APPENDIX I

Explosives Siting Plan

FORA ESCA REMEDIATION PROGRAM

Appendix I: Explosives Siting Plan

FINAL Group 1 Remedial Investigation / Feasibility Study Work Plan

Volume 2 - Sampling and Analysis Plan

Parker Flats Munitions Response Area Phase II

Former Fort Ord Monterey County, California

December 17, 2008

Prepared for:

FORT ORD REUSE AUTHORITY

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Prepared by:





Westcliffe Engineers, Inc.

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ACRONYMS AND ABBREVIATIONS

Army	U.S. Department of the Army
ASP	Ammunition Supply Point
BRAC	Base Realignment and Closure
DDESB	Department of Defense Explosives Safety Broad
ESCA RP ESL ESP	Environmental Services Cooperative Agreement Remediation Program explosive storage location Explosives Siting Plan
FORA ft FUDS	Fort Ord Reuse Authority foot or feet Formerly Used Defense Sites
HFD	hazardous fragment distance
LDSP LE	Land Disposal Site Plan Low Explosive
MEC MFD MGFD mm MRA MSD	munitions and explosives of concern maximum fragmentation distance munition with the greatest fragmentation distance millimeter Munitions Response Area minimum separation distance
POM FD	Presidio of Monterey Fire Department
RI	Remedial Investigation
SUXOS	Senior Unexploded Ordnance Supervisor
TSD	team separation distance
USACE UXO UXOSO	United States Army Corps of Engineers unexploded ordnance Unexploded Ordnance Safety Officer

1.0 INTRODUCTION

The former Fort Ord, Monterey County, California is the focus of this Explosives Siting Plan (ESP) in support of a Remedial Investigation (RI) to be conducted at the Parker Flats Munitions Response Area (MRA). This is Phase II of the Parker Flats RI and covers approximately 482 acres that potentially contain munitions and explosives of concern (MEC). Detailed information about the Parker Flats MRA can be found in the Group 1 Remedial Investigation and Feasibility Study Work Plan (ESCA RP Team 2008b). This plan for siting explosives operations conforms to the requirements of Data Item Description MR-005-004.

Figure 1 shows the location of the former Fort Ord and the general site layout. Figure 2 shows the Phase II RI area of the Parker Flats MRA. Figure 3 includes all anticipated minimum separation distances (MSDs) for the Parker Flats MRA Phase II.

1.1 Explosive Storage Magazines

Explosive donor charges will be drawn from the established explosive storage location (ESL). The ESL is the former Fort Ord Ammunition Supply Point (ASP) shown on Figure 1. The Department of Defense Explosives Safety Board (DDESB) approved the siting and final safety submission for this ASP on March 8, 1990. The ASP's magazines are standard earthcovered facilities. After Fort Ord closed under Base Realignment and Closure (BRAC), DDESB approved a change to the use of the magazines and resited them to allow the U.S. Department of the Army ("Army") to use the magazines for the storage of demolition materials for unexploded ordnance (UXO) contractors executing Fort Ord's munitions response actions. The Army used the magazines in this way for a number of years. The Army is no longer using the magazines and will eventually deed transfer the entire ESL to the Fort Ord Reuse Authority (FORA). Until transfer, the ESL will temporarily remain Army property, but the Army has granted a right of entry to FORA to allow FORA's contactors to use it to store demolition explosives. The ESL will continue to be used for UXO contractor munitions response actions for approximately 7 years. Siting of these magazines is covered under the DDESB final approval of the "2nd Addendum to the 3rd Amendment to the 17 Feb 94 Land Disposal Site Plan (LDSP) for BRAC of Fort Ord, California," dated January 14, 2008 (ESCA RP Team 2008a). The MSD requirements for each of the three earth-covered facilities being used at the ESL (Buildings 763, 764, and 765) are shown on Figures 4, 5, and 6.

1.2 Engineering Controls

Engineering controls will be implemented during intentional detonations per the guidance set forth in HNC-ED-CS-S-98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions. Only one item will be disposed of at a time when engineering controls are being employed.

In areas where an acceptable fragmentation distance cannot be achieved, items that are safe to move may be moved to another area as long as the movement does not require transportation

on public roads. If movement to another area is not possible, engineering controls (in accordance with HNC-ED-CS-S-98-7) will be employed to reduce the fragmentation hazard.

1.3 Munitions and Explosives of Concern

All recovered MEC will be blown-in-place in the grid found; engineering controls will be utilized to mitigate the hazard posed by fragments produced by the detonation.

1.4 Minimum Separation Distance

Figure 3 includes all anticipated MSDs for the Parker Flats MRA Phase II. The selection of the munition with the greatest fragmentation distance (MGFD) for the Parker Flats Phase II area is based on the results of MEC investigations and removal action in the Parker Flats MRA Phase I and Phase II areas.

- The MGFD for the northern portion of the Parker Flats Phase II area is the 37 millimeter (mm), MK I, Low Explosive (LE) projectile. This is a conservative assumption because 37 mm LE projectiles were only found in the Parker Flats Phase I areas, and none have been found in the Phase II areas.
- The MGFD for the southern portion of the Parker Flats Phase II area is the 75 mm MK I (shrapnel) projectile.

1.4.1 Maximum Fragmentation Distance MSD for Intentional Detonations

The maximum fragmentation distance (MFD) is in accordance with the Fragmentation Data Sheet for the 37 mm, MK I, LE projectile, and will be used for intentional detonations, as shown on Figure 3. The MFD for the 37 mm, MK I, LE projectile is 816 feet (ft) and the MFD for the 75 mm MK I (shrapnel) is 743 ft. Engineering controls for intentional detonations, per the guidance set forth in HNC-ED-CS-S-98-7, Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, will be employed to reduce the MFD.

The withdrawal distance or MSD for intentional detonations using sandbags is 200 ft, as shown on Figure 3. Engineering controls will be utilized for single item detonations only. Any inhabited buildings that fall within the MSD will be evacuated during MEC operations. All roadways will be blocked, with road guards (or equivalent) to ensure that nonessential personnel do not enter the MSD during MEC activities.

1.4.2 Hazardous Fragment Distance MSD for Nonessential Personnel for Unintentional Detonations

The MSD for nonessential personnel is as shown on Figure 3. The hazardous fragment distance (HFD) will be used for unintentional detonations based on the Fragmentation Data Sheet. The MSDs for intentional and unintentional detonations are provided in Table 1.

	MSDs (ft)			
	37 mm N	MK I, LE	75 mm Mk	K I (Shrapnel)
MEC Operation	Essential Personnel	Nonessential Personnel	Essential Personnel	Nonessential Personnel
Unintentional Detonations	NA	68	NA	200
Intentional Detonations with Engineering Controls	200	200	200	200
Intentional Detonations without Engineering Controls	816	816	743	743

 Table 1: Minimum Separation Distances

NA = Not Applicable (see team separation distance section below)

1.4.2.1 Authorization to Use Unintentional Detonation MSD HFD

United States Army Corps of Engineers (USACE) has intrusively investigated millions of surface MEC items and subsurface anomalies that have the potential to be UXO over the past 15 years on more than 1,000 project locations for Formerly Used Defense Sites (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% were 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 the HFD, for unintentional detonations, is warranted and authorized.

1.4.3 Team Separation Distance

Team separation distance (TSD) will be in accordance with the Fragmentation Data Sheet's K40 distance as shown on Figures 7 and 8. TSDs are 18 ft for the 37 mm MK I, LE and 10 ft for the 75 mm MK I (shrapnel).

1.4.4 Increase of MSD

If, during the course of operations, a munition with a greater fragmentation distance is encountered, the MSD will immediately be adjusted in accordance with DDESB Technical Paper 16, and operations will continue. In response, an amendment to this ESP will be expeditiously submitted.

1.5 Demolition Areas

No dedicated demolition area will be established at the Parker Flats MRA Phase II RI area. MEC identified within the Parker Flats MRA Phase II RI area will be blown-in-place using engineering controls to mitigate the hazard posed by fragments produced by the detonation.

1.6 Footprint Areas

There are no identified disposal areas.

1.6.1 Detonation Site and Blow-in-Place

Recovered MEC will be blown-in-place within the investigation area or transect found within the Parker Flats MRA. Material Potentially Presenting an Explosive Hazard and items requiring demilitarization may be stored in the MEC explosive magazine and added to future planned demolition shots. Items that are unsafe to move will be disposed of in the location where they are encountered.

Prior to initiation of demolition operations, all nonessential personnel will be evacuated from the exclusion zone. Before the demolition charges are primed, all avenues of ingress will be physically blocked by guard personnel. Radio communications will be maintained between all involved parties at all times. Avenues of ingress are not to be opened without the permission of the Senior Unexploded Ordnance Supervisor (SUXOS). A constant state of vigilance will be maintained by all personnel to detect any intrusion into the fragmentation zone including over flights by aircraft. Upon completion of disposal operations, the disposal team's UXO Technician III (Demolition Supervisor) and the Unexploded Ordnance Safety Officer (UXOSO) will visually inspect each disposal shot. The Technician III will perform a visual inspection of the disposal site(s). The UXOSO will stand by at a safe distance and be prepared to render assistance in the event of an emergency. Upon completion of this inspection and providing that there are no residual hazards, the SUXOS will authorize the resumption of operations.

Prior to any detonation, the SUXOS will initiate the appropriate notification and approval procedure. The SUXOS will schedule the demolition to allow sufficient time to complete all notifications and approvals.

Notifications and approvals will be conducted as follows:

- Complete the MEC Disposal Checklists and notifications for each disposal operation
- Request Presidio of Monterey Fire Department (POM FD) to perform an on-site fire risk assessment. For planned detonations, risk assessments require a 3-day notification and demolition shots require a 5-day notification. POM FD will expedite risk assessments for demolition shots that cannot be delayed. Following property transfer, requirements for risk assessments will be determined by the City of Seaside Fire Department, if the detonation is being conducted within the jurisdiction of the City of Seaside, or by the

Salinas Rural Fire District, if the detonation is being conducted within the jurisdiction of Monterey County.

• Complete a Detonation Approval Checklist/Risk Assessment and submit to the FORA ESCA Remediation Program Manager for approval.

1.6.2 Collection Points

Collection points are not applicable to this project.

1.6.3 In-Grid Consolidated Shots

In-grid consolidated shots are not applicable to this project.

2.0 REFERENCES

- Environmental Services Cooperative Agreement Remediation Program Team (ESCA RP Team). 2008a. 2nd Addendum to the 3rd Amendment to the 17 Feb 94 Land Disposal Site Plan (LDSP) for BRAC of Fort Ord, California, Phase II Seaside Munitions Response Area (MRA) Removal Action, Former Fort Ord, Monterey County, California. January 14.
- 2008b. Draft Group 1 Remedial Investigation/Feasibility Study Work Plan, Volumes 1 and 2, Seaside and Parker Flats MRAs, Former Fort Ord, Monterey County, California. May 23.





Westcliffe Engineers, Inc.



Legend

Phase II Remedial Investigation Area

Major Road



Phase I Remedial Investigation Area

Phase II Removal Action Completed











Building

Major Road

 \times × Fencing

Minimum Separation Distance (MSD)

Public Traffic Route

Inhabited Buildings







Building

Major Road

× × Fencing

Minimum Separation Distance (MSD)

Public Traffic Route

Inhabited Buildings



(Building 764) Minimum Separation Distances

FORA ESCA RP Monterey County, California

Westcliffe Engineers, Inc.

WESTER





Major Road

 \times × Fencing

Minimum Separation Distance (MSD)

Public Traffic Route

Inhabited Buildings



	MENTATION D	PATA REVIEW F	
abanny and a start	Black Revelas Devel	DODIC:	
acegory: Aunition:	37 mm Mk L LE Practice	Dobre:	7/30/2004
fornoort.	37 min Pik I, LE Placuce	Last Date Record Lindated:	7/9/2007
rimary Database Category:	projectile	Individual Last Updated Record:	Crull
econdary Database Category:	37 mm	Date Record Retired:	
Aunition Case Classification:	N/A		
Munition Inform	nation and	Theoretical Calculated F	ragment Range
r regimentation er		HFD [Range to No More	
Explosive Type:	Black Powder	per 600 Square Feet] (ft):	68
Explosive Weight (Ib):	0.03400	MED-V Eventical Papers of	
Diameter (in):	1.4567	Max Weight Fragment] (it):	570
Max Fragment Weight (lb):	0.034207	MFR-H [Horizontal Range	
Critical Fragment Velocity (fps)	1368	Fragment] (ft):	816
Overpressur	e Distances	Minimum Thickness to I	Prevent Perforation
		4000 psi Concrete	
Inhabited Building Distance		(Prevent Spall):	1.69
(12 psi), K40 Distance:	10	Mild Steel:	0.20
Inhabited Building Distance	13	Hard Steel:	0.16
(09 psi), KB0 Distance:	13	Aluminum:	0.41
K328 Distance:	83	LEXAN:	2.49
	,	Prevo-grass:	1.37
		Dullet Resist Glass.	1.07
Required Sandbag	Thickness	Water Containment Sys	tem and Minimum
Max Fragment Weight (Ib)S8:	0.034207		
Critical Fragment	1262	Max Fragment Weight (Ib)W:	0.034207
Velocity (fps)SB:	1300	Critical Fragment Velocity	
(lb-ft2/s2)SB:	0.0320	(fps)W:	1368
Required Wall, Boof		Kinetic Energy 106 (lb-ft2/s2)W:	0.0320
	12		
Sandbag Thickness (in)SB:		Water Containment 5	gal carboys/ inflatable
Sandbag Thickness (in)SB: Expected Maximum Sandbag Throw Distance		System: p	gal carboys/ inflatable col
Sandbag Thickness (in)SB: Expected Maximum Sandbag Throw Distance (ft)SB:	25	Water Containment S System: p Minimum Separation Distance (ft)W:	gal carboys/ inflatable ool 200/200
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C:\Documents and Settings\MSMiller\Desktop\FortORd 4108\5 15_08\Template 8.5x11_portrait.mxd - 5/15/2008 @ 3:30:41 PM

	Database Revision	Date 12/31/07
Category:	Black Powder Roun	DODIC:
Munition:	75 mm Mk1 (Shrapnel)	Date Record Created: 7/30/2004
Primary Database Category	projectile	Last Date Record Updated: 7/18/2005
Secondary Database Category.	75 mm	Individual Last Updated Record: Crull
Munition Case Classification:	N/A	
Munition Infor	mation and	Theoretical Calculated Fragment Range
Fragmentation C	Characteristics	HED [Range to No More
Explosive Type:	Black Powder	Than 1 Hazardous Fragment
Explosive Weight (lb):	0.19000	per 600 Square Feet] (π):
Diameter (in):	2.9528	MFR-V [Vertical Range of Max Weight Fragment] (ft): 523
Max Fragment Weight (lb):	0.026600	MFR-H [Horizontal Range
Critical Fragment Velocity (fp:	s): 1200	of Maximum Weight Fragment] (ft): 743
Overpressu	re Distances	Minimum Thickness to Prevent Perforation
o ra pressu		4000 psi Concrete
Inhabited Building Distance		(Prevent Spall): 2.14
(12 psi), K40 Distance:	18	Mild Steel: 0.14
Inhabited Building Distance (09 psi), K50 Distance	75	Hard Steel: 0.11
Intentional MSD (0065 pci)		Autinium: 0.28
K328 Distance:	148	
		PIEXI-UIdas.
		Bullet Resist Glass: 0.76
		Bullet Resist Glass: 0.76
Required Sandbag	Thickness	Water Containment System and Minimum
Required Sandbag	Thickness	Bullet Resist Glass: 0.76 Water Containment System and Minimum Separation Distance:
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Required Sandbag Max Fragment Weight (lb)SB: Critical Fragment Velocity (fps)SB: Kinetic Energy 106 (lb-ft2/s2)SB: Required Wall Roof Sandbag Thickness (in)SB: Expected Maximum Sandbag Throw Distance (ft)SB: Minimum Separation Distance (ft)SB:	Thickness 0.026600 1200 0.0192 0.0192 12 25 200	Piekrgiass. 0.58 Bullet Resist Glass: 0.76 Water Containment System and Minimum Separation Distance: Max Fragment Weight 0.026600 (lb/W): 0.026600 Critical Fragment Velocity 1200 (rb/Tz/sz)W: 0.0192 Water Containment System 0.0192 Water Containment System: 0.0192 Minimum Separation Distance (ft)W: 200/200 Image: Print This Form Close Form Image: Distance (ft)W: Print This Form Image: Distance (ft)W: MSDs and Fragmentation Characteristics for Project 15 Image: Distance (ft)W: MSDs and Fragmentation Characteristics for Project 15