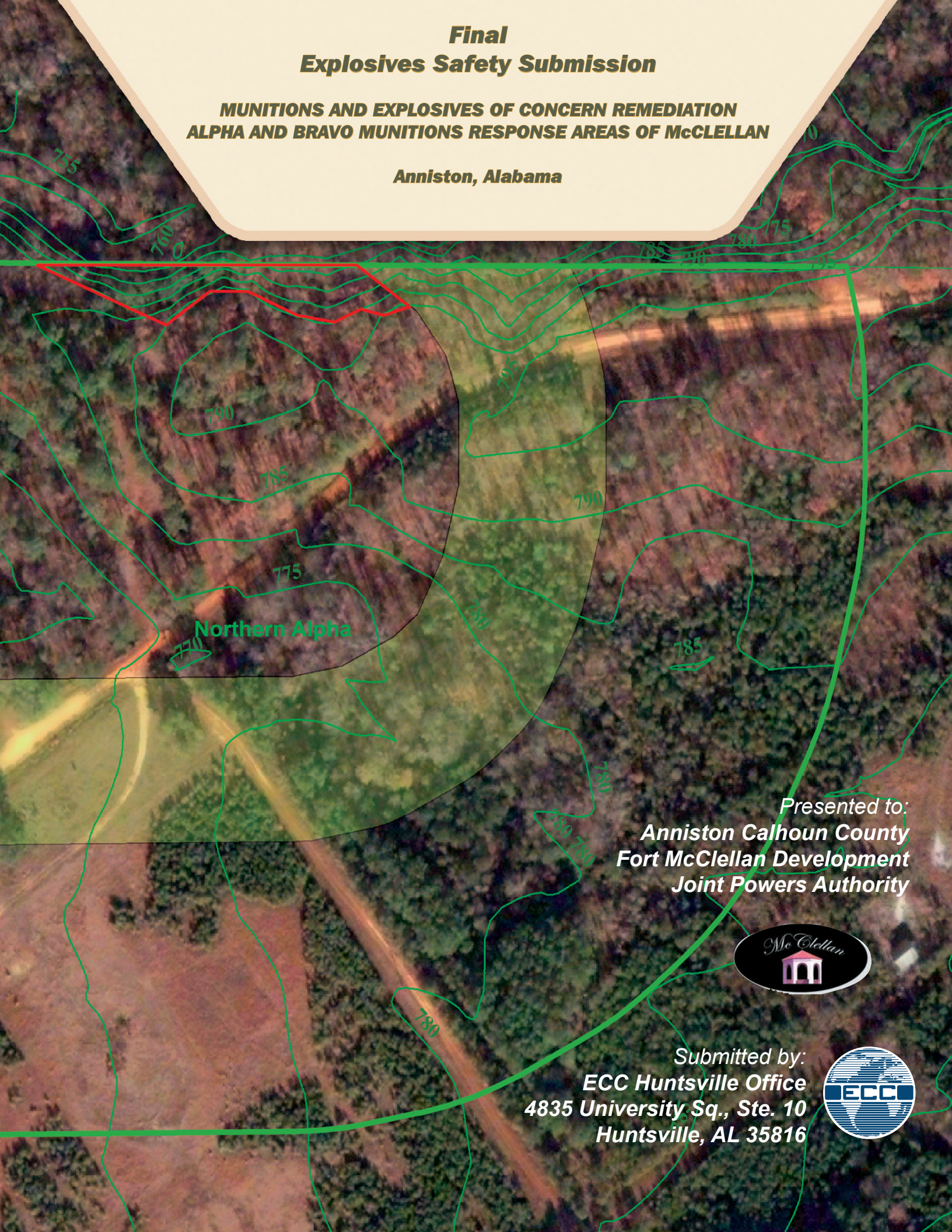
Final
Explosives Safety Submission

MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIATION
ALPHA AND BRAVO MUNITIONS RESPONSE AREAS OF McCLELLAN

Anniston, Alabama



Presented to:
Anniston Calhoun County
Fort McClellan Development
Joint Powers Authority

Submitted by:
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June 26, 2006

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Mr. Tom Lederly
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Subject: Cleanup Agreement No. Al4 210 020 562
Transmittal of DDESB-Approved Final Conventional Explosives Safety Submission, McClellan, Anniston, Alabama

Dear Mr. LaBarron and Mr. Lederly,

This letter is sent to forward courtesy copies of the March 2006 Final Conventional Explosives Safety Submission (ESS), McClellan, Anniston, Alabama for your records on behalf of the Anniston Calhoun County Fort McClellan Development Joint Powers Authority. This document is for informational purposes only and no review is required. The ESS submittal was approved by DDESB on May 16, 2006. Please contact me at 404.414.7054 if you have any questions on this submittal.

Sincerely,

MATRIX ENVIRONMENTAL SERVICES, LLC.

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DEPARTMENT OF THE ARMY
US ARMY DEFENSE AMMUNITION CENTER
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REPLY TO
ATTENTION OF

SJMAC-ESM

22 MAY 2006

MEMORANDUM FOR, Mr. Jeff Viebrock, P.G., ECC, 4825 University Square, Suite 3, Huntsville, Al 35816

SUBJECT: Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, AL

1. References:

a. Memorandum, DDESB, DDESB-KO, 16 May 2006, SAB (enclosed).

b. DOD 6055.9-STD, Ammunition and Explosives Safety Standards, 5 October 2005.

2. Reference 1a provides DDESB approval for subject amendment. This ESS is for the Munitions and Explosives of Concern (MEC) removal in the Alpha and Bravo Munitions Response Areas (MRAs) at the former Ft McClellan in Anniston, Alabama. This ESS was submitted on behalf of the Joint Powers Authority in accordance with an Environmental Services Cooperative Agreement (ESCA).

3. Point of contact (POC) is Karl J. Raue, SJMAC-ESM, DSN 956-8122, (918) 420-8122, FAX 8503, karl.raue@dac.army.mil.

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DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
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DDESB-PE

MAY 16 2006

MEMORANDUM FOR DIRECTOR, DEFENSE AMMUNITION CENTER
ATTENTION: SJMAC-ESM

SUBJECT: Explosives Safety Submission (ESS) for Portions of Alpha and Bravo Munitions Response Areas, Fort McClellan, AL

References: (a) DAC SJMAC-ESM Memorandum, 14 March 2006, Subject: Conventional Explosives Safety Submission, McClellan

(b) DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards, 5 October 2004

The DoD Explosives Safety Board (DDESB) Staff reviewed the subject ESS provided via reference (a), against the requirements at reference (b). Based on the information provided, we approve the ESS for removal of munitions and explosives of concern (MEC) from portions of Munitions Response Areas (MRAs) Alpha and Bravo at the former Fort McClellan, Anniston, AL. This approval is based on the following:

a. Removal-to-depth will be conducted within the Alpha MRA at the Northern Alpha (14 acres) and Southern Alpha (132 acres) munitions response sites, and within the Bravo MRA at the Industrial Access Road (55 acres) and Planning Area 4 (38 acres). Surface clearance will be conducted along the south side of Bains Gap Road (8.5 acres) within the Bravo MRA. Per reference (a), surface clearance of the Bains Gap Road MRA is an interim measure to allow opening the road to public access in the future, but a removal-to-depth is planned and an amendment to this ESS will be submitted to further address this MRA.

b. The property is intended for commercial/industrial development. Per reference (a), other portions within Alpha and Bravo MRAs not addressed in this ESS will undergo MEC response at a later date and will be addressed separately.

c. Northern Alpha: The munition with the greatest fragmentation distance (MGFD) is the M9 Rifle Grenade.

(1) The maximum fragment range for this MGFD is 351 feet. This is the minimum separation distance and exclusion zone (MSD/EZ) for intentional detonations. The MSD/EZ for this MGFD may be reduced to 200 feet when using the DDESB-approved sandbag or water containment blast and fragment mitigation methods. Keep in mind that these methods are approved to handle only one munition item at a time.

(2) The inhabited building distance (IBD) for accidental detonations (activities other than intentional detonations) is 200 feet, the hazardous fragment distance (HFD) for the MGFD.

c. Southern Alpha (Army Sector M5-1L Industrial): The MGFD for this sector is the M2 Practice Grenade. A separation distance of 200 feet applies to both, intentional and accidental detonation activities.

d. Southern Alpha [Army Sector M5-1L (South)-PR]: The MGFD for this sector is the M48, 75mm HE Projectile.

(1) The MSD/EZ for intentional detonations is 1,701 feet. The MSD/EZ may be reduced to 200 feet when using the DDESB-approved sandbag or water containment blast and fragment mitigation methods.

(2) The IBD for accidental detonation activities is 234 feet (HFD). When using the DDESB-approved Miniature Open Front Barricade (MOFB), this distance may be reduced to 200 feet to the sides, top and rear of the MOFB, but remains 234 feet to the front.

e. Industrial Access Road Bravo: The MGFD for all sectors within this site is the M43, 81mm HE Mortar.

(1) The MSD/EZ for intentional detonations is 1,395 feet. This MSD/EZ may be reduced to 200 feet when using the DDESB-approved sandbag or water containment blast and fragment mitigation methods.

(2) The IBD for accidental detonation activities is 230 feet. When using the MOFB, this distance may be reduced to 200 feet to the sides, top and rear of the MOFB, but remains at 230 feet to the front.

f. Planning Area 4 Bravo: The exact location of this site had not been determined yet at the time the ESS was submitted; however, it is within sector A1 Reconnaissance Area D. An amendment to this ESS will be necessary if the location of this site changes. The MGFD for this site is the MK II, 37 mm HE Projectile.

(1) The MSD/EZ for intentional detonations is 980 feet. This MSD/EZ may be reduced to 200 feet with the use of the DDESB-approved sandbag or water containment blast and fragment mitigation methods.

(2) The IBD for accidental detonation activities is 200 feet (HFD).

g. Bains Gap Road Bravo: The MGFD for this site is the M43, 81 mm HE Mortar. Apply the same separation distances as approved above for the Industrial Access Road Bravo area.

h. Per reference (a), if UXO is identified along boundaries of a munitions response site, a "step-out" will be performed to detect and remove UXO until there is a 200-foot buffer zone free and clear of UXO. The step-out will be performed as necessary in areas where no future MEC remediation is planned.

i. Non-MEC items and MEC-related scrap will be inspected and, once certified free of energetic material, it will be disposed of off-site.

j. Personnel unrelated to explosive operations must be provided IBD-level protection from the explosive hazards at the sites. Engineering controls and/or evacuation procedures must be implemented when explosive arcs encumber personnel or property unrelated to the explosive operations. Per reference (a), as removal actions are completed and redevelopment proceeds, security controls will be adjusted to continue to limit access to MEC contaminated areas.

k. In addition, the detection equipment to be used must be capable of detecting the MEC to whichever of these depths is shallower: the MGFD's expected depth; or the depth that will be used or disturbed during the allowed future use of the sites, including during the construction phase.

The point of contact for this action is Ms. Lydia E. Sanchez, (703) 325-1373, DSN 221-1373, E-mail address Lydia.Sanchez@ddesb.osd.mil.

T. CHIAPELLO FOR
WILLIAM E. WRIGHT
Captain, US Navy
Chairman

Explosives Safety Submission (Conventional)

MEC Remediation

Munitions Response Sites at McClellan

Anniston, Alabama

Prepared for the Anniston-Calhoun County Fort McClellan Development Joint Powers Authority

Prepared by:

ECC

March 2006

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LIST OF ACRONYMS

ADEM	Alabama Department of Environmental Management
BATF	Bureau of Alcohol, Tobacco and Firearms
BIP	Blow In Place
BRAC	Base Realignment And Closure
CWM	Chemical Warfare Materiel
DDESB	Department of Defense Explosives Safety Board
DGM	Digital Geophysical Mapping
DOD / DoD	Department Of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
EZ	Exclusion Zone
ft	Foot / Feet
GPS	Global Positioning System
IBD	Inhabited Building Distance
JPA	Joint Powers Authority
MEC	Munitions and Explosives of Concern
MES	Matrix Environmental Services, L.L.C.
MOFB	Miniature Open Front Barricade
mm	Millimeter
MGFD	Munition with the Greatest Fragmentation Distance
MPH	Miles Per Hour
MOA	Memorandum of Agreement
MRA	Munitions Response Area
MRS	Munitions Response Site
MSD	Minimum Separation Distance
NEW	Net Explosive Weight
OFB	Open Front Barricade
QA	Quality Assurance
QC	Quality Control
Q-D	Quantity-Distance
RCWM	Recovered Chemical Warfare Materiel
RLS	Registered Land Surveyor
SSWP	Site Specific Work Plan
STD	Standard
SUXOS	Senior UXO Supervisor
TEU	Technical Escort Unit
TTFWI	TetraTech Foster Wheeler Inc.
TSD	Team Separation Distance
U.S.	United States
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1.0 INTRODUCTION

This Explosives Safety Submission (ESS) has been prepared for the MEC Removal in the Alpha and Bravo Munitions Response Areas (MRAs) at McClellan in Anniston, Alabama. The purpose of this document is to present the selected remediation methodology to the Department of Defense Explosives Safety Board (DDESB) for review and approval. The regulatory guidance under which this ESS is prepared is the 5 October 2004 Revision of DoD 6055.9-STD including Chapter 15 (DDESB-approved on 14 December 2004). The purpose of remediation is to perform a clearance to depth at two munitions response sites (MRS) within the Alpha MRA and two within the Bravo MRA. A surface clearance will be conducted along the south side of Bains Gap Road in Bravo MRA These areas along with their corresponding Army-designated subsectors are shown below in Table 1-1.

Table 1-1: MEC Removal Areas

MRS	Army-designated Sector(s)	MGFD	EZ/MFD (feet)	1/600 (feet)	Clearance Acreage
Northern Alpha	M6-1L Suspect Area-I/AR	Grenade, Rifle, M9	351	200	14
Southern Alpha	M5-1L (South)-PR M5-1L I	Projectile, 75mm, HE, M48 Grenade, Practice, M2	1,701 200	234 200	132
Industrial Access Road Bravo	M4-1H Mixed Use Area-PR M3-1L Mixed Projectile Area-PR A1-Reconnaissance Area-D M3-1L Suspect Area 1-PR M3 Remainder Area-PR	Mortar, 81mm, HE, M43 Projectile, Shrapnel, 155mm Projectile, 37mm, HE, Mk II Projectile, 37mm, HE, Mk II NFA area, no MGFD	1,395 743 980 980 0	230	55
Planning Area 4 - Bravo	A1-Reconnaissance Area-D	Projectile, 37mm, HE, Mk II	980	200	38
Bains Gap Road (Surface Only) - Bravo	M4-1H Mixed Use Area-PR	Mortar, 81mm, HE, M43	1,395	230	8.5

Note: An EZ of 1,395 will be enforced for all work conducted at the Industrial Access Road

Figure 12-1 (located at the end of Section 12) shows the general layout of McClellan and shows the locations of each MRS covered in this document. This MEC remediation work is being conducted to clear land for use in redevelopment, which is covered and funded in accordance with an Environmental Services Cooperative Agreement (ESCA) No. DASW01-03-2-001 between the Department of the Army and Anniston-Calhoun County Fort McClellan Development Joint Powers Authority (JPA). Other areas within the Alpha and Bravo MRAs slated for redevelopment will be cleared at a later date. Explosives safety considerations for future work will be included as amendment(s) to this document as the work is staged.

This work is being contracted by the JPA using Army funding. Site specific work plans will be developed for each site undergoing MEC remediation at McClellan under this contract.

2.0 REASON FOR MUNITIONS AND EXPLOSIVES OF CONCERN (MEC)

Fort McClellan was used for artillery training of troops and the National Guard as early as 1912 to early WW II. In 1951, Fort McClellan became the site of the Chemical Corps Training Command. In 1962, the U.S. Army Combat Developments Command Chemical Biological-Radiological Agency moved to Fort McClellan. In 1973, the Chemical Corps School along with the U.S. Army Combat Developments Command Chemical Biological-Radiological Agency was moved to Edgewood Arsenal. In 1979, the U.S. Army Chemical Corps School was re-established along with a training Brigade for Basic Training. In September of 1999, Fort McClellan was closed under the Base Realignment and Closure Act (BRAC) as recommended by the 1995 Defense Base Closure Realignment Commission.

3.0 AMOUNT AND TYPE OF MEC

Alpha and Bravo MRAs have documented training areas and range impact areas based on previous investigations and studies conducted at McClellan by the U.S. Army and their contractors. Practice, training, high explosive and shrapnel-based ordnance items have been found in the specific MRA sites as documented in the Final Engineering Evaluation/Cost Analysis Alpha Area of the Redevelopment Area Fort McClellan, Alabama (Tetra Tech, FW Inc., September 2003) and Draft Engineering Evaluation/Cost Analysis Bravo Area of the Redevelopment Area Fort McClellan, Alabama (Tetra Tech, FW Inc., December 2004).

Clearance to depth and surface clearance are the selected methods of clearance at the MRSs at McClellan. The following table shows MEC items recovered in and around the MRS areas. Direct empirical data from the EE/CA reports show that MEC items are found at shallow depths that are well above the typical maximum detection depths. Also shown on Table 3-1 are the depth ranges to which Geophysical Prove-Out items will be buried. The GPO will be used to verify that geophysical instruments and personnel can detect the expected items, thereby validating the clearance to depth method. Digital geophysical mapping will be conducted in all accessible areas where the clearance to depth method is selected. Analog geophysical instruments will be used for areas inaccessible to DGM, these instruments and operators will also be required to demonstrate proficiency in the GPO area.

Table 3-1 Depth versus Detection Data

Munition	Expected Typical Maximum Detection Depths[a]	EE/CA Investigation Alpha and Bravo areas Maximum Recovery Depths[b]	Proposed GPO Depth Range
Mk II Hand Grenade	24.0 in.	6 in.	0 – 14 in.
37mm Projectile	15.6 in.	5 in.	0 – 14 in.
M9 Rifle Grenade	24.0 in.	2 in.	0 – 18 in.
2.36-in. Rocket	26.4 in.	18 in.	0 – 24 in.
3.5-in. Rocket	38.4 in.	2 in.	0 – 18 in.
75mm Projectile	32.4 in.	20 in.	0 – 30 in.
3-in. Stokes Mortar	33.0 in.	24 in.	0 – 32 in.
60mm Mortar Projectile	26.4 in.	14 in.	0 – 24 in.
81mm Mortar Projectile	34.8 in.	21 in.	0 – 30 in.
3.8-in. Projectile Shrapnel	41.8 in.	15 in.	0 – 24 in.
4.2-in. Mortar Projectile	46.8 in.	0 in.	0 – 36 in.
105mm Projectile	45.6 in.	N/A	0 – 36 in.
155mm Projectile	67.2 in.	N/A	0 – 48 in.
AT Mine	N/A	N/A	0 – 6 in.

[a] Typical expected maximum detection depth for geophysical instrumentation is a theoretical value based on USACE DID OE-005-05 and EM 1110-1-4009 (USACE 2000). The empirical formula used to derive the maximum detection depth is *log*(d) = 1.002 *log* (dia) – 1.961, where d=the actual depth to the top of buried MEC (in meters) and dia=the diameter of the minor axis of MEC (in mm). For items that are not specifically listed in the Table 7.3 in EM 1110-1-4009, detection depths are estimated based on 11 X their diameter (as referenced in USACE DID OE-005-05).

[b] Recovery depths from the Final Alpha Area EE/CA Report (Foster Wheeler 2003) and Draft Bravo Area EE/CA Report (Foster Wheeler 2004) .

3.1 Munitions Response Sites

Five MRSs are discussed in the following sections. All of these MRSs lie within the Alpha and Bravo MRAs. Inhabited buildings within exclusion zones are specifically named on each map in this section. Other buildings shown on the maps are not occupied.

3.1.1. Northern Alpha

The Northern Alpha MRS will be cleared to depth, it consists of 14 acres in the northern portion of the Alpha MRA and is comprised of the Army designated sector M6-1L Suspect Area-I/AR (see

Figure 3-1). During previous site characterization work conducted by the Army, two MEC and six MEC scrap items were found, primarily on the surface and at shallow depths, the maximum depth observed being 14 inches for one MEC scrap item. The following types of MEC and MEC scrap items were found (detailed list in Alpha EE/CA, TTFWI 2003):

- Hand grenade debris, smoke
- Mine, anti-tank, practice, M12
- Rifle grenade, M9
- Grenade, hand, practice
- Signal, ground, illumination

Based on these data, the munition with the greatest fragmentation distance (MGFD) selected for this MRA site is the **M9 Rifle Grenade**.

3.1.2. Southern Alpha

The Southern Alpha MRS will be cleared to depth. It is 132 acres and is comprised of two Army designated sectors, M5-1L-I and M5-1L (South)-PR (see Figure 3-2). M5-1L Industrial consists of 19 acres and is the triangular-shaped area located along the southwestern border of the Alpha Area. During the site characterization conducted by the Army, one MEC item and seven MEC scrap items were found on the surface, as follows (detailed list in Alpha EE/CA, TTFWI 2003):

- Signal, ground, illumination
- Grenade, practice, M2
- Livens, projector, FM smoke, Mk1
- Smoke pot

M5-1L (South)-PR consists of 113 acres along the southern border of the Alpha Area. During the site characterization conducted by the Army, 3 MEC items were found on the surface, and 16 MEC scrap items were found on the surface and at a maximum depth of 5 inches. Parsons ES performed intrusive sampling in nine 100-foot by 100-foot grids in this sector as part of the chemical warfare EE/CA and is documented in the Final Chemical Warfare Materiel (CWM) Engineering Evaluation/Cost Analysis (EE/CA) Fort McClellan, Alabama (Parsons, June 2002). Parsons' sampling uncovered 22 MEC scrap items in this sector at depths ranging from 6 to 24 inches. Within this sector, the following MEC and MEC scrap items were found (detailed list in Alpha EE/CA, TTFWI 2003):

- Projectile, 3.8 in., shrapnel
- Mortar debris, 4.2 in., white phosphorus (WP), M2A1
- Projectile, 75mm, HE, M48 not fired
- Shrapnel round pusher plate, 75mm, MK 1
- Signal, ground, illumination
- Fragmentation, projectile, 75mm, HE, M48
- Mortar fuze, Stokes, MK 1
- Mortar 4", WP, MK 2

Based on the data collected, the MGFD selected for the Southern Alpha MRA is the **M2 Practice Grenade** in M5-1L Industrial area and the **M48, 75mm HE Projectile** in M5-1L (South)-PR.

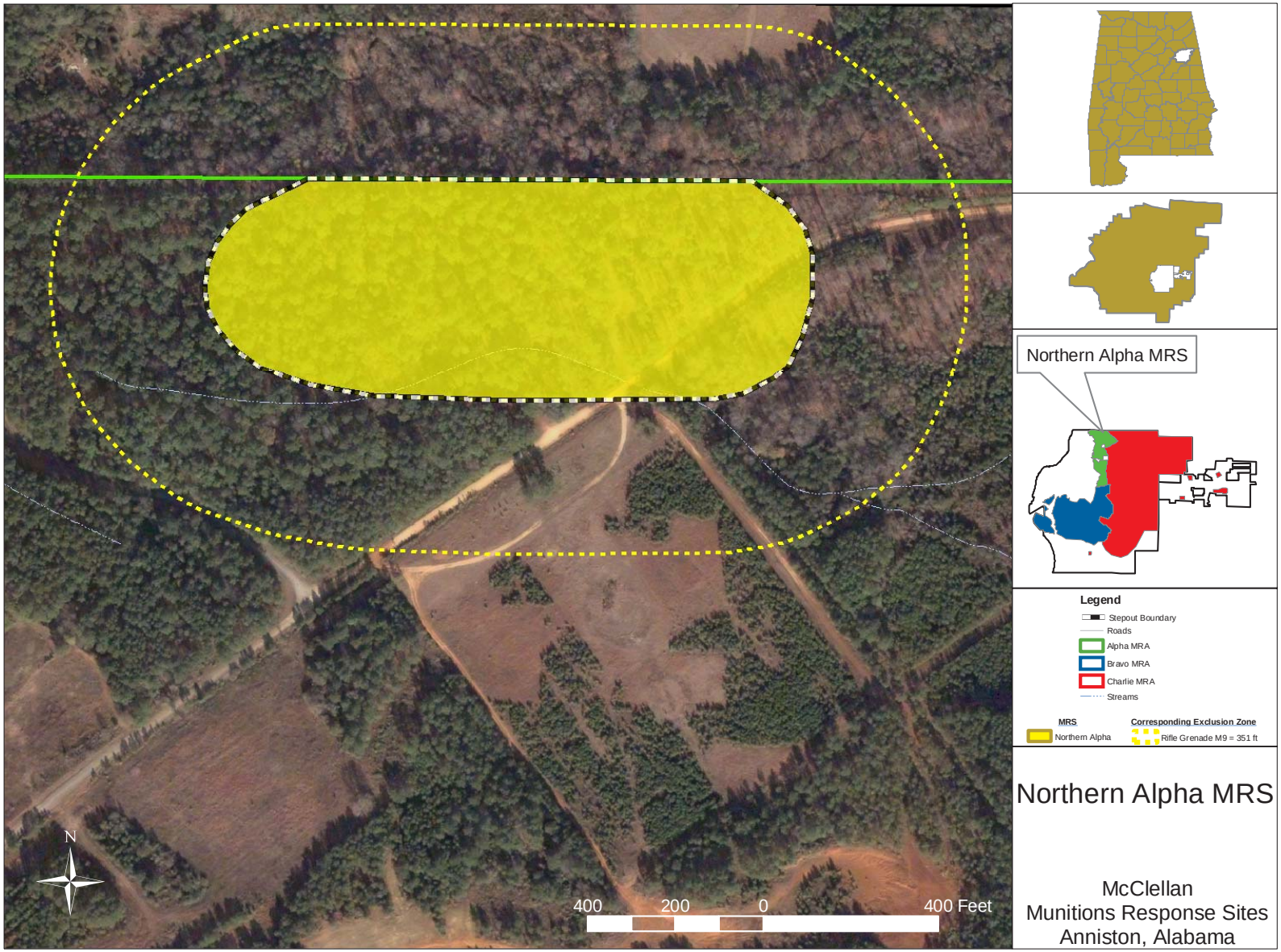

Figure 3-1. Northern Alpha MRS

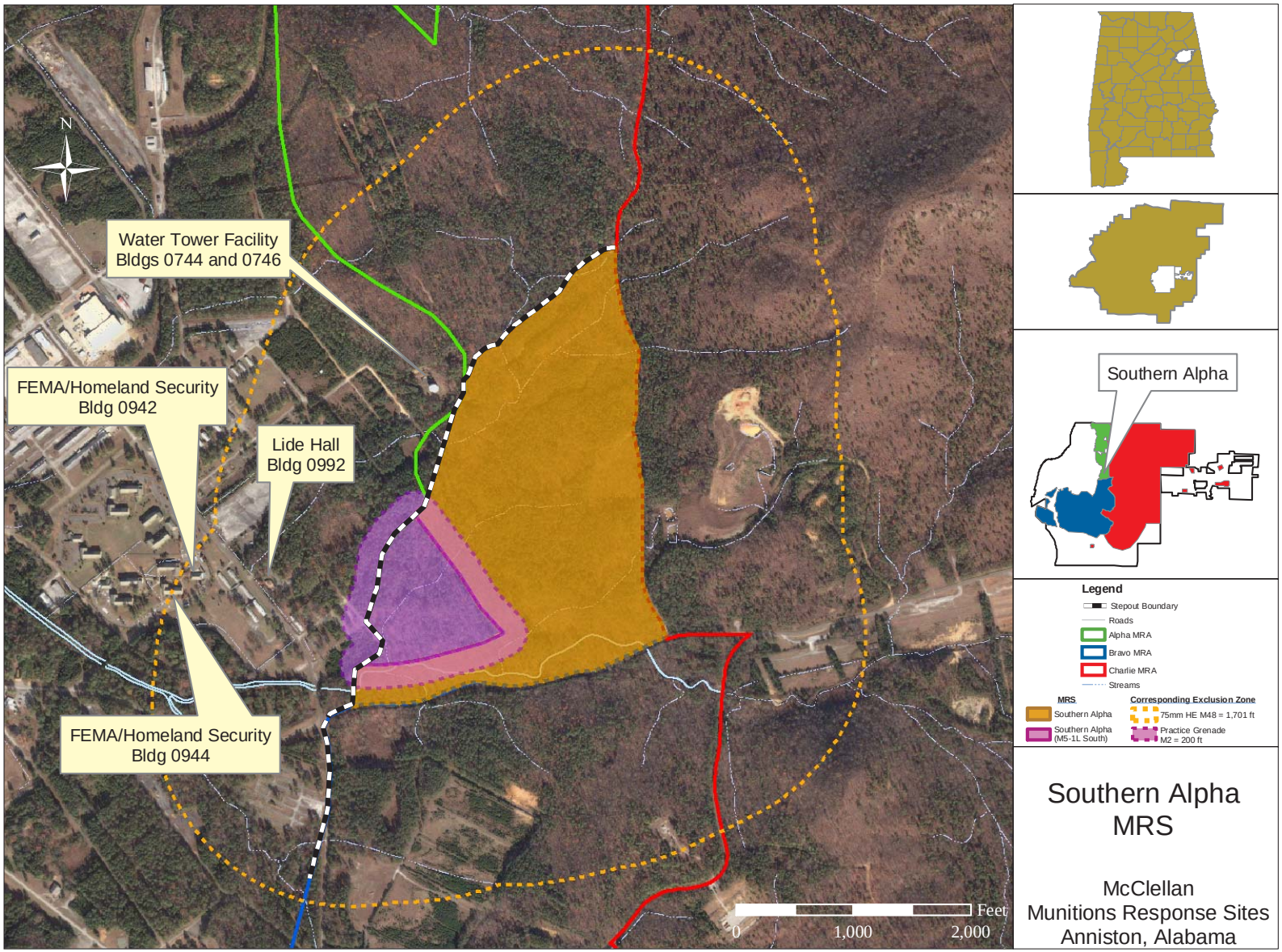

Figure 3-2. Southern Alpha MRS

3.1.3. Bains Gap Road

An 8.5-acre area consisting of a swath 100 feet from the southern edge of Bains Gap Road will be surface cleared and a small portion north of the road located along the western end of the road (see inset on Figure 3-3) will be cleared to depth. Surface clearance south of the road is an interim remedy being done to facilitate opening the road to public access in the future. This ESS will be amended in the future to address the final response action for this area.

This area lies within the Army designated sector M4-1H Mixed Use Area-PR which consists of approximately 623 acres in the northeastern portion of the Bravo Area. Grids and delineation transects were previously used to characterize MEC contamination in this area. Several MEC items were identified on the surface, at shallow depths, with the maximum depth of 21 inches observed during intrusive activities. A large quantity of MEC scrap was found at varying depths. The following types of MEC and MEC scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

Rocket, 2.36in M6

- Rocket, 2.36in M7
- Projectile, 40mm practice, MKII
- Projectile, 75mm shrapnel, MKI
- Projectile, 37mm, practice, MKII A1 w/LE charge
- Mortar, 81mm HE, M43
- Grenade, hand, practice, M69
- Mortar, 60mm practice, M69
- Grenade, 40mm
- Grendade, rifle, smoke
- Mortar, 3in Stokes, practice, MK1

Based on these data, the MGFD selected for this area is the **M43, 81mm HE Mortar**.

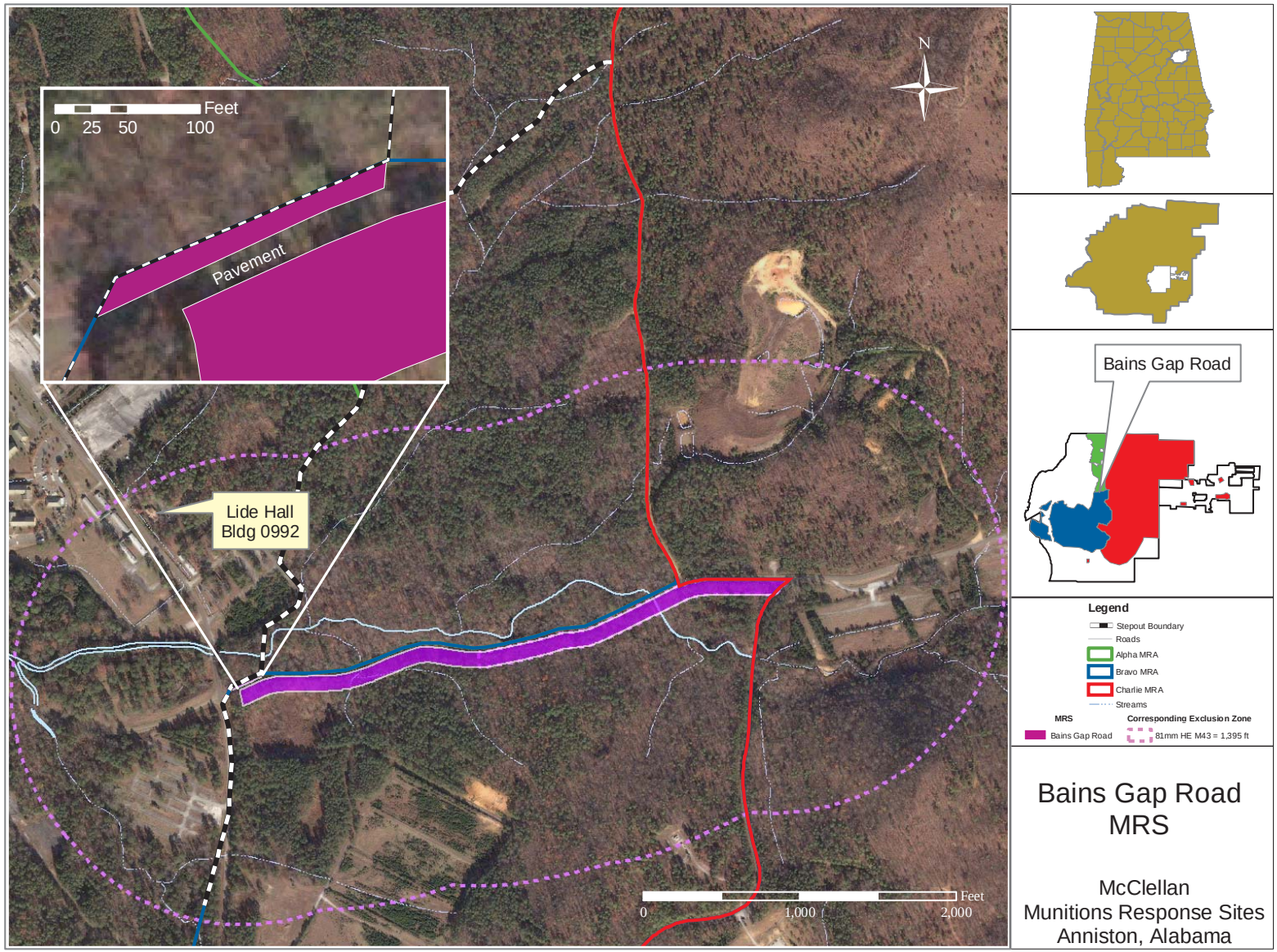

Figure 3-3. Bains Gap Road MRS

3.1.4. Industrial Access Road

This MRS is 55 acres and consists of a 250-foot swath centered on Industrial Access Road (see Figure 3-4). The footprint of the existing road will be geophysically-surveyed but no removal will occur there. The remaining portion of the area, on each side of the road, will be cleared to depth. This MRA passes through four Army-designated subsectors, they are described from north to south in the following text.

The M4-1H Mixed Use Area-PR subsector borders the northern portion of Iron Mountain Road to the east. This subsector is discussed above in Section 3.1.3 and the MGFD selected is the **M43, 81mm HE Mortar.**

The A1 Reconnaissance Area-D sector, which consists of approximately 160 acres along the northern border of the Bravo Area, borders the northern portion of the Industrial Access Road to the west. Grids and delineation transects were previously used to characterize this area. MEC items were found on the surface and to depths of 15 inches during field activities in this sector. A large amount of MEC scrap was also found on the surface and to depths of 36 inches. The following types of MEC and MEC scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

- Projectile, 75mm shrapnel, MKI
- Projectile, 3.8in shrapnel, MKI
- Projectile, 37mm, practice, MKII A1 w/LE charge
- Grenade, 40mm
- Mortar, 3in Stokes, MKI,
- Signal, illumination, ground, M127 series

The M3-1L Mixed Projectile Area-PR borders the southern portion of the Industrial Access Road to the east. This sector consists of approximately 370 acres in the southeastern portion of the Bravo Area. Grids, delineation transects, and mountain transects were previously used to characterize this area. One MEC item, a M1907 fuze, was identified at 2 inches depth during intrusive activities. A large amount of MEC scrap was found, primarily on the surface and at shallow depths within this risk sector. Only six MEC scrap items were found below 1 foot. The following types of MEC and MEC scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

- Projectile, 75mm shrapnel, MKI
- Fuze, powder train time, M1907
- Projectile, 155mm shrapnel, MKI
- Signal, smoke, ground, M62 series
- Signal, illumination, ground, M127 series
- Flare, surface, trip, M49A1
- Fuze, M1907 combination

The M3-1L Suspect Area 1-PR, which consists of approximately 193 acres in Bravo, borders the central portion of the Industrial Access Road to the west. Six MEC items were identified on the surface during previous site characterization work. Eight additional MEC items were found at shallow depths of less than 4 inches. A large amount of MEC scrap was found on the surface and to a maximum depth of 18 inches. The following types of MEC and MEC Scrap items were identified (detailed list in Draft Bravo EE/CA, TTFWI 2004):

- Fuze, powder train time, M1907
- Projectile, 75mm shrapnel, MKI
- Projectile, 37mm HE MKII
- Projectile, 37mm, TPT, M51A2
- Mortar, 60mm smoke, WP M302

The M3-1L Remainder Area, which was designated by the Army as requiring no further action but has not yet received concurrence from the Alabama Department of Environmental Management, borders the southern portion of the Industrial Access Road to the west. No MEC was found in this area during EE/CA work, rather MEC scrap consisting predominantly of 37mm TPT and 75mm Shrapnel.

Considering the MEC items found at the four subsectors through which the Industrial Access Road traverses and the relative remoteness of that area a single MGFD, the **M43, 81mm HE Mortar,** is being selected and will be used for the exclusion zone basis for the entire Industrial Access Road area.

3.1.5. Planning Area 4

At this time the exact location of Planning Area 4 has not been specified, however, it will be within the Army-designated sector A1 Reconnaissance Area - D discussed in Section 3.1.4 (see Figure 3-5) and it will consist of 38 acres cleared to depth. The estimated area of clearance is shown on Figure 3-5 as a smaller purple area, should this area change but still be within sector A1 Reconnaissance Area - D an amendment to this ESS will not be prepared, instead a correction will be issued. However, if the area selected is not within sector A1 Reconnaissance Area-D an amendment will be prepared showing the new location and specific clearance details. Therefore, the entire area comprising A1 Reconnaissance Area-D will be used for explosives safety planning and the exclusion zone for the area will be based on the **MkII, 37mm HE Projectile**.

3.1.6. Construction Support

Specific approval of construction support is not being requested at this time. The Golden Triangle area at McClellan is likely the location where construction will occur first. The likelihood of encountering MEC in this area is deemed to be “Low” since this area has already been cleared by the U.S. Army (“Site Specific Final Report M1.01 Parcel and M3 Miscellaneous Property Fort McClellan, Alabama,” March 2003 and “Draft-Final Site Specific Final Report Eastern Bypass “Y” Area Junction Fort McClellan, Alabama,” January 2004 both prepared by Foster Wheeler Environmental Corporation). On-call construction support will be provided during construction; therefore specific approval of construction support is not being sought. Other areas at McClellan where construction occurs in the future may require on-site construction support. An amendment to this ESS requesting DDESB approval will be submitted for any site classified as having a “Moderate to High” likelihood of encountering MEC per 6055.9 Chapter 12.

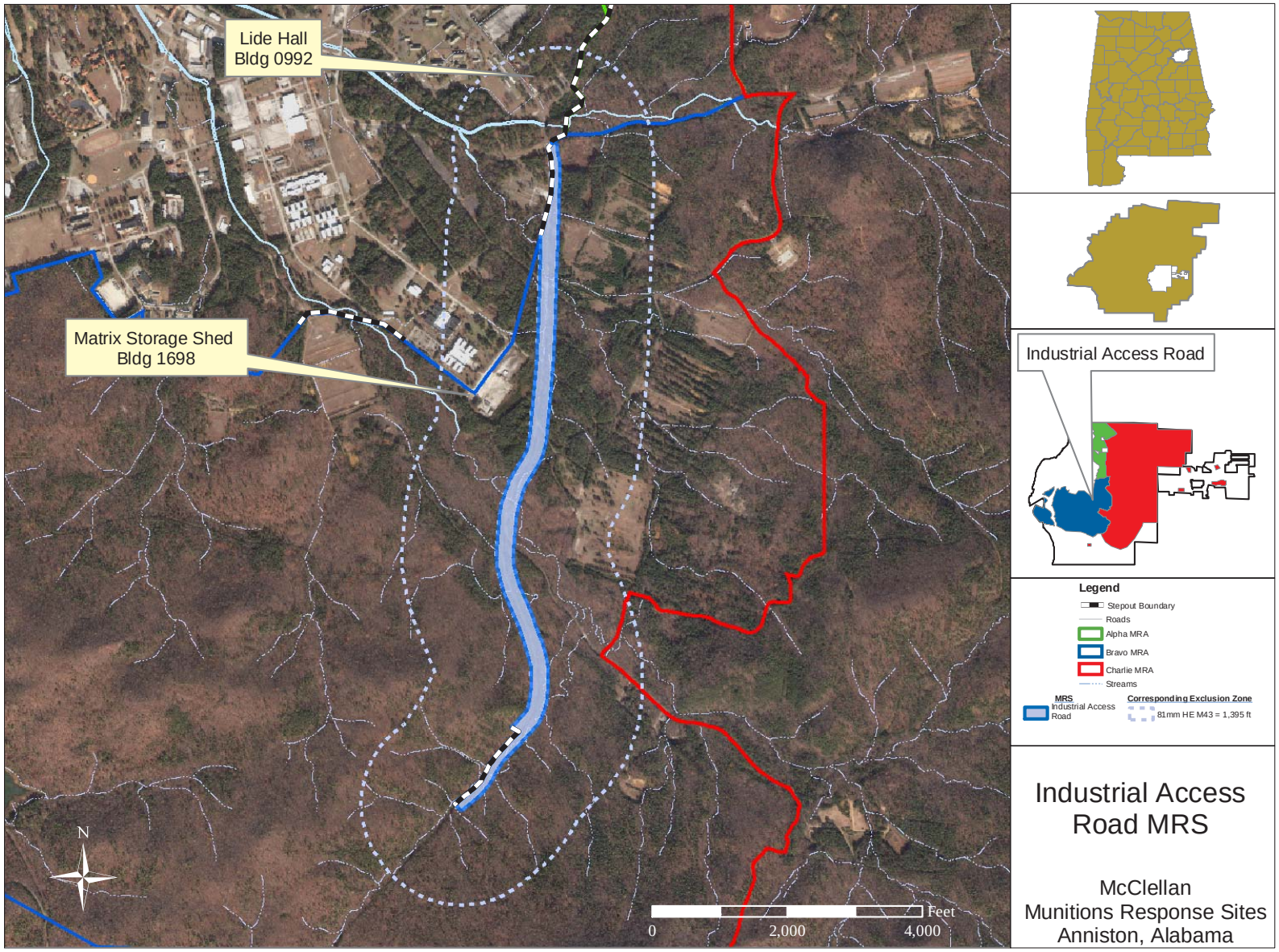

Figure 3-4. Industrial Access Road MRS.

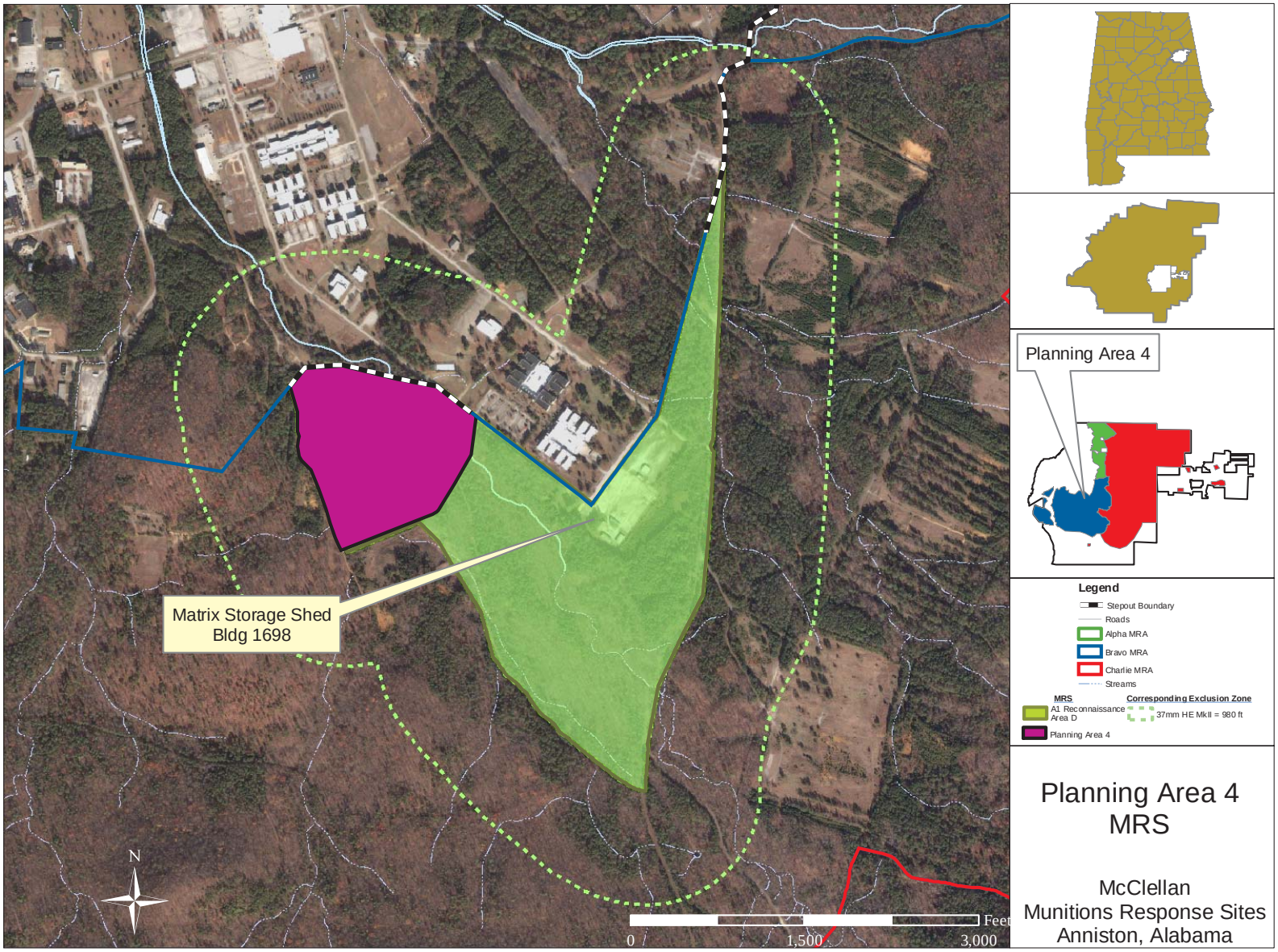

Figure 3-5. Planning Area 4 MRS.

3.2 Munition with the Greatest Fragmentation Distance

The MGFD is established for each area and is based on previous site characterization work as described in Section 3.1. Table 1-1 shows the MGFD for each area being remediated under this ESS and corresponding exclusion zones (EZ). The minimum separation distance (MSD, the distance that must be maintained between MEC operations and nonessential personnel) will also be the daily Exclusion Zone (EZ) for removal activities. The EZ distances shown in Table 1-1 and graphically represented on Figure 12-3 are those quoted in the DDESB's 18 November 2004 Revision to the Fragmentation Database referenced in DDESB's Technical Paper-16 (access to this database was granted to ECC by Dr. Michelle Crull during a 13 September 2005 meeting between Dr. Crull and John Bowles, Bowles' Personal Communication 2005).

Where inhabited buildings are present within the EZs shown in Figure 12-2 the Range to No More Than 1 Hazardous Fragment per 600 square feet (1/600) distance shown on Table 1-1 will be utilized as the EZ. In any case where inhabited buildings are closer than the 1/600 distances shown in Table 1-1, evacuations or engineering controls will be conducted.

If during the course of the investigation, MEC with a greater fragmentation range is discovered, the EZ will be adjusted and an amendment to the ESS submitted for approval. While awaiting approval either the distance for the MEC item from the Fragmentation Database will be used or the distances from DoD 6055.9-STD, Chapter 9 will be used if it is not in the database.

Blast overpressure (K40) and team separation distances (TSD) for the MGFDs are shown below in Table 3-2 as calculated using the equation from Draft DoD 6055.9-STD Chapter 12, which states that the greater of the two distances will be utilized as the TSD. A TSD of 200 feet will be used at each of these MRSs. Where possible, Net explosive weights (NEWs) were also taken from the Fragmentation Database for each MGFD; other data sources listed below were used if an ordnance item was not in the database.

Table 3-2 Team Separation Distances

MRS	MGFD	NEW (lbs)	K40 (feet)	TSD (feet)
Northern Alpha	Grenade, Rifle, M9	0.25*	26	200
Southern Alpha	Projectile, 75mm, HE, M48 Grenade, Practice, M2	1.47 0.002*	46 5	200 200
Bains Gap Road	Mortar, 81mm, HE, M43	1.29	44	200
Industrial Access Road	Mortar, 81mm, HE, M43	1.29	44	200
Planning Area 4	Projectile, 37mm, HE, Mk II	0.053	15	200

Notes: TSD is the greater of the two distances between: (1) blast overpressure safe distance as computed by the forumla $D = 40(NEW)^{1/3}$ or (2) 200 feet. *NEWs for the M9 Rifle Grenade and the M2 Practice Grenade were taken from ORDATA Online at http://www.maic.jmu.edu/ordata/disclaimer.asp

Existing gates in the Alpha and Bravo MRAs will be used to facilitate setup of exclusion zones. In areas where no gate exists to limit access to an EZ, barricades will be placed by UXO dig teams prior to work that day and checked by the UXOSO. Some of the barricades may require policing during daily operations. Evacuations may be required in the Southern Alpha, based on the EZ shown on Figure 12-2.

4.0 START DATE

Mobilization to the project site will not occur until the Site Specific Work Plan has been approved by the Alabama Department of Environmental Management (estimated to be March 2006) and DDESB approval of this document.

5.0 FROSTLINE

The City of Anniston has adopted the 2003 International Building Code which establishes the frost line at one foot below grade for footing construction, unless otherwise specified locally.

6.0 CLEARANCE TECHNIQUES

6.1 Detection Methods

6.1.1 Each MRS will be located by an Alabama Registered Land Surveyor (RLS). Vegetation removal will be conducted using mechanical and manual methods. Surveyors and brush clearing crews will all be escorted by EOD-qualified personnel performing UXO avoidance.

Differential GPS is not always reliable at McClellan. Following grubbing activities the RLS will survey in the southwest corner of each grid to facilitate accurate data recording during subsequent geophysical and intrusive work.

6.1.2 Digital geophysical mapping (DGM) using Geonics Model EM61 MkII instruments will be conducted in all areas accessible to that instrument. Data will be collected and evaluated by experienced geophysicists using proven techniques. Mag-and-dig operations will be conducted in areas not accessible to DGM by UXO dig teams using handheld analog geophysical instruments.

6.2 Recovery and Disposal

6.2.1 MEC items discovered during the course of this work will be disposed daily. If the MEC item is in an unsecure area, a 24-hr, EOD-qualified guard will be placed in the unlikely event that disposal operations cannot occur due to weather. Demolition operations will begin when all non-essential personnel are out of the exclusion zone (EZ, based on the maximum fragmentation distance of ordnance expected in each MRS and shown on the maps in Section 3) of the ordnance being detonated. To the greatest extent possible, all items will be blown in place (BIP) to reduce the risk inherent in handling and moving UXO. MEC items located during the day will be clearly marked and scheduled for demolition at the end of each day. Items deemed acceptable to move may also be consolidated within their original grid or another grid within the work area for disposal. The Demolition Team Leader (UXO Technician III) will be responsible for all demolition operations as directed by the Senior UXO Supervisor (SUXOS). Along with the demolition team members, only the UXO Safety Officer (UXOSO) is required to be on-site during disposal operations, the SUXOS will be in the local area, but is not required to be present at the exact location of the demolition operation.

6.2.2 The operation will be performed under the direction and supervision of the Demolition Team Leader, who is charged with the responsibility to ensure that procedures contained in the work plan and referenced documents are followed. The UXOSO will monitor compliance with the safety measures contained in the work plan and associated documents, and in the event of noncompliance, is vested with the authority to stop or suspend operations.

6.2.3 Since the sites are securely gated, there should be only occasional instances where the disposal or venting operations will have an EZ that extends outside the secured area. This may occur north of the Northern Alpha MRS and along the western boundary of the Southern Alpha MRS. Engineering controls for intentional detonations (demolition shots) will be used as described in the *Use of Sand Bags for Mitigation of Fragmentation and Blast Effects due to Intentional Detonation of Munitions*," HNC-ED-CS-S-98-7, dated August 1998 or in the *Use of Water for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions*, HNC-

ED-CS-S-00-3, dated September 2000. These controls will be applied as appropriate to mitigate fragmentation and blast hazards created during demolition operations. A copy of HNC-ED-CS-S-98-7 and HNC-ED-CS-S-00-3 will be available on-site when these engineering controls are to be used. If and when residents or workers are within the EZ of the current day's work area, each resident or worker will be provided protection by evacuation or the use of engineering controls. The roads within the EZ of the day's work area will be closed and barricaded at the EZ distance while intrusive work is conducted.

For inhabited buildings at McClellan which are within the 1/600 distance, we will schedule our intrusive operations to occur on days when they are not occupied. When this is not possible, miniature open front barricades (MOFB) or open front barricades (OFB), as appropriate, will be used for excavations that lie closer than the 1/600 distance to inhabited buildings as protection from unintentional detonations.

6.2.4 Upon completion of disposal operations, the Team Leader and one UXO Technician II will inspect each disposal shot. Upon completion of this inspection and providing that there are no residual hazards, the SUXOS will authorize the resumption of site operations.

6.2.5 If a UXO item is identified and removed along boundaries of a MRS, a step-out will be performed until there is a 200-foot buffer free and clear of UXO. The step-outs will be conducted in those areas where no future MEC remediation is planned either because 1) the area is pending a No Further Action; 2) the area has received a No Further Action; 3) the area will be remediated in the future, or 4) the area is outside of a suspected MEC area (offsite or in the main cantonment area). The step-out areas are shown in the attached Figure 12-2.

6.3 Quality Assurance/Quality Control (QA/QC) Plan

6.3.1 Quality Control is conducted using a three-phase control process; preparatory, initial, and follow-up inspection/audits to ensure processes are in control and opportunities for improving processes are captured and implemented. The UXO Quality Control Specialist (UXOQCS) has stop-work authority and is organizationally independent from production processes.

6.3.2 A QC inspection will be conducted by a geophysicist and the UXOQCS or his designee. The method of conducting the inspection will be to sample 15 percent or more of the excavations completed. This sampling will be performed using the same geophysical instrumentation used to identify and reacquire each target anomaly. The specific QC procedures will be explained in the SSWP. Quality Assurance (QA) will be provided by Matrix Environmental Services.

6.3.3 The failure criteria for Contractor QC and QA is based on finding any anomalies in cleared excavations. Based on a root-cause analysis of the production failure, complete grids may be reworked if a QC failure occurs. In any case QC and QA failures will be documented and recorded on daily production and QC logs and included in after action reports.

6.4 OE Scrap Explosive Hazards

Intrusive Teams will locate, excavate, identify and mark ordnance-related materials where they are located. Clearly identifiable Non-MEC scrap will be segregated from MEC scrap and each type will be consolidated for transport to the scrap metal processing area. The leader of the Intrusive Team will inspect the items and declare each item as free of energetic material to the best of his/her ability. These items will be transported to a central containment area to await further inspection, certification and disposal off-site. If a MEC item cannot be determined to be free of explosive, it

will be explosively vented. If the item is not positively identified and may be a chemical munition, no venting will be conducted and instructions in the program-wide work plan will be followed for suspect recovered Chemical Warfare Material (RCWM).

In the scrap containment area, a designated UXO Technician will remove items from the containers transported from the grids. He/She will re-inspect each item to assure that they are free of energetic material to the best of his/her ability. This scrap will then be segregated into locked storage areas or containers, disfigured as necessary and then certified for disposal off-site.

7.0 ALTERNATE TECHNIQUES

No alternate MEC-disposal techniques are planned.

8.0 OFFSITE DESTRUCTION

Off-site destruction of MEC will not occur.

9.0 TECHNICAL SUPPORT

ECC and its subcontractors will provide the technical support required during the removal action. If recovered MEC is identified or suspected of containing CWM, all intrusive activities will cease, the site will be evacuated in an upwind direction and secured and the USACE Transition Force and MES will be notified. The USACE Transition Force will contact the EOD unit assigned to the area for response, the 722nd EOD Company stationed at Anniston Army Depot. If the local EOD response unit determines that the item is RCWM, they will notify the Technical Escort Unit (TEU) through official Department of the Army channels. ECC will maintain security watch over the suspect item until relieved by competent authority. Work will not be resumed in that area until clearance is provided by the Department of the Army.

10.0 LAND USE RESTRICTIONS

10.1 Intended Land Use

Table 10-1 below shows the intended land use for each MRS being remediated in accordance with this ESS.

Table 10-1 Intended Land Uses

MRS	Intended Land Use	Remediation
Northern Alpha	Commercial/Industrial	Clearance to Depth
Southern Alpha	Commercial/Industrial and McClellan Park System	Clearance to Depth
Bains Gap Road	Road Easement	Surface Clearance, Clearance to Depth
Industrial Access Road	Utility Corridor	Clearance to Depth
Planning Area 4	Commercial/Industrial	Clearance to Depth

Prospective beneficial land uses at McClellan have been identified and prioritized by the JPA as documented in the JPA's Reuse Map dated March 2002. These land uses may be modified by JPA based on development absorption rates, marketing and other economic drivers. Any change in land use will be evaluated for its compatability with the completed remediation, and if additional remediation is necessary, an amendment to the ESS will be submitted. Engineering security controls (signage, gates, berms, fencing, and patrols) are currently in place to prohibit access to MEC-contaminated areas and reduce the potential for MEC exposure. As the removal actions are completed and redevelopment proceeds, the engineering security controls will be adapted to continue to limit access to MEC contaminated areas while allowing beneficial reuse to take place.

11.0 PUBLIC INVOLVMENT

As stated previously, if the general public falls within an EZ boundary then notification/evacuation and/or the use of engineering controls will be used. No other public involvement is expected for this work.

12.0 MAPS

12.1 Regional Map

Figure 12-1 shows the regional location of the MRA sites at McClellan.

12.2 Exclusion Zone Map

Exclusion zones based on the MFD are shown in Section 3.

12.3 Quantity-Distance Map

Figure 12-2 shows the location of the earth-covered magazines that will be used to store donor charges and initiating caps along with corresponding Q-D arcs.

13.0 QUANTITY-DISTANCE

13.1 MEC Areas

Barricades and locked gates will be utilized to establish the EZ for each MRS. Gate keys will be under the control of ECC during working hours while MEC remediation operations are underway.

13.2 Magazines

All demolition material will be stored in earth-covered magazines previously used at McClellan and shown on Figure 12-2. Initiating caps will be stored in one magazine while shaped charges/cast boosters will be stored separated in the other. These two magazines were previously sited for 1.2 ammunition, additional information about the two magazines is presented below:

- Magazine 4425 - Standard Earth Covered Magazine rated at 45,000 lbs NEW
- Magazine 4426 - Standard Earth Covered Magazine rated at 65,000 lbs NEW

Each magazine is 25 ft wide and 60 ft long with a ceiling height of 13.5 ft at the center. Walls are constructed of 18-inch thick steel-reinforced concrete with an 18-inch earth cover at the top and over 35 ft of cover to each side and the rear of the magazine. The doors are made of 7-inch thick steel and each is 10 ft tall with a rail glider for opening/closing. Locking mechanisms required long-hasp BATF-certified locks. Each magazine has a current grounding certification.

No more than 150 lbs of demolition explosives will be stored in either magazine. Based on information in 6055.9, Table C9.T1, an Inhabited Building Distance (IBD) arc of 500 feet is being applied as shown on Figure 12-3. At no time will MEC items be placed in these magazines.

Explosives will be transported in closed vehicles whenever possible. The load will be well-braced and, except when in closed vehicles, covered with a fire-resistant tarpaulin or in an appropriate shipping container.

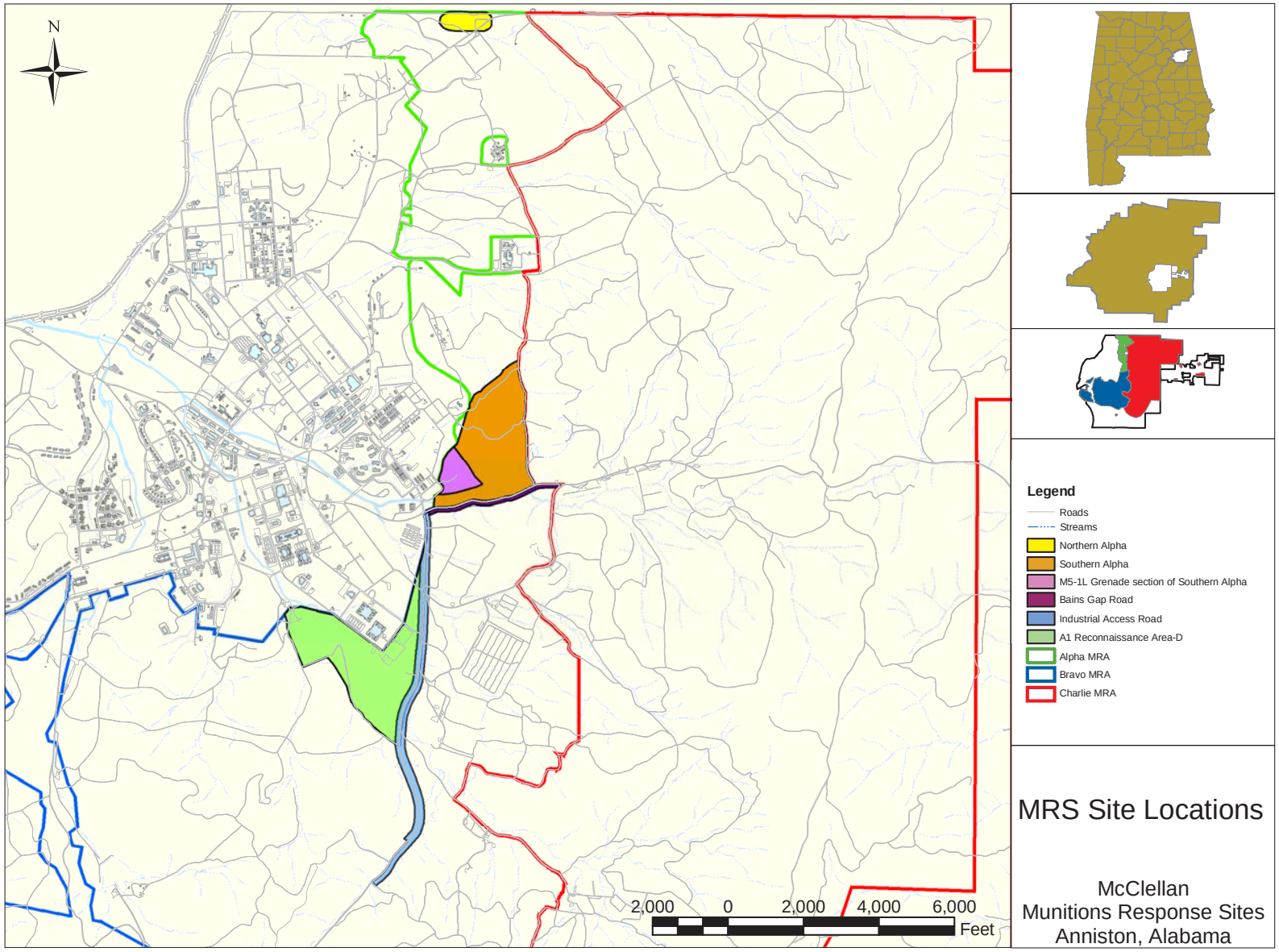

Figure 12-1 MRS Site Locations

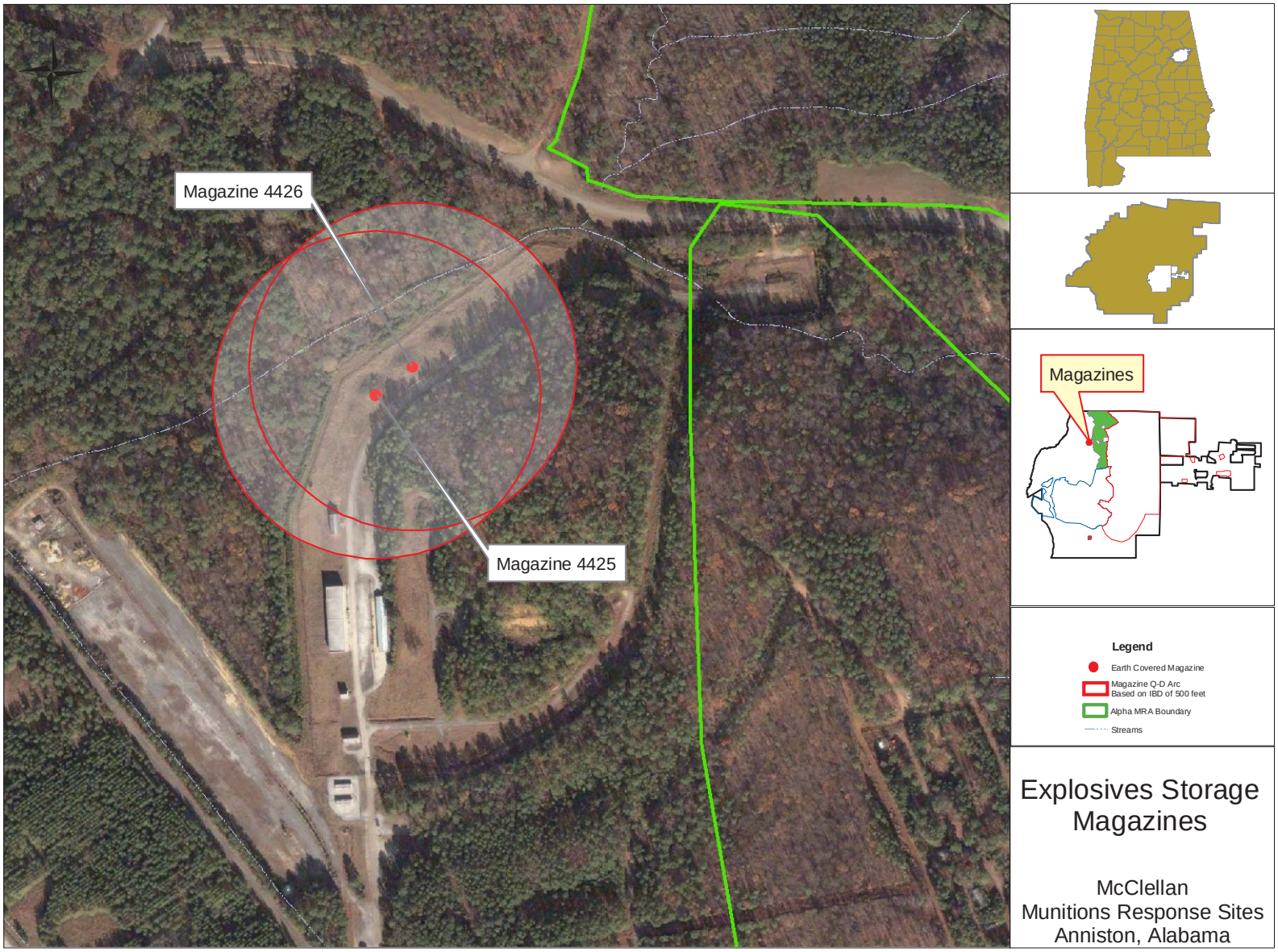

Figure 12-2 Explosives Storage Magazines

Transportation of demolition explosives will comply with all federal, state, and local regulations. For transportation of demoloition explosives to a disposal site, ECC will comply with regulatory requirements and the following:

- Initiating explosives, such as blasting caps, will remain separated at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate container and secured away from other items;
- Compatibility requirements including Category Z storage authorization requirements will be observed;
- Only UXO Technician III and above may be issued and transport explosive materials. The receiving party shall sign the receipt documents for accountability;
- Operators transporting explosives will have a valid drivers license;
- Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for the prevailing conditions. Vehicles transporting explosives off-road will not exceed 25 MPH;
- Personnel will not ride in the cargo compartment with explosives;
- Vehicles transporting explosives will be inspected daily, and will be properly placarded;
- Vehicle engine will not be running when loading/unloading explosives;
- Beds of vehicles will have either a wooden bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings; and
- Vehicles transporting explosives will have a first aid kit, two 10 lb., Class B/C rated fire extinguishers, and communications capability.

MEC will be disposed of or vented in place where it is encountered unless deemed acceptable to move within a grid.