FINAL

DECISION DOCUMENT

FORMER CAMP CROFT

MUNITIONS DEBRIS AREAS

SPARTANBURG, SOUTH CAROLINA
FUDS PROJECT NUMBER I04SC001603

Prepared by:

U.S. Army Corps of Engineers

JANUARY 2019

EXECUTIVE SUMMARY

ES.1 This Decision Document (DD) presents the selected remedy for the Munitions Debris Areas. These areas, located within the former Camp Croft Formerly Used Defense Site (FUDS) Property Number I04SC0016, are designated as FUDS Project Number I04SC001603. The Munitions Debris Area is inclusive of the following areas that were characterized during the Remedial Investigation (RI) and Feasibility Study (FS).

ES.2 The Grenade Area, comprised of approximately 19 acres, includes residential areas and a golf course.

ES.3 The Mortar/Rifle Grenade Area, comprised of approximately 23 acres, encompasses a golf course.

ES.4 The Practice Grenade Area, comprised of approximately 7 acres, includes residential and commercial properties.

ES.5 The Rocket Area, comprised of approximately 94 acres, includes residential and commercial properties and a portion of Croft State Natural Area.

ES.6 The Rocket/Grenade Maneuver Area, comprised of approximately126 acres, includes residential and commercial properties.

ES.7 The Remedial Action Objective (RAO) is to reduce the unacceptable risk due to presence of munitions debris within Project 03 to a depth of 12 inches below ground surface to address the likelihood of exposure to residents and recreational users via non-intrusive and intrusive activities such that an acceptable condition of negligible risk is achieved. The selected remedy is chosen to satisfy the RAO. Public Education will be implemented by the U.S. Army Corps of Engineers (USACE) to educate the public and land users about the potential MEC hazards and provide education with regard to proper safety and reporting procedures in the event that MEC is encountered. In developing the RAO, current and future land use were taken into account.

ES.8 The selected remedy for FUDS Project I04SC001603: Munitions Debris Areas is Public Education. This remedy includes educational materials and signage developed to enhance the community's general understanding of site conditions.

ES.9 The selected remedy is protective of human health and the environment and is cost effective. The estimated present worth cost for implementing the selected remedy at the five areas over 30 years is approximately $366,167. This cost estimate varies from the Feasibility Study and the Proposed Plan, which included fencing in the basis of estimate. During several Restoration Advisory Board (RAB) meetings, fencing extensive areas of land and private property was found to be unreasonable. As such, the cost for Public Education has been revised.

ES.10 Other MEC response actions were considered and evaluated against the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) nine criteria. The alternatives included

No Action; Analog Surface and Subsurface MEC Clearance and Public Education; and Digital Advanced Classification Surface and Subsurface MEC Clearance to Support Unlimited Use/Unrestricted Exposure. The No Action alternative was considered but judged not to be protective of human health. The other alternatives would not provide additional effectiveness for the added cost. This analysis was based on the results of the RI fieldwork, which determined that there was no evidence of concentrated munitions use in these areas. However, historical documentation and physical evidence support a determination that an unacceptable risk due to unexploded ordnance may exist. Munitions constituents (MC) do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC.

ES.11 The expected result of implementing this remedy is to provide an effective means of influencing behavior to reduce the risk of incident and exposure if MEC is encountered for current and reasonably anticipated future land use activities based on best available information at this time. Five-year reviews will be conducted to ensure the selected remedy remains effective in protecting human health and the environment.

TABLE OF CONTENTS

List of Tables

List of Figures

ABBREVIATIONS AND ACRONYMS

Ac	acres
AoPI	Area of Potential Interest
ARAR	Applicable or Relevant and Appropriate Requirements
ASR	Archives Search Report
BD/DR	Building Demolition and Debris Removal
BIP	Blow-in-Place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAC	U.S. Army Corps of Engineers, Charleston District
CFR	Code of Federal Regulations
DD	Decision Document
DHEC	Department of Health and Environmental Control
DMM	Discarded Military Munitions
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
HA	Hazard Assessment
IGD	Interim Guidance Document
IRTC	Infantry Replacement Training Center
LTM	Long-term Management
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
mm	millimeter
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OOU	Ordnance Operable Unit
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
SC	South Carolina
USACE	United States Army Corps of Engineers
USC	United States Code
UU/UE	Unlimited Use/Unrestricted Exposure
UXO	Unexploded Ordnance
XRF	X-ray Fluorescence

1.0 PART 1: THE DECLARATION

1.1 PROJECT NAME AND LOCATION

The Munitions Debris Areas are located within the former Camp Croft Formerly Used Defense Site (FUDS) and comprise FUDS Project I04SC001603. Their locations are shown on Figure 2-1 and Figure 2-2.

1.2 STATEMENT OF BASIS AND PURPOSE

1.2.1 This Decision Document is being presented by the United States Army Corps of Engineers (USACE) to describe the Department of Defense (DoD) selected remedy for FUDS Project I04SC001603: Munitions Debris Areas.

1.2.2 The remedy described in this Decision Document was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) § 9601 et seq., as amended, and, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. The South Carolina Department of Health and Environmental Control (SC DHEC) has reviewed the Proposed Plan and concurs with the selected remedy. The Administrative Record provides supporting documentation for this decision.

1.3 ASSESSMENT OF FUDS PROJECT I04SC0001603:

Historical information related to the use of the Camp Croft Infantry Replacement Training Center (IRTC) indicated the potential for MEC to be present on the site. Prior investigations and removal actions found limited munitions and explosives of concern (MEC) and nominal amounts of munitions debris (MD) within these areas. This limited physical evidence of MEC indicates that areas within the Munitions Debris Areas were not likely affected by concentrated munitions use and that a complete MEC exposure pathway is unlikely due to the probable lack of a source. However, the potential for explosive hazards cannot be completely dismissed due the presence of MEC and MD indicative of high explosive munitions encountered throughout the former Camp Croft during the Remedial Investigation (RI). The selected remedy is necessary to protect the public health and welfare from potential interaction with MEC, if encountered.

1.4 DESCRIPTION OF SELECTED REMEDY

1.4.1 The selected remedy for addressing potential hazards over the approximately 269 acres of FUDS Project I04SC001603: Munitions Debris Areas is Public Education which involves the following components:

- Educational materials and signage developed to enhance the community's general understanding of site conditions. This information will inform the public and site visitors about potential hazards (MEC) and appropriate response procedures in the event that MEC is found.

1.4.2 Public Education will be implemented by the USACE.

1.5 STATUTORY DETERMINATIONS

1.5.1 In accordance with CERCLA §121, the selected remedy is protective of human health and the environment; complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action; and is cost effective. Permanent solutions and alternative treatment technologies are not being used, and the selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. The RI indicated there was not an area of concentrated MEC use and the Feasibility Study (FS) evaluated remedial alternatives to address unacceptable risk. The selected remedy is considered protective of human health as it will reduce the associated hazard to human receptors through behavioral modification resulting from informational signage and distribution of informational documents.

1.5.2 Because the selected remedy may result in pollutants or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Statutory reviews will continue to be conducted no less often than every five years.

1.6 DATA CERTIFICATION CHECKLIST

1.6.1 The following information is included in the Decision Summary section of this Decision Document. Additional information can be found in the Administrative Record file.

- MEC suspected to be present;
- Baseline hazard represented by MEC;
- How MEC will be addressed;
- Current and reasonably anticipated future land use assumptions;
- Total present worth costs and the number of years over which the remedy cost estimates are projected; and
- Key factors that led to selecting the remedy.

1.6.2 The risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to munitions constituents (MC) in soil and sediment is considered negligible at the former Camp Croft. No action is recommended for MC. As such, the following information is not included in this Decision Document:

- MC and their respective concentrations;
- Baseline risk represented by the MC;
- Cleanup levels established for MC and the basis for these levels;
- How MC will be addressed; and
- Current and potential beneficial uses of groundwater used in the baseline assessment and Decision Document.

1.7 AUTHORIZING SIGNATURES

1.7.1 This Decision Document presents the determination that the CERCLA response action of Public Education is needed for FUDS Project I04SC001603: Munitions Debris Areas. The U.S.

Army Corps of Engineers is the lead agency under the Defense Environmental Restoration Program at the former Camp Croft, and has developed this Decision Document consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan. This Decision Document will be incorporated into the Administrative Record file for the former Camp Croft, which is available for public view at the Spartanburg County Public Library, 151 South Church Street, Spartanburg, SC 29306. This document, presenting the Public Education determination with a present worth cost of $366,167, is approved by the undersigned, pursuant to CEMP-CED (1200 PERM) Interim Guidance Document (IGD) for the Formerly Used Defense Sites (FUDS) Decision Document (DD) Staffing and Approval dated February 9, 2017.

APPROVED:

Theodore A Brown

Date 25 Jan 19

THEODORE A. BROWN, P.E. SES
Director of Regional Business

2.0 PART 2: THE DECISION SUMMARY

2.1 PROJECT NAME, LOCATION, AND BRIEF DESCRIPTION

2.1.1 The Former Camp Croft is located in the upstate of South Carolina, less than 10 miles southeast of downtown Spartanburg, SC. Between 1941 and 1944, the United States acquired 19,044.46 acres, comprising 19,039.04 acres in fee, 5.42 acres in easement interests, six no-area easements, and two no-area licenses. Acquisition was accomplished by condemnation. Land use prior to DoD use was a mix of woodlands, farms, and private residences. The entire installation (just over 19,000 acres) was declared surplus in November 1946 and excessed in 1947. One of the most significant conveyances was approximately 7,054 acres by quitclaim deed to the South Carolina Commission of Forestry; the property is now known as Croft State Natural Area. The USACE has determined that Camp Croft is eligible for the FUDS program. The single original FUDS Project Number I04SC001603 covered a munitions response site (MRS) approximately 12,337 acres in size to include all areas thought to overlap with munitions use. That single MRS has subsequently been delineated into numerous areas with various proposed outcomes.

2.1.2 This Decision Document is being presented by the USACE to describe the DoD determination of the remedy for FUDS Project I04SC001603: Munitions Debris Areas. The Secretary of Defense designated the Army as the Executive Agent for FUDS, regardless of which DoD component previously owned or used the property. The Secretary of the Army further delegated the program management and execution responsibility for FUDS to the USACE. USACE is the lead agency for investigating, reporting, evaluating, and implementing remedial action at the former Camp Croft. The regulatory agency for this project is the SC DHEC.

2.1.3 FUDS Project I04SC001603 is comprised of approximately 269 acres of mixed land use that includes residential and commercial properties and a golf course. A public utility right-of-way bisects a portion of the site. Some timber harvesting is conducted on private property. Portions of the site were not investigated because rights-of-entry were not granted by the property owners (approximately 11% of the total acreage). Residents, landowners, golfers, golf course workers, and recreational users (e.g., hikers, bikers, camping, and horseback riding) have unrestricted access to these areas.

2.2 PROJECT HISTORY

Camp Croft IRTC was officially activated on January 10, 1941 and consisted of two general areas: a series of firing ranges and a troop housing area with attached administrative headquarters, with housing for 20,000 trainees and support personnel. Camp Croft served as one of the Army's principal IRTCs; approximately 250,000 soldiers were trained at the facility. Camp Croft was also a prisoner-of-war camp during World War II.

2.3 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

Since the early 1990s, many investigations and removal actions have been conducted at various locations within the former Camp Croft property and are summarized below. These areas are

identified in various ways based on site actions, and are more clearly described in the Remedial Investigation Report.

2.3.1 On-site Survey

The earliest known investigation at the former Camp Croft was an August 1984 On-site Survey conducted by the U.S. Army Corps of Engineers, Charleston District (CESAC), Environmental and Real Estate Divisions. The survey determined that that there was no Building Demolition and Debris Removal (BD/DR) responsibility incurred by the DoD at Camp Croft. Further investigation was recommended to define the extent of MEC and MC based on interviews revealing the "potential for unexploded ordnance and dangerous bombs, shells, rockets, mines, and charges either upon or below the surface" and "a great deal of unexploded ordnance" uncovered and hauled away during the grading of the country club golf course.

2.3.2 Preliminary Assessment

A Preliminary Assessment was performed by CESAC with a Findings and Determination dated 25 November 1991; the site was determined to be FUDS-eligible. An Archives Search Report (ASR) was prepared by the USACE, Rock Island District in 1993 that covered the following potential FUDS: 1) Training Range Impact Area A, 2) Gas Chambers/Gas Obstacle Course Area D, 3) Cantonment Area B, and 4) Grenade Court Area B.

2.3.3 Phase I Engineering Evaluation/Cost Analysis (EE/CA) and Removal Actions

A Phase I Engineering Evaluation/Cost Analysis (EE/CA) was conducted in 1996. Nine Ordnance Operable Units (OOUs) were investigated; none of which included any of the Munitions Debris Areas.

2.3.4 Phase II EE/CA

A Phase II EE/CA was performed in 1998 that investigated five OOUs which included the Rocket Area, Mortar/Rifle Grenade Area, and the Rocket/Grenade Maneuver Area, now designated as FUDS Project I04SC001603.

2.3.5 Additional Actions

An ASR Supplement was prepared in 2004 focusing on the 12 ranges at Camp Croft and the munitions used.

2.3.6 Remedial Investigation

2.3.6.1 RI fieldwork was conducted at the former Camp Croft between January and October 2012. The investigation involved characterizing the nature and extent of MEC and MC and performing ecological and human health risk assessments. The RI was performed in former MRS 1, portions of MRS 3, Area of Potential Interest (AoPI) 8, AoPI 9E, AoPI 10A, AoPI 10B, and AoPI 11C. Areas that denied rights-of-entry include former MRS 2 and portions of MRS 3, AoPI 3, AoPI 5, AoPI 9G, AoPI 11B, and AoPI 11D. Thirty-nine UXO, one discarded military munition (DMM), and approximately 2,900 of pounds of MD were removed during the RI.

2.3.6.2 Munitions-related items are present in many locations across the former Camp Croft. Historical evidence collected from previous investigations and removal actions were combined

with findings from the RI to present a comprehensive understanding of the nature and extent of MEC and MC at many of the areas included in this investigation.

2.3.6.3 Based on the findings of the RI, former MRS 3 and five AoPIs are delineated as FUDS Project I04SC001603: Munitions Debris Areas from their original designations. Table 2-1 presents the revised designation. Those highlighted are included in this Decision Document and shown on Figure 2-2.

TABLE 2-1 PROJECT DELINEATIONS

Pre-RI Designation	Revised Designation	Decision Document Delineation (FUDS Project #)
MRS 1	MRS 1	Project 12: Gas Chamber and Cantonment AoPIs
MRS 2	MRS 2	Project 13: Grenade Court
MRS 3 (Land)	105mm Area	Project 10: 105mm Area
	Maneuver Area	Project 07: Maneuver Area/Croft State Park
	60mm Mortar Area	Project 11: 60mm Mortar Area
	60/81mm Mortar Area	Project 08: 60/81mm Mortar Area
	Rocket & Rifle Grenade Area	Project 06: Rocket and Rifle Grenade Area
	Rocket/Grenade Maneuver Area (126 ac)	Project 03: Munitions Debris Area
	Remaining Lands	Project 05: Range Complex Remaining Lands
AoPI 3	Grenade Area (19 ac)	Project 03: Munitions Debris Areas
AoPI 5	AoPI 5	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 8	AoPI 8	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 9E	AoPI 9E	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 9G	AoPI 9G	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 10A	Rocket Area (94 ac)	Project 03: Munitions Debris Area
AoPI 10B	Grenade Maneuver Area	Project 09: Grenade Maneuver Area
AoPI 11B		
AoPI 11C	Practice Grenade Area (7 ac)	Project 03: Munitions Debris Area
AoPI 11D	Mortar/Rifle Grenade Area (23 ac)	Project 03: Munitions Debris Area

2.3.6.4 *Rocket/Grenade Maneuver Area* - This area is within the southern portion former MRS 3 and roughly corresponds to the former OOU12B. As reported in the Phase II EE/CA, one MEC item (M9A1 rifle grenade) was encountered in OOU12B during previous field investigations. During the RI, minimal grenade MD and other fragments were observed. However, two fuzes were encountered in the southern portion of this area; these findings were inconsistent in that no real evidence of training was identified in close proximity to these items.

2.3.6.5 *Grenade Area* – The majority of the area was not accessible, as rights-of-entry were not granted. However, several residential parcels in the southern portion of this area were investigated. No MEC or MD were observed during the RI.

2.3.6.6 *Rocket Area* – This area corresponds to AoPI 10A investigated during the RI and OOU10A investigated during the Phase II EE/CA. Numerous munitions debris has been reported at this site since site closure; those include grenades, mortars, landmines, rockets, and small arms. No MEC was discovered during the RI field investigation. A total of 33 various MD were discovered during the RI field investigation, corroborating findings presented in the

Phase II EE/CA investigation; those MD fragments are generally categorized as rockets, grenades, landmines, mortars, projectiles, and undifferentiated MD.

2.3.6.7 *Practice Grenade Area* - This area corresponds approximately to AoPI 11C investigated during the RI. Minimal grenade-related MD was encountered.

2.3.6.8 *Mortar/Rifle Grenade Area* - This area, which was partially investigated, corresponds approximately to AoPI 11D investigated during the RI and OOU11D investigated during the Phase II EE/CA. The central portion of this area is a golf course fairway and was not accessible during the RI, as rights-of-entry were not granted. Six MD items (i.e., mortar fragments) were discovered in the southeastern corner of the area investigated during the RI.

2.4 ENFORCEMENT ACTIONS

No CERCLA enforcement actions have taken place at FUDS Project I04SC0001603: Munitions Debris Areas.

2.5 COMMUNITY PARTICIPATION

2.5.1 The Public Involvement Plan, prepared in August 2011, facilitates dialogue between the USACE and residents of the surrounding community regarding the RI/FS at the former Camp Croft. A project website, www.campcroft.net, contains information on the site history, meeting transcripts, historical documents, and project deliverables.

2.5.2 The Restoration Advisory Board (RAB) was formed in 1996 to increase public awareness and encourage open communication with the community and is still active. From its inception through April 2017, the RAB has met 66 times.

2.5.3 The RI Report, FS Report, and Proposed Plan for the former Camp Croft were made available to the public for comment and are available at the Spartanburg County Public Library, Spartanburg, SC as well as on the project website. A public meeting to present the Proposed Plan was held at the Spartanburg Marriott Renaissance Hotel, Spartanburg, SC on 24 March 2016. The Proposed Plan was available at the meeting and in the Information Repository. The notice of the public meeting and availability of the Proposed Plan for public comment was published on 15 March and 20 March 2016 in the Spartanburg Herald-Journal. In addition, meeting announcement cards were sent to more than 500 local residents and property owners. The Proposed Plan was also presented at the RAB meeting on 05 May 2016, which was announced in the online Spartanburg Herald-Journal and via mailed meeting announcements. Oral and written comments were solicited at the meeting and accepted during a public comment period from 24 March 2016 through 06 June 2016. Responses to written comments are included in Part 3.0: The Responsiveness Summary.

2.6 SCOPE AND ROLE OF RESPONSE ACTION

2.6.1 The former Camp Croft is comprised of 10 FUDS Projects created out of the original FUDS Project I04SC001603. This Decision Document only addresses FUDS Project I04SC0001603: Munitions Debris Areas. The remaining Projects are addressed in separate Decision Documents.

2.6.2 The selected remedy for FUDS Project I04SC0001603: Munitions Debris Areas is protective of human health and the environment by eliminating, reducing, or controlling potential MEC exposure hazards at the site through utilization of Public Education. These controls encourage behavior modification through educational materials and signage developed to enhance the community's general understanding of site conditions and information regarding appropriate responses, if munitions are encountered. The risk assessment concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC in soil and sediment is considered negligible; no action is recommended for MC. This remedy can be readily implemented under the authority of the USACE.

2.7 PROJECT CHARACTERISTICS

2.7.1 Site Characteristics

2.7.1.1 Site risks were evaluated in terms of a Conceptual Site Model that consists of a source of contamination, a receptor, and interaction at the exposure point or exposure pathways. Within this model, the source consists of MEC in the environment. Receptors include residents, visitors, workers associated with agriculture or construction, and recreational users, both currently and in the future. Based on the findings of the RI, the exposure pathway is (or will be) complete. These areas are relatively flat to gently rolling topography. Vegetation type and density varies based on current land use (e.g., dense vegetation in Croft State Natural Area and landscaped lawns in residential areas). Figure 2-1 illustrates these areas with respect to past military use.

2.7.1.2 The former Camp Croft is located in the upstate of South Carolina, less than 10 miles southeast of downtown Spartanburg, SC. The site is roughly bound to the north by SC Highway 295, to the east by US Highway 176, to the south by SC Highway 150 and to the west by SC Highway 56. The site can be accessed by taking US Highway 176 south at Exit 72 along US Interstate 85. Spartanburg County is located in the northwestern part of the state, in what has come to be known as the "Piedmont Crescent." The county lies just southeast of the Blue Ridge Mountains in the piedmont plateau, which is characterized by subdued topographic features and moderate relief. The land surface is inclined to elevations exceeding 1,000 feet in the northwest section of the county to less than 600 feet in the southeast. Hills have a well-rounded appearance with no conspicuously prominent ridges or peaks. Valley floors are generally about 100 feet deep with well-developed water courses. There are few swamp-like areas.

2.7.1.3 Croft State Natural Area occupies 7,054 acres of the 19,044-acre FUDS property. Facilities associated with the park include campgrounds (both primitive and for recreational vehicles), horse stables and a show ring, picnic shelters, restrooms, a comfort station, a dump station, a boat ramp, and park office. Lake Tom Moore Craig, a 148-acre impoundment, and Lake Edwin Johnson, a 37.5-acre impoundment, are also located within the park. These lakes were constructed after the FUDS was transferred to state ownership. Soil from onsite was used to construct the lakes' earthen dams.

2.7.1.4 Residential areas are concentrated in the north end of the former Camp Croft and residential property (small and large parcels) exists across much of the former camp, outside the Croft State Natural Area. The Creek Golf Course is located on the north end of Camp Croft.

2.7.1.5 Numerous small wetlands and riparian areas are located in the northern portion of the FUDS. The southern portion of the FUDS is dominated by numerous larger wetlands, primarily along Fairforest Creek. The largest wetland in southern portion of the FUDS is 82.85 acres and is located southwest of Lake Craig.

2.7.1.6 Bald eagles are known to nest in Croft State Natural Area and are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Both laws prohibit killing, selling or otherwise harming eagles, their nests, or eggs.

Remainder of page intentionally left blank.

FIGURE 2-1 FUDS PROJECT LOCATIONS

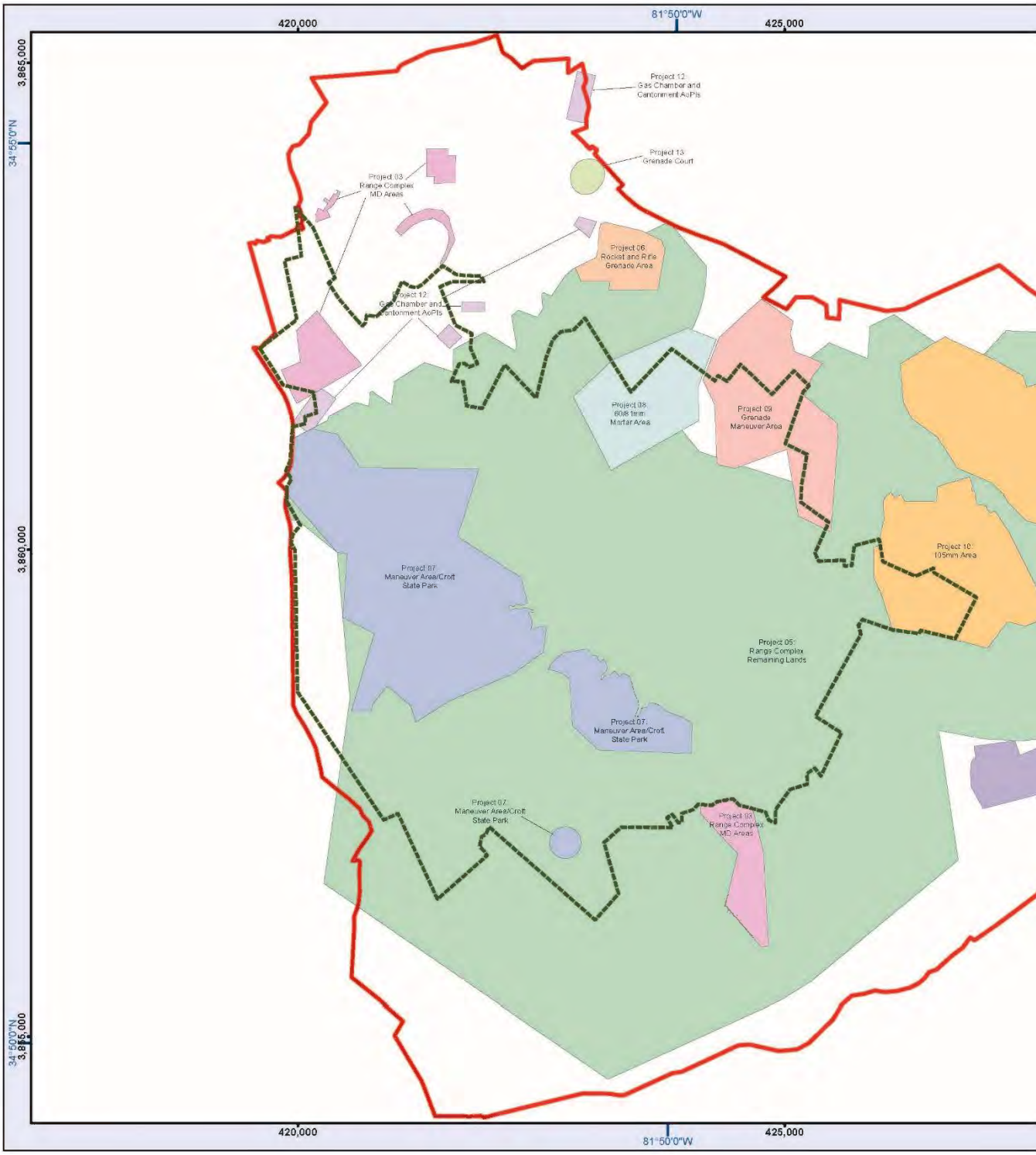
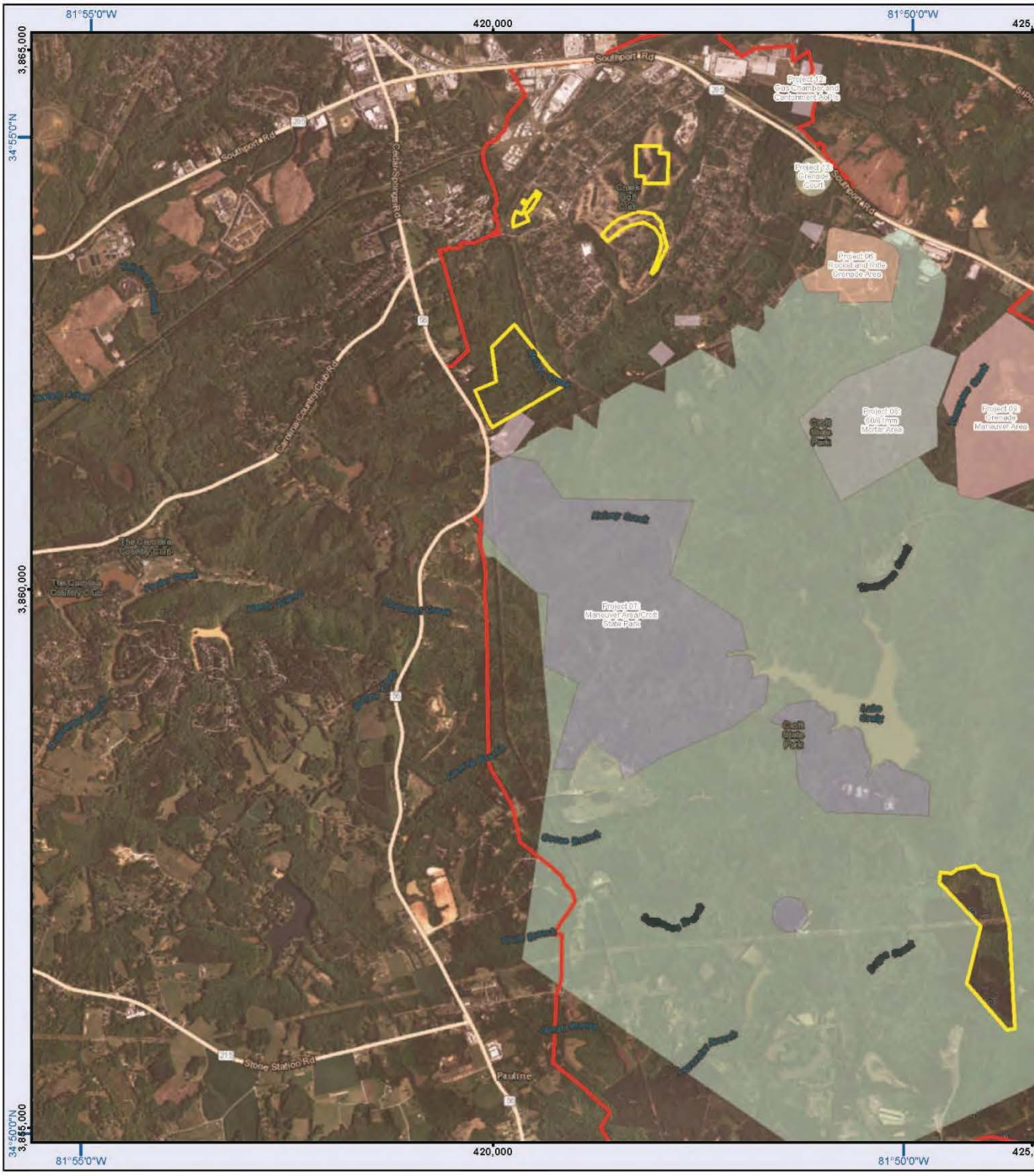


FIGURE 2-2 DECISION DOCUMENT FUDS PROJECT I04SC0001603 LOCATIONS



2.7.2 Sampling Strategy

2.7.2.1 For the RI, transects were positioned generally in an east-west orientation. Transect spacing varied between areas based on the detonation fragmentation distance of the smallest item of interest in each area and were investigated either by mag-and-dig or analog instrument-assisted surface reconnaissance. After reviewing the data collected during the mag-and-dig transect coverage, 110 individual 2,500 square foot grids were positioned principally in areas of medium and high estimated anomaly distribution to better define the nature and extent of MEC contamination. Targets of interest were intrusively investigated.

2.7.2.2 MC sampling was also conducted to support the RI; soil samples were collected from grids with high anomaly densities detected during the MEC investigation. Surface soil samples were collected from the four grid quadrants (northeast, northwest, southwest, and southeast) and the center point of the grid (i.e., five samples per grid). One-hundred-twenty-four discrete surface soil samples, plus 12 duplicates, were collected during the initial round of soil sampling. Samples were analyzed for explosives using EPA method 8330A and antimony, copper, lead, and zinc using EPA method 6020A.

2.7.2.3 X-ray fluorescence (XRF) was used to analyze soil samples in the field for lead in areas where soil lead levels exceed preliminary action levels. XRF samples were collected at 20-foot intervals in all directions from the original sample locations. In addition to the discrete surface soil samples, post-blow-in-place (BIP) composite surface soil samples were collected immediately following detonation of MEC items to determine if any MC contamination remained after the detonation. The U.S. Army Cold Regions Research and Engineering Laboratory's 7-Sample Wheel Approach was used to collected composite post-BIP soil samples.

2.7.2.4 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site and therefore was not sampled.

2.7.3 ***FUDS Project Contamination***

2.7.3.1 Grenade Area – No MEC or MD were observed during the RI.

2.7.3.2 Mortar/Rifle Grenade Area - Six MD items (mortar fragments) were discovered in the southeastern corner of the area investigated during the RI.

2.7.3.3 Practice Grenade Area - Minimal grenade-related MD was encountered during the RI field investigation.

2.7.3.4 Rocket Area – No MEC was discovered during the RI field investigation. A total of 33 various MD were discovered during the RI field investigation.

2.7.3.5 Rocket/Grenade Maneuver Area - Minimal grenade MD and other fragments were observed during the RI field investigation. Two fuzes were encountered in the southern portion of this area. However, these findings were inconsistent in that no real evidence of training was identified in close proximity to these items.

2.7.4 Location of Contamination and Routes of Migration

2.7.4.1 Camp Croft had at least 12 live ammunition training ranges used for small arms ammunition, anti-tank rockets, anti-aircraft artillery, 60-millimeter (mm) infantry mortars, and 81mm infantry mortars. The training range impact areas comprised 16,929 acres; a 175-acre grenade court was also located at the camp.

2.7.4.2 MEC may remain for long periods of time. Several factors influence the possible migration of MEC from the site, such as human activity resulting in redistribution of MEC items, and erosion.

2.7.4.3 Human populations which could be affected include residents, workers associated with agriculture or construction, recreational users, and visitors.

2.8 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.8.1 Land Uses

2.8.1.1 Land use in Spartanburg County generally is divided into four broad categories including agricultural/cropland, urban/built-up land, mixed forest (woodland), and deciduous forest (woodland). From an aerial perspective, these four land use groups present a physical form. The urban/built up land form represents a continually changing land mass, running into agricultural, grasslands and forested areas, continually altering its boundaries in response to changes brought by growth and development. Project 03 is comprised of residential, commercial and private property, and a portion of Croft State Natural Area.

2.8.1.2 Croft State Natural Area occupies 7,054 acres of the 19,044-acre FUDS property. The primary activities conducted at the park include hiking, mountain biking, camping, fishing, boating, and horseback riding. The park hosts horse shows on the third Saturday of each month between February and November. Bow hunting is allowed during three two-day sessions between September and November. Land use at Croft State Natural Area is not anticipated to change. Land use for the remainder of the FUDS property (approximately 11,990 acres) is composed of industrial, agricultural, commercial, and residential. It is likely those types of land use will continue.

2.8.2 Groundwater and Surface Water Uses

2.8.2.1 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site; no potable groundwater wells were identified within the Munitions Debris Areas.

2.8.2.2 Lake Craig (148 acres) and Lake Johnson (37.5 acres), both located within Croft State Natural Area, are used by boaters and fishers.

2.9 PROJECT SITE RISKS

2.9.1 Human Health & Ecological Risks

During the RI, risk assessments were conducted to determine the human health and ecological risks associated with potential MC exposure at the former Camp Croft. Based on the MC

analytical results, the risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC is negligible. Therefore, MC do not pose an unacceptable risk to human health and the environment and no further action will be taken for MC.

2.9.2 MEC Hazard Assessment

2.9.2.1 A qualitative MEC Hazard Assessment (HA) was conducted using information from previous investigations and the RI for two areas within the Munitions Debris Areas to provide a baseline assessment of response alternatives.

2.9.2.2 Considering the current site conditions, the MEC HA results consider the potential for explosive hazard conditions for the Munitions Debris Areas to be "moderate to low" for current and reasonably anticipated future land uses at FUDS Project I04SC0001603: Munitions Debris Areas. Results of the MEC HA are discussed in detail within the RI Report, which is available on the project website and in the Administrative Record file.

2.9.2.4 Previously recovered MEC locations, MD density and future land use activities were also used to assess response alternatives and develop basis for the selected remedy. In areas with a higher relative MD density, a receptor (human) may have a greater chance of encountering MEC based on anticipated future land use activities in these areas.

2.9.3 Basis for Response Action

2.9.3.1 The selected remedy for FUDS Project I04SC0001603: Munitions Debris Areas is implementation of Public Education. Based on the results of the RI fieldwork, there is no evidence of concentrated munitions use. The presence of MD indicates a possibility that MEC may be present (though at very low density) in the Munitions Debris Areas.

2.9.3.2 Public education will reduce hazards associated with potential residual munitions within FUDS Project I04SC0001603 through behavior modification and includes signage and educational materials developed to enhance the community's general understanding of site conditions. Five-year reviews will be conducted to ensure the selected remedy remains effective in protecting human health and the environment and continues to manage residual hazard in the long-term.

2.10 REMEDIAL ACTION OBJECTIVES

The Remedial Action Objective (RAO) is to limit or mitigate an interaction between a receptor and potential MEC items remaining in these areas. The selected remedy is chosen to satisfy the RAO. This will be accomplished through signage and educational materials developed to enhance the community's general understanding of site conditions.

2.11 DESCRIPTION OF ALTERNATIVES

2.11.1 The FS developed and evaluated four remedial alternatives for the five areas that comprise FUDS Project I04SC0001603:

- Alternative 1 – No Action;
- Alternative 2 – Public Education;

- Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education; and
- Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure.

2.11.2 Remedy Components

2.11.2.1 Alternative 1 - No Action is carried forward to represent the existing condition at the site. Under CERCLA, the No Action alternative is required for use as a baseline measure against the other alternatives. No Action assumes the following:

- No treatment technology;
- No containment technology;
- No institutional controls; and
- No monitoring requirements.

2.11.2.2 Alternative 2 – Public Education assumes that no physical MEC remediation would take place but would involve the following components:

- Funded and implemented by USACE;
- Community MEC awareness program;
- Posting of MEC awareness signs; and
- Development and distribution of informational material.

2.11.2.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education. Alternative 3 involves the following major components:

- Funded and implemented by USACE;
- Community MEC awareness program;
- Posting of MEC awareness signs;
- Development and distribution of informational material; Removal of MEC items visible on the ground surface; and
- Removal of subsurface anomalies identified by analog sensors.

2.11.2.4 Alternative 4 - Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure (UU/UE). With this advanced technology, it is anticipated that the completion of the MEC removal would reduce the MEC hazard to a level to support unlimited use/unrestricted exposure of the area. As such, Public Education and long-term management would not be required. The following components make up Alternative 4:

- Funded and implemented by USACE;
- Removal of MEC items visible on the ground surface; and
- Use of digital geophysical mapping and advanced classification to identify subsurface MEC items and conduct removal action.

2.11.3 Common Elements and Distinguishing Features of Each Alternative

2.11.3.1 Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are "those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site" as defined in 40 CFR 300.5. There are no ARARs pertinent to the remedy and Decision Document.

2.11.4 Long-term Reliability

2.11.4.1 Alternative 1 – No Action provides no reduction in MEC hazard and therefore, offers no permanent remedy.

2.11.4.2 Alternative 2 – Public Education provides no reduction in MEC volume because no MEC clearance will take place. However, there is a reduction of MEC hazard to residents, workers, and recreational visitors through MEC awareness via distribution of informational documents and posting of MEC awareness signs.

2.11.4.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education greatly and permanently reduce the risk of an accidental encounter with surface and subsurface MEC.

2.11.4.4 Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE would provide permanent reduction of hazard for residents, workers, and recreational visitors performing intrusive activities in areas where present and future land use dictates.

2.11.5 Estimated time to Implement

2.11.5.1 Alternative 1 – No Action can be implemented immediately.

2.11.5.2 Alternative 2 – Implementation of Public Education can occur within three to six months. Distribution of material should be ongoing.

2.11.5.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education can be implemented within four to six months. The time frame to complete the remedial design, fieldwork and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and regulatory review accommodations; however, a conservative estimated time-to-complete would be three years.

2.11.5.4 Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure can be implemented within four to six months. Time frame to complete the remedial design, fieldwork and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and

regulatory review accommodations; however, a conservative estimated time-to-complete would be three years.

2.11.6 Cost

Estimated present worth costs for each alternative are shown in Table 2-2.

TABLE 2-2 ALTERNATIVE APPROXIMATE COST SUMMARY

Alternative	Present Worth* ($)
1. No Action	$0
2. Public Education	$366,167
3. Analog Surface and Subsurface MEC Removal and Public Education	$1,279,425
4. Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure	$1,315,871

*In accordance with EPA guidance for the purpose of the detailed analysis of alternatives, the period of performance used for costing purposes was 30 years. Though not part of the remedy, the cost of five-year reviews is included where applicable to show total cost.

2.11.7 Expected Outcomes of Each Alternative

Alternative 1 affords no protection to human health and is not effective in reducing the MEC hazard at the five areas that comprise FUDS Project I04SC0001603: Munitions Debris Areas. Alternative 2 – Public Education reduces MEC hazards through education of residents, workers and site visitors. However, there is no reduction in volume of MEC with Alternative 2. Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education greatly reduces the risk of an accidental encounter with surface and subsurface MEC over the entire area. Public Education will reduce the hazard to residents, workers, and site visitors through community MEC awareness via distribution of informational materials and posting of signs. Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE would provide permanent reduction of hazard for former Camp Croft residents, workers, and recreational visitors performing surface and intrusive activities.

2.12 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-3 provides an assessment of each remedial alternative with respect to the nine NCP criteria.

TABLE 2-3 ASSESSMENT OF REMEDIAL ALTERNATIVES

Remedial Alternative	NCP Nine Evaluation Criteria								
	Threshold Criteria		Balancing Criteria					Modifying Criteria	
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment	Implementability	Cost	State Acceptance	Community Acceptance
Alternative 1 **No Action** No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor. This alternative is not protective of human health and the environment.	N/A	No action would be taken to reduce potential MEC hazards to a potential receptor. Accordingly, alternative would be implemented immediately, there would be no risks resulting from implementation, but risks to receptors would remain the same.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce mobility or volume of MEC.	Not administratively feasible, otherwise easy to implement.	No cost associated with this alternative.	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.
Alternative 2 **Public Education** Includes distribution of informational material and posting of MEC awareness signs.	Public eductation will reduce the hazard to human receptors through education resulting from distribution of informational documents and posting of signs. This Alternative provides overall protection of human health and the environment.	N/A	Individuals familiar with formerly used military sites, munitions types, and safety would be involved with the development and distribution of informational documents. Protection will occur immediately following implementation and can be executed within three to six months. Distribution of materials will be ongoing.	Since MEC is not removed, the long-term effectiveness/ permanence is questionable. Distribution of community MEC awareness informational documents would need to occur continually to ensure availability to receptors.	No reduction in volume as no MEC clearance would take place.	Distribution of informational documents and posting of signs are technically feasible. Materials and personnel are readily available for implementation. Property rights-of-entry would only be required for posting of signs. Implementation can occur within three to six months. Distribution of materials should be ongoing.	$122,975 $366,167 (with LTM)	The State provided one comment on this Alternative with respect to nesting bald eagles.	No comments from the public were received.
Alternative 3 **Analog Surface and Subsurface MEC Removal and Public Education** Clearance of surface MEC and subsurface anomalies, including public education	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e., clearance) and public education.	YES	The clearance of surface MEC and subsurface anomalies is effective in mitigating hazards.	This alternative is effective as a long-term remedy.	All surface MEC and subsurface anomalies would be removed, resulting in the reduction of mobility and volume.	Surface and subsurface clearance of MEC is technically feasible based on accessibility and land use. Moderate technical effort required for implementation. UXO-qualified personnel would visually inspect, aided by hand-held instruments, the ground surface and use hand-held sensors to detect and remove subsurface anomalies. Suspected MEC items would be inspected for explosive hazards and disposed of accordingly.	$1,036,234 $1,279,424 (with LTM)	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.
Alternative 4 **Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure** This alternative includes clearance of surface MEC and MEC from below the surface, to a depth compatible with land use or actual known depths of the ordnance.	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e., clearance).	YES	The clearance of surface and subsurface MEC is effective. Potential significant exposure to UXO workers during implementation. Hazard to the public resulting from implementation is considered minimal.	This alternative is effective as a long-term remedy if MEC is present.	Greatest reduction of MEC volume. Surface and subsurface MEC would be removed using the most effective technology available, resulting in the reduction of mobility and volume.	Surface and subsurface clearance of MEC is technically feasible for an entire area or a smaller footprint within an area, based on accessibility and land use. Extensive brush clearance would likely be required. Uses digital geophysical instrumentation in a specialized configuration for data collection such that data can be digitally compared to an established database, and anomalies can be discriminated. Anomalies identified as MEC would be excavated and disposed of using approved/safe procedures.	$1,315,871	The State did not comment on the acceptability of this alternative.	No comments from the public were received.

2.13 PRINCIPAL MEC/MC ISSUES

The principal issue at the former Camp Croft is MEC; however no concentrated munitions use areas or MEC were encountered during RI fieldwork at the FUDS Project I04SC0001603: Munitions Debris Areas. The presence of minimal quantities of MD in the Munitions Debris Areas indicates a possibility that MEC may be present, resulting in an unacceptable risk to human health.

2.14 SELECTED REMEDY

The selected remedy for FUDS Project I04SC0001603: Munitions Debris Areas is implementation of Public Education.

2.14.1 Summary of the Rationale for the Selected Remedy

2.14.1.1 The selected remedy, which includes community MEC awareness through posting MEC awareness signage and distribution of informational documents, is appropriate for the Munitions Debris Areas. Based on the results of the RI fieldwork, limited physical evidence of munition debris was observed and no MEC was encountered. Implementation of Public Education will manage residual hazards within all areas of FUDS Project I04SC0001603.

2.14.1.2 USACE believes that the selected remedy is protective of human health and the environment; complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action; and is cost effective. The use of permanent solutions and alternative treatment technologies are limited due to current site use and the fact that no MEC were encountered. If a MEC hazard is encountered, the selected remedy will reduce the associated hazard to human receptors through education resulting from community MEC awareness through distribution of informational documents and posting of MEC awareness signs. A relatively low long-term threat for a complete MEC exposure pathway is suspected based on the results of field investigations.

2.14.2 Detailed Description of the Selected Remedy

The estimated cost for Alternative 2 provided in the FS included fencing. Based on the extensive acreage, mixed land use, and private land ownership objection, fencing is not a feasible response action. The selected remedy is Public Education consisting of a community MEC awareness program that includes posting MEC awareness signage on government-owned property and development and distribution of informational materials. Informational material may be distributed at the Croft State Natural Area, with building/construction permits for properties within the former Camp Croft, at RAB meetings, and via annual mailings to the property owners and special interested groups identified in the Community Relations Plan. The selected remedy will inform the public about the history and boundaries of the former camp, potential hazards (MEC), and will explain appropriate response procedures in the event MEC is found.

2.14.3 Cost Estimate for Selected Remedy

2.14.3.1 A summary of the cost estimate for Public Education is provided in Table 2-4 and Table 2-5. Detailed cost is provided in the FS Report located in the Information Repository/Administrative Record.

2.14.3.2 The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an explanation of significant differences, or a Decision Document amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.14.4 Expected Outcomes of the Selected Remedy

2.14.4.1 The selected remedy will provide risk reduction through increased hazard awareness and education. The expected result of implementing this remedy is to provide an effective means of influencing behavior to reduce the risk of incident and exposure if potential MEC is encountered for current and reasonably anticipated future land use activities based on best available information at this time. The selected remedy will not impact current or anticipated future land uses.

TABLE 2-4 COST ESTIMATE - PUBLIC EDUCATION

Public Education		
Contractor Cost (Labor, Supplies, and Travel)	$	78,814
Government Cost (30% of Contractor Cost)	$	23,664
Subtotal	$	102,458
Contingency (20% of Subtotal)	$	20,517
Total	**$**	**122,975**

Long-Term Management		
Contractor Cost (Labor, Supplies, and Travel)	$	25,972
Government Cost (30% of Contractor Cost)	$	7,800
Subtotal	$	33,772
Contingency (20% of Subtotal)	$	6,760
Total	**$**	**40,532**
6 Reviews - Present Worth	**$**	**243,192**

2.14.4.2 Though not part of the remedy, the cost of Five-year Reviews is provided.

TABLE 2-5 Public Education Cost

	Acres	Alternative 2	Alternative 2 with LTM
Project 3: Munitions Debris Areas	269	$122,975	$366,167

2.15 STATUTORY DETERMINATIONS

In accordance with statutory requirements of CERCLA, the remedial action shall be protective of human health, comply with ARARs, be cost effective, utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, and prefer treatment as a principal element.

2.15.1 Protection of Human Health and the Environment

Unlike other Camp Croft Projects, Project 03 was not a concentrated munitions use area. This remedy will be protective by implementing Public Education in the form of a community MEC awareness program, posting MEC awareness signage, and distribution of informational materials to educate residents, commercial workers, and recreational users on MEC safety. The implementation of the selected remedy will not pose unacceptable short-term risks to human health or the environment or result in any cross-media impacts.

2.15.2 Compliance with Applicable or Relevant and Appropriate Requirements

There are no ARARs associated with this remedy.

2.15.3 Cost Effectiveness

The selected remedy is considered cost effective compared to MEC removal alternatives as it achieves the threshold criteria of overall protectiveness to human health and the environment. The estimated costs presented in Table 2-3 represent the costs developed for the FS Report.

2.15.4 Permanent Solution and Alternate Technology

The selected remedy will reduce the associated hazard to human receptors through behavior modification by means of education resulting from a community MEC awareness program and distribution of informational materials. Distribution of informational documents would occur as needed to ensure availability to residents, commercial workers and recreational users. A relatively low long-term threat for a complete MEC exposure pathway is suspected in the five areas incorporated herein.

2.15.5 Preference for Treatment as a Principal Element

The selected remedy does not meet the statutory preference for treatment as a principal element. The presence of MD indicates that the possibility exists that MEC is present (though at very low density) in FUDS Project I04SC0001603.

2.15.6 Five-year Reviews

Five-year reviews are a requirement for alternatives not allowing for unlimited use and unrestricted exposure (UU/UE) in accordance with 40 CFR 300.430(f)(4)(ii). As such, this remedy and Decision Document are subject to five-year reviews for the foreseeable future.

2.16 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the former Camp Croft was released for public comment on 24 March 2016. The Proposed Plan identified Alternative 2 - Land Use Controls (Limited) for FUDS Project I04SC0001603: Munitions Debris Areas. Based on comments received from the RAB, the term "Land Use Controls" has been replaced with "Public Education"; this change has been incorporated herein. The remedy, as originally identified in the Proposed Plan, has been revised to remove fencing and associated costs from the Alternative 2 remedy.

3.0 PART 3: THE RESPONSIVENESS SUMMARY

The public comment period for the Proposed Plan was from 24 March 2016 to 06 June 2016. USACE facilitated a public meeting at the Spartanburg Marriott Renaissance Hotel on 24 March 2016. The Proposed Plan was also presented to the RAB and the public on 05 May 2016.

3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

No comments were received from the public on the Proposed Plan. The SC DHEC has reviewed the Proposed Plan and provided the following comment on the selected remedy. The response is provided below.

SC DHEC Comment: From the February RAB meeting, it was mentioned by John Moon, the Croft State Park Ranger, that there were nesting Bald Eagles within Croft State Park. The Department understands that this was new information but wants to ensure that this information has been followed up by the USACE to determine if appropriate ARAR(s) are necessary.

Response: Section 2.7.1.6 addresses nesting bald eagles.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues have been identified.