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WIDE AREA ASSESSMENT FIELD DEMONSTRATION WORK PLAN FOR THE CLOSED CASTNER RANGE FORT BLISS, TEXAS

APPENDIX I: EXPLOSIVES SITE PLAN

CONTRACT W912QR-08-D-0011
TASK ORDER DK01

Prepared for

U.S. Army Environmental Command
and
U.S. Army Corps of Engineers, Omaha District

Prepared by

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List of Acronyms

ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
CFR	Code of Federal Regulations
DA PAM	Department of Army Pamphlet
DDESB	Department of Defense Explosives Safety Board
DMM	Discarded Military Munitions
DoD	Department of Defense
DoDI	Department of Defense Instruction
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
ESP	Explosives Site Plan
ESQD	Explosive Safety Quantity Distance
FTBLS	Fort Bliss
HE	High Explosive
HD/SCG	Hazard Division/Storage Compatibility Group
HFD	Hazardous Fragment Distance
IVS	Instrument Validation Strip
MEC	Munitions and Explosives of Concern
MFD-H	Maximum Fragment Distance - Horizontal
MGFD	Munition with the Greatest Fragmentation Distance
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MSD	Minimum Separation Distance
NEW	Net Explosive Weight
NON-EL	Non-electric
OB/OD	Open Burn/Open Detonation
OE	Ordnance and Explosives
OESS	Ordnance Explosive Safety Specialist
SI	Site Inspection
STD	Standard
SUXOS	Senior Unexploded Ordnance Supervisor
TM	Technical Manual
TP	Technical Paper
URS	URS Group, Inc.
USA	USA Environmental, Inc
USACE	United States Army Corps of Engineers
USAEC	United States Army Environmental Command

UXO	Unexploded Ordnance
UXOSO	Unexploded Ordnance Safety Officer
WAA	Wide Area Assessment

1.0 Site

This Explosives Site Plan (ESP) has been prepared in support of the Wide Area Assessment (WAA) Field Demonstration at the Closed Castner Firing Range MRS (FTBLS-004-R-01) at Fort Bliss, Texas. Based on the results of the *Wide Area Assessment Cost-Benefit Analysis: Active Army Military Munitions Response Program* [U.S. Army Environmental Command (USAEC) 2008] and the *Final Site Inspection Report, Fort Bliss, Texas* [U.S. Army Corps of Engineers (USACE) 2007], USAEC determined that an onsite demonstration of WAA methods would refine the conclusions contained in the cost-benefit analysis and support further site characterization of the Closed Castner Firing Range MRS (FTBLS-004-R-01). This task falls under the Military Munitions Response Program (MMRP), which is designed to address munitions and explosives of concern (MEC) on property owned by the Department of Defense (DoD). The WAA Field Demonstration for the Closed Castner Firing Range MRS (FTBLS-004-R-01) is being performed as Task Order DK01 under USACE Omaha District Contract W912QR-08-D-0011.

2.0 Anticipated Dates

Start of field activities: September 2010

Project completion: September 2011

3.0 Purpose

The ESP for the WAA Field Demonstration at the Closed Castner Firing Range MRS (FTBLS-004-R-01) describes how recovered MEC and MPPEH will be safely managed during the course of the project. This ESP provides information regarding the site background and current conditions, executing agencies, scope of the investigation, safety criteria, donor explosive storage, and methods of disposal.

4.0 Site Background and Current Conditions

Fort Bliss is located in three counties, Dona Ana and Otero counties in New Mexico and El Paso County in Texas. The cantonment area is situated adjacent to the city of El Paso, Texas, just north of the city of Juarez, Chihuahua, Mexico. The installation encompasses approximately 1.1 million acres. Figure 1 is a location map of Fort Bliss.

The Closed Castner Firing Range MRS (FTBLS-004-R-01) on Fort Bliss is located within El Paso, Texas, between U.S. Highway 54 and the Franklin Mountains State Park and is approximately 15 miles south of the border with New Mexico. The MRS is now 7,084 acres, after 1,230 acres were transferred to non-DoD entities. The site contains various high explosives (HE) projectiles, mortars, pyrotechnics, illumination flares, grenades, and small arms. Figure 2 is a map of the Closed Castner Firing Range MRS (FTBLS-004-R-01).

Historic site investigations between 1971 and 1999 included twelve surface clearance investigations, one subsurface clearance, and four soil sample studies. MEC was discovered during these investigations on the Closed Castner Firing Range MRS (FTBLS-004-R-01).

Several more recent site investigations have occurred. In January and June–July 2001 the Trans Mountain Buried Drum Site was surface swept and one 105mm projectile and two 2.36-in. rocket motors were discovered. The open burn (OB)/open detonation (OD) pit was cleared to a depth of 1 ft in June 2001 and no ordnance was found on the site. USA Environmental, Inc. (USA) performed a MEC removal on the Closed Castner Firing Range MRS (FTBLS-004-R-01) from 1 July 2003 to 11 March 2004, subsurface clearing 167 acres, excavating approximately 41,000 subsurface anomalies, and surface clearing 975 acres. USA located, identified, and disposed of 180 MEC items.

Munitions found on the Closed Castner Firing Range MRS (FTBLS-004-R-01) include grenades; small, medium, and large projectiles (20mm–120mm); mortars; and rockets (2.36 in. and 3.5 in.). The Site Inspection (SI) report also indicates that approximately 80% of the site was used for small arms training (USACE 2007).

5.0 Executing Agencies

- Fort Bliss
- U.S. Army Corps of Engineers - Omaha District
- U.S. Army Environmental Command
- Environmental and Munitions Center of Expertise

6.0 Scope of the WAA Field Demonstration

The purpose of this project is to demonstrate the costs and benefits of applying various investigation methods at an Active Army MMRP site, Closed Castner Firing Range MRS (FTBLS-004-R-01), Fort Bliss. The primary objectives are to test and refine the conclusions of the original cost-benefit analysis and to collect data about the relative densities and distributions of MEC to support the future remedial investigation/feasibility study. Data collection objectives are (1) identifying areas of concentrated munitions use, (2) identifying areas with no indication of munitions use, and (3) improving the understanding of relative densities of MEC across the MRS.

The WAA Field Demonstration WP presents the procedures for completing the field activities. Some of the activities include the following:

- Field recon
- Site delineation and marking
- Site preparation (vegetation removal and transect marking)
- Installation of Instrument Validation Strips (IVSs) and production seed items
- Orthophotography/lidar field demonstration
- Helicopter-borne magnetometry field demonstration

- Ground-based geophysics field demonstration
- Target anomaly selection
- Anomaly reacquisition
- Intrusive investigation
- MEC disposal
- MPPEH inspection and disposition

7.0 Safety Criteria

The following language is a global requirement for all ESP submissions in accordance with the *"Technical Update Implementation of DDESB Guidance on Minimum Separation Distances for Unintentional Detonations, 11 September 2007"* to utilize the Hazardous Fragment Distance (HFD) for responses dealing with UXO in determining the Minimum Separation Distance (MSD) for non-essential personnel for unintentional detonations:

> *"USACE has intrusively investigated millions of surface MEC items and subsurface anomalies that have the potential to be unexploded ordnance over the past 15 years on more than 1,000 project locations for FUDS, BRAC, and Active Installations. These are extremely conservative estimates. On one project alone, USACE investigated over 3,000,000 anomalies, of which approximately 1.67% was UXO with no accidents or unintentional detonations. For these reasons, the probability of an unintentional detonation, due to project activities, is assessed to be "Extremely Low" and the use of Hazardous Fragment Distance (HFD) for the Minimum Separation Distance (MSD) for non-essential personnel for unintentional detonations is warranted and authorized."*

The Closed Castner Firing Range MRS (FTBLS-004-R-01) potentially contains flares; signals; simulators; screening smoke; grenades (hand, rifle, smoke); small, medium, and large projectiles (20mm–155mm); mortars; rockets; and small arms. Munitions found on the Closed Castner Firing Range MRS (FTBLS-004-R-01) include grenades; small, medium, and large projectiles (20mm–120mm); mortars; and rockets (2.36 in. and 3.5 in.). Additionally, during the initial phase of this project (non-MEC activities, i.e. civil and geophysical surveys), there were significant discoveries of fragmentation from 155mm HE projectiles. Based on information and findings, the 155mm Mk I and Mk III HE projectile is determined to be the Munition with the Greatest Fragmentation Distance (MGFD). Table 1 lists the MSDs in feet for both intentional and unintentional detonations.

Table 1. Minimum Separation Distances at the Closed Castner Range Munitions Response Site

Area		MSDs (feet)				
		For Unintentional Detonations		For Intentional Detonations		
		Team Separation Distance (K40)	HFD	Without Engineering Controls (MFD-H)	Using Sandbag Mitigation	Using Water Mitigation Carboys/Pool
Closed Castner Firing Range MRS (FTBLS-004-R-01)	155mm Mk I & Mk III HE projectile	122 [3]	447 [4]	2842	Not Applicable	Not Applicable

Notes:

See Appendix B for calculation sheets and documentation of MSDs.

MGFD during MEC operations within area indicated above.

[3] K40 will be based on the 155mm M795, which has a greater K40 (122 feet) than the 155mm Mk I & Mk III (105 feet), see Appendix B

[4] HFD will be based on the 155mm M107, which has a greater HFD (447 feet) than the 155mm Mk I & III (395 feet), see Appendix B

The purpose of intrusive investigations associated with this project is to confirm respective areas as target areas or non-target areas and to gain an understanding of the nature and extent of MEC on the site. URS has flexibility in selecting which target anomalies to investigate, and will intrusively investigate only those target anomalies that are beyond the HFD from occupied buildings or public roadways.

If MEC with a fragmentation distance greater than the stated MGFD is encountered during the investigation, the MSDs will be adjusted in accordance with Department of Defense Explosives Safety Board (DDESB) Technical Paper (TP)-16, Revision 2, Methodologies for Calculating Primary Fragment Characteristics, operations will continue, and an amendment to this ESP will be submitted for expeditious approval.

8.0 Methods of Disposal

The Senior Unexploded Ordnance Supervisor (SUXOS), UXO Safety Officer (UXOSO), UXO Quality Control Specialist (UXOQCS), and the Ordnance Explosive Safety Specialist (OESS) will make the final explosive safety status determination for each MEC item discovered. As a general rule, all UXO and discarded military munitions (DMM) will be blown in place. This is the safest method to effect final disposition of munitions.

If occupied buildings or roadways are within the MFD-H of discovered MEC, URS will implement one of the following:

- Implement applicable and necessary engineering controls to reduce the MSD in accordance with HNC-ED-CS-S-98-7**,** August 1998, *Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions*.
- If determined acceptable to move,discovered MEC will be relocated beyond the MFD-H from occupied buildings or roadways.

- Evacuate any occupied buildings or block public roadways that are within the MSD to prevent non-essential personnel from entering during MEC disposal operations.

The UXOSO will ensure that appropriate MSDs for non-essential and essential personnel are properly established and maintained in accordance with the approved ESP. Explosive operations will be supervised by the SUXOS and coordinated with the on-site USACE OESS. MEC disposal activities will be conducted using qualified UXO personnel in accordance with TP-18 (DDESB 2004). All explosive operations will follow the procedures outlined in USACE EM 385-1-1, USACE EM 385-1-97, and Technical Manual (TM) 60A-1-1-31.

Consolidating multiple MEC items for disposal that have been determined to be acceptable to move will be conducted in accordance with the following documents:

- "Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites" (USACE 2000),

- Technical Update-3, "Mathematical Equations and Calculations for MEC Operations" (USAEC 2007)

- DDESB Memorandum, DDESB Approval of Minimum Separation Distance to Non-Essential Personnel When Using the DDESB-Approved Consolidated Shot Method, September 25, 2009

MEC disposal operations are planned to occur on a daily basis if required. The SUXOS will coordinate with Fort Bliss Range Control, El Paso City Police, and the Texas Department of Transportation prior to any MEC disposal operations.

Donor explosives for the WAA Field Demonstration at the Closed Castner Firing Range MRS (FTBLS-004-R-01) will be stored in a sited ATF Type 2 magazine with an integral cap box to ensure proper compatibility and separation of main charge donor explosives and initiators. All commercial explosives will have assigned DoD hazard division/storage compatibility groups (HD/SCG) and will be stored in accordance with DoD 6055.9-STD, DA PAM 385-64 and any local installation regulations. The magazine will be placed no closer than 300-ft from any public traffic routes and/or 500-ft from any inhabited buildings (Figure 4). The total NEW stored in the magazine will not exceed 50 pounds. The ATF Type 2 magazine will have a secure perimeter fence with approved access only.

The services of a local explosive vendor will be enlisted on an as needed basis to support MEC disposal operations by providing donor explosives. Disposal operations will be initiated by a radio firing device and non-electric (NON-EL) shock tube detonators or electric blasting caps. Donor charge explosives will consist of jet perforators or pentolite boosters. Transportation of explosives will be conducted in accordance with applicable sections of 49 CFR Part 397. Donor explosives will be consumed or returned to the sited ATF Type 2 magazine upon completion of disposal operations. The 100 lb explosive range limit for the Closed Castner Firing Range MRS (FTBLS-004-R-01) will not be exceeded during MEC disposal operations.

9.0 Maps

- Figure 1 depicts the regional location of Fort Bliss.
- Figure 2 depicts the Closed Castner Firing Range MRS (FTBLS-004-R-01).
- Figure 3 depicts the ESQD arcs including the HFD and the MFD-H distance around the Closed Castner Firing Range MRS (FTBLS-004-R-01) for the MGFD.
- Figure 4 depicts the planned location of the explosives storage magazine and associated ESQD arcs.

10.0 References

Department of the Army (DA). 1999. DA Pamphlet (DA PAM) 385-64, Ammunition and Explosives Safety Standards. December.

DA. 2008. Technical Manual (TM) 60A-1-1-31, Explosive Ordnance Disposal Procedures, General Information on EOD Disposal Procedures (Revision 5). October.

Department of Defense Explosive Safety Board (DDESB). 2004. Technical Paper (TP) 18, Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel. December.

DDESB. 2007. Technical Update, Implementation of DDESB Guidance on Minimum Separation Distances for Unintentional Detonations. September.

DDESB. 2009a. TP 16. Methodologies for Calculating Primary Fragment Characteristics. Revision 3. April.

DDESB. 2009b. "DDESB Approval of Minimum Separation Distance to Non-Essential Personnel When Using DDESB-Approved Consolidated Shot Method, September 25, 2009." September.

Department of Defense (DoD). 2008a. DoD 6055.09 - STD, DoD Ammunition and Explosives Safety Standards. (Change 2, August 2009.) February.

DoD. 2008b. DoD Instruction (DoDI) 4140.62, Material Potentially Presenting an Explosive Hazard. November.

United States Army Corps of Engineers (USACE). 1998a. Serena, J.M. and Crull, M. "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions." Huntsville Division, HNC-ED-CS-S-98-7. August.

USACE. 1998b. Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites. Engineering and Support Center, Huntsville. August (Terminology Update March 2000).

USACE. 2007a. Technical Update-3, Mathematical Equations and Calculations for MEC

Operations. November.

USACE. 2007b. Engineering Manual (EM) 1110-1-4009. Military Munitions Response Actions. June.

USACE. 2008a. EM 385-1-1, Safety and Health Requirements Manual. 15 September.

USACE. 2008b. EM 385-1-97, Explosives Safety and Health Requirements Manual. 15 September. (Errata 1 through 4 dated June and July 2009.)

U.S. Army Corps of Engineers (USACE). 2007. *Final Site Inspection Report, Fort Bliss, Texas*.

U.S. Army Environmental Command (USAEC). 2008. *Wide Area Assessment Cost-Benefit Analysis: Active Army Military Munitions Response Program*

FIGURES

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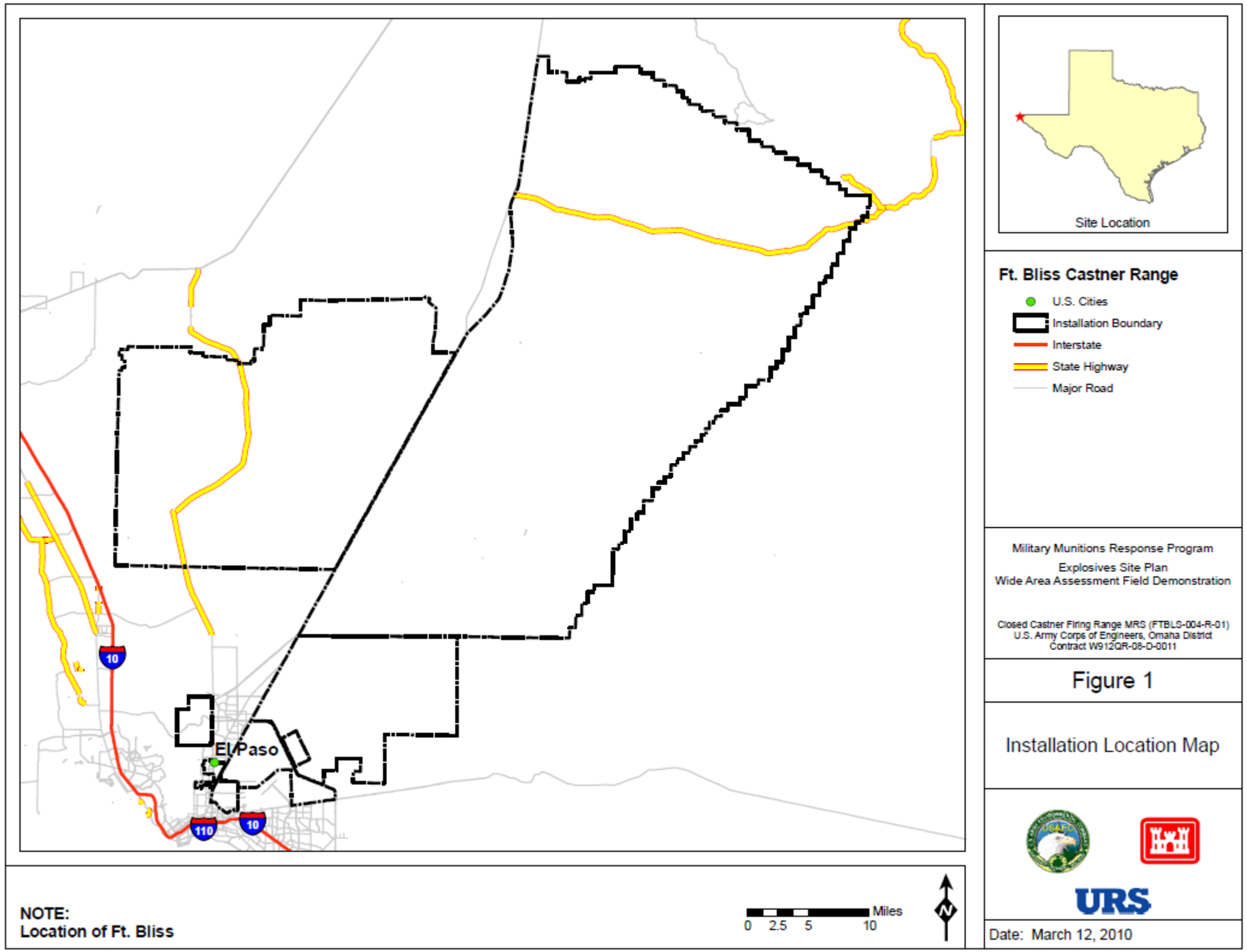
10
El Paso
110
10
Site Location
Ft. Bliss Castner Range
U.S. Cities
Installation Boundary
Interstate
State Highway
Major Road
NOTE:
Location of Ft. Bliss
0 2.5 5 10
Miles
N
Military Munitions Response Program
Explosives Site Plan
Wide Area Assessment Field Demonstration
Closed Castner Firing Range MRS (FTBLS-004-R-01)
U.S. Army Corps of Engineers, Omaha District
Contract W912QR-08-D-0011
Figure 1
Installation Location Map
URS
Date: March 12, 2010

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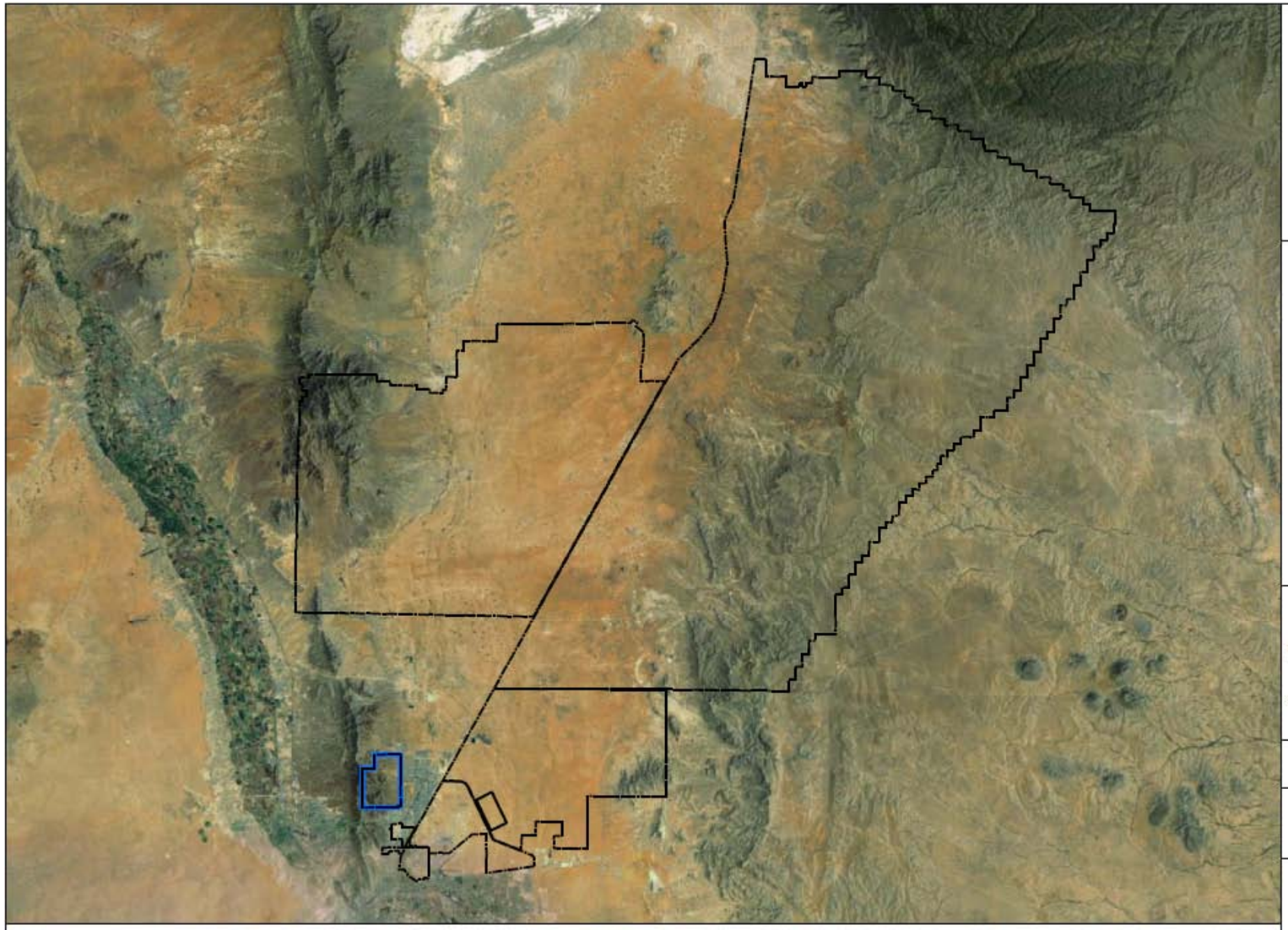

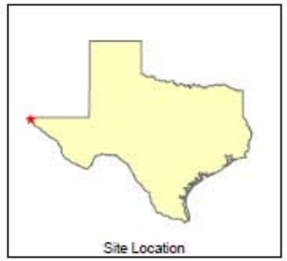

Legend

Installation Boundary

MRS Site Boundary

NOTE:
Location of the Castner Range

0 2.5 5 10 15 20 Miles

Military Munitions Response Program

Explosives Site Plan
Wide Area Assessment Field Demonstration

Closed Castner Firing Range MRS (FTBLS-004-R-01)
U.S. Army Corps of Engineers, Omaha District
Contract W912QR-08-D-0011

Figure 2

Munitions Response Site

URS

Date: March 12, 2010

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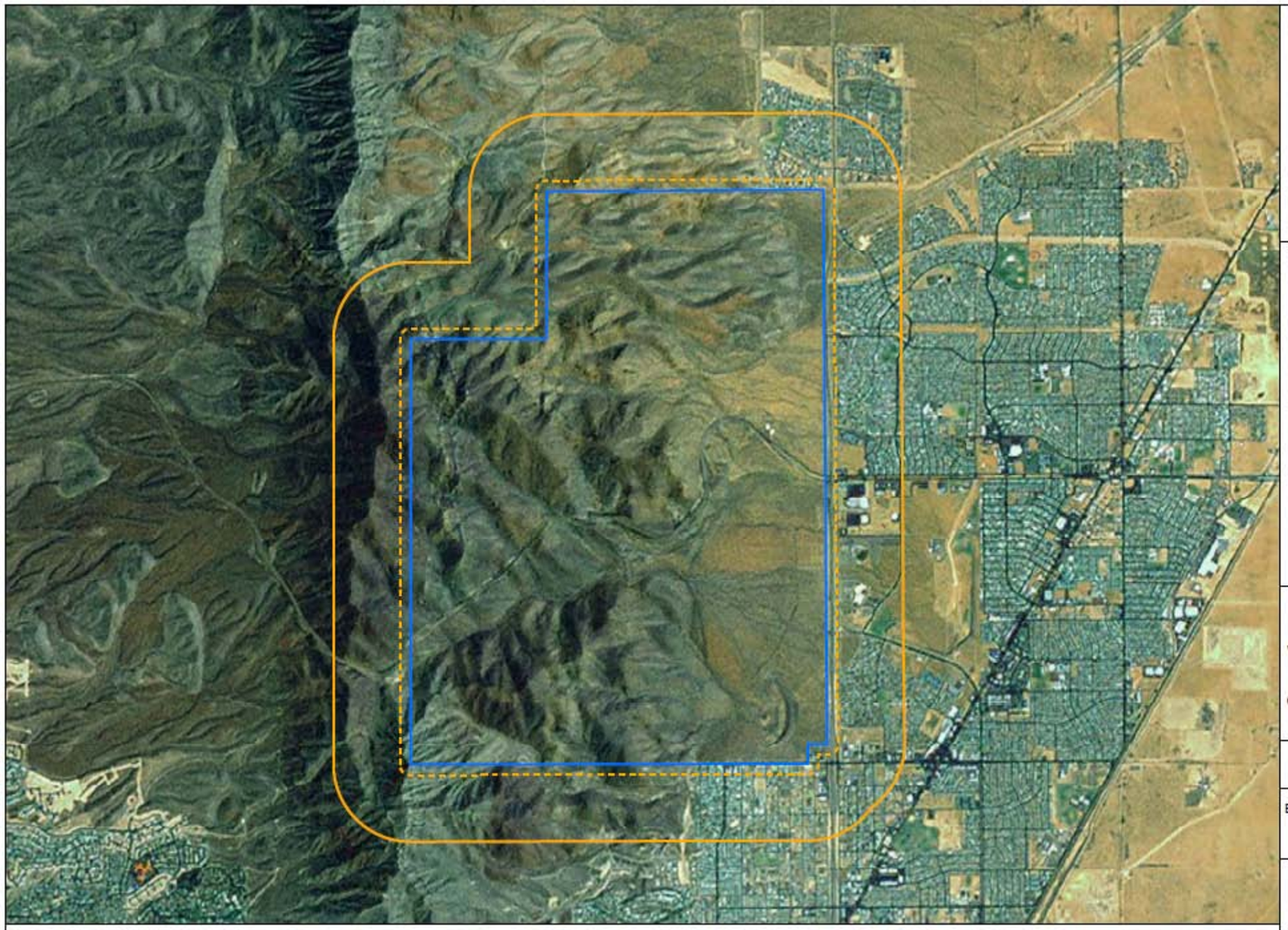

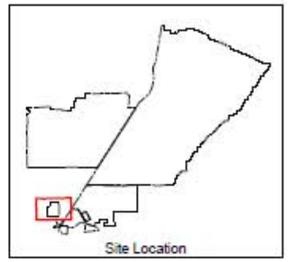

Legend

- MRS Site Boundary
- Hazardous Fragment Distance (HFD) - 395 feet for 155 mm Mk I & Mk III HE projectile
- Maximum Fragment Distance (MFD) - Horizontal (H) - 2,842 feet for 155 mm Mk I & Mk III HE projectile

NOTE:
Location of the Castner Range

0 0.25 0.5 1 1.5 2 Miles

Military Munitions Response Program

Explosives Site Plan
Wide Area Assessment Field Demonstration

Closed Castner Firing Range MRS (FTBLS-004-R-01)
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Figure 3

Explosive Safety Quantity-Distance Arcs for HFD and for MFD-H of the MGFD, Closed Castner Range MRS (FTBLS-004-R-01)

URS

Date: March 12, 2010

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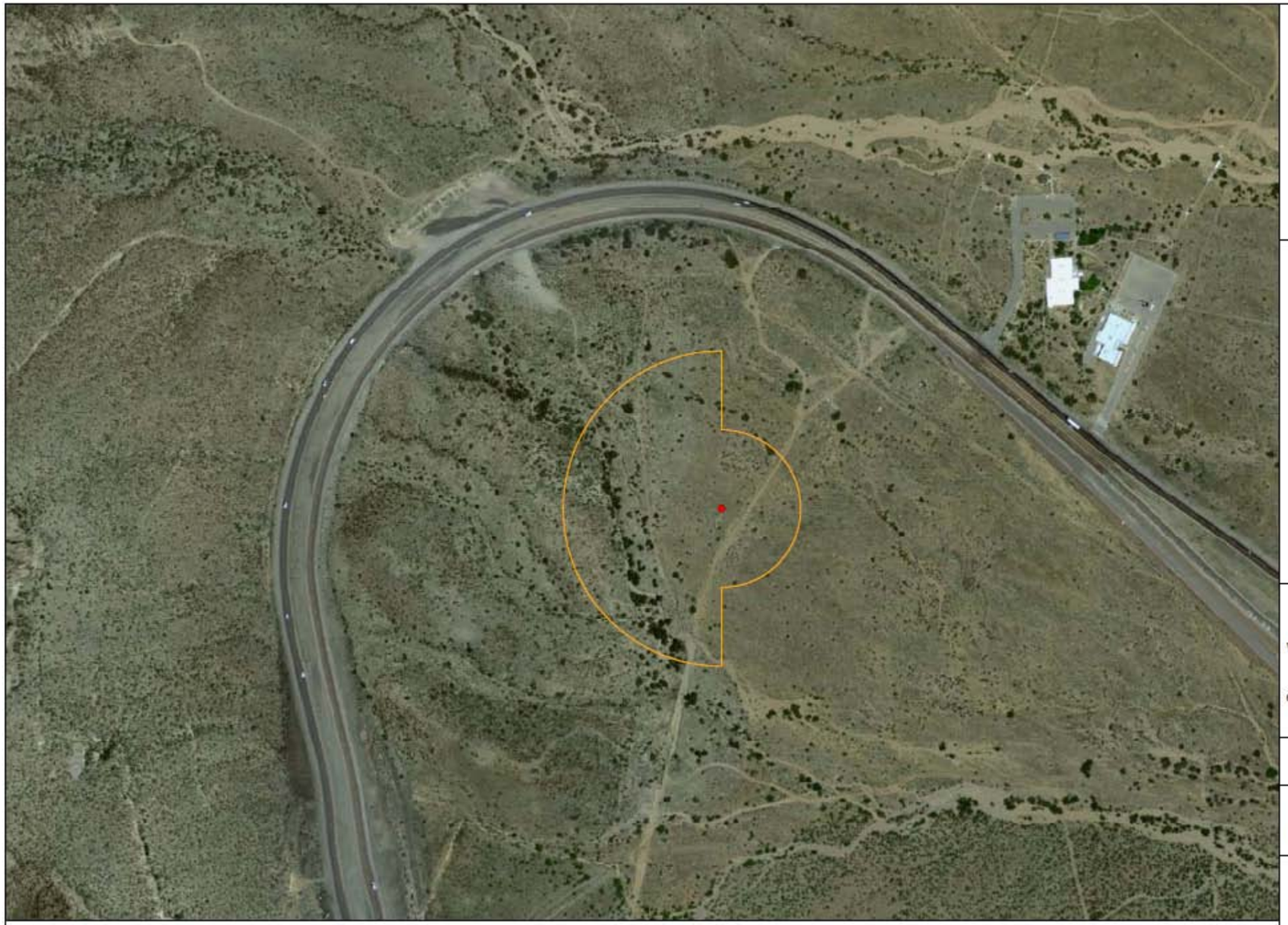

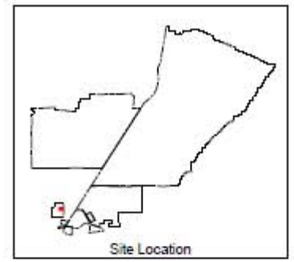

Legend

- Type II Explosives Storage Magazine
- Quantity-Distance Safety Arc (250 foot - back/sides and 500 foot - front)

NOTE:
Location of the Closed Castner Firing Range

0 100 200 400 600 800 Feet

Military Munitions Response Program

Explosives Site Plan
Wide Area Assessment Field Demonstration

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Figure 4

Explosives Storage Magazine
Quantity-Distance Safety Arc

URS

Date: March 12, 2010

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APPENDIX A

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FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	HE Rounds	DODIC:	D571
Munition:	155 mm M107	Date Record Created:	7/30/2004
		Last Date Record Updated:	7/30/2004
Primary Database Category:	projectile	Individual Last Updated Record:	Crull
Secondary Database Category:	155 mm	Date Record Retired:	
Munition Case Classification:	Robust		

Munition Information and Fragmentation Characteristics

Explosive Type:	Comp B
Explosive Weight (lb):	15.44800
Diameter (in):	6.1024
Max Fragment Weight (lb):	0.648213
Critical Fragment Velocity (fps):	3426

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	447
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	1983
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	2577

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	112
Inhabited Building Distance (09 psi), K50 Distance:	141
Intentional MSD (0065 psi), K328 Distance:	922

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	6.82
Mild Steel:	1.27
Hard Steel:	0.64
Aluminum:	2.59
LEXAN:	6.76
Plexi-glass:	5.13
Bullet Resist Glass:	4.43

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.648213
Critical Fragment Velocity (fps)SB:	3426
Kinetic Energy 106 (lb-ft2/s2)SB:	3.8042
Required Wall Roof Sandbag Thickness (in)SB:	36
Expected Maximum Sandbag Throw Distance (ft)SB:	220
Minimum Separation Distance (ft)SB:	220

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.648213
Critical Fragment Velocity (fps)W:	3426
Kinetic Energy 106 (lb-ft2/s2)W:	3.8042
Water Containment System:	1100 gal tank
Minimum Separation Distance (ft)W:	275

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FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	HE Rounds	DODIC:	D529
Munition:	155 mm M795	Date Record Created:	7/30/2004
		Last Date Record Updated:	7/30/2004
Primary Database Category:	projectile	Individual Last Updated Record:	Crull
Secondary Database Category:	155 mm	Date Record Retired:	
Munition Case Classification:	Robust		

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	23.80000
Diameter (in):	6.1024
Max Fragment Weight (lb):	0.562000
Critical Fragment Velocity (fps):	4635

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	436
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	2078
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	2699

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	122
Inhabited Building Distance (09 psi), K50 Distance:	153
Intentional MSD (0065 psi), K328 Distance:	1003

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	7.58
Mild Steel:	1.41
Hard Steel:	1.16
Aluminum:	2.85
LEXAN:	7.14
Plexi-glass:	5.51
Bullet Resist Glass:	4.73

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.562000
Critical Fragment Velocity (fps)SB:	4635
Kinetic Energy 106 (lb-ft2/s2)SB:	6.0368
Required Wall Roof Sandbag Thickness (in)SB:	NA
Expected Maximum Sandbag Throw Distance (ft)SB:	NA
Minimum Separation Distance (ft)SB:	NA

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.562000
Critical Fragment Velocity (fps)W:	4635
Kinetic Energy 106 (lb-ft2/s2)W:	6.0368
Water Containment System:	NA
Minimum Separation Distance (ft)W:	NA

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FRAGMENTATION DATA REVIEW FORM

Database Revision Date 8/15/09

Category:	HE Rounds	DODIC:	
Munition:	155 mm Mk I & Mk III	Date Record Created:	7/30/2004
		Last Date Record Updated:	10/3/2005
Primary Database Category:	projectile	Individual Last Updated Record:	Crull
Secondary Database Category:	155 mm	Date Record Retired:	
Munition Case Classification:	Robust		

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	15.17000
Diameter (in):	6.1024
Max Fragment Weight (lb):	0.768143
Critical Fragment Velocity (fps):	4032

Theoretical Calculated Fragment Range

HFD [Distance to No More Than 1 Hazardous Fragment per 600 Square Feet] (ft):	395
MFD-V [Vertical Distance of Max Weight Fragment] (ft):	2169
MFD-H [Horizontal Distance of Maximum Weight Fragment] (ft):	2842

Overpressure Distances

Inhabited Building Distance (12 psi), K40 Distance:	105
Inhabited Building Distance (09 psi), K50 Distance:	132
Intentional MSD (0065 psi), K328 Distance:	863

Minimum Thickness to Prevent Perforation

4000 psi Concrete (Prevent Spall):	7.55
Mild Steel:	1.42
Hard Steel:	1.17
Aluminum:	2.84
LEXAN:	7.33
Plexi-glass:	5.72
Bullet Resist Glass:	5.04

Required Sandbag Thickness

Max Fragment Weight (lb)SB:	0.768143
Critical Fragment Velocity (fps)SB:	4032
Kinetic Energy 106 (lb-ft2/s2)SB:	6.2439
Required Wall Roof Sandbag Thickness (in)SB:	NA
Expected Maximum Sandbag Throw Distance (ft)SB:	NA
Minimum Separation Distance (ft)SB:	NA

Water Containment System and Minimum Separation Distance:

Max Fragment Weight (lb)W:	0.768143
Critical Fragment Velocity (fps)W:	4032
Kinetic Energy 106 (lb-ft2/s2)W:	6.2439
Water Containment System:	NA
Minimum Separation Distance (ft)W:	NA

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