs) meets the RAO to prevent direct human contact with MEC on the surface and in the subsurface by limiting potential contact

through restrictions, increasing awareness of MEC/MD through public education, and by providing construction support to protect workers. It can be implemented with little impact to wetlands and wildlife habitat, and with little disruption to FTBL residents and workers. It is the least expensive of the alternatives that meet the RAOs.

Alternative 3 (Focused MEC/MD Removal and LUCs) is the preferred alternative to address potential MEC at the Demolition Area-01. Focused MEC removal would cover approximately 45.5 acres of the Demolition Area-01 where historical photographs suggest that mine training occurred and RI findings indicate that clusters of mines were left in place.

Portions of Demolition Area-01 are being leased for redevelopment but will remain in the control of FTBL. Additional housing construction is planned in the transferred portion. Because of the planned change in land use, the Focused MEC/MD Removal included under Alternative 3 was completed in 2016 as a removal action at the 45.5 acres included under this alternative. This removal action, coupled with LUCs is the preferred final action for Demolition Area-01. Requirements of the LUC program will be incorporated into the leasing agreement, the Land Use Control Implementation Plan, and monitored by FTBL to verify LUCs are maintained.

The NCP statutory preference for reduction of toxicity, mobility, or volume is best achieved with Alternative 4, and to a lesser degree Alternative 3. Although Alternative 2 does not provide any reduction of toxicity, mobility, or volume of MEC, the findings of the RI concluded that each MRS has a relatively low MEC density, so only limited reduction is possible.

Upon consideration of all criteria, Alternative 3 meets the Threshold Criteria and provides the most favorable combination of Balancing Criteria for the Demolition Area-01. For the remaining MRSs, Alternative 2 meets the Threshold Criteria and provides the most favorable combination of Balancing Criteria.

Preferred Alternatives Summary

The Preferred Alternatives for the five MRSs are listed as follows:

Alternative 2 (LUCs)

- T-16 Range
- Demolition Area-USACE
- Grenade Court
- Booby Trap Site

Alternative 3 Focused MEC/MD Removal and LUCs

- Demolition Area-01

The Army and VADEQ support the Preferred Remedial Alternatives stated above and believe they are the best remedial alternatives for the respective sites with respect to the evaluation criteria. The Army and VADEQ expect the Preferred Remedial Alternatives to satisfy the following statutory requirements of CERCLA Section 121(b): 1) be protective of human health and the environment; 2) comply with ARARs; 3) be cost effective, 4) use permanent solutions and alternative treatment technologies to the maximum extent practicable, and 5) satisfy the preference for treatment as a principal element.

The Preferred Alternatives can change in response to public comment or new information.

COMMUNITY PARTICIPATION

Detailed information regarding these proposed actions is available in the Administrative Record File, which is located at the Lorton and Kingstowne Libraries, and the FTBL Directorate of Public Works, Environmental Division, Room 201. An announcement of the availability of this Proposed Plan was published in the Mount Vernon Voice and The Mount Vernon Gazette in October 2016 in accordance with CERCLA.

The Army is seeking comments on the actions recommended in this Proposed Plan, which will be considered prior to a final decision. Comments will be accepted during the public comment period running from October 17, 2016 to November 17, 2016. In addition, a public meeting will be held at the Fairfax County South County Center, 8350 Richmond Highway, Alexandria, VA on October 20, 2016, to explain these proposed actions and to answer questions and accept written comments. A comment form has been included at the end of this document to submit input on the Proposed Plan.

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ACRONYMS AND ABBREVIATIONS

APAnti-Personnel
 ARARApplicable or Relevant and Appropriate Requirement
 ATAnti-Tank
 CERCLA.....Comprehensive Environmental Response, Compensation, and Liability Act
 CFR.....Code of Federal Regulations
 COPCChemical of Potential Concern
 COPEC.....Chemical of Potential Ecological Concern
 DD.....Decision Document
 DDESBDepartment of Defense Explosives Safety Board
 DERPDefense Environmental Restoration Program
 DoD.....U.S. Department of Defense
 EE/CA.....Engineering Evaluation/Cost Analysis
 EODExplosives Ordnance Disposal
 FSFeasibility Study
 FTBL.....Fort Belvoir
 GISGeographic Information System
 HA.....Hazard Assessment
 HEHigh Explosives
 HEC.....Humphreys Engineer Center
 HHRAHuman Health Risk Assessment
 HIHazard Index
 HQ.....Hazard Quotient
 LUC.....Land-Use Control
 MCMunitions Constituents
 MDMunitions Debris
 MEC.....Munitions and Explosives of Concern
 mmmillimeter
 MMRP.....Military Munitions Response Program
 MPPEHMaterial Potentially Presenting an Explosive Hazard
 MRSMunitions Response Site

NCP.....National Oil and Hazardous Substances Pollution Contingency Plan
 O&M.....Operations and Maintenance
 RAO.....Remedial Action Objective
 RI.....Remedial Investigation
 SI.....Site Inspection
 SL.....Screening Level
 SLERA.....Screening Level Ecological Risk Assessment
 US EPA.....U.S. Environmental Protection Agency
 USACEU.S. Army Corps of Engineers
 UXO.....Unexploded Ordnance
 VADEQ.....Virginia Department of Environmental Quality

GLOSSARY OF TERMS

Administrative Record File – A compilation of documents that serve as the basis for the decision in selecting a response action to be taken at a site.

Applicable or Relevant and Appropriate Requirements (ARAR) – The federal and state environmental laws that a selected remedy will meet. These requirements may vary among sites and alternatives.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) – The federal law that addresses problems resulting from releases of hazardous substances to the environment.

Decision Document – The CERCLA decision document that presents the cleanup remedy selected by the Army and VADEQ.

Feasibility Study (FS) – This CERCLA document develops and evaluates options for remedial action. The FS emphasizes data analysis and is generally performed concurrently in an interactive fashion with the RI, using data gathered during the RI.

Land-Use Controls (LUC) – 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 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.

Military Munitions – Ammunition products and components produced for or used by the armed forces for national defense and security. 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.

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

Munitions and Explosives of Concern (MEC) – A specific category of military munitions that may pose unique explosives safety risks, and includes: (a) UXO; (b) DMM; or (c) MC (e.g., TNT, RDX) present in high enough concentrations to pose an explosive hazard.

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response – Response actions, including investigation, removal and remedial actions to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC.

Munitions Response Site (MRS) – A discrete location that is known to require a munitions response.

National Priorities List – US EPA's list of uncontrolled or abandoned waste sites that present the greatest potential threat to human health or the environment.

Operations and Maintenance (O&M) – Measures required to operate and maintain remedial systems to ensure the effectiveness of the response action.

Preferred Remedial Alternative – The remedial alternative selected by the Army and VADEQ, based on a comparison of various remedial alternatives using specific evaluation criteria.

Present Worth – The amount of money that would need to be invested in the current year, at a particular discount rate, to sufficiently evaluation criteria.

Proposed Plan – CERCLA document that summarizes evidence to support the selection of a preferred remedial alternative at a CERCLA site. The document is intended for public distribution to solicit comments on the proposed action(s).

Record of Decision (ROD) – The CERCLA decision document that presents the cleanup remedy selected by the Army and US EPA.

Remedial Action Objectives (RAO) – Site-specific goals to protect human health and the environment.

Remedial Investigation (RI) – A process under CERCLA to determine the nature and extent of the problem presented by a contaminant release. The RI includes sampling, monitoring, and gathering of sufficient information to determine the necessity for remedial action.

Remedial Goals (RG) – Contaminant concentrations used to identify the soil requiring excavation, treatment, and disposal to meet the RAOs and provide protection for human health and the environment.

Target Risk Range – US EPA-established acceptable risk range for carcinogens of 1×10^{-4} to 1×10^{-6} . Estimated excess cancer risks within this range are generally considered unlikely in the general population. If calculated risks fall within the risk range, risk managers must determine whether remedial action is warranted to reduce the

risk. If the risks are less than 1×10^{-6} (less than 1 in 1 million), no remedial action is required. If the risks are greater than 1×10^{-4} (1 in 10 thousand), remedial action is generally required.

Unexploded Ordnance (UXO) – Military munitions that: (a) Have been primed, fuzed, 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; and (c) Remain unexploded either by malfunction, design, or any other cause.

