FINAL
WORK PLAN
SURFACE AND SUBSURFACE CLEARANCE FOR MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIAL ACTION UNIT 3 (RAU 3) PHASE 2

Former Camp Bonneville Military Reservation,
Vancouver, Washington

November 2015

Prepared for:

Clark County
Public Works Department
1300 Franklin Street
Vancouver, Washington 98666

Prepared by:

Weston Solutions, Inc.
1340 Treat Blvd, Suite 210
Walnut Creek, California 94597-7580
DCN B0003

WORK PLAN LIST OF REVISIONS SHEET

Revision	Date Approved	Approved By

FINAL
WORK PLAN
SURFACE AND SUBSURFACE CLEARANCE FOR MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIAL ACTION UNIT 3 (RAU 3) PHASE 2

Former Camp Bonneville Military Reservation,
Vancouver, Washington

November 2015

Reviewed by:

Andrew Caldwell
Senior UXO Supervisor

Date: November 20, 2015

Approved by:

Dwight Gemar, PE
Project Manager

Date: November 20, 2015

DCN B0003

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

APP	Accident Prevention Plan
ATF	Bureau of Alcohol, Tobacco and Firearms
BCRRT	Bonneville Conservation Restoration and Renewal Team, LLC
bgs	below ground surface
BIP	blown-in-place
BRAC	Base Realignment and Closure
CAP	Cleanup Action Plan
CAR	Corrective Action Report
CBMR	Former Camp Bonneville Military Reservation
CFR	Code of Federal Regulations
CVF	Central Valley Floor
CVFAW	Central Valley Floor and Associated Wetlands
DA1	Demolition Area 1
DA2	Demolition Area 2
DDESB	Department of Defense Explosives Safety Board
DID	Data Item Description
DMM	Discarded Military Munitions
DOD	Department of Defense
ESS	Explosives Safety Submission
FS	Feasibility Study
IVS	instrument verification strip
MDAS	material documented as safe
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
NCR	Non-Conformance Report
NGVD	National Geodetic Vertical Datum
PM	Project Manager
QA	quality assurance
QC	quality control
RAU 3	Remedial Action Unit 3
RI	Remedial Investigation

ABBREVIATIONS AND ACRONYMS (Continued)

SOP	Standard Operating Procedure
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	United States Army Corps of Engineers
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
UXOQCS	Unexploded Ordnance Quality Control Specialist
WADOE	Washington Department of Ecology
WESTON	Weston Solutions, Inc.

1. INTRODUCTION

1.1 PROJECT AUTHORIZATION

Weston Solutions, Inc. (WESTON) has been contracted by Clark County to implement the Final Remedial Action Unit 3 (RAU 3) Cleanup Action Plan (CAP) (BCRRT, 2010) for Phase 2 at the Former Camp Bonneville Military Reservation (CBMR) (Figure 1). The scope of this work includes surface and subsurface analog geophysical survey and clearance of potential munitions and explosives of concern (MEC) at several locations within the CBMR as described in this RAU 3 Phase 2 Work Plan.

1.2 PURPOSE AND SCOPE

This Work Plan describes the technical and operational approach WESTON will use to implement RAU 3 Phase 2 MEC clearance for the areas listed below and shown on Figure 2:

- Former Demolition Areas 1 and 2 (DA1 and DA2); surface clearance (0 to 3 inches)
- Former Training Range Target Areas: Hand Grenade Range, Rifle Grenade Range, and 3.5-inch Rocket Range; surface clearance (0 to 3 inches)
- Former Firing Positions and Firing Points: Artillery Positions 1, 2, 3, 4 and 7, Mortar Positions 1, 2, 5, and 6, Rifle Grenade Range Firing Point, and 3.5-inch Rocket Range Firing Point; subsurface clearance (0 to 14 inches)

In total the RAU 3 Phase 2 clearance areas comprise approximately 124 acres. Stepouts, if required, will be performed per the procedure specified in the Final RAU 3 CAP (BCRRT, 2010) to ensure that isolated discoveries of MEC within boundary grids are not evidence of additional areas of concern:

1. If a MEC, material documented as an explosive hazard (MDEH), or material documented as safe (MDAS) item is found within a boundary grid of a designated clearance area, then the clearance area shall be expanded by adding a new (100 foot x 100 foot) grid adjacent to the grid of concern.
2. The new grid will be brush cleared.

3. The new grid will be surface cleared and if a MEC, MDEH or MDAS item is discovered, the procedure will repeat until no MEC, MDEH or MDAS items are found.

The following exceptions will stop/modify the stepout procedures**:**

- If the new grid extends beyond the property perimeter fence line.
- If the new grid extends to an adjacent cleanup area requiring clearance or a previously cleared area.
- If worker safety would be compromised due to extremely steep terrain making the area inaccessible.

Scheduling and/or exceptions to the stepout procedure will be addressed in coordination with Clark County and WADOE.

1.3 TERMS USED TO DESCRIBE MUNITIONS

The following terms are used to describe potential munitions identified during clearance actions (Department of Defense Explosives Safety Board [DDESB], 2015 and Department of Defense [DOD], 2015).

Discarded Military Munitions (DMM)—DMM includes military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance (UXO), military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations (10 USC 2710(e)(2)).

Material Documented as Safe (MDAS)— Material potentially presenting an explosive hazard (MPPEH) that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Documented as an Explosive Hazard (MDEH)—MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the

material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Potentially Presenting an Explosive Hazard (MPPEH)—Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are (1) military munitions and military munitions-related materials, including wholly inert components (e.g., fins, launch tubes, containers, packaging material), that are to be used or reused for their intended purpose and are within a DOD Component-established munitions management system; (2) non-munitions-related material (e.g., horseshoes, rebar, other solid objects) and munitions debris that are solid metal fragments that do not realistically present an explosive hazard; (3) other items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Munitions and Explosives of Concern (MEC)—This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means UXO, as defined in 10 USC 101(e)(5)(A) through (C); DMM, as defined in 10 USC 2710(e)(2); or MC (e.g., TNT, cyclotrimethylenetrinitramine), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC)—MC include any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3)).

Unexploded Ordnance (UXO)—UXO includes military munitions that have been primed, fuzed, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and remain unexploded either by malfunction, design, or any other cause. (10 USC 101(e)(5)(A) through (C)).

Items that cannot be positively identified as MEC will be considered MPPEH. After further inspection, MPPEH items will be classified as either MDEH or MDAS. Ammunition of 0.50 caliber in size or smaller will be considered small arms. Inert items that are not MEC, MDEH, MDAS, or small arms will be handled as non-munitions –related material

1.4 PROJECT LOCATION AND SITE DESCRIPTIONS

The former CBMR comprises approximately 3,840 acres and is located in southwestern Washington, approximately 5 miles east of the Vancouver City limits and approximately 3.5 miles north of the city limits of Camas. The former CBMR is approximately seven miles north of the Columbia River. The site is located in Township 2 North and Township 3 North of Range 3 East in the Washington Public Lands Survey system. Together the RAU 3 Phase 2 clearance areas (Figure 2) comprise approximately 124 acres.

1.4.1 Former Demolition Areas DA1 and DA2

DA1 is located in the northwest portion of the site, east of Little Elkhorn Mountain. DA1 is co-located with Landfill 4. Based on information provided in the RAU 3 CAP (BCRRT, 2010), Landfill 4 was used for disposal of building demolition debris from the Vancouver Barracks and possible military wastes. In 2004, the United States Army Corps of Engineers (USACE) physically removed the contents and associated contaminated soils at DA1 as part of the Landfill 4 Interim Removal Action. In the RAU 3 CAP, DA1 clearance area is identified as a 1200-foot radius kickout area (approximately 103.8 acres) centered on the original DA1/Landfill 4. The area is accessible by roads and trail; however it is located outside the boundary of the proposed regional park and within the Wildlife Management Area and was therefore classified as low reuse intensity in the RAU 3 CAP. The DA1 clearance area includes creeks and a wetland area.

As shown on Figure 2, the DA2 clearance area is a 500 foot by 500-foot area (approximately 5.7 acres) centered on the original location of DA2. It is located east of the Central Valley Floor (CVF), within the proposed Wildlife Management Area. The area was classified as low reuse intensity in the RAU 3 CAP (BCRRT, 2010).

1.4.2 Former Training Range Target Areas

As shown on Figure 2, three former training range / target areas located east of the CVF will be surface cleared during RAU 3 Phase 2: the hand grenade range, the rifle grenade range and the 3.5-inch rocket range. Together these training range target areas comprise approximately 7.6 acres.

1.4.3 Former Firing Point Areas

As shown on Figure 2, RAU 3 Phase 2 includes five artillery firing position areas, four mortar firing position areas, and firing point areas associated with the rifle grenade range and 3.5-inch rocket range. In total these areas comprise approximately 6.7 acres. The firing point areas will be cleared to 14 inches below ground surface (bgs).

1.5 FORMER CAMP BONNEVILLE MILITARY RESERVATION DESCRIPTION

1.5.1 Environmental Setting

Climate

CBMR is situated between the Cascade Mountains to the east and the Coast Range to the west. These two mountain ranges influence the local climate, which is otherwise a mild marine climate, typical of the region. The Coast Range keeps the area from feeling the full effect of the winter storms from the Pacific Ocean. The Cascade Mountains protect the area from the strong temperature contrasts between summer and winter that occur in eastern Washington. The summers in this area are warm and dry. The winters are mild and wet, with an average of approximately 6.1 inches of rain per month during the winter months.

Regional Geology and Physiography

CBMR is situated on the margin of the western foothills of the southern Cascades in the transition zone between the Puget Trough and the Willamette Trough Provinces. The geology of this area generally consists of Eocene and Miocene volcanic and sedimentary rock types overlain by unconsolidated clays, silts, sands, and gravels of the Troutdale Formation (Phillips, 1987).

The area surrounding CBMR is sparsely populated with scattered residences and is used primarily for agriculture and livestock grazing. The nearest town is Proebstel, an unincorporated community about 2.5 miles to the southwest of the western entrance to CBMR.

The two cantonments, Camp Killpack and Camp Bonneville, are located on the valley floor. The remainder of CBMR consists of moderately steep, heavily vegetated slopes that have been used primarily as firing ranges. The valley floor is a relatively narrow floodplain, which ranges from an elevation of about 290 feet National Geodetic Vertical Datum (NGVD) on the western end of CBMR to about 360 feet NGVD on the east. The adjoining slopes rise moderately steeply to elevations between approximately 1,000 and 1,500 feet NGVD along ridge tops within the property boundaries. The entire installation is heavily vegetated.

Surface Water Features

The principal surface water feature in the vicinity of the investigation area is Lacamas Creek, which flows southward from the confluence of two branch streams in the north-central part of CBMR, exiting the installation at its southwest corner. Wetlands extend throughout the CVF along the Lacamas Creek basin.

Geology and Soil

CBMR is situated along the structural and physiographic boundary between the western flank of the southern Cascade Mountains and the Portland-Vancouver Basin. The geology of the CBMR vicinity is known primarily from geologic mapping by Mundorff (1964) and Phillips (1987), a limited number of well logs available from the general area, and a Multi-Sites Investigation conducted by Shannon and Wilson (1999a).

The geology at CBMR can be divided into three general areas that correspond approximately to topographic divisions. The area west of Lacamas Creek is composed of a series of predominantly gravel and semi-consolidated conglomerate layers with scattered lenses and stringers of sand (Upper Troutdale Formation).

Underlying the Troutdale Formation and comprising the area to the north and east of Lacamas Creek are predominantly basalt flows and flow breccia, with some pyroclastic and andesitic

rocks that are folded and faulted. The bottomland along Lacamas Creek is composed of unconsolidated silt, sand, and gravel valley fill, with some clay. Because of the thick soil and dense vegetation, faults have not been identified within CBMR (Environmental Science and Engineering, Inc., 1983).

The CBMR soils are mainly low-permeability clays, which results in considerable runoff after storms and occasional minor flooding of Lacamas Creek. Upland soils have mainly developed from basalt and are generally gravel, stone and fairly shallow. Bottomland soils along Lacamas Creek tend to be clay.

Vegetative Cover

CBMR is a heavily wooded area with Douglas fir, western red cedar, western hemlock, and red alder as the dominant tree species. Depending primarily on moisture gradients, the understory is composed of salal, Oregon grape, viney maple, and sword fern (Larson, 1980 and GeoRecon International, 1981).

Hydrogeology

Limited information is available about the hydrogeology of CBMR. Most prior work throughout the Clark County area has focused on the Troutdale Formation (as described in Mundorff, 1964). CBMR resides over the eastern edge of the Troutdale Formation where it is pinched out by the underlying bedrock.

Groundwater Flow

The localized groundwater flow generally follows local topography toward tributaries and creeks. Groundwater within the shallow alluvium and Upper Troutdale Formation flows horizontally toward Lacamas Creek from upland areas within the Lacamas Creek valley, which encompasses most of CBMR. The general groundwater flow is to the southwest through the Lacamas Creek Valley and groundwater leaves CBMR where Lacamas Creek exits the western boundary of the camp. A small area north of the Lacamas watershed appears to drain west into another watershed.

Two monitoring wells were installed as part of the investigation of Landfill 4, an upland area of CBMR (Shannon and Wilson, 1999b). The depths to water in the wells ranged from 10.4 feet bgs to 18.8 feet bgs. The limited groundwater elevation data suggested a groundwater flow direction towards the creek, which is consistent with the surface topography.

Mammals and Birds

Several species of small mammals and birds reside on the site including cottontail rabbits, ground squirrels, mice, and shrews. Large mammals such as deer, elk, bears, and cougars are also present at CBMR.

There are also several special-status species present at or near CBMR. Species confirmed at or near CBMR include:

- **Amphibians:** Northern red-legged frog (federal species of concern)
- **Birds:** Vaux's swift (state candidate species) and Pileated woodpecker (state candidate species)
- **Mammals:** Brush Prairie (Northern) pocket gopher (state candidate species)
- **Fish:** Coastal Cutthroat Trout (federal species of concern)

Summary of Cultural and Historic Resources

The Army performed a cultural resources assessment and survey in selected parcels not previously inventoried for cultural resources but considered to have a high probability for prehistoric and/or historic archaeological sites. These areas included the Lacamas Creek valley, Munsell Hill, and the Little Baldy (Bald Mountain)/Buck Creek vicinity in the eastern part of the base (Sadler, 2003). None of the sites were recommended as eligible for the National Register of Historic Places (Sadler, 2003).

1.5.2 Former Camp Bonneville Military Reservation Mission and Operational History

The Former CBMR was used by the Army for live fire of small arms, assault weapons, artillery, and field and air defense artillery training between 1910 and 1995. Since 1947, CBMR has also provided training for a variety of military and nonmilitary units from the National Guard,

Reserves, U.S. Air Force, and federal, state, and local law enforcement agencies. In the early 1950s the DOD arranged to lease an additional 840 acres from the State of Washington Department of Natural Resources to expand training possibilities of the post. The facility has also been used for weekend and summer training by the U.S. Army Reserve units in southern Washington and northern Oregon and prior to property transfer in October 2006, was a sub-installation of Fort Lewis.

In July of 1995, CBMR was selected for closure under the 1995 Base Realignment and Closure (BRAC) process and all active training units ceased operations by October 1995. Since closure, numerous investigations have been conducted by the Army and its consultants in order to characterize the nature and extent of contamination at the site and to develop a plan for transferring ownership. The Camp Bonneville Local Redevelopment Authority was initially responsible for determining cost-effectiveness and feasibility of land reuse plans for the CBMR. A land reuse plan was developed and submitted to the Board of County Commissioners (Camp Bonneville Local Redevelopment Authority, 2005). The reuse plan called for CBMR to be transferred to the County. In October 2006, the Army transferred ownership of the property to Clark County via a conservation conveyance for remediation and subsequent development as a regional park. Clark County immediately transferred ownership to the Bonneville Conservation Restoration and Renewal Team, LLC (BCRRT). BCRRT held the deed of the property during investigation and cleanup activities at the site from 2006 thru 2011.

Based on a Remedial Investigation (RI)/Feasibility Study (FS) and Supplemental RI/FS reports for site-wide Munitions (RAU 3), BCRRT drafted and submitted a draft CAP for RAU 3 to the Washington Department of Ecology (WADOE) in May 2009. The draft CAP for RAU 3 was finalized by WADOE in September 2010 (BCRRT, 2010).

1.5.3 Current and Projected Land Use

Current: Since its closing by the US Army in 1995, CBMR has not been actively used with the exception of training for FBI and local law enforcement personnel conducted at the designated FBI Firing Range.

Future: The Camp Bonneville Land Reuse Plan (Camp Bonneville Local Redevelopment Authority, 2005) divides the CBMR into a Regional Park and Wildlife Management Area. The planned Regional Park consists of approximately 1,200 acres located between the western boundary of the site and the floodplain of the Lacamas Creek Valley. The park area is designed to provide recreational opportunities for the local community and will be managed by Clark County. The recreational activities proposed in the reuse plan for the Regional Park include, but are not limited to, the following:

- Recreational trails (hiking and equestrian use)
- Group picnic areas and picnic shelters
- Amphitheater and stage (for outdoor school and small local events)
- Meadow area for group picnicking and recreational sports activities
- Restroom facilities
- Tent camping facilities
- Recreational vehicle camping facilities
- Park directors' residences
- Vehicular access roads
- Parking areas
- Native American cultural center at the Camp Bonneville cantonment area
- Environmental Study Area at the southwest portion of the site

The majority (approximately two-thirds) of the CBMR site is classified as the Wildlife Management Area, which includes approximately 2,188 acres. The Wildlife Management Area is located east of the Lacamas Creek valley. The remaining 572 acres of the CBMR are contained within the original Central Impact Target Area, where no public access will be allowed. The Central Valley Floor and Associated Wetlands (CVFAW), RAU 3 Phase 1 clearance areas, fall within the area designated for Regional Park. The RAU 3 Phase 2 clearance areas fall within the area designated for Wildlife Management Areas.

1.6 PREVIOUS INVESTIGATIONS

Details of previous munitions response and related activities conducted at CBMR RAU 3 from 1997 to 2009 are presented in the RAU 3 RI/FS (BCRRT, 2008), Supplemental RI/FS (BCRRT, 2009) and CAP (BCRRT, 2010). A summary of those investigations are listed below:

- **Archives Search Report (1997)—**The report outlined the nature and degree to which MEC may potentially be present at CBMR.
- **MEC Site Characterization (1998)—**The purpose of this action was to determine the presence and density of MEC at CBMR.
- **Time-Critical Removal Action (1999/2000)—**The purpose of this action was to remove all MEC and munitions debris in the two former M203 rifle grenade ranges TA 8 and TA 9. These ranges totaled approximately 12 acres combined. Both of these ranges are within the CVF. This action was expanded to 19 acres that included a buffer zone around the two former ranges. Geophysical surveys and munitions response removal actions were conducted at TA 8 and TA 9 to a depth of two feet.
- **Instrument-aided Field Reconnaissance (2001/2002)—**The action was to confirm the location and characterize any MEC-related characteristics of Areas of Concern and Areas of Potential Concern within the CVF.
- **RAU 3 site-wide munitions cleanup (2006-2009)—**During the course of this cleanup, numerous MEC and munitions debris items were found in areas of the CVFAW where they were not anticipated and led to the discovery of a number of new target impact areas and waste disposal areas. WADOE required the contractor (BCRRT) to conduct a Supplemental RI/FS. The results of the report determined that a much more thorough cleanup action was needed for the future land use of the CVFAW. The 2009 Draft Supplemental RI/FS for RAU 3 (BCRRT, 2009) summarizes emergency actions and interim actions that focused on site perimeters and 20-foot buffer zones around trails and roads.
- **RAU 3 Phase 1, Central Valley Floor and Associated Wetlands (2012 – ongoing)—** Beginning in 2012, systematic clearance of the CVFAW has been performed to a depth of 14 inches bgs in an effort now identified as RAU 3 Phase 1. The areas to be cleared

comprise approximately 449 acres, approximately 329 acres in the CVF and approximately 120 acres in the associated wetlands (Figure 2).

Table 1 includes a list of munitions observed or potentially used at CBMR.

1.7 CLEANUP ACTION PLAN

The MEC cleanup actions listed in the Final RAU 3 CAP (BCRRT, 2010) reflect the findings of the Supplemental RI/FS and are divided into four phases: Phase 1, subsurface clearance of the CVFAW; Phase 2, surface and subsurface clearance of specific former demolition areas, target ranges and firing points; Phase 3, surface clearance of the Central Impact Target Area and Central Impact Target Area Expansion; and Phase 4, accessible portions of the Western Slopes (slopes less than 25 percent). Phase 1, clearance of the CVFAW, is ongoing and is described in a separate Work Plan (WESTON, 2012). The work described in this Work Plan is associated with RAU 3 Phase 2.

1.8 WORK PLAN ORGANIZATION

This Work Plan was prepared using components of the Army guidance documents, Engineer Manual 1110-1-4009 (USACE, 2007) and the Data Item Description (DID) MMRP-09-001 (USACE, 2009a). The Work Plan is organized as follows:

Section 1—Introduction

Section 2—Technical Management Plan

Section 3—Field Investigation Plan

Section 4—Quality Control Plan

Section 5—Explosives Management Plan

Section 6—Environmental Protection Plan

Section 7—Property Management Plan

Section 8—Interim Holding Facility Siting Plan for Recovered Chemical Warfare Materiel Projects

Section 9—Physical Security Plan for Recovered Chemical Warfare Materiel Project Sites

Section 10—References

The following documents are appended to this Work Plan:

Appendix A—RAU 3 Phase 2 Scope of Work

Appendix B—Site Maps

Appendix C—Points of Contact

Appendix D—Accident Prevention Plan (APP)

Appendix E—Munitions Constituents Sampling and Analysis Plan (not required)

Appendix F—Contractor Forms

Appendix G—Standard Operating Procedures (SOPs)

Appendix H—Personnel Qualifications Certifications

Appendix I—Explosives Safety Submission Amendment 3

Appendix J—Wetland Protocol

2. TECHNICAL MANAGEMENT PLAN

2.1 PROJECT OBJECTIVES

The project objective is to remove MEC from RAU 3 Phase 2 locations to a depth of 0 to 3 inches bgs using ferromagnetic metal detectors for surface clearance and 0 to 14 inches bgs using all metals detectors for subsurface clearance areas. Additional information, including a list of the specific Phase 2 areas and associated clearance depths is presented in Section 1.2 of this document.

2.2 PROJECT ORGANIZATION

The WESTON Project Manager (PM), will provide overall management of project activities. The WESTON PM will interact directly with the Clark County PM and will coordinate all site work activities through communications with WESTON's Senior Unexploded Ordnance Supervisor (SUXOS), Unexploded Ordnance Safety Officer (UXOSO), and Unexploded Ordnance Quality Control Specialist (UXOQCS). Contact information for the above-listed personnel is included in Appendix C.

The following subsections contain details pertaining to project personnel, communications and reporting, deliverables, schedule, public involvement, subcontractor management, and field operations management. A project organization chart is provided on Figure 3.

2.3 PROJECT STAFF—WESTON SOLUTIONS, INC.

2.3.1 Project Manager

The PM is the primary point of contact for the project, and has the overall responsibility for the management of project activities. The PM is responsible for interacting with WESTON and Clark County personnel to ensure that the RAU 3 Phase 2 Remedial Action is executed according to the Clark County Scope of Work and WESTON Project Plans. The duties of the PM include:

- ensuring timely, transparent communication and coordination between the WESTON Team and Clark County

- allocating and committing resources to achieve project goals
- monitoring/controlling project performance, costs, schedules, quality, and safety
- preparing monthly status reports and attending internal and client status meetings
- assessing/directing subcontractor performance
- maintaining the Project Management Plan.
- overall supervision of the activities and resources to achieve project goals
- ensuring on-time completion and approval of deliverables
- notifying management of needed resources and obtaining resource commitment
- ensuring implementation of project health and safety and quality control (QC) procedures
- maintaining effective communications with stakeholders
- preparing project status reports as required
- ensuring Clark County is provided with real-time access to reports and other deliverables, utilizing WESTON's TeamLink® website

2.3.2 Senior UXO Supervisor

The SUXOS will provide supervision and oversight of MEC-related activities. The SUXOS will report directly to the WESTON PM and will have an open line of communication with the UXOQCS and UXOSO. The SUXOS responsibilities include:

- coordinating with the onsite client team
- planning, coordinating, and supervising onsite MEC-related activities, and implementing the Site-specific Safety and Health Plan
- coordinating and supervising onsite subcontractors
- ensuring compliance with procedures and guidance for site operations, including quality and safety
- inspecting and certifying MDAS for proper disposal
- preparing the Daily Activity Report
- adherence to the contract schedule
- supervising multiple project teams during the MEC removal and MEC-related activities, such as:
  - unexploded ordnance (UXO) escort for analog geophysical surveys, investigations and removal actions

- UXO escort for anomaly avoidance during brush cutting, potential natural resource inspections and land surveying
- MEC demolition activities
- storing explosive material

The SUXOS will meet or exceed the requirements for this position as presented in the DDESB-approved Technical Paper Number 18 (DDESB, 2015).

The SUXOS is to be physically onsite whenever project-related fieldwork is in progress. If the SUXOS is to be absent from the site, with client approval, an alternative SUXOS will be designated and will be given equivalent responsibilities and authority.

2.3.3 UXO Safety Officer

The UXOSO will provide health and safety support to the SUXOS and assure compliance with health and safety requirements, including MEC and any hazardous or toxic materials. The UXOSO will be responsible for monitoring compliance with plans, procedures, and regulations relative to health and safety during all site activities.

The UXOSO will have a direct line of communication with the Corporate Environmental Health and Safety Director for administrative and technical direction on health and safety matters and will maintain an open line of communication with the PM, SUXOS and UXOQCS. The UXOSO responsibilities include:

- assuring compliance with the approved Explosives Safety Submission (ESS), Amendment 3, APP/SSHP, and WESTON UXO safety program consistent with applicable DOD, federal, state, and local statutes and codes
- analyzing UXO and explosives operational risks, hazards, and safety requirements
- assuring compliance with site-specific safety requirements for UXO and explosives operations
- enforcing personnel limits and safety exclusion zones for UXO removal operations, UXO and explosives transportation, storage, and destruction
- conducting safety inspections to ensure compliance with UXO and explosives safety codes

- stop work to correct an unsafe condition or procedure

The UXOSO will meet or exceed the requirements for this position as presented in DDESB Technical Paper Number 18 (DDESB, 2015).

The UXOSO is to be physically onsite whenever project-related fieldwork is in progress. If the UXOSO is to be absent from the site, with client approval, an alternative UXOSO will be designated and will be given equivalent responsibilities and authority. The UXOSO will also serve as the Site Safety and Health Officer, as described in the APP (Appendix D).

2.3.4 UXO Quality Control Specialist

The UXOQCS will have a direct line of communication with the WESTON Executive Sponsor for administrative and technical direction on quality matters. The UXOQCS will maintain an open line of communication with the PM, SUXOS and UXOSO. The UXOQCS responsibilities include:

- monitoring activities affecting quality and safety during the MEC remediation activities
- ensuring that procedures are being carried out in accordance with established requirements and protocols
- performing QC-related activities, including placement of blind QC seeds, daily surveillance of work activities and issuing corrective actions, as necessary
- preparing the daily UXO Quality Control Report documenting QC processes and results
- monitoring MEC investigation, removal, and demolition activities for compliance with health and safety requirements as established in plans and procedures

The UXOQCS will meet or exceed the requirements for this position as presented in DDESB Technical Paper Number 18 (DDESB, 2015).

The UXOQCS is to be physically onsite whenever project-related fieldwork is in progress. If the UXOQCS is to be absent from the site, with client approval, an alternative UXOQCS will be designated and will be given equivalent responsibilities and authority.

2.3.5 UXO Technicians

UXO technicians will be required to perform visual identification, removal, and disposal operations at locations where MPPEH and non-munitions related metallic items are detected. UXO technicians will work under the supervision of the SUXOS. The technicians will be responsible for locating, investigating, identifying, removing, and disposing of all recovered metallic debris. In addition, they will be responsible for documenting required information identified in this work plan. UXO technicians will meet the qualifications of a UXO Technician I, at a minimum, and be under the direct supervision of a UXO Technician III. UXO technicians will meet the requirements presented in DDESB Technical Paper Number 18 (DDESB, 2015).

Composition of the UXO teams will vary according to the type of removal activity. Teams will be comprised of UXO Technician IIIs as team leader and UXO Technician IIs.

UXO Technician III

The UXO Technician III supervises a project team performing work on this project. The UXO Technician III may also serve in the capacity of Demolition Supervisor during demolition and explosive demilitarization operations. The UXO Technician III is responsible for:

- supervising the team to which he/she is assigned
- providing MEC subject matter expertise to ensure the team's safety and the project's quality
- ensuring the team's action is accomplished safely and efficiently
- maintaining administrative records related to the team's operations
- implementing the work, safety, and quality plans for this project
- supervising the conduct of all onsite evaluations directly related to MEC operations
- being familiar with the duties of all assigned personnel and being able to perform all of the functions enumerated for a UXO Technician II
- if assigned as a Demolition Supervisor during demolition operations, the UXO Technician III is also responsible for:
  - training all personnel regarding the nature of materials, hazards, and precautions
  - coordinating with the SUXOS to ensure all notifications are completed prior to demolition

- being present and in direct control during all onsite disposal operations

The UXO Technician III will report directly to the SUXOS and will have the experience and qualifications required in DDESB Technical Paper Number 18 (DDESB, 2015).

UXO Technician II

The UXO Technician II will report directly to the UXO Technician III team leader, and will have the experience and qualifications required in DDESB Technical Paper Number 18 (DDESB, 2015).

2.4 PROJECT COMMUNICATION AND REPORTING

This section describes the coordination and communication with stakeholders necessary to ensure the successful completion of the RAU 3 Phase 2 Remedial Action at CBMR. Key stakeholders, including Clark County, the WADOE, and the Army BRAC office, will be kept informed of project status. WESTON will promote communication with Clark County and its approved stakeholders by using the secure, web-based TeamLink® system to facilitate electronic data-sharing/communication. TeamLink® provides an organized web-based site to post and view project information, provides a means of tracking project action items, and establishes various security levels to control which team members can access posted information. TeamLink® will provide Clark County and its approved stakeholders with direct, secure, and reliable electronic access to project-specific documents and data from anywhere they have internet access.

2.4.1 Monthly Status Report Meeting Minutes

Monthly Status Report Meeting Minutes will be posted on TeamLink® each month summarizing work performed during the previous month and documenting the meeting conducted each month to review the status summary. Meeting attendees include the SUXOS, UXOSO, UXOQCS, WESTON PM, WESTON Data Manager, Army BRAC representative, WADOE representatives, and Clark County representatives. The minutes will review the following:

- Work performed during the previous reporting period (major grids in which work was performed, acres cleared, approximate number of anomalies investigated, QC performed, quality assurance [QA] performed, etc.)

- Activities in progress during the current monthly reporting period
- 30-day forecast and update of project schedule if required
- Topics of interest
- Dates of future monthly meetings

The following will be attached to the meeting minutes each month: a map showing the investigation status; a 30-day forecast table identifying grids to be investigated by specific teams, and a current copy of the project schedule.

2.4.2 Daily and Weekly Status Reports

The following daily reports will be posted to the WESTON TeamLink® project website for each day work is performed:

- Daily Safety Inspection Log (documenting the daily briefing and safety inspection, noting any safety violations or incidents and corrective measures taken)
- Daily UXO QC Reports
- Daily SUXOS Production Report (documenting safety briefing and accidents or incidents, MEC clearance activities, demolition, vegetation removal, QC activities, QA activities, personnel and hours worked)
- Daily Surveillance Report (documenting QC/safety inspection of demolition activities)

A Weekly Field Activity Report will also be prepared and posted to the WESTON TeamLink® project website documenting grids investigated, QC and QA activities; team resources; summary of findings and anomaly count; and safety inspections, incidents or accidents.

2.4.3 Phone Conferences/Informal Site Meetings

Telephone conferences and informal site meetings with Clark County will be documented appropriately through follow-up email. Only the Clark County PM can provide official direction to WESTON.

2.4.4 Regulatory Coordination

All regulatory coordination must be approved by the Clark County PM. The WESTON PM will provide the necessary support to initiate, schedule, and address all regulatory aspects of the project (e.g., organizing discussions with regulators concerning site response objectives and completion requirements, obtaining regulator comments on site documents and appropriately addressing them, and obtaining written documentation of completion from the regulators for RAU 3 Phase 2). The Clark County PM, or designee, will attend and represent the County at all meetings with the regulators. WESTON will prepare and submit minutes for all significant meetings attended. The Clark County PM will be the signature authority for all regulatory agreements and investigative documentation.

2.5 PROJECT DELIVERABLES

The major project deliverables for the RAU 3 Phase 2 MEC Remedial Action include:

- RAU 3 Phase 2 Work Plan
- Explosives Safety Submission (completed: the Phase 1 ESS was amended to address the Phase 2 field work -- Amendment 3 is included in Appendix I to the Work Plan)
- RAU 3 Phase 2 After Action Report

Documents will be produced in draft and final versions in both hard copy and electronic PDF. Documents will be identified as draft until completion of stakeholder review, incorporation of responses to comments, and approval as final. A copy of the final document will be placed in designated repositories.

2.6 PROJECT SCHEDULE

Field work for RAU 3 Phase 2 is expected to begin in the fourth quarter of 2015 and will be performed in coordination with Phase 1 activities in the CVFAW. Field work associated with both Phase 1 and Phase 2 is anticipated to be completed by the end of 2016; however, monthly updates of the completion date will be provided based on actual production rates. The draft After Action Report will be submitted within 60 days of completion of field work. Updated project schedules will be submitted to the Clark County PM with the monthly status reports.

2.7 PUBLIC INVOLVEMENT

WESTON will not make available or publicly disclose any data or report generated under this contract unless specifically authorized by Clark County. If any person or entity requests information on work being conducted hereunder, WESTON will refer them to the Clark County PM. All reports and other information generated for this work will become the property of Clark County.

WESTON will support Clark County, upon request, for public and stakeholder meetings and, at the direction of Clark County, be available for stakeholder interaction that can contribute to positive project communications and cooperation.

2.8 SUBCONTRACTOR MANAGEMENT

WESTON will manage subcontractors performing work on site. Anticipated subcontractors include brush cutting, land surveying and archeological services. Subcontractors will be required to follow and comply with all project-specific requirements related to their scope of work.

2.9 MANAGEMENT OF FIELD OPERATIONS

During field operations, WESTON will use existing buildings at CBMR for field offices. Field operation safety and quality will be monitored by the UXOSO and UXOQCS. A Professional Archaeologist will provide monthly inspection of non-munitions cultural debris to identify and protect cultural and historical resources in accordance with the Camp Bonneville Cultural and Historical Resources Protection Plan (Archeological Investigations Northwest, Inc., 2014).

3. FIELD INVESTIGATION PLAN

3.1 OVERALL APPROACH TO MEC CLEARANCE ACTIVITIES

The overall MEC clearance approach at the Phase 2 areas includes the following activities:

- Land Surveying
- Brush Cutting
- Analog Geophysical Survey and MEC Clearance
  - Analog geophysical surface clearance (0 to 3 inches)
  - Analog geophysical subsurface clearance (0 to 14 inches)
  - MEC/MPPEH identification
- Disposal

3.1.1 Land Surveying

WESTON will ensure that all location surveying and mapping are performed under the direction of a Professional Land Surveyor licensed in the State of Washington. The Professional Land Surveyor will locate and/or establish a minimum number of control monuments. The location, identification, coordinates, and elevations of control points recovered and/or established at the site shall be identified with sub-foot precision and referenced to the North American Datum of 1983/North American Vertical Datum of 1988. The limits of each work area will be marked at appropriate intervals to provide adequate reference points for establishing subgrid areas and clearance lanes (for DA1 all major grid corners and at least one interior subgrid corner will be marked). Major grids (500 feet by 500 feet) and subgrids (100 feet by 100 feet) will be identified based on the existing CBMR grid system. Horizontal precision for perimeter stakes will be sub-foot and referenced to the North American Datum of 1983. A UXO technician II will provide UXO escort and anomaly avoidance support for the surveyor in accordance with SOP-1 (Appendix G).

3.1.2 Brush Cutting

Each RAU 3 Phase 2 MEC clearance location will require cutting of vegetation and removal of deadfall litter prior to MEC clearance consistent with SOP-2 (Appendix G). A preliminary visual

inspection of the work area will be performed for terrain or debris hazards or environmental concerns. Trees, shrubs and vegetation less than six inches in diameter will be cut to a height not more than six inches above ground surface. The cutting crew will be provided with a UXO escort that will provide anomaly avoidance support. Deadfall will be placed in nearby areas near roads and not hauled off. In the event that steep or otherwise dangerous terrain precludes the safe removal of vegetation, those areas will be excluded and the County notified.

DA2, the ranges and firing points all represent vegetation and terrain conditions similar to the CVFAW. DA1 includes steep terrain and wetlands along the North Fork of Lacamas Creek. Manual methods will be required for cutting of vegetation within 15 feet of the creek in accordance with the established Wetland Protocol (Appendix J).

3.1.3 Analog Geophysical Survey and MEC Clearance

Prior to analog geophysical survey, anomaly detection and removal activities, all non-essential personnel will be evacuated from the area in accordance with the appropriate minimum separation distance as presented in the ESS, Amendment 3 (Appendix I). An exclusion zone will be established with barricades and/or signage, stating "Munitions Investigation Do Not Enter".

SOP-3 (Appendix G) describes the methodology and procedures for the analog-instrument-aided anomaly detection and removal. In areas designated for surface clearance and removal (DA1, DA2 and range target areas), UXO-qualified personnel will use Schonstedt Cx52 ferromagnetic metal detectors to evaluate and remove all anomalies from 0 to 3 inches bgs. QC evaluation criteria are described in Section 4.3.

Fixed objects (e.g. observation towers, fortifications, etc.) will not be removed. Roads/trails have been surface cleared by others. Locations of individual anomalies that do not produce an item within the upper 3 inches will not be recorded; however, qualitative information regarding anomaly density within the subgrid will be noted for the After Action Report. Field work documentation will be recorded in accordance with SOP-4 (Appendix G).

The mortar and artillery firing positions and range firing points will be subsurface cleared (0 to 14 inches) using Minelab F3 all-metal detectors (small head). The lateral extent of the firing positions and firing points will be field verified by Clark County and the WADOE prior to

initiating the land survey task. Intrusive investigation and removal of anomalies will also be performed in accordance with SOP-3 (Appendix G). Locations of anomalies deeper than 14 inches will be recorded. The firing positions and firing points include nine artillery and mortar positions specifically (Artillery Positions 1, 2, 3, 4 and 7 and Mortar Positions 1, 2, 5 and 6), the Rifle Grenade Firing Point, and the 3.5-inch Rocket Range Firing Point. The County will assist with communication and coordination with fence-line residents that fall within the exclusion zone during investigation of Artillery Positions 1, 2, 3 and 4. Field work documentation will be recorded in accordance with SOP-4 (Appendix G).

A backhoe may occasionally be used during RAU 3 Phase 2 to remove overburden associated with geophysical anomaly removal. SOP-5 (Appendix G) describes the required procedures for safe operation of the backhoe. If unanticipated chemical contamination conditions in soil are encountered, SOP-6 (Appendix G) provides safety and health requirements and step-by-step procedures to be followed. If MEC or MPPEH items with unknown filler are encountered, SOP-7 (Appendix G) provides safety and health requirements and step-by-step procedures to be followed.

3.1.4 MEC/MPPEH Identification

The correct identification of recovered munitions hazards is required before destruction or disposal. After encountering a suspected MEC or MPPEH item, the UXO-qualified technician will clear debris/dirt from around the item only enough to permit identification. UXO technicians will identify the item as MEC, MDEH, or MDAS. Items of undetermined explosive hazard will be classified as MDEH.

3.1.5 MEC/MDEH Disposal

An onsite magazine is available for storage of donor explosives. MEC/MDEH will be blown-in-place (BIP) if determined to be unacceptable to move by the SUXOS and UXOSO. Munitions that have been determined acceptable to move by the SUXOS and UXOSO may be relocated to the designated demolition site within the Central Impact Target Area at CBMR for disposal or stored for later disposal. Access routes and the detonation exclusion zone will be guarded during

demolition activities. All detonations will take place in the Central Impact Target Area except those detonations that require BIP operations.

WESTON will conduct demolition activities in accordance with the approved ESS, Amendment 3 (Appendix I) of this Work Plan and SOP-8, (Appendix G). Demolition activities will follow the requirements of Technical Manual 60A-1-1-31 (DOD, 2003), Engineering Manual 385-1-97 (USACE, 2008), applicable Bureau of Alcohol, Tobacco and Firearms (ATF), and federal, state, and local regulations. Notifications will be provided prior to demolition (Table 2).

Small arms ammunition segregated from MEC/MDEH and securely stored until transferred to an authorized munitions disposal contractor for offsite disposal by thermal treatment.

3.1.6 MDAS and Non-Munitions Related Material Disposal

Non-munitions related material and MDAS will be held for 100 percent re-inspection and QC. MDAS will be smelted at an authorized offsite facility prior to recycle. Non-munitions related material will be examined by the Professional Archaeologist to identify and retain any cultural and historical resources. Scrap items will be transported to an offsite recycling facility in accordance with governing regulations.

3.2 DATA MANAGEMENT

A data manager designated by WESTON will be responsible for consolidation, organization, and storage of data collected during this project.

3.2.1 Data

Data include both field and technical data that will be collected during the RAU 3 Phase 2 Remedial Action. No samples will be collected for laboratory analysis during this project. Data generated will include the following categories of information:

- Analog investigation status maps
- Spreadsheets summarizing grid status and characterization of found items
- Completed forms (examples are included in Appendix F)

- Field notes

These data may be stored in electronic files or archived as hard copies.

3.2.2 Filing System

A project file (electronic and/or hard copy) will be maintained by WESTON documenting the work performed during RAU 3 Phase 2. The file may contain the following information:

Pertinent Project Communications and Updates

- Work Plans
- Explosives Safety Submissions
- Protocols
- Schedule updates
- Contact list updates
- Field Variance Forms
- Monthly Status Report Meeting Minutes

QA Reports

- Analog Investigation Status Maps
- Signed Camp Bonneville QC/QA Verification Grid Sheets

Field Activity Reports

- SUXOS Production Reports
- Safety Reports
- UXO QC Reports
- Surveillance Reports
- Non-Conformance/Corrective Action Reports (CAR)

3.2.3 Data Location, Numbering, and Maintenance

Key documents, such as work plans and reports, will be numbered with a unique document control number.

3.2.4 TeamLink Website

As described in Section 2.4, WESTON will maintain a TeamLink® project website providing real-time access to reports and other deliverables to Clark County and other stakeholders.

4. QUALITY CONTROL PLAN

4.1 STANDARD QUALITY CONTROL PROCESS

It is WESTON's policy to apply sound and cost-effective quality principles to all of its activities. This policy assists in ensuring the proper execution of work, the management of liability, and the maintenance of WESTON's professional reputation for excellence. The quality policies established within this Work Plan and its implementing plans and procedures are applicable to all project personnel and subcontractors affecting quality, including, but not limited to, MEC investigation and removal, demolition operations, handling of demolition materials, and data management. Regardless of subcontractor or teaming agreements, WESTON is solely responsible for the control of quality and for providing Clark County with services and deliverables that conform to contractual requirements.

This Quality Control Plan identifies quality requirements to ensure that overall project activities are accomplished using an acceptable level of internal controls and review procedures. The intent of such controls is to eliminate conflicts, errors, and omissions and to ensure the technical accuracy of deliverables. SOP-4 (Appendix G) provides additional direction regarding the completion of field documentation.

4.1.1 Logs and Records

Field activities affecting QC will be performed in accordance with documented procedures identified in the Work Plan or applicable SOPs. During field activities, WESTON may use any or all of the reporting forms included in Appendix F and additional forms and reporting media as necessary. Forms may be modified as needed. Examples of such forms include:

- Daily UXO QC Reports
- Daily Safety Inspection Logs
- Daily SUXOS Production Reports
- QC Surveillance Reports (documenting specific QC inspections)
- Monthly Archaeological Investigation Reports (documenting the monthly site visits to examine artifacts)

- Equipment and Vehicle Inspection Forms
- Site Visitors Logs

4.1.2 Anomaly Excavation Records

The UXO Team Leaders will prepare individual records for each operating grid. This record consists of fields that are used to record data on the excavation of anomalies and work conducted. These data are filed daily. The following workday, these data are reviewed by the SUXOS and UXOQCS for completeness, accuracy, and overall quality.

4.1.3 Daily UXO Quality Control Reports

The UXOQCS will prepare UXO QC Reports including the following information:

- Preparer (name and signature) and date
- Summary of inspections, surveillance, or reviews performed, noting the results and discrepancies, if any (see also QC Surveillance Reports)
- Results of any review of submittals or other items
- Results of QC inspections of grids and transects
- Significant issues or open items

The UXOQCS will also maintain a field logbook of all inspection and testing activities. This daily logbook will be used in preparing the recurring reports and deliverables and the project report.

4.1.4 Daily Safety Inspection Logs

Safety logs will be maintained in accordance with requirements of the APP (Appendix D) and retained in the project files. The UXOSO will prepare Safety Inspection Logs including the following information:

- Preparer (name and signature) and date
- Weather conditions
- Documentation of daily briefing and safety inspections, noting any safety violations or incidents and corrective measures

- Documentation of any incidents, accidents, or significant site events that may impact safety, and stopping work because of safety issues.

The UXOSO will also document daily safety meeting attendance.

4.1.5 Daily SUXOS Production Reports

The SUXOS will prepare Production Reports including, the following information:

- Preparer (name and signature) and date
- Documentation of safety briefing and accidents or incidents
- Descriptions of MEC clearance activities, demolition, vegetation removal, QC activities, QA activities
- Personnel and hours worked

4.1.6 QC Surveillance Reports

The UXOQCS will prepare QC Surveillance Reports including, the following information:

- Preparer (name and signature) and date
- Description of inspections, surveillance, or reviews performed, noting the results and discrepancies, if any

4.1.7 Training Records

The UXOSO maintains training records for all site personnel. These records contain training certificates, licenses, and other qualifying data for an individual's duty position.

4.1.8 Site Visitor's Log Book

WESTON will maintain a visitor log book on site. All personnel who are not directly involved in the project site activities are identified in this log by name, company, date, time in/out, and a contact phone number. Safety briefings and training for visiting personnel are recorded in this log. The Clark County Range Control also maintains a site visitor's log.

4.2 QUALITY CONTROL INSPECTION PROCESS

Quality control measures will be similar in scope to the Phase 1 work at the CVFAW. A full-time UXOQCS will be on site monitoring all site activities. Failure criteria for the firing point subsurface clearance will be identical to the CVFAW. Failure criteria for the DA1, DA2, and firing range surface clearance areas will be consistent with the CVFAW failure criteria but limited to ferromagnetic items within the upper 3 inches detectable using a Schonstedt detector. The failure criteria are discussed in Section 4.3.

The quality requirements associated with the RAU 3 Phase 2 Remedial Action field activities are defined in Table 3. These requirements apply to all field activities that affect the quality of work and work products. QC checks will be conducted as follows:

Daily Briefings—The UXOSO and SUXOS will ensure that morning tailgate safety and operational briefings are conducted with the project team.

Communications—Positive communications with site personnel will be maintained throughout the workday. At a minimum, communication checks will be conducted each morning prior to starting work. Additional checks will be performed as necessary throughout the workday to monitor progress, safety, and/or QC. Teams will not start operations until satisfactory checks have been achieved.

Training—The UXOQCS will ensure that initial site-specific training is provided to all field personnel prior to startup of field activities and that safety control measures have been established. Training will be accomplished using only approved training materials. The UXOQCS will ensure that all certifications are filed on site for review.

Geophysical Instrument Function Testing—Magnetometers and all-metals detectors will be tested at the established Phase 1 instrument verification strip (IVS) with simulants comprised of industry standard objects (metal pipes) buried at different depths and attitudes to simulate ordnance. Each instrument operator will be responsible for demonstrating the magnetometers functionality. The UXOQCS will fill out the Instrument Daily Check Out and Return Procedure Form each day to confirm the instrument has been checked. The UXOQCS will monitor the checkout process at the IVS. If the seed items in the test plot are not detectable by the

magnetometer, the instrument will be labeled and taken out of service until repaired. Questionable functionality of the magnetometer during removal operations requires additional testing at the IVS by the operator.

Documentation—The UXOQCS will ensure the completion of all Daily Field Activity Records.

Review—The UXOQCS will be responsible for the following activities:

- QC inspections of the areas investigated. A minimum of 10 percent of each grid investigated will be inspected to ensure that the detectable MPPEH, MEC, MDAS, and other non-munitions-related metallic items have been removed. Failure criteria are described in Section 4.3. Once a grid has passed the QC check, the Clark County Munitions Safety Officer will be notified for QA inspection. After Clark County QA, the WADOE will be notified to perform their QA.
- compliance with the project's Work Plan, Quality Control Plan, and APP/Site Safety and Health Plan
- communication with WESTON's PM regarding matters related to quality

4.3 QUALITY CONTROL EVALUATION

Quality control evaluation criteria for the subsurface clearance areas will be identical to the CVFAW (Phase 1) criteria detailed in Field Variance #5, i.e., grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid
2. Any inert blind seed item or 1 whole MDAS item equal to or larger than a 14.5 millimeter sub caliber projectile remaining in a grid
3. 5 metal items or MDAS fragments ranging in size from 2 square inches up to 8 square inches remaining in a grid
4. 1 metal item or MDAS fragment equal to or greater than 8 square inches remaining in a grid
5. Small arms equal to or greater than 0.50 caliber (projectile and case) will be considered MEC and fail a grid if 1 remains in a grid

6. Small arms casings equal to or greater than 0.50 caliber will be considered MDAS and fail a grid if 5 or more remain in a grid
7. Small arms less than 0.50 caliber (projectile only) will not be considered MDAS and not count toward the 5 metal item limit

Table 4 provides blind seed specifications. Failure criteria for the DA1, DA2, and target area surface clearance will be consistent with the Phase 1 CVFAW failure criteria, except that for these areas, the instrument-aided surface clearance, quality control, and quality assurance will be performed using Schonstedt detectors to a depth of zero to three inches. Upon completion of a grid by the UXO Team, the UXOQCS will perform a QC grid inspection encompassing, at a minimum, 10 percent of the grid surface area. The list of grids completed, checked by QC, and ready for QA inspection will be updated daily, as required, and forwarded or made available to Clark County. The QC process is shown on Figure 4. Grid failures will be documented on the UXO QC Report. Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings. The exact corrective action will be determined by following the corrective action process detailed in the sections below.

4.4 CORRECTIVE ACTION PROCESS

It is the responsibility of the PM to ensure procedures for reporting, evaluating, and correcting non-conformance are addressed through planned QC procedures. Non-conforming conditions may be discovered as a result of inspecting items or materials or by observing operations.

Project personnel are responsible for identifying non-conforming conditions and notifying their supervisor or manager as soon as the conditions are identified. Determination of any non-conforming conditions must be supported with objective evidence. Non-conforming conditions will be evaluated and corrected and may be considered as opportunities to improve the process.

4.4.1 Identifying and Reporting Non-Conforming Conditions

Non-conforming conditions must be identified and documented. Individuals having knowledge of a nonconforming condition will notify the UXOQCS, who will document the condition in a Non-Conformance Report (NCR).

4.4.2 Controlling Non-Conforming Conditions

The UXOQCS or designee will perform the following activities:

- Log in the NCR and assign it a number
- Notify client representative, SUXOS and PM
- Review the report to determine the nature of the nonconformance
- Initiate a CAR
- Transmit the report to the PM for review and evaluation

The UXOQCS will maintain an NCR log for the project. The NCR log will be used to track and control each nonconforming condition and its corrective action. At a minimum, the NCR log must contain the date each nonconforming condition was discovered (NCR, date), the CAR number, and a description of the nonconforming condition, , the recommended disposition, and the CAR closure date.

4.4.3 Root Cause Analysis

If a product or a process displays a characteristic out of specification with those required by the project specifications or QC objectives, action will be taken to determine the cause. The depth and extent of root cause analysis depends on the situation; it may be as simple as an overlooked step, or it may be a complicated process. Root cause analysis is the responsibility of the PM and may be delegated to other qualified technical and/or QC personnel. The following factors should be considered in the analysis:

- Personnel factors
- Equipment factors
- Methodology factors
- Measurement factors

- Environmental factors
- Material factors

Input may be obtained as necessary from field personnel and technical advisors in order to identify the factors that led to the condition. Any analysis conducted must be documented on the CAR.

4.4.4 Review, Evaluation, and Disposition of Non-Conforming Conditions

The UXOQCS will notify SUXOS and PM of the non-conformance and will review the non-conforming condition and document the recommended disposition on the form. The UXOQCS or designee will update the NCR log, evaluate the recommended disposition, and determine whether corrective action is required.

If corrective action is warranted, the UXOQCS will initiate a CAR. The UXOQCS will also indicate on the CAR the affected disciplines or organizations who must review the recommended disposition. The UXOQCS or designee will route the CAR to the PM and SUXOS for review, concurrence, or rejection.

Upon receipt of the reviewed and evaluated CAR, the UXOQCS will log in the results of the review, indicate acceptance or rejection by signing the CAR, and distribute completed copies to the individuals who reviewed the CAR and to the client. CARs will be maintained in the project files and available on site.

4.5 FIELD VARIANCE APPROVAL REPORT

Changes to the procedures and/or scope of work described in this Work Plan will be addressed through a field variance request. An example Field Variance Form is included in Appendix F.

5. EXPLOSIVES MANAGEMENT PLAN

5.1 GENERAL

This Explosives Management Plan provides the procedures to be used by UXO personnel to acquire, receive, store, transport, and issue explosives utilized during the RAU 3 Phase 2 Remedial Action. All personnel involved with explosives will comply with federal, state, and local laws as required.

5.2 LICENSES/PERMITS

WESTON has a Type 33-User of High Explosives Permit from the Department of the Treasury – ATF and a State of Washington permit to purchase, use and store explosives. A copy of all licenses and permits are maintained on site and available to any local, state, or federal authority. Site personnel who will handle or have access to explosives shall have ATF Employee Possessor Forms, which will be kept on file.

5.3 ACQUISITIONS

Acquisitions will be made by the SUXOS on an as-needed-basis in a timely manner. The initial acquisition must be in place prior to beginning intrusive activities, and all subsequent shipments must be on site to ensure there is no break in operations. Before demolition materials are ordered, the Purchase/Receipt Authorization List (Appendix F) must be completed and forwarded to the explosives distributor(s), along with a copy of WESTON's ATF License. Prior to bringing the explosives on site to the CBMR property, the SUXOS will coordinate with the Clark County PM and Munitions Safety Advisor. WESTON will determine the quantity of donor explosives on an as-needed basis. Explosives will be stored on site in three portable explosives storage magazines. Donor explosives may include perforators, boosters, detonation cord, and blasting caps.

5.4 ACQUISITION SOURCE

Donor explosives will be purchased from sources authorized and licensed by ATF.

5.5 INITIAL RECEIPT OF EXPLOSIVES

Only those individuals named on the authorization list may sign for explosives from the shipper. To ensure that the quantity shipped is the same as the quantity listed on the shipping documents, the SUXOS will inventory the shipment before signing for it. If the SUXOS is unavailable, a designee from the Purchase/Receipt Authorization List will inventory the shipment before signing for the shipment.

In the event there is a discrepancy between the amount of explosives shipped and the amount of explosives received, the SUXOS will immediately contact the explosives supplier and inform the supplier of the discrepancy. If there is a discrepancy, the shipment will not be accepted. It is then the responsibility of the supplier to rectify the situation and inform WESTON of the results. If the discrepancy cannot be resolved within 24 hours, the Clark County PM, Local Law Enforcement Agency, and ATF will be notified. Figure 5 depicts the receipt of explosive materials process.

5.6 EXPLOSIVES STORAGE MAGAZINE

Donor explosives will be stored in two ATF Type 2 magazines; one has an attached detonator box that is also considered a magazine. No more than 100 pounds net explosive weight will be stored in a single magazine. The Inhabited Building Distance for this net explosive weight is 658 feet in accordance with the DOD 6055.09-M Table V3.E3.T2 and the Public Transportation Route distance is 395 feet in accordance with DOD 6055.09-M Table V3.E3.T2. These distances are more conservative than those prescribed by the ATF. Magazines will be separated by a minimum of the Intermagazine Distance K11 of 51 feet in accordance with DOD 6055.09-M Table V3.E3.T8. These commercial explosives will have assigned DOD hazard division/storage compatibility groups and will be stored in accordance with DOD 6055.09-M, DA Pam 385-64 and any local installation regulations.

5.7 TRANSPORTATION

The transportation of explosives to onsite locations requiring demolition operations will be conducted in the following manner:

- Vehicles transporting explosives to locations requiring demolition operations will stay on roads either improved or unimproved.
- Drivers will comply with posted speed limits, but will not exceed a safe and reasonable speed for conditions.
- Vehicle engine will not be running and brakes will be set when loading/unloading explosives.
- Vehicles will have a safety inspection performed and documented on the Motor Vehicle Inspection Checklist for vehicles carrying explosives (Appendix F) completed prior to loading explosives.
- Vehicles will be equipped with a first aid kit and fire extinguisher.
- Initiating explosives, such as detonators, will remain separated from other high explosives during loading, unloading, and while on vehicles.

5.8 INVENTORY

Upon receipt and verification of explosives demolition material, the Magazine Data Card (Appendix F) will be filled out and kept in the magazine on top of the listed item. A duplicate copy will be maintained by the UXOQCS. A weekly inspection by the SUXOS and QC will be conducted.

Upon completion of each demolition operation, an ammunition consumption report will be completed. Upon expenditure of all explosives, the authorized person will certify in writing that the explosives were used for their intended purpose.

5.9 REPORTING LOST OR STOLEN EXPLOSIVES

If, during an inspection of the explosives magazine, it is determined that forced entry has occurred, personnel will follow these rules:

- Do not open the magazine.
- Do not handle or disturb items within the immediate vicinity.
- Secure the magazine by posting a guard to prevent further access.
- Immediately notify the individuals and agencies listed in Table 5.
- Do not allow entry near the magazine by others until law enforcement personnel arrive.

- Immediately upon request of Law Enforcement Personnel, perform physical inventory and reconcile on-hand explosives with Magazine Data Cards (Appendix F).
- Assist above individuals and agencies as needed.

Loss or theft of explosives will be reported as stated in 27 Code of Federal Regulations (CFR) Part 555 on Commerce in Explosives.

5.10 DISPOSAL OF REMAINING EXPLOSIVES

WESTON is required by ATF to account for all explosives purchased and used. Following completion of work in the CVFAW, unused explosives will be retained for usage in subsequent work at the CBMR, returned to the supplier, or destroyed on site and properly documented.

6. ENVIRONMENTAL PROTECTION PLAN

This Environmental Protection Plan (EPP) has been prepared in accordance with DID MR-005-12 (USACE, 2003). The objective of this EPP is to provide adequate procedures and methods during site activities to safeguard against detrimental impacts to the surrounding environment and its natural resources, to correct any damage done to the environment as a result of site activities, and to control noise and dust on site within reasonable limits. This EPP addresses the known environmental concerns/issues associated with this project; however, during operations, unforeseen concerns/issues may arise. In this event, operations in the affected area will be suspended until the full potential environmental impact is understood and appropriate measures are taken to minimize the environmental impact.

6.1 THREATENED/ENDANGERED SPECIES

There are no federally registered endangered species either present or potentially present at CBMR. However, there are several special-status species present at or near CBMR. Species confirmed at or near CBMR include:

- **Amphibians:** Northern red-legged frog (federal species of concern)
- **Birds:** Vaux's swift (state candidate species) and Pileated woodpecker (state candidate species)
- **Mammals:** Brush Prairie (Northern) pocket gopher (state candidate species)
- **Fish:** Coastal Cutthroat Trout (federal species of concern)
- **Vegetation:** Hairy-stemmed checker mallow (state endangered species) and Small-flowered trillium (state sensitive species)

WESTON will provide training that outlines special-status species potentially onsite. The training will be administered by the UXOSO to all WESTON employees and subcontractors that participate perform tasks at the CVFAW one time upon arrival to the site. In the event that special-status species is observed, the SUXOS will be notified. The SUXOS will verify the presence of the special-status species. After verification, the SUXOS will immediately notify Clark County and the WESTON PM.

6.2 WATER RESOURCES

The principal surface water feature in the vicinity of the investigation area is Lacamas Creek, which flows southward from the confluence of two branch streams in the north-central part of CBMR, exiting the installation at its southwest corner. From the southwestern property boundary, Lacamas Creek flows southwestward to Proebstel, where it turns toward the southeast and continues to its confluence with the Columbia River at the town of Camas. Numerous minor tributaries, that drain adjacent uplands, flow into Lacamas Creek. Buck Creek and David Creek, the largest of these streams, drain the southeastern hills of CBMR. Operations will not result in significant disturbance of soil and will not result in erosion of sediment or distribution of debris into Lacamas Creek.

6.3 CULTURAL, ARCHAEOLOGICAL, AND HISTORICAL RESOURCES

During RAU 3 Phase 2, cultural, archeological and historical resources will be protected by implementing the Camp Bonneville Cultural and Historical Resources Protection Plan: 2014 Update (Archeological Investigations Northwest, Inc., 2014). All workers to perform intrusive activities will receive archaeological awareness training prior to the commencement of the RAU 3 Phase 2 MEC remedial action. Monthly inspections will be performed by the Archeologist for all recovered non-munition items. Upon inadvertent discovery of any archaeological site or human remains, work will stop in the vicinity of the discovery pending further evaluation.

6.4 COASTAL ZONES

There are no coastal zones on or near the CBMR RAU 3 Phase 2 work areas.

6.5 VEGETATION REMOVAL

Procedures to be followed during vegetation removal, i.e., brush cutting, are described in Section 3.1.2.

6.6 SAMPLING

No sampling for munitions constituents or other traditional environmental contaminants is anticipated during the RAU 3 Phase 2 MEC remedial action.

6.7 INVESTIGATION DERIVED WASTE DISPOSAL

Investigation-derived waste generated during the project will be limited to materials that do not require special handling, packaging or disposal.

6.8 DECONTAMINATION PROCEDURES

Decontamination of personnel, equipment or vehicles is not expected to be required.

6.9 MITIGATION PROCEDURES

6.9.1 Investigation Derived Waste

No investigation-derived waste is expected to be generated during the RAU 3 Phase 2 Remedial Action. If, however, investigation-derived waste is generated, it will be properly containerized and characterized prior to disposal. For non-explosive soil, containerization will consist of plastic or steel drums or pails with secure covers. For liquids (i.e., water) containerization will consist of a plastic drum or pail with secure cover. Characterization of the wastes will be as required by the disposal site. All personal protective equipment and disposable sampling equipment are considered non-hazardous. Personal protective equipment and sampling equipment will be placed in a plastic bag and disposed in an appropriate refuse container.

6.9.2 Burning Activities

Open fires, such as campfires or fires to dispose of cut brush, will not be permitted during the performance of this project.

Smoking will be restricted to designated areas. Smoking areas will be designated by the UXOSO. In all cases, cigarettes butts and matches must be disposed of in a sand-filled container. Cigarette butts and matches may not be discarded onto the ground surface.

6.9.3 Dust and Emission Control

WESTON will limit vehicle travel to a slow rate of speed in order to minimize the potential for dust emissions. If soil grading, transportation, and/or sifting operations are performed, dust levels will be monitored, and abatement measures will be implemented, if required. These procedures are detailed in the SSHP (Appendix D).

6.9.4 Noise Control and Prevention

It is expected that this project will generate two primary sources of noise: noise from mechanical equipment (e.g., trucks), and noise from demolition activities. WESTON will control the noise emissions from mechanical equipment by ensuring that the manufacturer's noise control equipment is in place and functioning (e.g., mufflers). To minimize nuisance noise, equipment will be powered off when it is not in use.

The second source of noise will be pulse noises resulting from demolition activities. Both tamping the demolition shot with earth or sand bags and observing weather conditions on the day of the shot will control this noise. For example, a day with a low cloud ceiling will transmit the nuisance noise more significantly than a clear day. To reduce the nuisance noise on a cloudy day, various options, including possibilities such as not conducting the demolition shot, waiting for a shift in prevailing winds, reducing the net explosive weight of the shot, or some combination of controls, will be assessed. The SUXOS and the Demolition Supervisor will determine the best method of noise control.

6.9.5 Spill Control and Prevention

The Spill Prevention Control and Countermeasures regulations require owners or operators of certain above ground oil storage facilities to prepare and comply with written, site-specific, spill prevention plans (see 40 CFR Part 112):

- Facilities with a total above ground oil storage capacity of more than 1,320 gallons
- Single above ground tanks with an oil storage capacity of more than 660 gallons
- Facilities with a combined underground oil storage capacity greater than 42,000 gallons

It is not anticipated that petroleum products will be stored in any one above-ground tank exceeding 600 gallons or in more than one above-ground tank with total storage capacity exceeding 1,320 gallons; therefore a Spill Prevention Control and Countermeasure Plan is not required. WESTON plans to conduct most fueling and repair of vehicles off site if possible. This practice will decrease the amount of pollutants that need to be stored on the Site. Utility vehicles may be refueled on site.

If hazardous materials are stored on site, secondary containment of adequate size to contain a spill (110 percent of storage tank size) will be provided. In the unlikely event that WESTON will need to store containers of hazardous waste on site, they will be used and managed in accordance with 40 Code of Federal Regulations Subpart I. Any spills originating from small containers (e.g., gasoline cans) will be contained by the use of absorbent materials.

Because of the nature of the operations, the potential for a spill of pollutants during operations is low. The highest probability for a spill will occur during re-fueling operations of equipment. A spill kit will be maintained on site to be used for immediate cleanup if a petroleum product is inadvertently spilled. Any spills originating from small containers (e.g., gasoline cans) would be contained using absorbent materials. In the event of a spill, WESTON will notify the appropriate emergency responders. If fuel or oil is spilled, the following measures will be taken:

- The spill area will be isolated and contained.
- The WESTON PM will be notified during a spill response.
- The liquid and affected soil will be placed into a Department of Transportation-approved shipping container.
- The material will be sampled to characterize the waste and each container labeled to identify its contents.
- The container(s) will be shipped off site and disposed of at a permitted facility in accordance with Washington State regulations.

6.9.6 Storage Areas and Temporary Facilities

Storage of materials will be in a designated onsite area approved by Clark County. Munitions-related materials will be handled in accordance with the SOPs in Appendix G. Containerized

scrap metal will be disposed of off site at the conclusion of the project. Temporary storage of fuel containers will be contained within an established fuel storage area. Any temporary facilities will be removed during demobilization.

6.9.7 Access Routes

WESTON will use established roadways (dirt or paved). Although the majority of operations will be conducted using trucks, all-terrain vehicles may be used throughout the CBMR. WESTON does not anticipate preparing any temporary roads in CBMR.

6.9.8 Vegetation Protection and Restoration

WESTON will take all actions necessary to protect and prevent unnecessary damage to vegetation. WESTON personnel will cut only the vegetation necessary for safe and effective access for investigation activities, to ensure that the impacts on all rare and protected floral and faunal species will be avoided and minimized to the greatest extent practicable. No vegetative restoration is planned after remedial actions are completed except for excavation areas, if applicable.

6.9.9 Site Water Run-On and Run-off

All project activities will be conducted in a manner that prevents the discharge of pollutants into adjacent waterways.

7. PROPERTY MANAGEMENT PLAN

No federal, state, or local government equipment or material will used during this effort; therefore a Property Management Plan is not required or applicable for the RAU 3 Phase 2 Remedial Action.

8. INTERIM HOLDING FACILITY SITING PLAN FOR RECOVERED CHEMICAL WARFARE MATERIEL PROJECTS

There is no known or suspected presence or use of Chemical Warfare Materiel at the CBMR thus an interim holding Facility Siting Plan for Chemical Warfare Materiel Projects is not required or applicable for the RAU 3 Phase 2 Remedial Action.

9. PHYSICAL SECURITY PLAN FOR RECOVERED CHEMICAL WARFARE MATERIEL PROJECT SITES

There is no known or suspected presence or use of Chemical Warfare Materiel at the CBMR thus a Physical Security Plan for Chemical Warfare Materiel Projects is not required or applicable for RAU 3 Phase 2 Remedial Action.

10. REFERENCES

Archeological Investigations Northwest, Inc. 2014. *Camp Bonneville Cultural and Historical Resources Protection Plan: 2014 Update*. Prepared for Clark County Department of Public Works, Vancouver, Washington. Report No. 3151. Revised February 6.

Bonneville Conservation Restoration and Renewal Team, LLC (BCRRT). 2008. *Final Remedial Investigation and Feasibility Study – RAU 3*. February.

BCRRT. 2009. *Draft Supplemental Remedial Investigation/Feasibility Study for RAU3.* Revision 2. May.

BCRRT. 2010. *Final Remedial Action Unit 3 (RAU 3) Cleanup Action Plan. Vancouver, WA*. April.

Camp Bonneville Local Redevelopment Authority, 2005. Camp Bonneville Reuse Plan. November 15.

Department of Defense (DOD). 2003. Technical Manual 60A-1-1-4, "Explosive Ordnance Disposal Procedures." Revision 5. December 13.

DOD. 2015. DOD Instruction 4140.62, "Material Potentially Presenting an Explosive Hazard (MPPEH)." August 20.

Department of Defense Explosives Safety Board (DDESB), 2015. Technical Paper (TP) 18, *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities.* September 1.

Environmental Science and Engineering, Inc. 1983. *Installation Assessment of the HQ, I Corps and Ft. Lewis, Washington and the Sub installation Yakima Firing Center, Camp Bonneville, and Vancouver Barracks.*

Geo Recon International. 1981. *Cultural Resources Survey, Forest Management Project, Ft. Lewis and Camp Bonneville, Washington, for U.S. Army, Ft. Lewis.*

Larson, Lynn L. 1980. *Cultural Resource Reconnaissance of Forest Management Tracts on Fort Lewis and Camp Bonneville.* Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Reconnaissance Report No. 34.

Mundorff, MR. 1964. *Geology and groundwater conditions of Clark County, Washington, with a description of major alluvial aquifer supply along the Columbia River*: U.S. Geological Survey Water Supply Paper 1600, 268 p.

Phillips, WIMP. 1987. Geologic Map of the Vancouver Quadrangle, Washington and Oregon.

Sadler, Dale L. 2003. Cultural Resources Survey of Selected Areas, Camp Bonneville, Clark County, Washington. Fort Lewis, Washington.

Shannon and Wilson. 1999a. *Final Report Volume 1 Multi-Sites Investigations, Camp Bonneville, Washington.* Contract No. DACA 67-94-D-1014. July 1999.

Shannon and Wilson 1999b. *Final Landfill 4 Investigation Report, Camp Bonneville, Washington.* Contract DACA 67-94-D-1014. August 1999.

U.S. Army Corps of Engineers (USACE). 2003. DID MR-005-12, Environmental Protection Plan.

USACE. 2007. Engineering Manual (EM) 1110-1-4009, Engineering and Design – Ordnance and Explosives Response, June 15.

USACE. 2008. Engineering Manual (EM) 385-1-97, Explosives – Safety and Health Requirements Manual. September 15.

USACE. 2009a. DID MMRP-09-001, Work Plans.

USACE. 2009b. DID MMRP-09-016, Periodic Status Report.

Weston Solutions, Inc. (WESTON). 2012. *Final Work Plan, Munitions and Explosives of Concern, Remedial Action Unit 3 (RAU 3), Central Valley Floor and Wetlands (CVFAW), Former Camp Bonneville Military Reservation, Vancouver, Washington*. July.

FIGURES

TABLES

APPENDIX A
RAU 3 PHASE 2 SCOPE OF WORK

APPENDIX B
SITE MAPS

APPENDIX C
POINTS OF CONTACT

APPENDIX D
ACCIDENT PREVENTION PLAN AND SITE-SPECIFIC SAFETY AND HEALTH PLAN

APPENDIX E
MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS PLAN (NOT REQUIRED)

APPENDIX F
CONTRACTOR FORMS

APPENDIX G
STANDARD OPERATING PROCEDURES

SOP-1 MEC Anomaly Avoidance

SOP-2 Mechanical Brush Cutting

SOP-3 Analog Geological Survey and Anomaly Removal

SOP-4 Field Documentation

SOP-5 Backhoe Operations

SOP-6 Unanticipated Chemical Contamination Conditions

SOP-7 MEC with Unknown Filler

SOP-8 MEC/MDEH Detonation

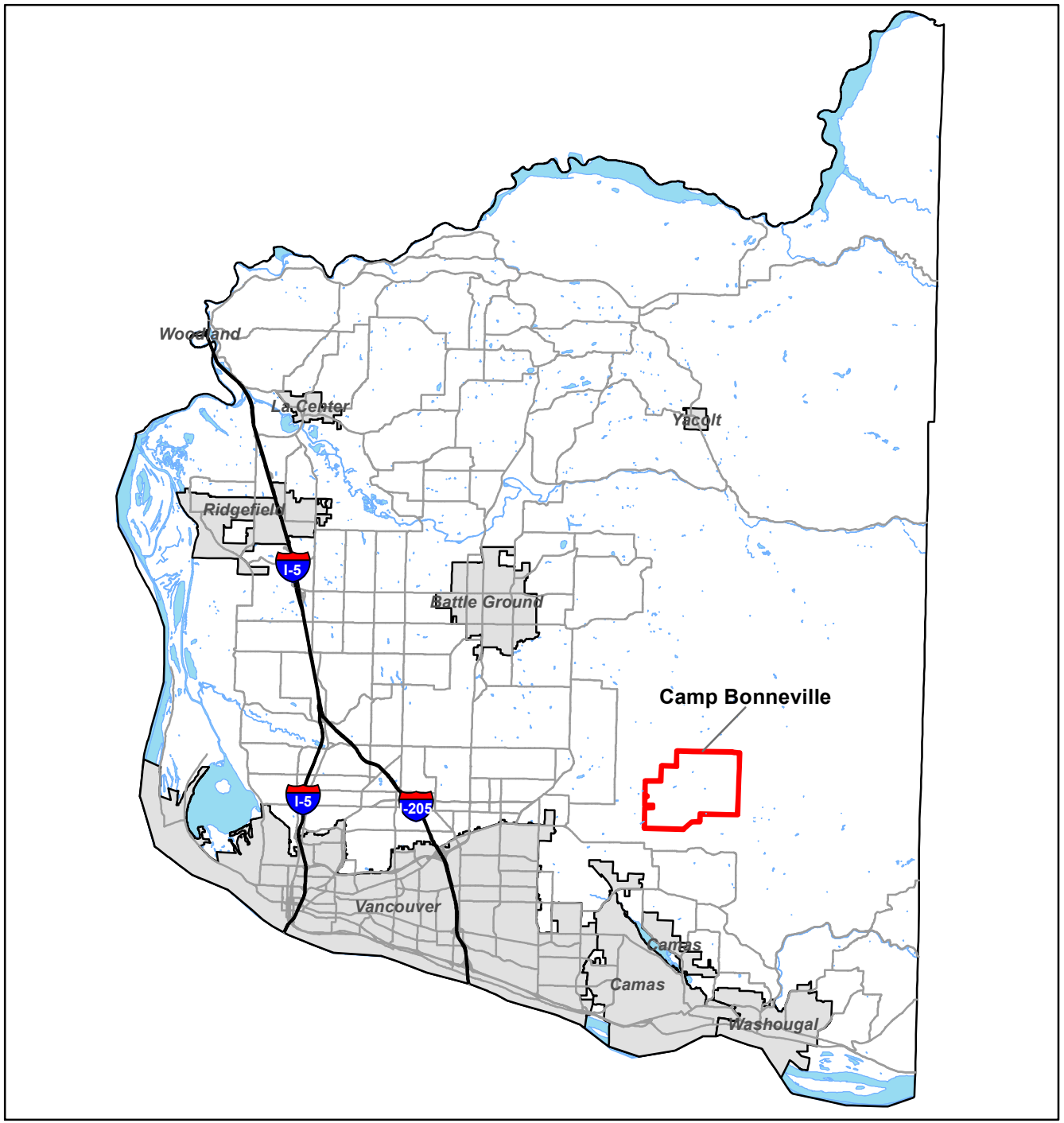
SOP-9 MEC/MPPEH Characterization and MDAS/Small Arms Disposal

APPENDIX H
PERSONNEL QUALIFICATIONS CERTIFICATIONS
Certifications of UXO Techs will be maintained on site in the field office

APPENDIX I
EXPLOSIVES SAFETY SUBMISSION AMENDMENT 3

APPENDIX J
WETLAND PROTOCOL

FIGURES



N

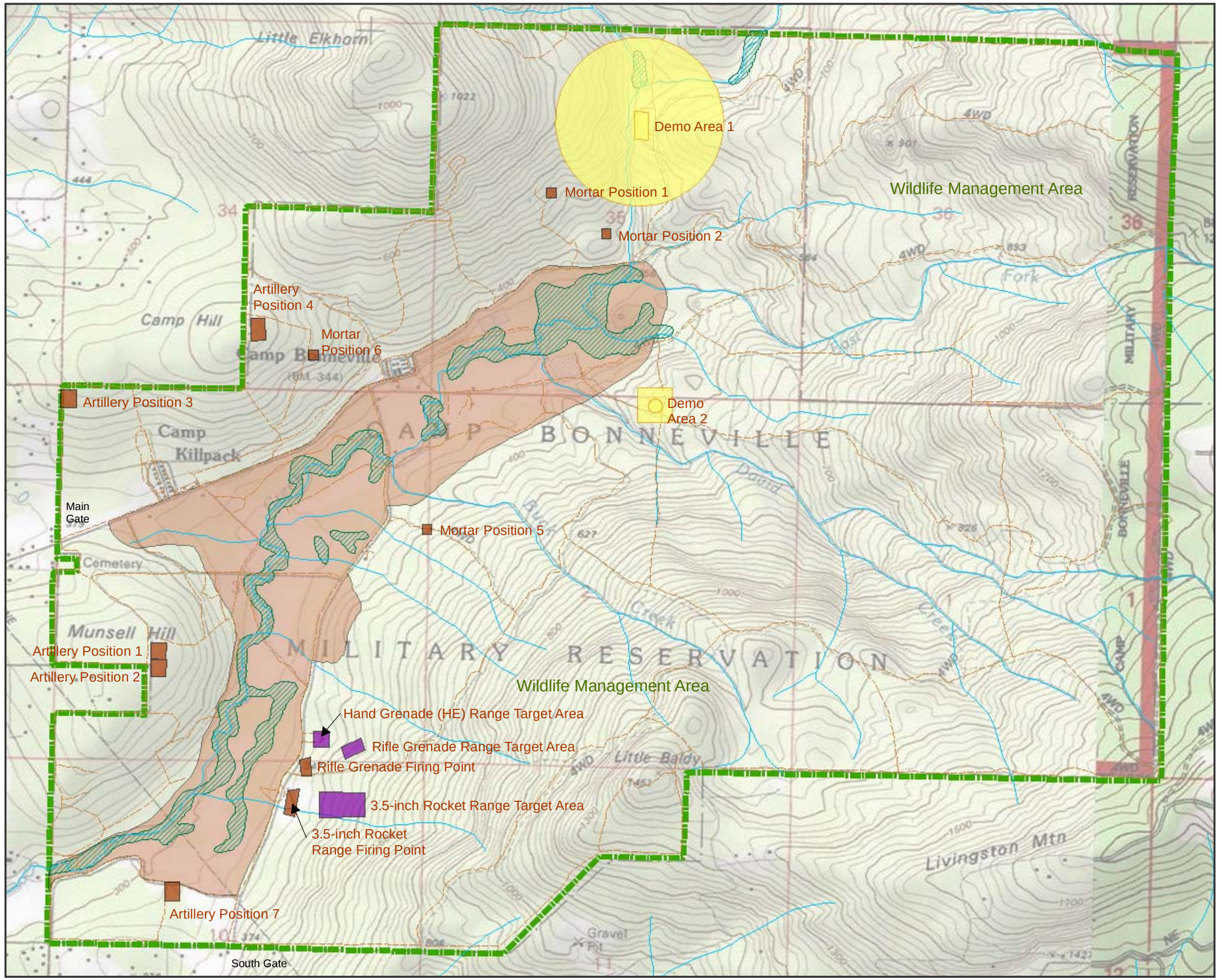
0 2.5 5 10 Miles

Clark County Public Works

FIGURE 1
FORMER CAMP BONNEVILLE
MILITARY RESERVATION LOCATION

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Property Boundary
- Central Valley Area (RAU3 Phase 1)
- Demolition Area (RAU 3 Phase 2)
- Training Range Target Area (RAU3 Phase 2)
- Firing Position/Firing Point (RAU3 Phase 2)
- Wetland Area
- Roads
- Streams / Rivers

N

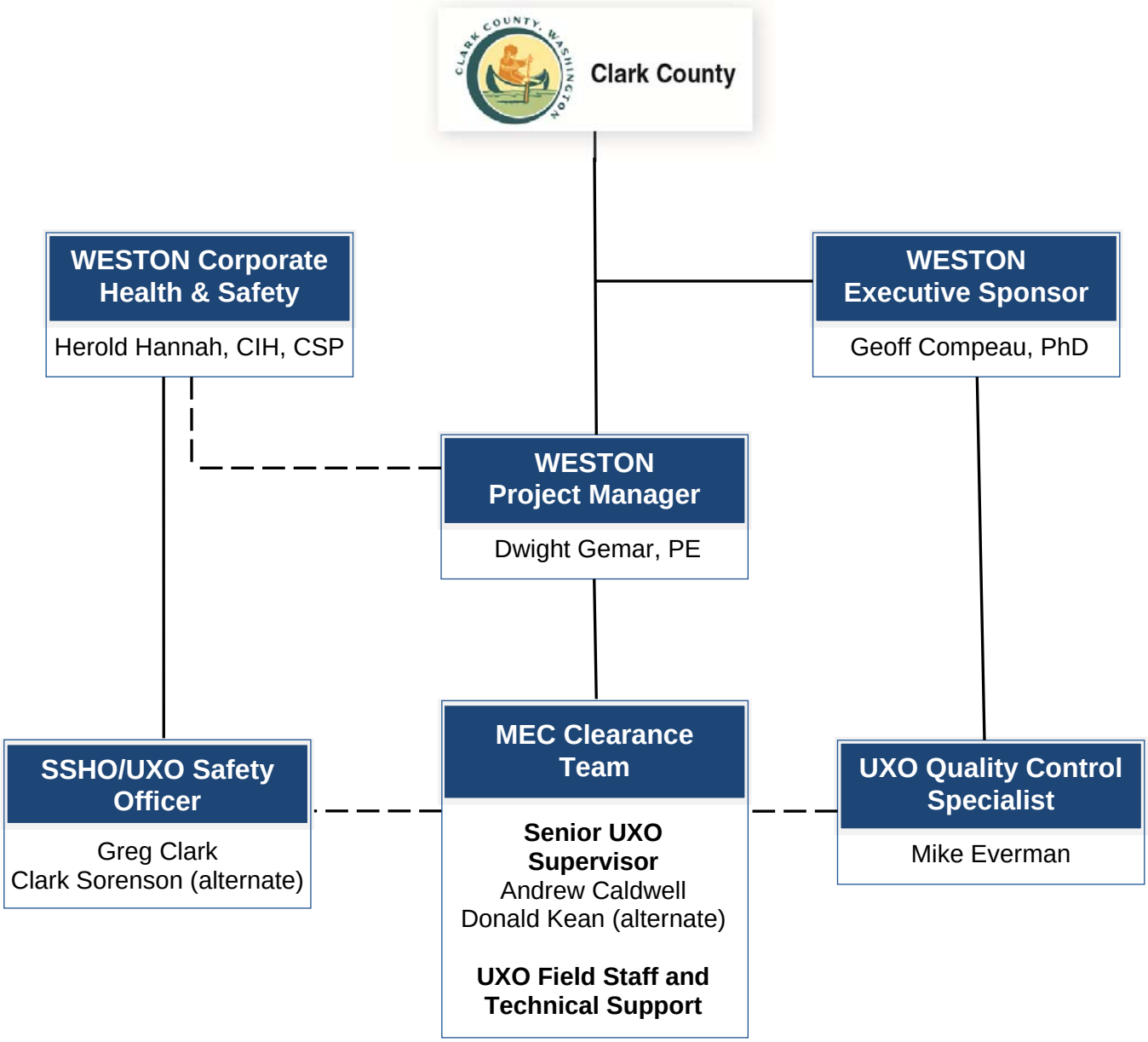
0 1,000 2,000 4,000 Feet

Clark County Public Works

FIGURE 2
RAU 3 PHASE 2
CLEARANCE LOCATIONS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



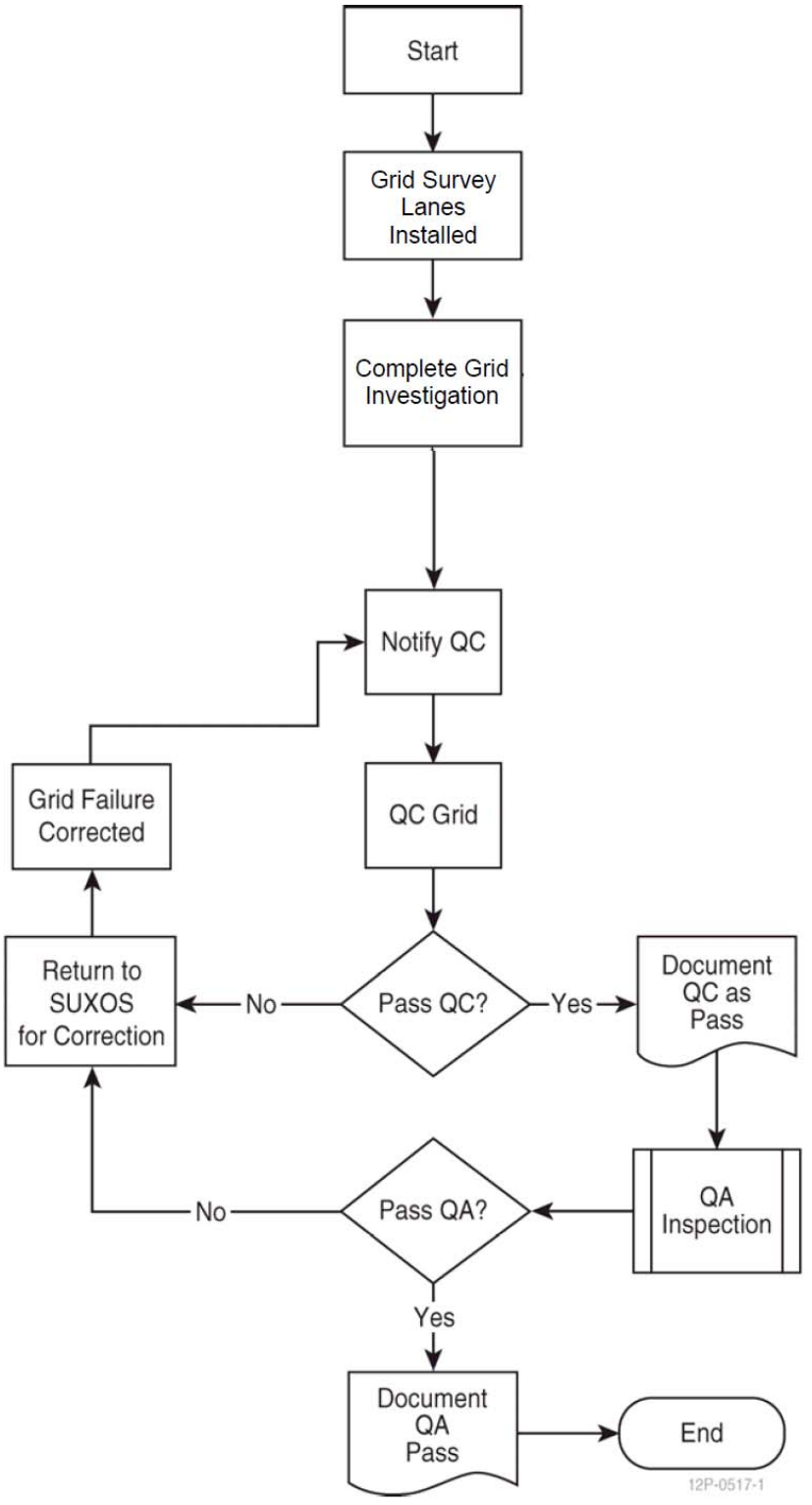
Reporting Relationship

Lines of Communication

Clark County Public Works

FIGURE 3
PROJECT ORGANIZATION CHART

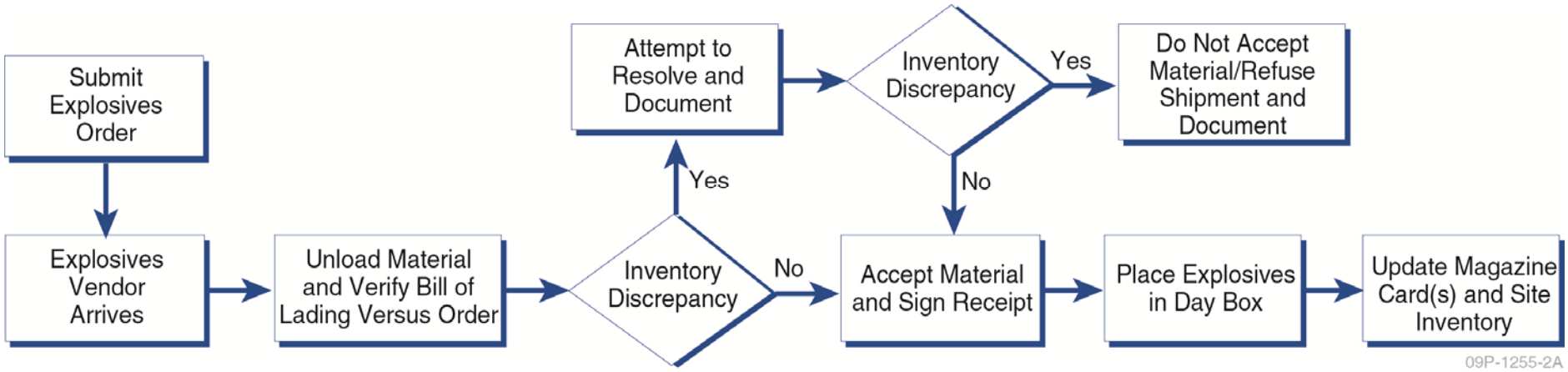
Former Camp Bonneville Military Reservation
Vancouver, Washington



Clark County Public Works

FIGURE 4
QUALITY CONTROL PROCESS

Former Camp Bonneville Military Reservation
Vancouver, Washington



Clark County Public Works

FIGURE 5
RECEIPT OF EXPLOSIVES MATERIAL PROCESS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS

TABLES

Table 1
Munitions Observed or Potentially Used at CBMR

MUNITION ITEM DESCRIPTION
Small Arms, General
Small Arms, 12 Gauge
Cartridge, 14.5-mm, Trainer-Spotter, M183A1
Shell, Fixed, 37-mm, HE, MKII
Shell, Fixed, 37-mm, HE, M54 with Self Destruct Tracer
Shell, Fixed, 37-mm, HE, M54
Shot, 37-mm, AP, M74 with Tracer
Shot, Fixed, APC, 37-mm, M59
Projectile, 37-mm, Practice, M55A1
Cartridge, 37-mm, TP, M63 MOD 1
Cartridge, 40-mm, AP-T, M81
Projectile, 40-mm, HE, HE-I, MK 2
Cartridge, 40-mm, Practice, M382
Cartridge, 40-mm, Practice, M385
Cartridge, 40-mm, HE, M406
Cartridge, 40-mm, Practice, M781
Shell, 75-mm, High Explosive, M48
Cartridge, 75-mm, HE, M309A1 Recoilless Rifle
Shell, Fixed, 3 inch, HE, MK IX
Shell, Fixed, 3-Inch, HE, M42 Series
Shell, Fixed, Practice, 3-Inch, M42B2
Shot, Fixed, 3-Inch, AP, M79
Cartridge, 105-mm, HE, M1
Cartridge, 105-mm, TP-T, M67
Cartridge, 105-mm, HEAT-T, M622
Cartridge, 105-mm, Illuminating, M314A3
Cartridge, 105-mm, Smoke, WP, M60 Series
Projectile, 155-mm, AP, M112
Projectile, 155-mm, HE, Mk I Series
Projectile, 155-mm, Smoke, WP, M110 Series
Projectile, 155-mm, HE, M107
Projectile, 155-mm, Illum, M118 Series
Propelling Charge, 155-mm, M3 Series
Propelling Charge, 155-mm, M4 Series
Mortar, 60-mm, HE, M49A2
Cartridge, 60-mm, Illuminating, M83 Series

MUNITION ITEM DESCRIPTION
Cartridge, 60-mm, Training, M69
Cartridge, 60-mm, SABOT M3
Cartridge, 22-mm, Sub-caliber, Practice M744
Cartridge, 22-mm, Sub-caliber, Practice M745
Cartridge, 22-mm, Sub-caliber, Practice M746
Cartridge, 22-mm, Sub-caliber, Practice M747
Shell, 81-mm, HE and Practice, M43A1
Cartridge, 81-mm, Smoke, WP, M370
Cartridge, 81-mm, Illuminating, M301 Series
Cartridge, 81-mm, SABOT, M1
Cartridge, 81-mm, Training, M68
Trench Mortar, 3-Inch, HE, MK I, MK II
Trench Mortar, Practice, 3-Inch, MK III
Cartridge, 4.2-Inch, Illum, M335A2
Cartridge, 4.2-Inch, HE, M3 Series
Mortar, 4.2-Inch, Smoke, WP, M328
Cartridge, 4.2-Inch, Smoke, PWP or WP, M2 Series
Rocket, 2.36-Inch, Anti-tank, M6A1
Rocket, 2.36-Inch, Practice, M7
Rocket Motor, 2.75-Inch, MK40 Mod 7
Rocket, 3.5-Inch, HEAT, M28
Rocket, 3.5-Inch, Practice, M29
Rocket, 66-mm, HEAT, M72 Series
Rocket, 35-mm, Sub-caliber, M73
Missile, Sparrow, Aim-7E3
Missile, Sparrow, Aim-7F/M
Grenade, Fragmentation, Delay, M26 Series
Grenade, Fragmentation, Delay, M33
Grenade, Fragmentation, Delay, Mk II Series
Grenade, Hand, Training, Mk IA1
Rifle Grenade, Smoke, WP, M19A1
Rifle Grenade, Smoke, M22
Rifle Grenade, Practice, M11A2
Rifle Grenade, Antitank, M9A1
Rifle Grenade, Fragmentation, M17
Grenade, Smoke, WP, M15
Grenade, Hand, Tear, CN, M7 Series
Grenade, Smoke, M18 with fuze

MUNITION ITEM DESCRIPTION
Grenade, Smoke, M201 Series
Grenade, Smoke, HC, AN-M8
Mine, Anti-personal, Practice, M68
Mine, Anti-Tank, M7A1
Mine, Anti-Tank, M1A1
Signals, Illumination, Ground, Parachute, Red Star, M126A1
Signal, Illumination, Ground, Parachute, White Star, M127A1
Signal, Illumination, Ground, Parachute, Green Star, M195
Simulator, Projectile, Ground Burst, M115A2
Simulator, Grenade, Hand, M116A1
Simulator, Boobytrap, Flash, M117
Simulator, Boobytrap, Whistling, M119
Projectile, 75-mm HE Mk I
Rocket, 2.75-inch HE

Table 2
Demolition Notification Roster

Point of Contact	Affiliation	Phone	Comment/ email
Notify by phone at least 30 minutes before detonation			
Hockinson Dispatch	Clark County Fire Station 31	(360) 892-2331	N/A
Non-Emergency Dispatch	Clark County Sheriff Department	(360) 696-4461	N/A
N/A	Portland International Airport	(877) 739-4636	N/A
Notify by email at least 30 minutes before detonation			
Jerry Barnett, PE	Clark County PM	(360) 566-6992	Jerry.Barnett @clark.wa.gov
Greg Johnson	Clark County Munitions Safety Advisor	(360) 566-6993	Greg.Johnson@clark.wa.gov
Tina Redline	Clark County Commissioners' Office	(360) 397-2232	Tina.Redline@clark.wa.gov
Ben Forson	Washington Department of Ecology	(360) 407-7227	bfor461@ecy.wa.gov
Ronnie Johnson	Washington Department of Ecology	(360) 407-6487	RONJ461@ecy.wa.gov
Scott Armstrong	Calibre	(916) 261-4577	Scott.Armstrong@calibresys.com

Table 3
Field Activity Quality Requirements

Objective	Activity	Activity Quality Requirement	Quality Control Verification
Prepare Site	Mobilization and Site Preparation	Mobilize equipment and personnel, and prepare site as described in the Work Plan.	▪ Daily Site Health and Safety Meeting Report ▪ Field Logbooks
Site Work	Analog Operations	Operators locate all items within the instrument verification strip using handheld analog instrument.	▪ Daily instrument checks at IVS to verify performance of each instrument and operator
	Visual Identification of MEC/MPPEH/ MDAS and metallic items	MEC/MPPEH/MDAS and metal will be inspected by a minimum of two UXO-qualified technicians. The UXOQCS will randomly observe this inspection process.	▪ Daily UXO QC Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ Weekly Status Report ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Field Logbooks
	Surface and sub-surface MEC/ MPPEH/MDAS and metal transport, removal and disposal	Site inspection by UXOQCS to inspect a minimum of 10% of the area cleared by the UXO Team to verify thoroughness of MEC/ MPPEH/MDAS and metal removal .	▪ Daily UXO QC Report ▪ Daily Site Health and Safety Meeting Report ▪ Daily Equipment Checklist ▪ Weekly Status Report ▪ QA Audit Checklist and Audit Form ▪ Health and Safety Compliance Inspection ▪ Form 1348 ▪ Field Logbooks
	Demobilization	Demobilize equipment and personnel according to schedule.	▪ Daily Site Health and Safety Meeting Report ▪ Weekly Status Report ▪ Health and Safety Compliance Inspection ▪ Field Logbooks

Table 4
Industry Standard Objects Characterized for Use as Munitions Surrogates
(Adapted from NRL/MR/6110_09_99183)

Item	Nominal Pipe Size	Outside Diameter	Length	Part Number*	ASTM Specification
Small ISO	1 inches	1.315" (33 mm)	4" (102 mm)	44615K466	A53/A773
Medium ISO	2 inches	2.375" (60 mm)	8" (204 mm)	44615K529	A53/A773

Notes:
*Part number from the McMaster-Carr catalog.
*mm = millimeter

Table 5
Notification List for Explosives Theft

Title	Name	Telephone Number
Clark County Project Manager	Jerry Barnett, P.E.	office: 360-566-6992 cell: 360-773-7664
Clark County Munitions Safety Advisor	Greg Johnson, Master EOD	office: 360-566-6993 cell: 360-229-0529
WESTON SUXOS	Andrew Caldwell	office: 610-701-3960 cell: 831-359-8331
WESTON UXO Safety Officer	Greg Clark	cell: 831-915-1169
WESTON UXOQCS	Mike Everman	office: 610-701-3960 cell: 360-929-5725
WESTON Project Manager	Dwight Gemar, P.E.	office: 925-948-2612 cell: 925-899-4674
Bureau of Alcohol, Tobacco, Firearms and Explosives	N/A	800-461-8841

APPENDIX A
RAU 3 PHASE 2 SCOPE OF WORK

Camp Bonneville RAU 3 Phase 2 Scope of Work – Task Descriptions

The RAU 3 Phase 2 Scope of Work is to perform surface and subsurface analog clearance for munitions and explosives of concern (MEC) in accordance with the Final Remedial Action (RAU) 3 Phase 2 work, remediation agreement between Clark County and Weston Solutions, Inc. (Weston), and RFP 614 as applicable. Total clearance area is approximately 124 acres. Specific work areas, clearance depths and methods addressed under this cost proposal include:

- Former Demolition Areas 1 and 2 (DA1 and DA2); surface clearance (0 to 3 inches); using Schonstedt ferromagnetic metal detector
  - DA1: 103.8 acres (1200 ft radius from DA1)
  - DA2: 5.7 acres (500 ft x 500 ft centered on DA2)
- Former Training Ranges: Hand Grenade, Rifle Grenade, and 3.5-inch rocket ranges; surface clearance (0 to 3 inches), using Schonstedt ferromagnetic metal detector
  - Hand grenade range
  - Rifle grenade range
  - 3.5 inch rocket range
- Former Firing Positions: Artillery Position 1, 2, 3, 4 and 7 and Mortar Positions 1, 2, 5, and 6; and Range Firing Points; subsurface clearance (0 to 14 inches); using Minelab all-metals detector (small head)
  - Assumed to be approximately 100 ft x 200 ft each

Task 1, Permits, Work Plans, and all other Federal, State, Local and Tribal Government Requirements

This task includes home office and field personnel effort to prepare a separate work plan, or amendment to the Central Valley Floor and Wetlands (CVFAW) workplan, to address the Final RAU 3 Phase 2 work, utilizing existing relevant Standard Operating Procedures where applicable. A new Explosives Safety Submission (ESS) or revision to the existing ESS will also be prepared to address the RAU 3 Phase 2 work. Although no new permit requirements are anticipated, established CVFAW environmental protection and archeological resource protection requirements will be applied to the RAU 3 Phase 2 work.

Task 2, Location Surveying, Mapping and GIS Plan

This task includes home office and field personnel and subcontractor costs for surveying and mapping. Level of effort by a licensed land surveyor assumes that the limits of each work area are marked at appropriate intervals, and for Demolition Area 1 that all major grid corners and at least one interior subgrid corner are marked, to provide adequate reference points for establishing subgrid areas and clearance lanes. Horizontal precision is assumed to be to the nearest one foot. One UXO technician II will provide UXO escort and anomaly avoidance support for the surveyor.

Task 3, Site Facilities, Access and Contractor Office and Shop Buildings

This task includes field office support based on the anticipated 6.3-month duration to complete the RAU 3 Phase 2 work described above and includes personnel, equipment, temporary facilities and materials. This task also includes effort and materials to surface grade and place up to 600 tons of 3"-minus rock in selected locations along an unimproved logging trail if required to provide adequate all-season vehicle access to DA1.

Task 4, Vegetation Removal (approximately 124 acres total)

Each surface and subsurface MEC clearance location will require cutting of vegetation and removal of deadfall litter prior to MEC clearance. Due to the heavy growth in most areas, a preliminary UXO sweep will not be performed, however a preliminary visual inspection of the work area will be performed for terrain or debris hazards and wildlife or environmental concerns. Trees six inches in diameter and larger will not be cut. To avoid contact with potential MEC items, vegetation will be cut to approximately six inches in height and the cutting crew will be provided with a UXO escort consistent with CVFAW Workplan, SOP-3. Deadfall may be placed in nearby roadside areas and not hauled off. In the event that steep or otherwise dangerous terrain precludes the safe removal of vegetation, those areas will be excluded upon County concurrence.

Task 5a: DA1 Surface Clearance (approximately 103.8 acres)

DA1 encompasses the equivalent of approximately 452 subgrids (100 ft x 100 ft). Surface clearance will be performed in each subgrid using ropes to delineate 5 ft-wide lines and Schonstedt detectors to locate and evaluate ferromagnetic anomalies to a depth of 3 inches. In addition to any MEC/MDAS, other detected items in the 0-3 inch range will be removed. A daily photo of recovered items will be provided rather than a photographic log of each specific item. An "Infiltration Course" is present within DA1; however fixed objects (e.g. observation towers, fortifications, etc.) will not be removed. Roads/trails have been surface cleared by others. Individual anomalies that do not produce an item within the upper 3 inches will not be recorded, however qualitative information regarding anomaly density within the subgrid will be noted for the After Action Report.

Task 5b: DA2 Surface Clearance (approximately 5.7 acres)

DA2 is assumed to be a 500'x500' area (25 subgrids). Clearance methods and instruments will be performed in a manner identical to DA1. As with DA1, no fixed items, if encountered, will be removed.

Task 5c: Firing Range Surface Clearance (approximately 7.6 acres)

The firing range target areas consist of the 3.5-inch Rocket Range (5.2 acres), Rife Grenade Range (1.3 acres), and Hand Grenade Range (1.1 acres). Clearance methods and instruments will be performed in a manner identical to DA1.

Task 5d: Firing Point Subsurface Clearance (approximately 6.7 acres)

The firing points consist of nine artillery and mortar positions outside the CVFAW, specifically Artillery Positions 1, 2, 3, 4 and 7 and Mortar Positions 1, 2, 5 and 6. It is assumed that each firing point is approximately 100 ft x 200 ft. Subsurface clearance procedures/methods currently used for the CVFAW are applicable to this task, including use of the Minelab all-metal detector (small head). Locations of anomalies greater than 14 inches will be recorded. The County will assist with communication and coordination with fence-line residents that fall within the explosive safety arc during investigation of Artillery Positions 1, 2, 3 and 4.

Task 5e: MEC and MD Disposal

An on-site magazine is available for storage of donor explosives. It is anticipated that one MEC disposal event per month will be required during the clearance work. Approximately 2,000 pounds of MDAS are assumed to be collected and after inspection will be securely stored on site and transported to an off-site smelter at the end of the work.

Task 6: Site Restoration

Although a significant amount of vegetation cutting is required, it is assumed that the cut areas will naturally revegetate. Some surface disturbance is expected during investigation of the surface/near-surface anomalies, however it is assumed that no reseeding will be required and site restoration activities, if any, would be minimal.

Task 7: Project QC

Quality control measures will be similar in scope to the CVFAW. A full-time UXOQCS will be on site monitoring all site activities. Failure criteria for the firing point subsurface clearance will be identical to the CVFAW. Failure criteria for the DA1, DA2, and firing range surface clearance areas will be consistent with the CVFAW failure criteria but limited to ferromagnetic items within the upper 3 inches detectable using a Schonstedt detector.

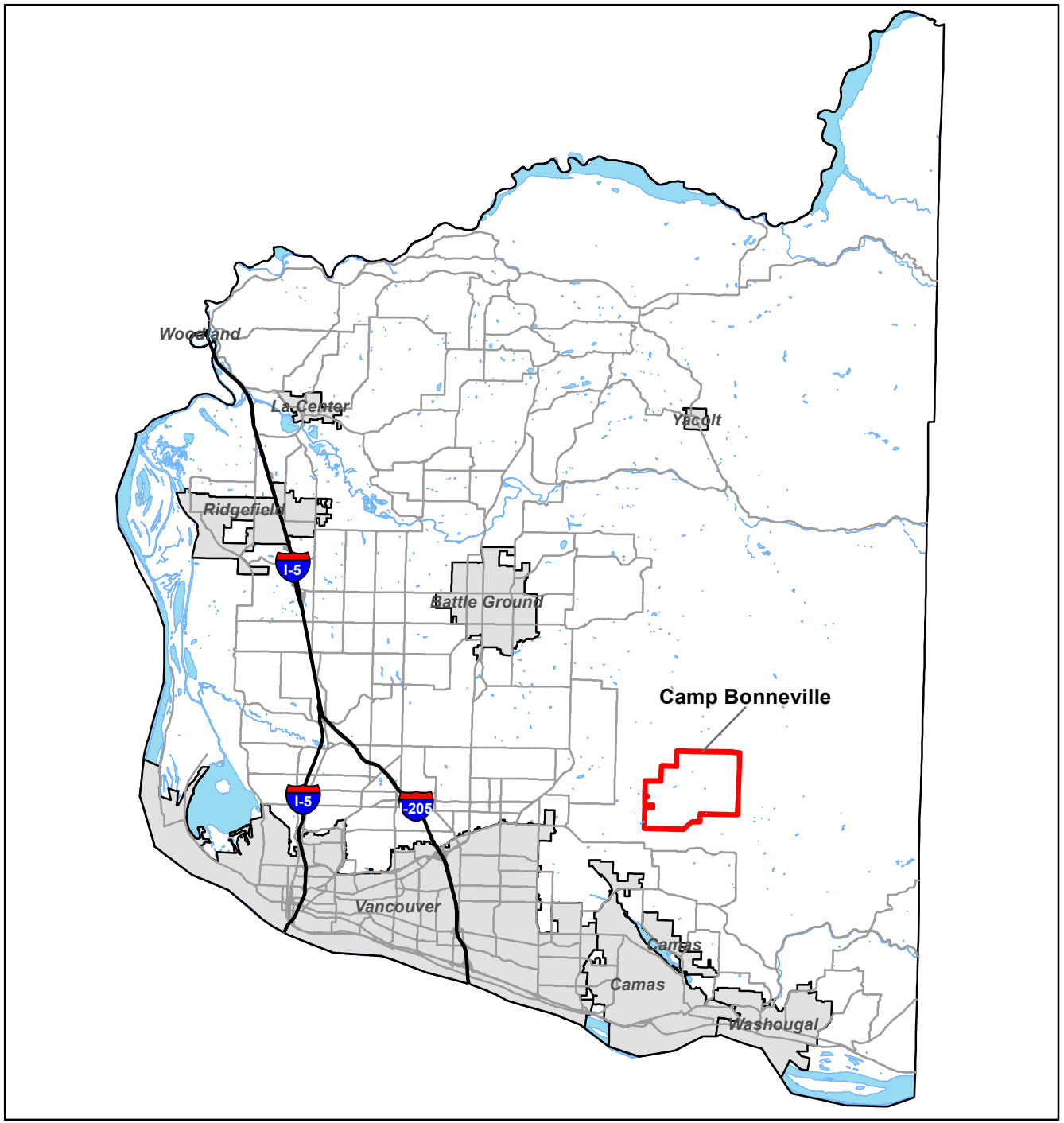
Task 8: Disclosure

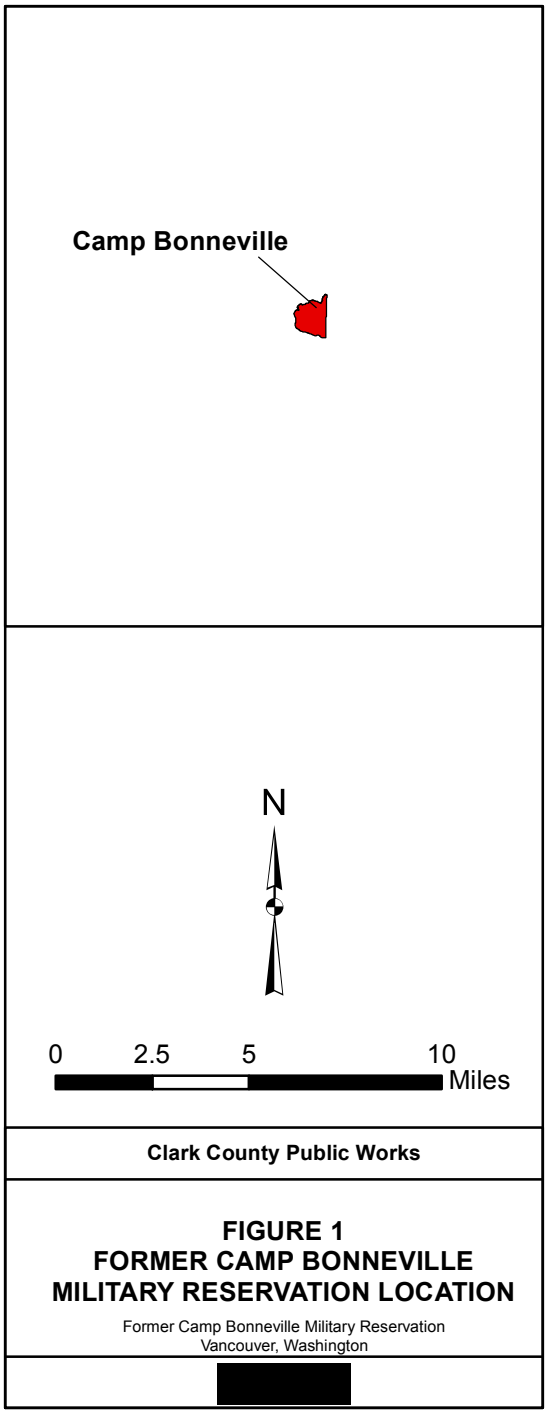
No additional effort is associated with this item.

Task 9: After Action Report

This task includes home office and field personnel effort to prepare the after action report.

APPENDIX B
SITE MAPS



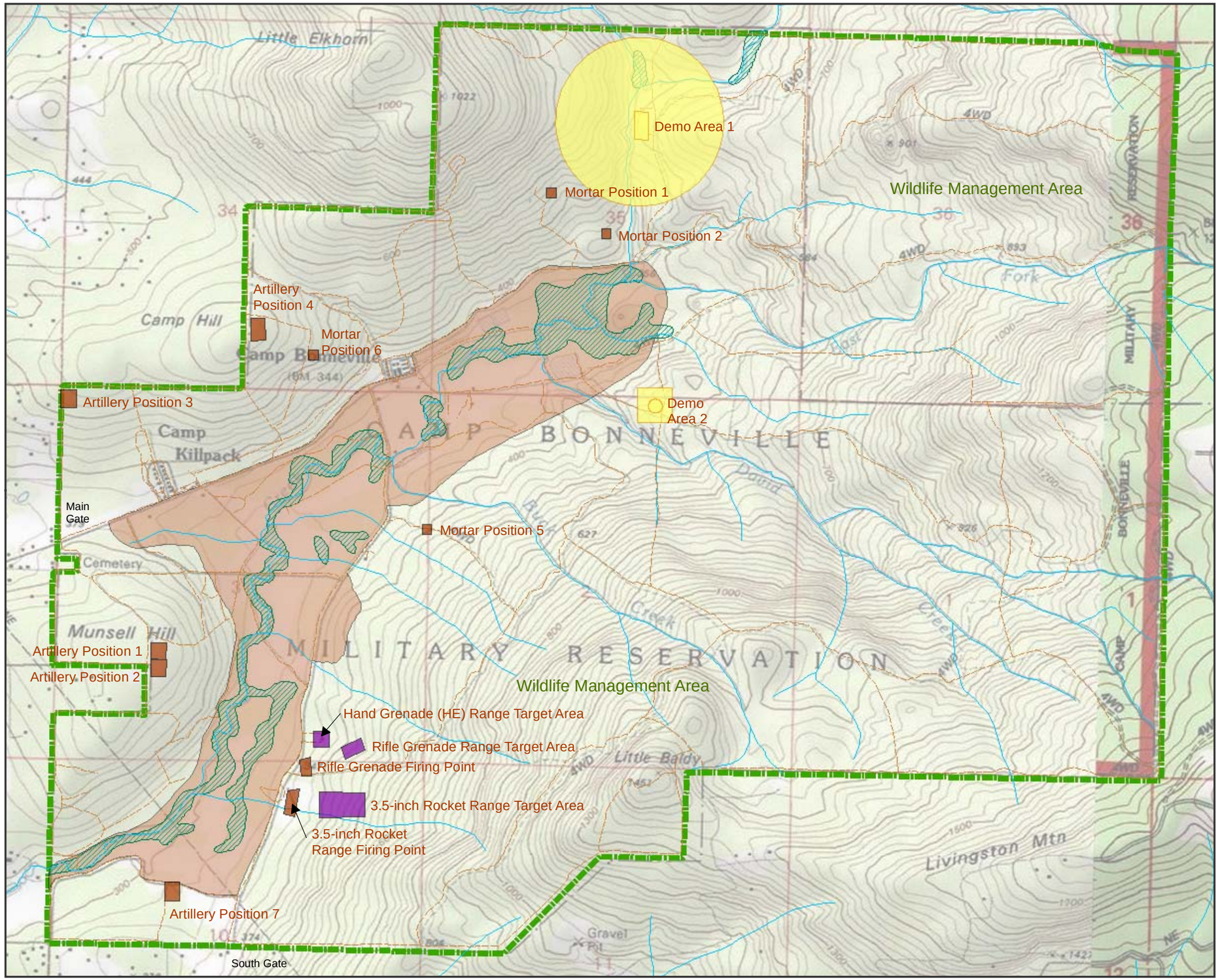


Clark County Public Works

FIGURE 1
FORMER CAMP BONNEVILLE
MILITARY RESERVATION LOCATION

Former Camp Bonneville Military Reservation
Vancouver, Washington

[redacted]



LEGEND

- Property Boundary
- Central Valley Area (RAU3 Phase 1)
- Demolition Area (RAU 3 Phase 2)
- Training Range Target Area (RAU3 Phase 2)
- Firing Position/Firing Point (RAU3 Phase 2)
- Wetland Area
- Roads
- Streams / Rivers

N

0 1,000 2,000 4,000 Feet

Clark County Public Works

FIGURE 2
RAU 3 PHASE 2
CLEARANCE LOCATIONS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS

APPENDIX C
POINTS OF CONTACT

Appendix C
Points of Contact

Title	Name	Telephone Number
Clark County Project Manager	Jerry Barnett, P.E.	office: 360-566-6992 cell: 360-773-7664
Clark County Munitions Safety Advisor	Greg Johnson, Master EOD	office: 360-566-6993 cell: 360-229-0529
WESTON SUXOS	Andrew Caldwell	office: 610-701-3960 cell: 831-359-8331
WESTON UXO Safety Officer	Greg Clark	cell: 831-915-1169
WESTON UXOQCS	Mike Everman	office: 610-701-3960 cell: 360-929-5725
WESTON Project Manager	Dwight Gemar, P.E.	office: 925-948-2612 cell: 925-899-4674
Local Authorities, as directed	Department of Emergency Services	911
Bureau of Alcohol, Tobacco, Firearms and Explosives	N/A	800-461-8841

APPENDIX D
ACCIDENT PREVENTION PLAN AND SITE-SPECIFIC SAFETY AND HEALTH PLAN

FINAL ACCIDENT PREVENTION PLAN
SURFACE AND SUBSURFACE CLEARANCE FOR MUNITIONS AND EXPLOSIVES OF CONCERN
REMEDIAL ACTION UNIT 3 PHASE 2

Former Camp Bonneville Military Reservation,
Vancouver, Washington

November 2015

Prepared for

Clark County
Public Works Department
1300 Franklin Street
Vancouver, Washington 98666

Prepared by:

Weston Solutions, Inc.
1340 Treat Blvd, Suite 210
Walnut Creek, California 94597-7580
DCN B0003 Appendix D

LIST OF REVISIONS

Revision	Pages	Date Approved	Approved By

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

AHA	activity hazard analysis
APP	Accident Prevention Plan
BBP	bloodborne pathogen
CBMR	Camp Bonneville Military Reservation
CEHS	Corporate Environmental Health and Safety
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
DA1	Demolition Area 1
DA2	Demolition Area 2
dBA	A-weighted decibels
DDESB	Department of Defense Explosives Safety Board
EAP	Emergency Action Plan
EHS	Environmental Health and Safety
ESS	Explosives Safety Submission, Amendment 3
HAZWOPER	Hazardous Waste Operations and Emergency Response
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
OSHA	Occupational Safety and Health Administration
PPE	personal protective equipment
RAU	Remedial Action Unit
SDS	Safety Data Sheet
SSHO	Site Safety and Health Officer
SSHP	Site-Specific Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	U.S. Army Corps of Engineers
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
WAC	Washington Administrative Code
WESTON	Weston Solutions, Inc.

1. SIGNATURE SHEET

ACCIDENT PREVENTION PLAN CONCURRENCE

By their signature, the undersigned concur with this Accident Prevention Plan (APP) for utilization during the Remedial Action Unit (RAU) 3 Phase 2 Remedial Action at the former Camp Bonneville Military Reservation (CBMR), Vancouver, Washington. This APP follows the format of the U.S. Army Corps of Engineers Manual 385-1-1 of November 30, 2014 for an APP (EM 385-1-1 Appendix A).

Plan Preparation:

Claudia Gemar, PE — 11/20/2015
Date Prepared

Project Engineer
Weston Solutions, Inc.
(925) 948-2607

Plan Approval:

Dwight Gemar, PE — 11/20/2015
Date Approved

Project Manager
Weston Solutions, Inc.
(925) 948-2612

Plan Concurrence:

Herold Hannah, CIH, CSP — 11/20/2015
Date Concurred

Director Environmental Health and Safety
Weston Solutions, Inc.
(610) 701- 3024

2. BACKGROUND INFORMATION

Contractor Name: Weston Solutions, Inc. (WESTON)

Contract Number: Modification 3 to Clark County Remediation Agreement with WESTON

Project Name: Remedial Action Unit (RAU) 3 Phase 2 Remedial Action, Former Camp Bonneville Military Reservation (CBMR), Vancouver, Washington

This Accident Prevention Plan (APP) has been prepared to support the RAU 3 Phase 2 Remedial Action at CBMR (Figure 1). Since 2012, WESTON has been providing clearance of munitions and explosives of concern (MEC) in the Central Valley Floor and Associated Wetlands at CBMR, work identified as RAU 3, Phase 1. This APP addresses RAU 3 Phase 2 during which WESTON will provide MEC clearance for the following specific work areas (Figure 2):

- Former Demolition Areas 1 and 2 (DA1 and DA2); surface clearance (0 to 3 inches); using Schonstedt ferromagnetic metal detector
- Former Training Range Target Areas: Hand Grenade Range, Rifle Grenade Range, and 3.5-inch Rocket Range; surface clearance (0 to 3 inches); using Schonstedt ferromagnetic metal detector
- Former Firing Positions and Firing Points: Artillery Positions 1, 2, 3, 4 and 7, Mortar Positions 1, 2, 5, and 6, Rifle Grenade Range Firing Point, and 3.5-inch Rocket Range Firing Point; subsurface clearance (0 to 14 inches); using Minelab all-metals detector (small head)

If directed by Clark County, WESTON will perform stepouts to ensure that isolated discoveries of MEC within boundary grids are not evidence of additional areas of concern.

This APP, together with its appendices, follows the outline provided in U.S. Army Corps of Engineers (USACE) EM 385-1-1 Safety and Health Requirements Manual, Appendix A (USACE, 2104). It is designed to anticipate, identify, evaluate, and provide control protocols for anticipated safety and health hazards expected to be encountered in the implementation of the RAU 3 Phase 2 Remedial Action, in addition to providing emergency response procedures relative to operations conducted at the site. Unforeseeable site conditions or changes in scope of work may warrant a reassessment of protection levels and controls stated. All adjustments to the

APP must have prior approval by the WESTON Environmental Health and Safety (EHS) Director and the Project Manager.

All WESTON, client, and subcontractor personnel involved in this project will review and understand this document prior to the start of work. Any questions in reference to this APP will be directed to the WESTON EHS Director, Senior Unexploded Ordnance Supervisor (SUXOS) or Site Safety and Health Officer (SSHO)/Unexploded Ordnance Safety Officer (UXOSO). All onsite personnel will follow the designated safety and health procedures, be alert to the hazards associated with working on the site, and exercise reasonable caution at all times.

The following phases of field work are anticipated. Accident Hazard Analyses (AHAs) are included in Attachment 1 of the APP. They will be reviewed and updated as necessary before work begins:

1. Land Surveying Anomaly Avoidance (AHA1) – note: the Land Surveyor will provide an AHA for the work they will perform
2. Brush Cutting Anomaly Avoidance (AHA2) – note: the Brush Cutting Subcontractor will provide an AHA for the work they will perform
3. Analog Geophysical Anomaly Detection and Removal (AHA3)
4. MEC/MPPEH Identification and Disposal (AHA4)
5. Soil Excavation/Mechanical Screening (AHA5) – if used

3. STATEMENT OF SAFETY AND HEALTH POLICY

The WESTON Corporate Environmental Health and Safety (CEHS) Program is established to provide a safe and healthful workplace for all WESTON employees and WESTON subcontractor personnel who work onsite.

3.1 CORPORATE SAFETY AND HEALTH POLICY STATEMENT, GOALS, AND OBJECTIVES

The following corporate safety and health policy statement is included in WESTON's Corporate Environmental Compliance, Health, and Safety Program (WESTON, 2015a).

"Senior management communicates organizational goals and policy to all personnel, clients, contractors, and additional interested parties/stakeholders. In performing its mission, WESTON will conduct activities in a manner protecting human health and the environment:

- With commitment to working safely—100 percent of the time and zero releases to the environment
- With commitment to regulatory compliance and applicable requirements
- In a manner protective of the worker, the public, and the environment
- With pollution reduction goals and continual improvement targets in the foreground
- Communicating CEHS awareness and policy to all personnel
- With incentives for positive CEHS performance—going beyond compliance because we care
- Making CEHS policy available to the public
- Seeking performance improvement input from stakeholders
- Identifying environmental aspects with potential for significant impact
- Prescribing remedies to offset impact potential

WESTON commits to integrated CEHS Programs that fully implement applicable and relevant regulatory requirements including federal, state and local environmental regulations, prescribed plans, permits, Occupational Safety and Health Administration (OSHA) compliance requirements, and other controlling requirements."

3.2 CONTRACTOR ACCIDENT EXPERIENCE GOALS

WESTON has established a CEHS corporate goal of Zero Accidents involving personnel and the environment (WESTON, 2015a).

3.3 ACCIDENT PREVENTION PLAN PURPOSE AND OBJECTIVES

The purpose of the APP is to establish standard safety and health procedures for WESTON and WESTON subcontractor personnel in performance of their work during the RAU 3 Phase 2 Remedial Action to achieve the goal of zero accidents. The APP is designed to anticipate, identify, evaluate, and control safety and health hazards, in addition to providing emergency response procedures relative to operations conducted at the site.

3.4 REGULATIONS AND GUIDELINES

Compliance with all applicable requirements and regulations that are listed in the following publications will ensure the safety and health of onsite personnel, visitors, client, regulatory personnel, and the local community:

- 29 Code of Federal Regulations (CFR) 1910
- 29 CFR 1926
- Washington Industrial Safety and Health Act Safety and Health Core Rules (Chapter 296-800, Washington Administrative Code [WAC])
- Washington State Safety Standards for Construction Work (Chapter 296-155, WAC)
- USACE EM 385-1-1 (USACE, 2014)

Should additional guidelines or regulatory criteria prove necessary for worker or environmental safety, said materials will be referenced within this APP and the site personnel informed.

4. RESPONSIBILITIES AND LINES OF AUTHORITY

4.1 STATEMENT OF RESPONSIBILITY

WESTON is ultimately responsible for the health and safety of its employees and the implementation of its CEHS Program, and is responsible for assuring adherence to this APP/ Site-Specific Safety and Health Plan (SSHP) by all onsite personnel.

4.2 PERSONNEL RESPONSIBLE FOR SAFETY MANAGEMENT AND LINES OF AUTHORITY

WESTON has overall responsibility for safety under the contract. Subcontractors shall work under this APP (or provide an equivalent APP). Subcontractors shall also supplement the APP by providing AHAs for the specific work they will perform and any relevant standard operating procedures. Subcontractors shall ensure all safety requirements specific to their scope of work are address within their companies safety and health program and procedures. Subcontractors shall be responsible for the safety of their own personnel, for the implementation of this APP as it applies to their work, and for implementing their own AHAs and operating procedures.

Corporate and project personnel responsible for safety management for the RAU 3 Phase 2 Remedial Action are identified below. Lines of Authority are illustrated on the Health and Safety Organization Chart (Figure 3). Resumes and certifications are included in Appendix A for the EHS Director, SSHO/UXOSO (and alternate), Project Manager, and SUXOS (and alternate).

4.2.1 Corporate Environmental Health and Safety Director

The WESTON EHS Director, Mr. Herold Hannah, CSP, CIH, is certified in a comprehensive practice of industrial hygiene by the American Board of Industrial Hygiene. The EHS Director will serve as the Safety and Health Manager for this project. Mr. Hannah has over 20 years of industrial hygiene and safety experience and is responsible for the overall development and implementation of the WESTON Safety and Health program, including reviewing and approving the provisions of this APP/SSHP and any amendments that may become necessary.

The WESTON EHS Director is responsible for the following actions:

- Oversee and maintain the WESTON CEHS Program and the APP
- Concur, by signature, with the APP
- Be available for consultation in case of emergency
- Review notice of incident reports and provide follow-up as required
- Evaluate and authorize changes to the APP based on field observations or response to incidents, as necessary

4.2.2 Site Safety and Health Officer

The SSHO will be a Competent Person as stated in OSHA 29 CFR 1926.32, having experience in implementing safety and occupational health work on sites of similar hazard, risk, and complexity. The SSHO will have completed the OSHA 30-hour construction safety course or equivalent course (required by EM 385-1-1 Section 01.A.17b), have five years of continuous construction/industry safety experience in a supervising/managing role, and complete eight hours of safety and health related continuing education each year (to be fulfilled by completing the 8-hour Hazardous Waste Operations and Emergency Response [HAZWOPER] refresher). In addition to 40-hour HAZWOPER training and 8-hour annual HAZWOPER refresher, the SSHO will have at least one year experience implementing safety and occupational health procedures at cleanup operations (required by EM 385-1-1 Section 33.C.02). The EHS Director is responsible for reviewing and approving the qualifications of the SSHO.

Mr. Greg Clark will serve as SSHO/UXOSO and Mr. Clark Sorenson will serve as alternate SSHO/UXOSO. The SSHO is responsible for assuring compliance with the APP and will select and adjust personal protective equipment (PPE) usage. Regarding the APP and Safety and Health Program, the SSHO reports to the EHS Director and is responsible for the following actions:

- Inspect site activities to identify safety and occupational health deficiencies and correct them
- Coordinate changes and modifications to the APP with the Project Manager and EHS Director
- Conduct project site-specific training and daily safety briefings

- Develop additional field safety and health procedures, as necessary
- Investigate accidents, incidents, and "near misses"
- Conduct visitor orientation
- Has stop work authority

4.2.3 Unexploded Ordnance Safety Officer

Mr. Greg Clark will serve as SSHO/UXOSO and Mr. Clark Sorenson will serve as alternate SSHO/UXOSO. The UXOSO will be a Competent Person and will be qualified by training and experience as required by Department of Defense Explosives Safety Board (DDESB) *Technical Paper 18, Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities* (DDESB, 2015).

The UXOSO is responsible for the safety and health aspects of the project as they relate to explosives safety. The UXOSO reports to the EHS Director. The UXOSO will have the same minimum qualifications as an unexploded ordnance (UXO) Technician III. In addition, the UXOSO will have the specific training, knowledge, and experience necessary to implement the APP and the site-specific AHAs and verify compliance with applicable safety and health requirements. This individual will be able to perform all functions of UXO Sweep Personnel and UXO Technicians I, II, and III. In addition, the UXOSO will have the ability to implement the approved explosives safety program in compliance with all U.S. Department of Defense, federal, state, and local statutes and codes, and be responsible for the following actions:

- Analyze explosives operational risks, hazards, and safety requirements
- Establish and ensure compliance with all site-specific safety requirements for explosives operations
- Enforce personnel limits and safety exclusion zones for material potentially presenting an explosive hazard (MPPEH) clearance operations, MEC/material documented as an explosive hazard and explosives transportation, storage, and destruction
- Conduct safety inspections to ensure compliance with explosives safety requirements
- Operate and maintain air monitoring equipment for airborne contaminates if needed
- Has stop work authority

4.2.4 Project Manager

The Project Manager, Mr. Dwight Gemar, P.E., has overall responsibility for the project and associated safety of the field activities and will coordinate with SUXOS and SSHO/UXOSO to ensure that the project goals are completed incompliance with the APP. The WESTON Project Manager is responsible for the following actions:

- Ensure project personnel (including subcontractor personnel) comply with EHS regulations, program requirements, and procedures
- Ensure project personnel meet applicable safety certification requirements
- Ensure project support is acquired from appropriately qualified safety personnel
- Ensure appropriate safety equipment and materials are provided to the project

4.2.5 Senior Unexploded Ordnance Supervisor

Mr. Andrew Caldwell will serve as the SUXOS for this project and Mr. Donald Kean will serve as alternate SUXOS. The SUXOS is responsible for the onsite implementation and enforcement of the APP and will be responsible for all intrusive activities that are performed by UXO personnel and for providing UXO anomaly avoidance during land surveying and brush cutting activities. The SUXOS will be a Competent Person and will be qualified by training and experience as required by DDESB Technical Paper 18, *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities* (DDESB, 2015).

SUXOS will be able to fully perform all of the functions enumerated for UXO Sweep Personnel and UXO Technicians I, II, and III. In addition, the ability to perform the following functions is a requirement for the SUXOS: planning, coordinating, and supervising all onsite MEC activities; preparation of Standard Operating Procedures for MEC operations; ensuring compliance with U.S. Department of Defense directives as well as federal, state, and local statues and codes; and certification of Ammunition, Explosives, and Dangerous Articles and/or range scrap as ready for turn-in or disposal in accordance with current policies. The SUXOS will also be fully capable of supervising multiple project teams, which may be performing MEC related activities (e.g., land surveying; brush cutting; reconnaissance and classification of MEC, pyrotechnic items, and

military explosives and demolition materials; locating surface and subsurface MEC; destroying MEC by burning or detonation; and transporting and storing MEC and explosives material).

4.3 COMPETENT AND/OR QUALIFIED PERSON

4.3.1 Competent Person

At a minimum, according to OSHA Regulation 29 CFR 1926.32, site personnel will include an authorized and Competent Person who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has the authority to take prompt corrective measures to eliminate them. The SSHO/UXOSO and SUXOS are Competent Persons. The Project Manager(s) and EHS Director will be responsible for reviewing and approving the qualifications of these individuals.

The SUXOS will serve as a Competent Person for the inspection of heavy machinery such as backhoes. If a screen plant is used, a Competent Person will be on site during all work involving this equipment. Mr. Charles Smith and Mr. Mark Major are both qualified to serve as Competent Persons for the use of this equipment.

4.3.2 Qualified Person

Site personnel will also include Qualified Persons. WESTON will permit only those employees qualified by training or experience to operate equipment and machinery in compliance with OSHA 29 CFR 1926.20(b)(4). According to OSHA 29 CFR 1926.32, "qualified" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to resolve problems related to the subject matter, the work, or the project.

4.4 "NO WORK" STATUS

No work requiring the oversight of a designated Competent Person will be performed unless a designated Competent Person is present on the job site.

4.5 PRE-TASK SAFETY AND HEALTH ANALYSIS

AHAs have been prepared for each of the anticipated phases of work (Attachment 1 of Appendix B). The AHAs will be reviewed and revised if necessary before work is performed. AHAs will be reviewed during the course of the work and changes will be incorporated where necessary into revisions. The AHAs will identify Competent Persons and the SSHO/UXOSO. No work will be performed unless designated Competent Persons and the SSHO/UXOSO or approved alternates are onsite.

The SUXOS or SSHO/UXOSO will review the AHAs with field crews prior to commencement of work. For Activities 1 and 2, additional AHA will be provided by the land surveying and brush cutting subcontractors, respectively. Subcontractors will review AHAs provided for their tasks with field crews that will be involved in the work The SSHO/UXOSO will review training certifications provided by the subcontractor for onsite personnel. Subcontractors shall be responsible for providing supervision and safety oversight for the work they are performing. Subcontractors shall complete and provide WESTON copies of equipment inspections.

Known or potential biological, chemical, and physical hazards that may pose a threat to the safety and health of site workers are identified in the AHA to ensure workers are adequately protected. Emphasis is placed on identifying conditions that may cause death or serious harm. All site workers must be vigilant in identifying hazards in the work place and bringing them to the attention of supervisory personnel. Evaluation of work site characteristics and hazards will continue throughout the duration of the field work. While all personnel share responsibility to communicate and understand onsite hazards, the SSHO/UXOSO is responsible for thoroughly evaluating field operations with respect to potential hazards to personnel. These potential hazards and the specific procedures to be followed to help prevent or reduce exposure will be reviewed and documented during the daily safety briefing, as applicable.

4.6 NONCOMPLIANCE WITH SAFETY REQUIREMENTS

WESTON tracks performance and conformance with the organization's CEHS objectives and milestones. The CEHS Program defines responsibility and authority for handling and

investigating nonconformance, taking action to mitigate impacts, and for initiating corrective action.

WESTON typically uses a tiered approach to disciplinary action. This approach utilizes prescriptive measures such as verbal warnings and letters to file for initial infractions. Subsequent measures include removal from the project or termination.

4.7 ACCOUNTABILITY

Health and safety is the responsibility of all WESTON employees. Each WESTON employee has been entrusted with the responsibility to ensure that the policies and procedures outlined in WESTON's CEHS Program and this APP are implemented correctly. Each manager and supervisor is held responsible for the health and safety of those he or she supervises.

5. SUBCONTRACTORS AND SUPPLIERS

5.1 IDENTIFICATION OF SUBCONTRACTORS AND SUPPLIERS

The subcontractors for the following definable features of work/activities are not known at this time, but additional information will be submitted to the APP for acceptance prior to the start of any activities listed (EM 385-1-1 Appendix A, Section 3.e(1)).

- Land Surveying. (AHA will be required)
- Brush Cutting (AHA will be required)

5.2 CONTROL AND COORDINATION OF SUBCONTRACTORS AND SUPPLIERS

WESTON is responsible for control and coordination of onsite personnel, including subcontractors and suppliers. Subcontractors are responsible for assigning specific tasks to their employees; ensuring that their employees are properly trained and are in compliance with applicable regulations; and allocating sufficient time, materials, and equipment to safely complete activities in accordance with this APP, the SSHP, and their individual health and safety programs and plans. Subcontractors who will be performing specialized tasks will be required to provide an AHA and credentials of competent and qualified employees before work begins (information to be reviewed by the SSHO/UXOSO).

5.3 SAFETY RESPONSIBILITIES OF SUBCONTRACTORS AND SUPPLIERS

All onsite personnel, including subcontracted personnel, are responsible for compliance with this APP, the SSHP, and other applicable regulations. WESTON and subcontractor personnel will receive a briefing from the SSHO/UXOSO prior to access to the project site and will attend all daily briefings when on site. As part of this daily briefing it will be the responsibility of subcontractor supervisory personnel to address any safety requirements associated with their scope of work. They shall fulfill the requirements established by this plan. They shall acknowledge receipt of the plan and the hazard communication briefing. Onsite subcontractors are responsible for providing their personnel with appropriate PPE, as specified by the plan. Subcontractors shall provide safety hazard assessments for the work they will perform

(Section 5.2). Any member of the work party observing an imminent safety hazard, or potentially dangerous situation, will immediately suspend field activities.

WESTON management is responsible for making sure that subcontractor employees follow the WESTON APP and SSHP. Subcontractors shall review this APP and agree to work under this APP or provide an equivalent APP/SSHP. If subcontractor safety plans are more restrictive, the subcontractor's supervisor shall ensure that their safety plan is also followed.

If hazards not listed in this APP but known by subcontractor, or known to be associated with a subcontractor's specialty, such hazards must be identified and addressed in the subcontractor's AHAs and APP/SSHP (if provided) and be brought to the attention of the SSHO/UXOSO and the WESTON Project Manager before work begins. These hazards shall also be discussed by the subcontractor during the daily tailgate meeting prior to beginning work.

6. TRAINING

6.1 EMPLOYEE ORIENTATION

New employees are orientated to WESTON's CEHS Program upon hiring. Site-specific orientation will be given by the SSHO/UXOSO or SUXOS.

6.2 SITE TRAINING AND CERTIFICATION REQUIREMENTS

All personnel assigned to or regularly entering the project site will have received the required training. In accordance with USACE EM 385-1-1 and OSHA regulations, applicable required training for all site workers will be in accordance with the following subsections. All training is documented.

6.2.1 Occupational Safety and Health Administration Training

All personnel working onsite will have completed 40-hour HAZWOPER training, an additional three days of field experience under the direct supervision of a trained experienced supervisor, and annual 8-hour refresher training, as required. The SUXOS will have an additional eight hours of specialized site supervisory training. All workers will have initial training completed or refresher training within the required regulatory time frame.

6.2.2 First Aid and Cardiopulmonary Resuscitation Training

At least two employees on site will be currently certified in first aid and cardiopulmonary resuscitation (CPR). The training will be equivalent to that provided by the American Red Cross. Personnel trained in first aid and expected to administer first aid will receive training in controlling exposures to bloodborne pathogens (BBPs).

6.2.3 Hearing Conservation Training

All WESTON personnel exposed to noise levels exceeding 85 decibel 8-hour time-weighted average will be provided with training that addresses the following topics:

- Physical and psychological effects of high noise exposure

- Noise exposure limits
- Elements of the Hearing Conservation Program
- Selection, use, and limitations of hearing protection devices

6.2.4 Personal Protective Equipment/Respiratory Protection Training

The SSHP (Appendix B) and task-specific AHAs address PPE deemed appropriate for specific tasks associated with the work. PPE requirements will be reviewed during AHA reviews prior to the initiation of each task. Any questions regarding the use of appropriate PPE will be brought to the attention of the SUXOS or SSHO/UXOSO, who will contact the EHS Director for assistance in evaluation of PPE as necessary.

6.3 PERIODIC TRAINING

The following subsections provide information regarding periodic training that will be conducted onsite for supervisors, employees, subcontract personnel, and visitors.

6.3.1 Site-Specific Safety and Emergency Action Plan Training

All employees assigned to the RAU 3 Phase 2 Remedial Action will receive initial project orientation and safety training. The APP/SSHP will be reviewed, including site-specific hazards, the AHAs, and the Emergency Action Plan. All work crews will undergo a briefing session on recognizing endangered and sensitive species and the importance of avoiding disturbance or damage to sensitive habitats, as well as a briefing addressing munitions hazards. The contents of the required site-specific safety training are described in Section 5 of the SSHP.

6.3.2 Safety Meetings

At a minimum, safety briefings (prior to start of work for the day) will be given daily by the SUXOS or SSHO/UXOSO on days when field work is conducted. Topics will include proposed work scheduled, associated hazards, controls and inspections or training, and other pertinent topics. WESTON and subcontractor field personnel, along with authorized visitors, are required to attend the daily safety meetings, which will be documented by the SSHO/UXOSO.

6.3.3 Visitor Orientation

Site visitors are defined as persons who are not employed at the project site, who do not routinely enter restricted work areas, and whose presence is of short duration. Visitors who enter the active remediation areas during site operations will meet the same medical clearance and OSHA training requirements specified for all site personnel. Visitors who do not enter the active remediation areas are required to be briefed in the following:

- Location and description of potential hazards and risks
- Areas of the site that are closed to visitors
- The site evacuation plan and emergency procedures
- Other topics as deemed appropriate

7. SAFETY AND HEALTH INSPECTIONS

7.1 SAFETY INSPECTIONS AND LOGS

7.1.1 Safety Log

The SSHO/UXOSO will maintain a Safety Log of all safety-related activities. The SSHO/UXOSO is responsible for ensuring that health and safety activities for the day, as well as safety meeting minutes, are documented appropriately.

7.1.2 Visitor Log

A visitor log will be maintained at the work site to record visitations to the job site.

7.1.3 Site Inspections and Forms

Inspection and monitoring of site activities will be conducted by the SSHO/UXOSO or UXO Quality Control Specialist daily when work is being performed. The SSHO/UXOSO and UXO Quality Control Specialist will have training and will be qualified to perform safety inspections. This task will be ongoing throughout site activities, and deficiencies will be noted, corrected, and documented in the Production Daily Report.

Additionally, subcontractors will document inspections in accordance with their respective safety programs ensuring WESTON has access for onsite review.

7.1.4 Equipment Inspections and Forms

Any piece of mechanized equipment utilized will undergo initial inspection by the SUXOS or appropriate Competent Person, and will undergo daily inspections at the beginning of each work day prior to commencing work per USACE EM 385-1-1, Section 18. Construction equipment operated by subcontractors shall be inspected by a Competent Person identified in the Subcontractor's AHA. All inspections will be documented and records maintained in the project file. If the unit fails a substantive safety part of the inspection, the unit will be repaired and re-inspected before being returned to service.

7.2 EXTERNAL SAFETY INSPECTIONS

Clark County will be notified if any external agencies request to conduct a safety inspection. The inspector will be requested to provide the appropriate credentials and successfully complete a site-specific visitor orientation. A record of this orientation will be maintained onsite. The inspector will be escorted to the requested work areas for inspection. Copies of all external safety inspections conducted and certifications received will be provided to Clark County.

8. MISHAP REPORTING

The WESTON Project Manager is responsible for ensuring that accident ingestions, notifications, reports and logs are completed as detailed below.

8.1 EXPOSURE DATA

WESTON will provide daily reports of field man-hours worked and a monthly summary of man-hours worked for the previous month to Clark County. The monthly summary will be provided within five working days of the beginning of each new month or as directed.

8.2 MISHAP INVESTIGATIONS, REPORTS, AND LOGS

For any incident, including near misses, appropriate investigation, documentation, and corrective actions will be completed. As necessary, a report will be made to the Clark County Project Manager or his/her designated representative as soon as possible but no later than within 24 hours after the incident occurs. A written report of the accident/incident will be generated if the incident results in more than $5,000 in property damages or a recordable injury or illness occurs at the job site (days away injury, days away illness or restricted/transfer injuries) (EM 385-1-1 Section 01.D.03). All incident reports will be provided to the Clark County Project Manager or his/her designated representative within five working days of the incident. OSHA (per 29 CFR 1904.39) will be notified within eight hours of a work related death and 24 hours of:

- in-patient hospitalization of one or more employees
- amputation
- loss of an eye

8.3 IMMEDIATE MISHAP NOTIFICATIONS

Should an incident occur resulting in a fatality, a permanent total or partial disability, one or more persons being hospitalized as inpatients, $500,000 or more in property damage, or three or more individuals become ill or have a medical condition which is suspected to be related to a site condition, or a hazardous or toxic agent on the site, the Clark County Project Manager and the EHS Director will be notified immediately (EM 385-1-1 Section 01.D.04), i.e., as soon as

possible and not more than four hours after the event. The EHS director will coordinate all notifications to OSHA within the required time requirement.

In addition, the Clark County Project Manager and the EHS Director will be notified immediately of mishaps associated with the following hazards (EM 385-1-1 Section 01.D.05), i.e., as soon as possible and not more than four hours after the event.

- electrical hazards (e.g., arc flash, electrical shock)
- uncontrolled release of hazardous energy
- load handling equipment or rigging
- fall from height

9. PLANS REQUIRED BY THE SAFETY MANUAL

Plans required by EM 385-1-1, Appendix A, Section 3(i)(4) are addressed below.

9.1 FATIGUE MANAGEMENT PLAN

This plan is not applicable to this project. Work is not scheduled to exceed the criteria in EM 385-1-1 Section 01.A.20 (USACE, 2014), e.g., more than 10 hours a day for more than 4 consecutive days, 50 hours in a 7-day work week, etc.

9.2 EMERGENCY RESPONSE PLANS

Emergency Response Plans will not be required for this project because site workers will not respond to or assist with the cleanup of hazardous substance spills and releases. An Emergency Action Plan (EAP) is included in the SSHP (Appendix B) and describes procedures for employee evacuation, provides an emergency contact list with phone numbers to be posted onsite, and includes a map showing the route to the hospital. As described in the EAP, worker response will be limited to spill kit containment or berming of minor spills (e.g., fuel spills) or fighting of incipient stage fires (if they have been trained and feel safe doing so). The only spills and fires on the project site that are likely to occur would be related to the vehicles and equipment used onsite. There will be a spill kit and be at least one dry chemical fire extinguisher at each work site where work is being performed. Fire extinguishers will also be located in each piece of heavy equipment and in each crew vehicle. The fire extinguishers are intended to only fight fires that have recently occurred and can be reasonably extinguished immediately.

9.3 PLAN FOR PREVENTION OF ALCOHOL AND DRUG ABUSE

WESTON has a Drug-Free Workplace Program. All contractors and subcontractors on this project are subject to drug and alcohol testing at any time. Supervisors, managers, and the SSHO/UXOSO are to determine the fitness of their workers, including whether their workers may be under the influence of any drugs or alcohol. This includes over-the-counter medications and prescription medications. At the beginning of the project, at the initial site orientation and training, all workers are reminded of the program and policies. If a worker is involved in an accident or is injured, the worker(s) involved may be asked to be tested. If supervisors observe

any worker who appears to be under the influence of drugs or alcohol, they may request a testing of the worker.

9.4 SITE SANITATION/HOUSEKEEPING PLAN

Applicable sanitation requirements are contained in OSHA regulations and USACE EM 385-1-1, and include the following unless otherwise approved:

- Bottled water will be provided for all workers at the site.
- The appropriate numbers of portable sanitation facilities will be obtained. At a minimum, washing facilities will be set up using hand sanitizers or a suitable equivalent. The units will be serviced as necessary.

All work areas will have trash receptacles. Areas will be kept free of trash and any equipment not being used will be removed and appropriately stored.

9.5 MEDICAL SUPPORT PLAN

A minimum of two employees certified in CPR/first aid will onsite during field work, and a first aid kit will be provided in each work area. The SSHO/UXOSO will be certified in CPR/first aid, and will maintain a list of other employees with such training. An EAP is included in the SSHP (Section 15 of the SSHP in Appendix B) and identifies procedures for summoning medical assistance. The SSHP provides an emergency contact list with phone numbers to be posted onsite, and includes a map showing address and route to the hospital.

9.6 BLOODBORNE PATHOGEN PLAN

Personnel trained in first aid and expected to administer first aid will also receive training in the sources, hazards, and avoidance of BBPs. First aid kits provided for the project will include breathing barriers and gloves to prevent contact with blood or other potentially infectious materials when rendering first aid or other medical assistance.

9.7 EXPOSURE CONTROL PLAN

WESTON's Exposure Control Plan for first aid providers as it pertains to this project is summarized as follows.

- Training–Personnel trained in first aid and expected to administer first aid will also receive training in the sources, hazards, and avoidance of BBPs.
- Universal Precautions–When treating an injured individual, conducting CPR, or handling potentially infectious waste, the use of universal precautions is the recommended approach to infection control. Universal precautions assume all human blood and certain human body fluids are infectious for human immunodeficiency virus, hepatitis B virus, and other BBPs.
- Work Practices–All first aid procedures involving blood or other potentially infectious materials shall be performed in a manner that minimizes splashing, spraying, spattering, and generation of droplets of these substances. Mouth suctioning of blood or other infectious materials is prohibited. When handling sharps such as needles used for bee stings or diabetes, do not recap, purposely bend, break by hand, remove from disposable syringes, or otherwise manipulate by hand. As soon as possible after use, contaminated sharps are to be placed in puncture proof/leak proof containers until they can be disposed. All PPE should be inspected prior to use. PPE should not be worn if the PPE barrier is compromised. Hands and other skin surfaces should be washed immediately and thoroughly if contaminated with blood, other body fluids to which universal precautions apply, or their potentially contaminated articles. Hands should always be washed after gloves are removed even if the gloves appear intact. Where hand washing facilities are not readily accessible, an antiseptic hand cleaner along with clean cloth/paper towels or antiseptic towelettes should be used. When antiseptic hand cleaners or towelettes are used hands shall be washed with soap and running water as soon as feasible.
- PPE–First-aid kits will be supplemented with BBPs kits or supplies to include breathing barriers and gloves. If the chance of being exposed to blood is high, the caregiver should put on protective attire before beginning CPR or first aid. Protective barriers should be used in accordance with the level of exposure encountered.

- Incident Reporting–When an employee gives first aid or CPR, or is potentially exposed to a BBP, a Notification of Incident Report must be completed. The report must indicate "Potential Exposure to Bloodborne Pathogens". The pre-work hepatitis B vaccination for First Aid providers is not required; it will therefore be offered post-exposure. Hepatitis B vaccines are effective in preventing hepatitis B following a documented exposure when given within 1 week after HBV exposure. Upon suspicion or verification of exposure to blood or infectious materials, hepatitis B vaccine will be made available to the exposed individual(s) at no cost to the employee. The employee will immediately be referred to WESTON's Occupational Medical Consultant for counseling and management.

9.8 SITE LAYOUT PLAN

A Site Layout Plan (as defined under USACE EM 385-1-1 Section 04.A) will not be required for this project, as the work will not involve the construction of temporary construction buildings, power lines, access roads, and the like.

9.9 ACCESS AND HAUL ROAD PLAN

This plan is not applicable to this project.

9.10 HEARING CONSERVATION PROGRAM

WESTON describes its Occupational Noise and Hearing Conservation Program in the EHS Safety Manual (WESTON, 2015a). The key aspects of the program include:

- Noise Evaluation and Surveillance–Noise exposure assessment is performed only by qualified personnel with properly calibrated and functional noise measuring equipment.
- Engineering Controls–The primary means of reducing or eliminating personnel exposure to noise is through engineering controls.
- Hearing Protection–Hearing protection devices are utilized whenever engineering controls prove to be infeasible or cost prohibitive. Various types of ear muffs and ear plugs are available. Hearing protector attenuation is intended to reduce employee exposures below 80 A-weighted decibels (dBA) for employees with standard threshold shifts and below 85 dBA for all other employees. WESTON personnel and WESTON

subcontractors must wear hearing protection devices when required and where signs are posted requiring their use. Hearing protection devices are strongly recommended in any noisy environment, but are mandatory in the following situations:

- The 8-hour average may equal or exceed 85 dBA
- Any employee exposed to greater than or equal to 85 dBA and who have experienced a standard threshold shift in their hearing
- Any noise equal to greater than 100 dBA impact, continuous or intermittent
- Anywhere a "HEARING PROTECTION REQUIRED" sign is posted. These signs are to be posted in all mandatory situations listed above.

- In addition when noise levels equal or exceed 80 dBA employees must have:
  - Availability of hearing protectors
  - Information and training on effects of noise
  - Availability of audiometric testing where there is a risk to health

Compliance with the Hearing Conservation Program is required when an employee's exposure to noise is in excess of 85 dBA. Employees who work with drill rigs, heavy construction equipment, or other noisy operations are candidates for the Hearing Conservation Program and medical surveillance requirements thereof. Audiometric testing is performed annually to evaluate the hearing of all individuals who are routinely exposed to 8-hour time-weighted-average exposures of 85 dBA or greater.

Training is regularly provided during WESTON's initial and refresher courses under 29 CFR 1910.120 (HAZWOPER). Initial and annual training shall be given to each employee included in the Hearing Conservation Program and address the following: the effects of noise on hearing; the purpose of hearing protection, advantages, disadvantages, attenuation of various types, and the selection, fitting, use, and care of protectors; the purpose of audiometric tests and explanation of test procedures; and recognition of hazardous noise.

9.11 RESPIRATORY PROTECTION PLAN

This plan is not applicable to this project.

9.12 HEATH HAZARD CONTROL PLAN

The primary health hazards associated with this project are potential exposures to physical hazards.

A first-aid kit meeting the requirements of EM 385-1-1, Section 03.B.01 (USACE, 2014) will be available and plainly marked at each work location. Emergency transport eyewash bottles will be located with the first-aids.

Further details pertaining to potential health hazards and their respective controls are identified in Section 4 of the SSHP (Appendix B).

9.13 HAZARD COMMUNICATION PROGRAM

The SSHO/UXOSO will maintain onsite a file of Safety Data Sheets (SDSs) for products brought onsite such as (but not limited to): detonating cord, detonators, pentolite boosters, gasoline, diesel fuel, gear oil, hydraulic oil, grease, survey paint, wasp and hornet insecticide, chain lubricant, and engine oils lubricants for equipment. The SSHO/UXOSO will review the SDSs with the workers using the material during safety meetings, and this training will be documented. All workers will have general hazard communication training that specifically requires workers to notify the SSHO/UXOSO when any new material is brought on to the site, and describes how the Hazard Communication Program is managed on the site.

All containers will be labeled as to content and hazards of the material in the container.

9.14 PROCESS SAFETY MANAGEMENT PLAN

This plan is not applicable to this project.

9.15 LEAD ABATEMENT PLAN

This plan is not applicable to this project.

9.16 ASBESTOS ABATEMENT PLAN

This plan is not applicable to this project.

9.17 RADIATION SAFETY PROGRAM

This plan is not applicable to this project.

9.18 ABRASIVE BLASTING PLAN

This plan is not applicable to this project.

9.19 HEAT/COLD STRESS MONITORING PLAN

When strenuous field activities are part of ongoing site work conducted in hot weather, the following guidelines should be used to monitor the body's physiological response to heat, and to manage the work cycle, even if workers are not wearing impervious clothing. These procedures should be instituted when the relative heat index exceeds or is forecasted to exceed 75 ºF (i.e., ambient temperature of 75 ºF and relative humidity of 55 percent) and the tasks/risk analysis indicates an increased risk of heat stress problems (EM 385-1-1 Section 06.J.01d and 06.J.03h). Consult the safety professional (e.g., Regional and/or Corporate EHS, and the SSHO/UXOSO) if questions arise as to the need for specific heat stress monitoring. In all cases, the site personnel must be aware of the signs and symptoms of heat stress and provide adequate rest breaks and proper aid as necessary. The SSHO/UXOSO will conduct heat stress monitoring.

If the heat index is forecast to exceed 75 ºF (i.e., ambient temperature of 75 ºF and relative humidity of 55%), workers will perform baseline pulse rate monitoring at the beginning of the shift, documented by the SSHO/UXOSO. Monitoring will be repeated at the beginning of each scheduled break. When the heat index exceeds 75 ºF, monitoring will occur hourly or when any individual exhibits symptoms. If a pulse rate is measured at 110 beats per minute or higher, the SSHO/UXOSO will confirm the reading after the individual rests for 2½ minutes. If the pulse rate remains elevated (110 beats per minute or higher) the individual will work on a 45 minute work/15 minute rest schedule for the remainder of the shift with the pulse rate monitored at the end of each rest period. This cycle will begin with a 15 minute rest period. The rest period will be extended if the pulse rate does not return to the individual's baseline or less than 95 beats per minute (whichever is higher), or the employee work shift will be terminated for the day. The SSHO/UXOSO will maintain frequent observations of affected individuals for signs of heat stress and take other measures (e.g., ear or oral temperature measurements, further reduction in

work schedule, or ceasing work for the day) as deemed necessary. Workers who have more than one heat-related episode within a month shall have a doctor's written release prior to returning to exposures in a potential heat stress environment.

Site workers should learn to recognize and treat the various forms of heat stress:

Heat Rash—Heat rash is caused by continuous exposure to heat and humidity, and is aggravated by chafing clothes. The condition decreases an individual's ability to tolerate heat and can be extremely uncomfortable. Symptoms may include mild red rash, especially in areas of the body that come into contact with protective gear. Workers exhibiting symptoms should decrease the amount of time spent working in protective gear and use body powder to help absorb moisture and decrease chafing.

Heat Cramps—Heat cramps are caused by inadequate electrolyte intake. The individual may be receiving adequate water; however, if not combined with an adequate supply of electrolytes, the blood can thin to the point where it seeps into the active muscle tissue, causing cramping. Symptoms include acute painful spasms of voluntary muscles, most notably the abdomen and extremities. Individuals showing symptoms of heat cramps should be moved to a cool area and their clothing loosened. Have the affected individual drink 1 to 2 cups of cool potable water or diluted commercial electrolyte solution (one to one dilution with water or, if mixing from powder, double the water added) immediately, and then every 20 minutes thereafter until symptoms subside.

Heat Exhaustion—Heat exhaustion is a state of very definite weakness or exhaustion caused by the loss of fluids from the body. Heat exhaustion is not as dangerous as heat stroke, but if not properly managed in the field it may lead to heat stroke. Symptoms of heat exhaustion include pale, clammy, and moist skin, profuse perspiration, and extreme weakness. Body temperature is normal, pulse is weak and rapid, and breathing is shallow. The person may have a headache, may vomit, and may feel dizzy. Remove all PPE and loosen the affected individual's clothing. Move the affected individual to a cool, air-conditioned, or temperature-controlled area, and place in a position with the head lower than the feet. Ensure that the affected individual is not nauseated or vomiting. If not nauseated or vomiting, give the affected individual small sips of cool water or diluted electrolyte replenishment solution (one to one dilution with water, or if mixing from

powder, double the water added). If this is tolerated, have the affected individual drink 1 to 2 cups of fluid; repeat every 20 minutes thereafter until symptoms subside.

Heat Stroke—Heat stroke is an acute and dangerous reaction to heat stress caused by a failure of the body's heat regulating mechanisms, i.e., the individual's temperature control system (sweating) stops working correctly. Body temperature rises so high that brain damage and death may result if the person is not cooled quickly. Symptoms include red, hot, dry skin (although the person may have been sweating earlier); nausea, dizziness, confusion, extremely high body temperature (i.e., 104 ºF or greater, as measured with an oral thermometer), rapid respiratory and pulse rate, unconsciousness, or coma. The affected employee should be removed from the source of heat and cooled quickly. Remove all PPE and as much personal clothing as decency permits, and call for ambulance support as soon as possible. Fan the person while sponging or spraying with cool or tepid water. Apply ice packs (if available) to the back of the neck, armpits, groin area, or behind the knees. Place the affected employee flat on their back or with head and shoulders slightly elevated. If conscious, and not nauseated or vomiting, the affected employee may be provided sips of cool water. Monitor the affected individual's vital signs and obtain immediate medical help. Do not give the affected employee coffee, tea, or alcoholic beverages. Emergency medical personnel will take over treatment when they arrive.

Workers will be briefed about heat stress symptoms, monitoring, and work/rest cycles as part of site-specific safety training.

Because of the temperate climate in Vancouver, Washington, extreme cold weather is not anticipated. However, during cold weather it may be necessary to protect personnel from the effects of cold temperatures and wind, as well as wetting from precipitation. The UXOSO is responsible for monitoring personnel for cold stress and evaluating the conditions, work tasks, and requirements for PPE.

9.20 INDOOR AIR QUALITY MANAGEMENT PLAN

This plan is not applicable to this project.

9.21 MOLD REMEDIATION PLAN

This plan is not applicable to this project.

9.22 CHROMIUM (VI) EXPOSURE EVALUATION

This plan is not applicable to this project.

9.23 CRYSTALLINE SILICA ASSESSMENT/EVALUATION

This plan is not applicable to this project.

9.24 LIGHTING EVALUATION

This plan is not applicable to this project.

9.25 LIGHTING PLAN FOR NIGHT OPERATIONS

This plan is not applicable to this project.

9.26 TRAFFIC CONTROL PLAN

The RAU 3 Phase 2 project areas are within controlled area of CBMR. As such, there are no public roads at the site. This plan is not applicable to this project.

9.27 FIRE PREVENTION PLAN

The field office will be equipped with a dry-chemical type fire extinguisher rated at least 4A:20B:C. In addition, a fire extinguisher rated at least 2A:10B:C will be located in each project truck and piece of heavy equipment on-site. Fire extinguishers in the cabs of all vehicles must be mounted or secured. All fire extinguishers will be inspected monthly. Employees will follow safe work practices, to include the proper storage of flammable and combustible liquids. Smoking is permitted only in those areas designated specifically by the SUXOS and/or UXOSO/SSHO.

Refueling will be performed only in a designated area. Equipment must be refueled with the equipment turned off (except under special circumstances, as required by an operator's manual).

No refueling will be performed unattended. Latch-on fueling hoses are prohibited. No smoking is authorized in any area where refueling is performed.

In the event of a fire or explosion, the proper procedure is to immediately summon the Fire Department by calling 911, implement evacuation procedures and take a head count. If the fire is small (i.e., it may be extinguished with one fire extinguisher) and there are no secondary hazards (i.e., downed power lines and/or chemical involvement) workers may initiate fire suppression with fire extinguishers in a safe manner (if they are trained and are comfortable doing so). Any fire must be reported to the Project Manager and EHS Director.

9.28 WILD LAND FIRE MANAGEMENT

This plan is not applicable to this project.

9.29 ARC FLASH HAZARD ANALYSIS

This plan is not applicable to this project.

9.30 ASSURED EQUIPMENT GROUNDING CONTROL PROGRAM

This plan is not applicable to this project.

9.31 HAZARDOUS ENERGY CONTROL PLAN

This plan is not applicable to this project.

9.32 STANDARD PRE-LIFT PLAN

This plan is not applicable to this project.

9.33 CRITICAL LIFT PLAN

This plan is not applicable to this project.

9.34 NAVAL ARCHITECTURAL ANALYSIS

This plan is not applicable to this project.

9.35 CONTINGENCY PLAN FOR SEVERE WEATHER

Although severe weather is unusual for the area surrounding CBMR, the contingency plan for this project includes weather and other environmental events. The project area could be subject to high winds. When winds exceed 25 miles per hour, the SUXOS and/or SSHO will determine if work can continue, or if work should be stopped. Materials and equipment may be difficult to manage in high winds. Nearby thunderstorms, although unusual, could have lightning associated with them. Whenever a thunderstorm arises, the SSHO will determine if lightning is within 10 miles of the site. If lightning is close to the site, work will stop and, if appropriate, personnel will retreat to a safe location.

In preparing for a severe storm, all equipment will be secured and all doors and windows of the field vehicles will be closed. All tools and supplies will be stored in a designated secure location.

9.36 MAN OVERBOARD/ABANDON SHIP PROCEDURES

This plan is not applicable to this project.

9.37 FLOAT PLAN FOR LAUNCHES, MOTORBOATS, AND SKIFFS

This plan is not applicable to this project.

9.38 FALL PROTECTION AND PREVENTION PLAN

This plan is not applicable to this project.

9.39 DEMOLITION/RENOVATION PLAN

This plan is not applicable to this project.

9.40 ROPE ACCESS WORK PLAN

This plan is not applicable to this project.

9.41 EXCAVATION/TRENCHING PLAN

This plan is not applicable to this project.

9.42 UNDERGROUND CONSTRUCTION FIRE PREVENTION AND PROTECTION PLAN

This plan is not applicable to this project.

9.43 COMPRESSED AIR WORK PLAN FOR UNDERGROUND CONSTRUCTION

This plan is not applicable to this project.

9.44 FORMWORK AND SHORING ERECTION AND REMOVAL PLAN

This plan is not applicable to this project.

9.45 PRECAST CONCRETE PLAN

This plan is not applicable to this project.

9.46 LIFT SLAB PLANS

These plans are not applicable to this project.

9.47 MASONRY BRACING PLAN

This plan is not applicable to this project.

9.48 STEEL ERECTION PLAN

This plan is not applicable to this project.

9.49 EXPLOSIVES SAFETY SITE PLAN

Explosives Safety Submission, Amendment 3 (ESS) (Appendix I of the RAU 3 Phase 2 Work Plan [WESTON, 2015b]) addresses the work to be performed during the RAU 3 Phase 2 Remedial Action. The ESS provides information from previous investigations and removal actions in order to assess the potential hazards at the site. It also addresses detection technologies, response actions, and risk management.

9.50 BLASTING PLAN

Blasting as it relates to MEC and/or MPPEH disposition (detonation) is addressed in the ESS (Appendix I of the RAU 3 Phase 2 Work Plan [WESTON, 2015b]) and SOP-8 (Appendix G of the RAU 3 Phase 2 Work Plan [WESTON, 2015b]).

9.51 UNDERWATER DIVE OPERATIONS PLAN

This plan is not applicable to this project.

9.52 TREE FELLING/MAINTENANCE PROGRAM

This plan is not applicable to this project.

9.53 AIRCRAFT/AIRFIELD CONSTRUCTION SAFETY AND PHASING PLAN AND COMPLIANCE DOCUMENT

This plan is not applicable to this project.

9.54 SITE SAFETY AND HEALTH PLAN FOR HAZARDOUS, TOXIC AND RADIOACTIVE WASTE WORK

A SSHP meeting the criteria of EM 385-1-1 (USACE, 2014), OSHA, and Washington State requirements is included as Appendix B to this APP.

9.55 CONFINED SPACE ENTRY PROGRAM AND PROCEDURES

This program is not applicable to this project.

10. RISK MANAGEMENT PROCESSES

AHAs for the planned activities are included in Attachment 1 of the SSHP (Appendix B of this APP) and will be reviewed and modified as necessary for each work activity (also referred to as phase of field work or definable feature of work). If any new activities are identified or if planned activities vary from the written AHAs, the UXOSO/SSHO will develop or alter the existing AHAs with the assistance of subcontractors or workers to address the specific activities. AHAs prepared and provided by subcontractors for their scope of work will also be reviewed and added to the APP/SSHP. AHAs for given tasks will be reviewed at least monthly when that task is being performed and will be updated using a revision number. Updated AHAs will be substituted in all field copies of the APP/SSHP.

The following work activities have been identified:

1. Land Surveying Anomaly Avoidance (AHA1) – note: the Land Surveyor will provide an AHA for the work they will perform
2. Brush Cutting Anomaly Avoidance (AHA2) – note: the Brush Cutting Subcontractor will provide an AHA for the work they will perform
3. Analog Geophysical Anomaly Detection and Removal (AHA3)
4. MEC/MPPEH Identification and Disposal (AHA4)
5. Soil Excavation/Mechanical Screening (AHA5) – if used

11. REFERENCES

29 Code of Federal Regulations (CFR) Part 1910. "Occupational Safety and Health Standards."

29 CFR Part 1926. "Safety and Health Regulations for Construction."

Chapter 296-155. Washington Administrative Code (WAC). "Washington State Safety Standards for Construction Work."

Chapter 296-800. WAC. "Washington Industrial Safety and Health Act Safety and Health Core Rules."

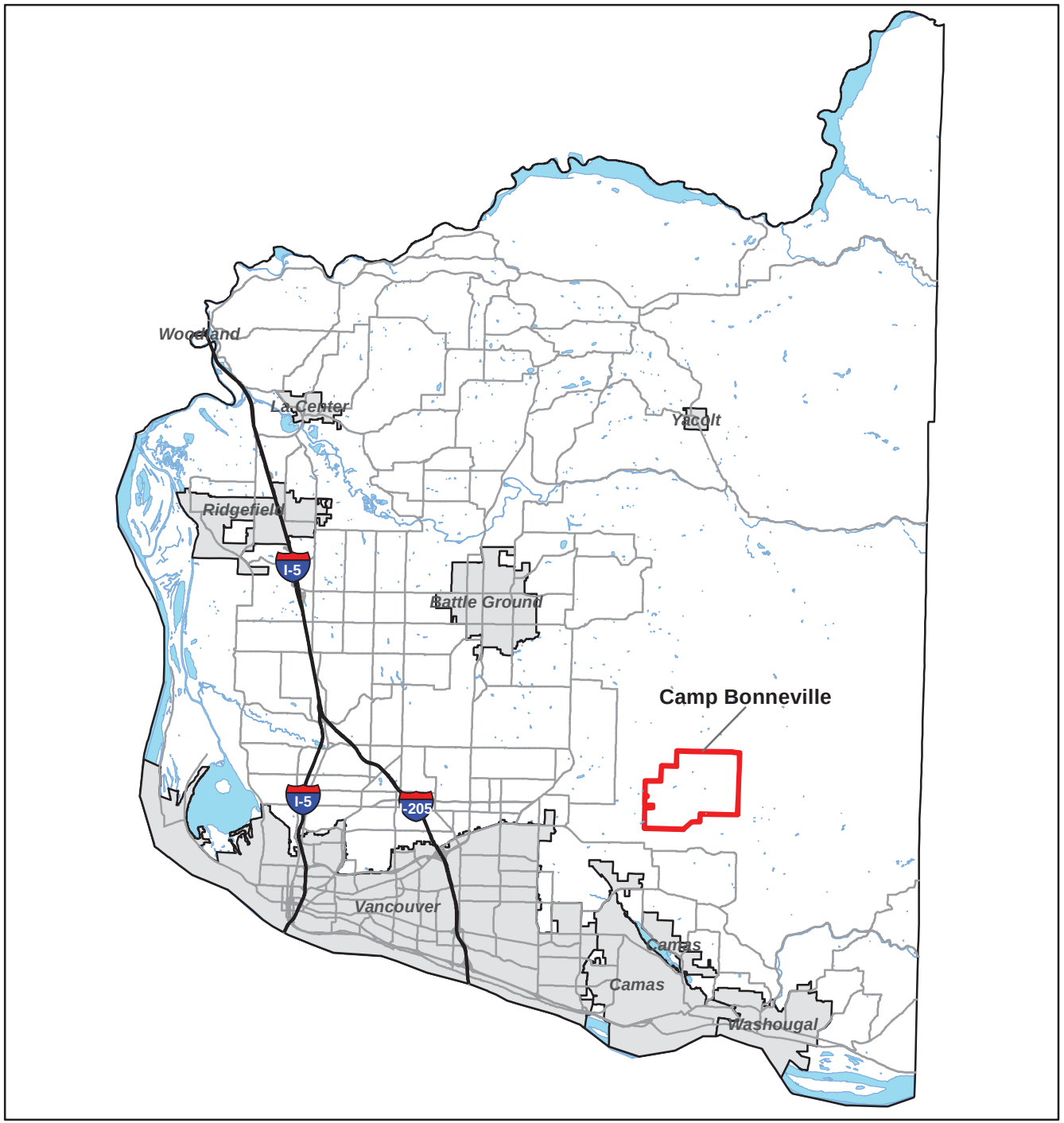
Department of Defense Explosives Safety Board (DDESB). 2015. Technical Paper 18, *Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities*, Alexandria, VA. 1 September.

U.S. Army Corps of Engineers (USACE). 2014. EM 385-1-1 *Safety and Health Requirements Manual*. November 30.

Weston Solutions, Inc. (WESTON). 2015a. *Weston Solutions, Inc. Corporate Environmental Compliance, Health, and Safety Program Manual*.

WESTON. 2015b. *Work Plan, Surface and Subsurface Clearance Munitions and Explosives of Concern, Remedial Action Unit 3 Phase 2, Former Camp Bonneville Military Reservation, Vancouver, Washington.*

FIGURES



N

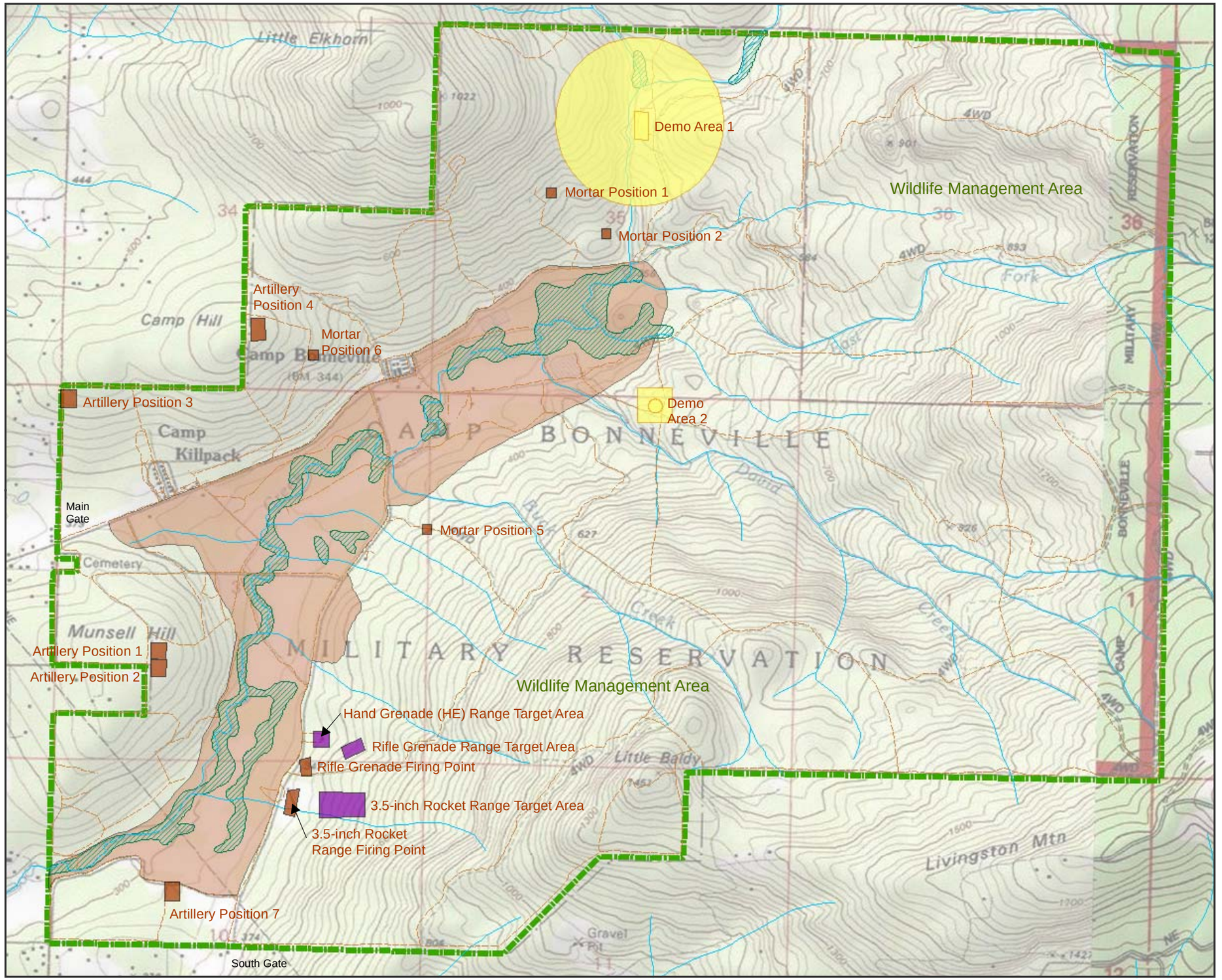
0 2.5 5 10 Miles

Clark County Public Works

FIGURE 1
SITE LOCATION

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Property Boundary
- Central Valley Area (RAU3 Phase 1)
- Demolition Area (RAU 3 Phase 2)
- Training Range Target Area (RAU3 Phase 2)
- Firing Position/Firing Point (RAU3 Phase 2)
- Wetland Area
- Roads
- Streams / Rivers

N

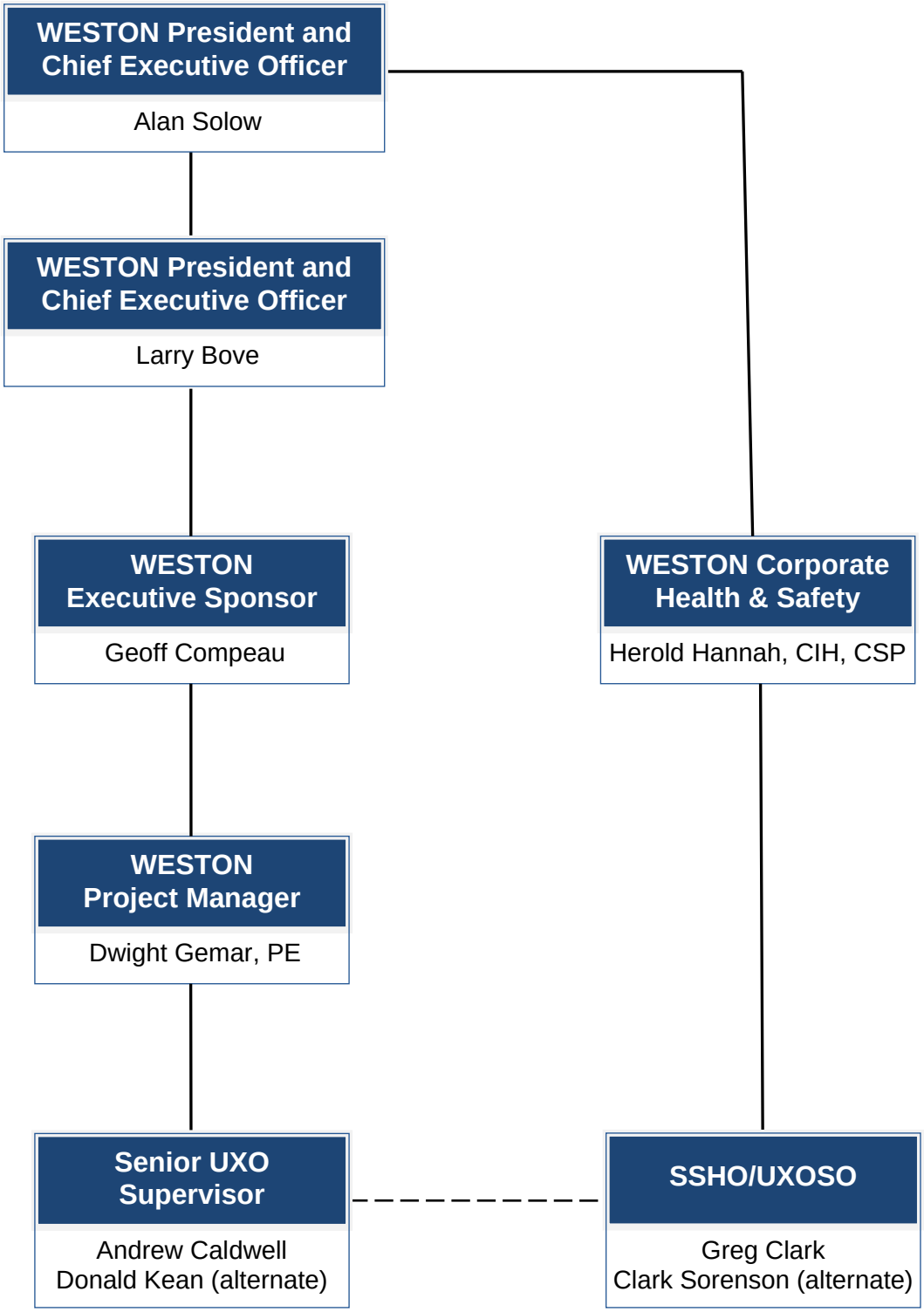
0 1,000 2,000 4,000 Feet

Clark County Public Works

FIGURE 2
RAU 3 PHASE 2
CLEARANCE LOCATIONS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



Clark County Public Works

FIGURE 3
HEALTH AND SAFETY ORGANIZATION CHART AND LINES OF AUTHORITY

Former Camp Bonneville Military Reservation
Vancouver, Washington

APPENDIX A
RESUMES AND CERTIFICATIONS

Herold S. Hannah Jr, CIH, CSP

Qualifications Summary

- Over 29 years of direct experience industrial and construction hygiene, health, safety, rapid response, and occupational management. in environmental, construction, remediation, HazMat response, training programs NRC SH&E Program Consolidation
- Managed continuous improvement OSHA and HAZWOPER Training Programs
    - Standardized training programs to assure consistent delivery across Americas
    - Assessment programs that ranked trainers and provided constructive actions to improve training skills
    - Developed risk assessment tool that focused training needs to prioritize high risk activities and associated training.
- HUD Healthy Homes Program – Joint Venture - managed and directed implementation of US wide Healthy Homes (HUD) lead based paint assessment program. Standardized assessment and reporting processes.
- Developed content and work web developers and IT support for on-demand/online SH&E orientation training programs.
- Development of an Americas cross business and country (US/Canada/Latin America) HSE program. Direct management of a team of SH&E professionals that consolidated more than 19 SH&E programs that were part of subsidiary companies (most were less than 1000 employees) into one HSE program supporting >15,000 employees).This included the consolidation of multiple HSE programs This included:
- SH&E assessments and metrics that measured success of operational leadership implementation of SH&E program
- Developed HSE Construction Programs
    - Development and execution of HSE program that aligned with oil and gas company requirements.n the oil and gas programs.
    - SH&E construction program protecting employees working with UXO, chemical agent, and highly hazardous chemicals (Rocky Mountain Arsenal)
- Developed and implemented train the trainer HSE mentoring programs

Credentials

Certified Industrial Hygienist (CIH) (No. CP 6854), ABIH (1994)

Certified Safety Professional (CSP) (No. 14282), BCSP (1996)

Education

B.S., Biology/Microbiology - University of Pittsburgh (1986)

Training, Memberships & Awards

- ABIH
- ASSE
- AIHA

Employment History

1987 to 1991 NUS Corporation

1991 to 2003 Geo-Con, Inc.

2003 to 2004 Masi Max

2004 to 2009 AECOM Technical Services (Formerly Earth Tech)

2009 to 2014 AECOM

2014 to 2015 National Response Corporation

2015 to Present Weston Solutions

Key Projects

NPC Site Baton Rouge LA, Baton Rouge, LA, NPC - Cosortium of oil and gas companies, Health and Safety Officer. Large high hazard remediation project that included landfill construction, lagoon stabilization, excavation, consolidation and containment VOCs, tars, oil, and other by products of fractional oil distillations. Work involved extensive use of level B and C. Construction of office and decontamination complexes for >100 employees. Contaminates of concern included BETX (benzene, ethyl benzene, toluene, and xylene), and hexa-chlorobutadiene.

HAZWOPER Training Program, Multiple Locations, Various, HAZWOPER Training Manager. Manage 29 CFR1910.120 HAZWOPER training programs for internal and external clients. Provided 40-Hour HAZ, 40-HOUR ER, 8-Hour Refresher, and 8-Supervisory training programs. Role consisted of content development, lesson planning and program management across the US.

HUD Healthy Homes Program - Lead Based Paint Inspection and Reporting Standardization, Multiple Locations, HUD, Senior Industrial Hygienist. Managed and directed implementation of US wide Healthy Homes (HUD) lead based paint assessment program. Standardized assessment and reporting processes. Coordinated as a minority owned business joint venture.

Cambridge, MA: Release Abatement Measure, In-Situ Soil Stabilization, Cambridge, MA, MassDEP, Health and Safety Manager. As a Release Abatement Measure (RAM) under the provisions of Massachusetts Environmental Regulations, in-situ Shallow Soil Mixing (SSM) of impacted soil (LNAPL and DNAPL) over an area of approximately 2.2 acres. Approximately 103,000 cy of soils were stabilized in-place to an average depth of 22 feet bls for this project.

The property was the former location of a Manufactured Gas Plant (MGP). Past MGP operations resulted in the release of hazardous chemicals into the soil and groundwater. Hazardous chemicals, including but not limited to volatile and semi-volatile organic compounds, were present in soil and groundwater at concentrations greater than Reportable Concentrations specified in the Regulations for the State of Massachusetts.

The equipment being used to perform the stabilization includes the following; a 4000 series Manitowoc crane, a rotary drill table (Caldwell CH-200 capable of developing 350,000 ft-pounds of torque), a 10-ft diameter mixing tool, a batch plant and a Soil-Vapor Extraction (SVE) system, shroud and carbon filter. The SVE system was used to collect and treat any hazardous gases that may be released during the stabilization process. Cement-Kiln Dust (CKD) and Bentonite are the mixing reagents.

A spacing of 8.67 feet between the center of adjacent columns was implemented based on the effective ten-foot column mixed by the ten-foot diameter-mixing tool. This pattern layout allows for mixing of 100% of the soil mass and includes approximately 35% overlap of each interior column. The SSM operation required approximately 590 columns for treatment of the LNAPL impacted soils and approximately 1620 columns for treatment of the DNAPL impacted soils inside the treatment boundry.

All columns within the LNAPL stabilization area were stabilized to a depth of 12 feet below the existing ground surface. In areas where both LNAPL and DNAPL are present, stabilization occurs to a depth of 2 feet below the clay surface. All columns within the boundry of the DNAPL stabilization area were stabilized to a depth of 2 feet below the clay surface.

Prior to stabilizing the soil, excavation is performed within the limits of the stabilization area to locate and remove rock obstructions and abandoned subsurface structures to a depth of approximately 22 feet below the existing land surface. The subsurface structures consist of gas holders, tar tanks, boiler house and other structures. The obstructions are either removed or broken in place and then removed. The existing ground water elevation is approximately 8-10 feet below land surface. To reduce the odors generated during the excavation of the substructures, the disturbed area was constantly foamed.

Site Remediation - MGP - Municipal Gas Plant - Georgetown, DE, Georgetown, DE, Health and Safety Manager. Site remediation project at a former MGP site in Georgetown, Delaware. The site was small and located within the city limits of Georgetown. Special concern of the client was the close proximity (8 feet) of the proposed excavation area from a cold storage food warehouse where differential settlement could adversely impact the operations. Additionally, a completion date of April 30, 2001 was mandatory as warehouse operations commenced on May 1, 2001.

Initial work consisted of several buildings and former gas holder foundation removal, which involved approximately 150 tons of materials. A 2 ft wide, 10 ft deep diaphragm wall was installed which allowed for the successful removal of contaminated subsurface soils. A small offset excavator was used to excavate the trench, while bentonite slurry was simultaneously pumped and maintained in the trench during excavation. A truck-mounted drill rig preceded the excavator and augered 18-inch diameter holes through 22 feet of soil. The 23 holes were used to set the support columns and anchor them into 10 feet of virgin soil. Thereafter, 14 x 73 "H" beams spaced 10-15 ft from centers were placed into the holes. Upon trench completion, 3,000

psi concrete was pumped into the trench, displacing the slurry and creating the retention wall. The subsurface contaminated soils were excavated and directly loaded into trucks for disposal. Upon completion of back filling activities, final restoration was completed.

The project was completed on time with no movement of the cold storage warehouse foundations. Managed a confined work area and community concerns successfully in order to execute this project with zero incidents.

Shallow Soil Mixing/Soil Vapor Extraction, Piketon, OH, Department of Energy - MMES, Health and Safety Manager. First full-scale project to use Shallow Soil Mixing (SSM)/Thermally Enhanced Vapor Extraction (TEVE) and Soil Vapor Extraction (SVE) to remove Volatile Organic Compounds (VOCs) contamination from a waste disposal area. The site is at the Portsmouth Gaseous Diffusion Plant in Piketon, Ohio and was contaminated to a depth of 22 feet. The cleanup was completed without excavation and the soils remained in place after treatment in accordance with Ohio EPA approvals. SSM was performed with 8 to 12 feet diameter-mixing tools.

The site consisted of primarily silty and clayey soils with a groundwater table 15 feet below the surface. Trichloroethylene (TCE) contamination was spread over the site at levels, which varied from 1 to 500 ppm. The VOCs were mobilized by SSM and TEVE and removed through a SVE treatment unit.

Considerable experimentation was required in auger/mixer designs, procedures, additives, and equipment during the work. Hydrogen peroxide was experimentally used during part of the process. Much of the work was performed in harsh winter conditions. Work was performed around the clock, seven days per week to avoid state-mandated liquidated damages. Geo-Con completed the project on time and removed 200% of the planned amount of VOCs.

The specified objective of the Work Plan was to remove or destroy a minimum of 70 percent of the VOCs. Over 90% of the VOCs were removed. This project was the first full-scale implementation of SSM/SVE and is being used as the model for future DOE cleanups.

Site Remediation Island Sports Complex Neville Land Company; Excavation and Disposal, Neville Island, PA, Health and Safety Manager.

Site remediation of a former steel byproducts waste disposal site, consisted of a slurry cutoff wall, 9 acre multi-layer geo-membrane cap, river bank slope stabilization, monitoring well abandonment, gas well abandonment, 200,000 cy of soil fill, building and ancillary demolition, and installation of subsurface utilities for future use.

The project was a one-of-a-kind Superfund site where a multi-discipline sports complex was constructed above the cap. The complex consists of 4 ice hockey surfaces, batting cages, 9 hole golf course, indoor/outdoor golf dome, and restaurant.

The project presented significant challenges in that the work scope was not initially developed and evolved as it progressed. This required significant management and scheduling demands to keep the project on track and within budget.

The primary contaminants of concern on this site were aromatic hydrocarbons, chlorinated volatile organic compounds, poly nuclear aromatic hydrocarbons (PAHs), pesticides, and PCBs. Real-time monitoring onsite consisted of a photoionization detector (PID) for the volatile organic compounds, combustible gas indicator, oxygen monitor, total dust meter (PDM3), and colorimetric evaluation.

Meteorological conditions were tracked daily via the internet collecting weather data which provides current weather conditions (e.g., temperature, wind direction, humidity, precipitation, etc.).

Rocky Mountain Arsenal Site Remediation; Soil Treatment (Lead, pesticides, chemical agent, CO, Rocky Mountain PMC, Health and Safety Manager. Contractor at Rock Mountain Arsenal in Denver, Colorado to complete a soil remediation project. The project consisted of the remediation of material in former disposal pits that contained waste from the manufacture of chemical weapons on the Arsenal. The material in the pits was excavated and combined with the clean soil surrounding the pits. This mixture was then fed through a pugmill plant where it was mixed with cement and water to produce a stabilized end product.

The primary contaminants treated were heavy metals such as arsenic, lead and mercury, with the maximum mercury concentration in soil equaling 94.0 mg/kg. The 6% cement in the mixture was designed to bind the metals and reduce the leachability, achieving TCLP criteria. The treated material was then hauled to the on-post landfill. Initially, completed trial batches at various cement contents to determine what would be used during full scale production. The entire project was performed under Level "B" protection.

Additionally, in order to minimize the possibility of vapors being released during the pumill mixing, a custom built a vapor extraction and treatment system was attached to the pugmill mixing chamber. Proper blending of the pit material and the clean surrounding material was achieved with a system of screens and belts equipped with belt scale system. The belt scales were connected to a CPU, which constantly monitored and adjusted the belt speeds to ensure the proper blending ratio. The clean-up at the Rocky Mountain Arsenal was a multi-contractor effort under the direction of the Program Management Contractor.

EH&S Services for Hazardous Waste Sites; Superfund; 29 CFR 1910.120, Multiple Locations, Safety Manager.

Developed and audited 150+ site-specific health and safety programs including specifications for personal protective equipment, confined space entry, contaminated soil excavation, lockout tagout, HAZCOM, HAZWOPER, construction safety, heavy equipment operations, and cranes. Projects include:

Shallow Soil Mixing, Slurry Wall and Cap, Oil Refinery Sludge Pond Closure - Whiting, Indiana

- Slurry Wall, Cap and Cover, Kane & Lombard Superfund, Site Remediation - Baltimore, Maryland
- In-Situ Stabilization, Slurry Wall and RCRA Cap, Sinclair Refinery Superfund Site - Wellsville, New York
- Remedial Action Work Site, Osborne Landfill Site - Grove City, Pennsylvania
- Site Remediation, Avesta Sheffield - Baltimore, Maryland
- Site Remediation, Island Sports Complex - Neville Island, Pennsylvania
- Cap and Cover - Lockhaven, Pennsylvania

- Cutoff/Collection Trench - Streator, Illinois
- Sonoma County Landfill, Soil Bentonite Cutoff Wall and Groundwater Collection Trench - Sonoma, California
- J. H. Baxter Superfund Site, Soil Bentonite Cutoff Wall and Groundwater Collection Trench - Weed, California
- Fresh Kills Landfill, Cutoff Wall Project - Staten Island, New York
- Site Remediation, MGP Site - Georgetown, Delaware
- Englewood Dam Crest Improvements, Cement-Bentonite Vertical Barrier - Dayton, Ohio
- Groundwater Collection/Barrier Wall System Lis; Brine Ponds Landfill, Albemarle Corporation - Magnolia, Arkansas
- Bio-Polymer Slurry Trench, Air Injection Trench - Camp Lejeune, North Carolina
- HDPE Curtain Wall and Underdrain System, Sun Company, Philadelphia Refinery - Pennsylvania
- Bio-Polymer Trench - Philadelphia, Pennsylvania
- Air Sparging Trench Installation, Winder Leaksite - Winder, Georgia
- Construction of a Seepage Cutoff Wall, Using Deep Soil Mixing and Jet Grouting - Vancouver, British Columbia
- Deep Soil Mixed Cut-Off Wall - Bay City, Michigan
- On-Base Containment Wall, Operable Unit No. 2 - Hill Air Force Base, Utah
- Groundwater Barriers by Deep Soil Mixing, Rocky Mountain Arsenal - Commerce City, Colorado
- Deep Soil Mixing - Piketon, Ohio
- Deep Soil Mixing - Sheffield, Illinois
- In-Situ Stabilization via Shallow Soil Mixing (SSM) of Organic Contaminated Soils and Sludges, Bailey Waste Superfund Site - Bridge City, Texas
- In-Situ Soil Stabilization, Shallow Soil Mixing (SSM) - Columbus, Georgia
- Shallow Soil Mixing, Former Railroad Yard - Pittsburgh, Pennsylvania
- In-Situ Soil Stabilization, Shallow Soil Mixing - Cambridge, Massachusetts
- Shallow Soil Mixing/Vapor Extraction - Brunswick, Georgia
- Shallow Soil Mixing, Former MGP Site - Exeter, New Hampshire

- Cadmium Remediation - Binghamton, New York
- INEL - Idaho Falls, Idaho

NAVFAC Mid-Atlantic, Civil Engineering and Design Services IDIQ, Camp Lejeune, NC, NC, DOD/US Navy/NAFAC, Contract Safety Manager.

Safety manager responsible for development and review of site safety and health plans for a variety of task orders. Task orders included site development and engineering design for the Fisher House Wounded Warrior Barracks complex; site designs for various buildings including a hazmat storage facility, portable armory, and personal vehicle and equipment parking areas; as well as environmental compliance tasks.

Water and Wastewater Treatment Clients, Compliance Evaluations, Massachusetts, Rhode Island, and Connecticut, Lead Auditor.

Lead auditor for assessment teams that evaluated 14 facilities for compliance with environmental discharge permits which included water, air, and solid waste discharge streams. Water treatment facilities were assessed using a national drinking water act compliance map. Wastewater facilities were evaluated using compliance maps that were based on state permits. Examples of assessment areas included SPCC, EPCRA, AST/UST, PSM, ERP, RMP, QA/QC, and laboratory compliance.

Water and Wastewater Treatment Clients, Process Safety Management (PSM) Program, Multiple Sites, Program Health and Safety/ QA Manager.

Developed and implemented a process safety management (PSM) program for wastewater and water treatment facilities operated by company staff. Support included facility compliance assessment reviews, written program development, training, emergency response program reviews, best management practices, management of change, and process hazard analysis (PHA). The process hazard was chlorine gas.

Multiple US Federal Agencies, IDIQ Contracts, US Department of Defense, US Navy, US Army, US Airforce, US Coast Guard and USACE, Program Health and Safety Manager.

Program safety, health and environment manager for federal IDIQ contracts managed from Mid-Atlantic District. Responsible for development/review of program and site-specific health and safety plans and oversight of implementation of safety programs. Clients included AFCEE (4PAE, 4PAE08), US Air National Guard (Environmental Engineering, Professional, Technical, and Remediation Support Services); US Air Force Air Combat Command (ECAS); NAVFAC Washington (Facilities Planning and Natural/Cultural Resources Management Program Support); US Army Space and Missile Defense Command, and US EPA (ERRS).

AFCEE, 4PAE08, Worldwide, Air Force Civil Engineer Center, Program Health and Safety Manager.

Program health and safety manager for multidisciplinary environmental and A-E services contract. Task orders cover environmental restoration, compliance, planning, and conservation; information technology; force protection; and traditional Title I and Title II services at Air Force sites worldwide.

US Army Corps of Engineers - Omaha District, Environmental Remediation Services Contract (ERSC). Multiple Sites, US Army Corps of Engineers - Omaha District, Health and Safety Manager.

Health and safety manager with district-level oversight of EH&S issues for a wide range of environmental remediation services and ordnance explosive services to the Omaha District at various known or suspected HTRW sites and OE sites in the US under a 5-year ID/IQ contract. Task orders included performance-based statements of work. Projects included remediation efforts at MacDill AFB and Eglin AFB.

Groundwater Treatment Plant, Robins AFB, Georgia, GA, US Airforce, District Safety Manager.

District safety manager responsible for Health and Safety Plan development and review of safety programs (HAZWOPER, confined space, fall protection, hearing protection, respiratory safety).

Civil Engineering and Design Services, Camp Lejeune, North Carolina, NC, DOD/NAVFAC, District Safety Manager. District safety manager responsible for development and review of site safety and health plans for a variety of task orders. Task orders included site development and engineering design for the Fisher House Wounded Warrior Barracks complex; site designs for various buildings including a hazmat storage facility, portable armory, and personal vehicle and equipment parking areas; as well as environmental compliance tasks

Anniston-Calhoun County Fort McClellan Development Joint Powers Authority (JPA), MEC Remediation Services, Fort McClellan, Alabama, AL, USACE, SH&E Manager.

Health and safety manager for MEC remediation services. Under a master services agreement with the JPA, AECOM is providing surface and subsurface clearance services along the re-development corridor leading from Anniston to the Fort McClellan cantonment area.

Dwight W. Gemar, P.E.

Qualifications Summary

- More than 30 years of experience as a Program Manager, Project Manager, technical supervisor, and process engineer.
- Direct hands-on management of large fixed-price and cost-reimbursable remedial construction activities, including early transfers under CERCLA for BRAC installations.
- Experienced and knowledgeable in areas of soil and groundwater processing, remedial design, regulatory compliance, quality assurance/quality control (QA/QC) requirements, scheduling analysis, and cost control techniques.
- Technical design and/or implementation experience with the following remedial techniques and technologies: geomembrane caps, solidification/stabilization, slurry walls, dual vacuum extraction, *in-situ* bioremediation, carbon adsorption, ozone/peroxide destruction, air stripping, metals precipitation, clarification and sludge dewatering, soil washing, and low temperature thermal desorption.
- Munitions and explosives of concern (MEC) and radiological contamination remediation.

Credentials

Certified General Contractor (No. 522739), CA (2004)

Certified General Contractor (No. 0043621), NV (2011)

Professional Engineer (P.E.) (No. CH 5011), CA (1995)

Education

B.S., Chemical Engineering - South Dakota School of Mines and Technology (1980)

Training, Memberships & Awards

- Bloodborne Pathogens Training – Initial, OSHA 29 CFR 1910.1030, WESTON (2008); Refresher, WESTON (2014) (2014)
- Behavior Based Safety, Phase I Training, WESTON (2007)
- First Aid/CPR/AED Training, American Safety and Health Institute (2010)
- 10-Hour Construction Safety Training, OSHA 29 CFR 1926, U.S. Department of Labor (2004)
- 8-Hour Managers and Supervisors Course (SHSC), OSHA 29 CFR 1910.120(e)(4), (1990)
- 40-Hour Health and Safety Training, OSHA 29 CFR 1910.120(e)(3), OHM (1989)
- 8-Hour Hazardous Waste Refresher Course, OSHA 29 CFR 1910.120(e)(8), WESTON (2014) (2014)

- 30-Hour Construction Safety and Health Training Course, OSHA 29 CFR 1926, U.S. Department of Labor (2004)
- Nuclear Criticality Safety Training, DuPont (1988)
- Process Safety Management, DuPont (1984)

Employment History

2001 to Present WESTON

1989 to 2001 IT Corporation/OHM Remediation Services Corp.

1980 to 1989 E.I. du Pont de Nemours and Company, Inc.

Key Projects

Munitions Non Time Critical Removal Action, Production Manufacturing Area and South Shore Area, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Served as Project Manager for a $6.7M fixed price/unit price contract to implement a Non Time Critical Removal Action (NTCRA) for the removal of munitions and contaminants of concern (MEC) at the Production Manufacturing Area and South Shore Area of the former Mare Island Naval Shipyard (MINS). Due to the potential for the detection of radiological items, WESTON utilized our radiological materials handling license from the State of California to perform the work. The work entailed the radiological monitoring and excavation/evaluation of a portion of the 28,810 geophysical anomalies identified during a digital geophysical mapping survey conducted by WESTON in 2006 under separate contract in several different work environments, including upland, tidal wetlands, and mudflats.

Prior to beginning work, WESTON performed a survey for the federal/state endangered California Clapper Rail and implemented avoidance measures for the federal/state endangered Salt Marsh Harvest Mouse, including daily oversight by a qualified biological monitor. Due to the presence of MEC, munitions-related materials identified as safe (MDAS), or non-munitions related metal debris at depth, the excavations often required excavation to 4 feet below ground surface to adequately evaluate the geophysical anomaly locations for MEC. Due to the history of radiological items found in other locations on MINS, each one foot interval of the excavated soil was scanned with radiation detectors to check for the presence of any radiological items. In total, UXO personnel from WESTON excavated 18,375 geophysical anomaly locations and safely located and removed 1,020 MEC items, 10,049 MDAS items, and over 30,500 small arms ammunition.

The majority of the removed MEC items within the upland areas included 20-mm anti-aircraft rounds, primers, fuzes and a 4-inch armor piercing projectile. MEC removed from shoreline areas included mostly primers and fuzes, however an unexpected find included a fully-charged WWII era depth charge containing an estimated 300 pounds of explosives located in the mudflats and removed by WESTON, and transported by the Navy to Fallon Naval Air Station in Nevada for detonation. The depth charge find required a substantial increase in the explosive safety arc. In order to not impact access to an adjacent nature preserve frequented by the public, WESTON suggested that the waterside of the shoreline where the depth charge was located be

considered separately from the upland areas. This allowed public access to the preserve to continue which provided Navy with a significant public relations benefit.

All recovered MEC items other than the depth charge were safety stored and later detonated at a designated demolition range location on MINS by WESTON. MDAS items were inspected and transported off-site for demilitarization, and 69 tons of non-munitions scrap metal was also inspected and transported for recycling. WESTON also supported the Navy in presentations to the public on the status of the NTCRA activities at the Mare Island Restoration Advisory Board meetings.

Over 44,000 field labor hours were performed with no injuries, lost or restricted work day events. Upon completion of the field work, WESTON prepared the Completion Report and After Action Report documenting the results of the NTCRA. Based on completion of the fieldwork, the Navy issued an "Outstanding" interim rating under its Construction Contractor Appraisal Support System (CCASS).

Petroleum Corrective Action, Defense Reutilization and Marketing Office Site, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Served as Project Manager for a $8.2M fixed price project to perform a Petroleum Corrective Action (PCA) at the Defense Reutilization and Marketing Office Site on the former Mare Island Naval Shipyard. The site involved soils contaminated with weathered Bunker C fuel oil to depths at concentrations as high as 97,000 mg/kg. The total surface area of the contamination covered 7.2 acres extending from the surface to between 7 to 20 feet below ground surface. The footprint of the petroleum contaminated soils extended beneath a major roadway on Mare Island, therefore the scope included removal and replacement of the paved roadway along with removal and replacement of a 12KV underground electrical duct bank, an 8-inch potable water line, and stormwater lines and catch basins. The objective of the PCA was to excavate and dispose of soil contaminated in excess of limits established by the San Francisco Bay Regional Water Quality Control Board. To effect significant costs savings on disposal, WESTON coordinated with the Navy, regulators and an adjacent property owner to obtain approval to utilize the petroleum impacted soil as subgrade beneath an engineered cap for a former landfill area being constructed by WESTON under a separate contact.

Approximately 160,000 cubic yards of soils and other debris were excavated and consolidated as subgrade. Due to the physical properties of the soil containing high concentration of petroleum it was not practical to consistently meet the required compaction requirement for the landfill cap subgrade. However WESTON tested and obtained regulatory approval for amending the soil with quick lime to both dry the soil and provide improved handling and compressive strength properties which allowed the subgrade compaction properties to be achieved.

WESTON obtained a source for the large volume of suitable import soil and met all geophysical requirements to backfill the extensive excavation areas. WESTON also prepared the design packages and obtained the required approvals from the City of Vallejo to reinstall the underground high-voltage electrical duct bank, water and stormwater utilities, and to restore the approximately 1,000 feet of paved surface for Azuar Drive removed during the excavation of the underlying contaminated soils. During implementation of the petroleum corrective action, over 16,000 field labor hours were performed without incident or injury.

By utilizing the contaminated soils as subgrade for the nearby landfill undergoing closure, WESTON saved the Navy over $10M compared with off-site disposal at a commercial landfill.

Non Time Critical Removal Action, IR Site 17 and Building 503 Area, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Served as Project Manager for a $2.1M fixed price Non Time Critical Removal Action (NTCRA) at Installation Restoration Site 17 and Building 503 Area on the Former Mare Island Naval Shipyard in Vallejo, California. The NTCRA objective was to reduce residual free-phase product (coal tar distillates) in the subsurface related to a former paint manufacturing facility on the shipyard. WESTON prepared the required workplan and health and safety plan for Navy and regulator approval to implement the preferred remedial alternative consisting of soil excavation and off-site disposal.

To prepare the excavation area, WESTON removed a rail line spur, cut/cap utilities, and abandoned monitoring wells within the excavation footprint. Biological avoidance and impact minimization measures for the federal and state endangered salt marsh harvest mouse was performed during excavation in the vicinity of an adjacent wetland. During excavation, a non-toxic biodegradable odor inhibitor foam was applied to the open excavation surfaces as needed to minimize odors. Approximately 9,500 cubic yards of soil were excavated, sampled for off-site disposal characterization, and excavated soil loaded for off-site disposal with a total of 690 truckloads. Site restoration consisted of replacing the removed rail line spur, and replacing removed potable water lines. All excavation areas were backfilled to grade and restored with asphalt paving as required. Over 4,800 field labor hours were performed within incident or injury and the project was completed on schedule and budget. Follow-up soil gas monitoring performed by the Navy indicated that the excavated areas had met the NTCRA remedial objective.

Early Transfer and Environmental Services, Former Mare Island Naval Shipyard, Vallejo, CA, City of Vallejo, California, Project Manager, City of Vallejo, CA, U.S. Navy, Project Manager. Project Manager for a $54.1M project to perform environmental services on behalf of the City of Vallejo at Navy properties on the former Mare Island Naval Shipyard (MINS) through an Environmental Services Cooperative Agreement (ESCA) grant. The project involved direct interaction and negotiations with multiple regulators, the City of Vallejo, and other stakeholders to complete the required CERCLA site closure/remedy in place documentation to facilitate an early transfer for 2,824 acres on the MINS known as the Western Early Transfer Parcel (WETP), As a final step to clear the way for early transfer approval, WESTON performed a digital geophysical mapping survey of over 350 acres considered accessible to the public and investigated over 1,000 geophysical anomaly locations. The WETP property transfer was approved by the Governor of California within one year of the ESCA grant approval, which was the largest CERCLA early transfer by the Navy at that time.

Under the ESCA scope, WESTON also performed the environmental studies and cleanup, and is performing long-term operations and maintenance, for an additional Navy-retained properties on MINS to allow property transfer to the State of California.

In addition, WESTON developed and obtained regulatory approvals for the RI, FS, and Record

of Decision/Remedial Action Plan for the 230-acre Investigation Area H1 (IA-H1) disposal area and developed an approach to mitigation for potential conflicts with the endangered salt marsh harvest mouse, and completed construction of 8.2 acres of wetlands for mitigation. The final remedy for IA-H1 was implemented by WESTON, which included an Action Memorandum for a time-critical removal action (TCRA) and construction of a 7,300 linear foot soil/bentonite slurry wall and groundwater extraction trench along with perimeter of a 72-acre former landfill area. The IA-H1 final remedy included removal and consolidation of over 200,000 yd^3 of soil contaminated with metals, polychlorinated biphenyls (PCBs), polyaromatic hydrocarbon (PAHs), and petroleum hydrocarbons, and construction of a 72-acre engineered cap at IA-H1 consisting of a multi-layer geosynthetic Resource Conservation and Recovery Act (RCRA) Subtitle C and RCRA Subtitle D design.

WESTON also prepared work plans to conduct geophysical and radiation surveys, identified and removed over 1,100 munitions and explosives of concern (MEC) and radiological items from over 150 acres within the Western Magazine Area and Installation Restoration Site 05 on MINS, prepared and obtained NOSSA approvals for the After Action Reports. WESTON also prepared and presented over 30 briefings for the Mare Island Restoration Advisory Board to update local citizens on the progress of the remediation activities.

All required Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) documentation (Remedial Investigation [RI], Feasibility Study [FS], PP/Draft Remedial Action Plan [RAP], RAP/Record of Decisions [ROD], Remedial Design [RD] and post-closure reports) were prepared by WESTON for the sites remediated under the ESCA, and the work coordinated with multiple agencies such as the Department of Toxic Substances Control (DTSC), Department of Fish and Game, San Francisco Bay Regional Water Quality Control Board, U.S. Environmental Protection Agency (EPA), and the U.S. Fish and Wildlife Service (USFWS). In total over 209,000 field labor hours were performed without incident or injury.

In 2011, the IA-H1 Closure portion of the environmental services performed by WESTON was nominated by the Navy BRAC office overseeing the work and selected as a winner of the Chief of Naval Operations environmental restoration team competition. The IA-H1 Closure project then advanced and was selected as winner of the Secretary of the Navy's award for environmental restoration, and in 2012 selected as winner of the Secretary of Defense award competition for environmental restoration at DOD installations world wide.

Petroluem Corrective Action, Vallejo, CA, Lennar Mare Island LLC, Project Manager. Project Manager for a $7.0M petroleum corrective action which consisted of excavation and off-site disposal of 73,495 bank yd^3 of Bunker C fuel-oil-contaminated soil and debris. The corrective action required capping and removal of multiple utilities within the excavation area, and required a temporary overhead bypass installation to provide service due to removal of over 1,000 linear feet of a 12 kilovolt (kv) duct bank. Soil excavated extended up to a depth of approximately 20 feet below ground surface (bgs) and required removal of 1,200 linear feet of a major roadway (Azuar Drive) on Mare Island.

Obtained the required grading and road closure permits and coordinated the work with multiple stakeholders including Lennar Mare Island, City Public Works, City Water Department, Vallejo Sanitation and Flood Control District, and Island Energy. Confirmation samples were collected, based on an established 50-foot grid system, from the bottoms and sidewalls of the excavations

and analyzed for total petroleum hydrocarbons (TPH) as Bunker C fuel oil (C12 – C40). The results were compared to Tier 2 screening levels (SLs) as specified in the Work Plan. Samples within LMI property exceeding the criteria were over-excavated. All final confirmation excavation bottom and sidewall sample results within the LMI property met the Tier 2 SLs; therefore, the project objective was achieved for the site. After obtaining LMI and San Francisco Bay Regional Water Quality Control Board (Water Board) approval of soil confirmation sample results, the excavations were backfilled by spreading and compacting pre-approved imported soil in 1-foot intervals and tested for compaction criteria at specified intervals. Site restoration included replacement of a potable water line and a stormwater line; restoration of Dump Road (crushed rock) and Azuar Drive (paving); placement of geotextile and 6 inches of crushed rock over backfilled areas in the IA-B.2-2 portion of the site; replacement of fencing along Azuar Drive; and hydroseeding.

Excavation and/or Removal of Metals-Impacted Soils, Munitions, and Radiological Items from Former Marine Corps Rifle and Pistol Ranges and Historical Outfall 45, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Project Manager for a $4.4M fixed price Time Critical Removal Action (TCRA) at the Marine Corps Firing Range (MCFR) and Historical Outfall 4S on the former Mare Island Naval Shipyard (MINS). Scope included the excavation of over 30,000 yd^3 of lead-impacted soils from the former rifle range and pistol ranges at the MCFR. Confirmation sampling was performed to verify that target cleanup goals were achieved and the TCRA was sufficient to achieve regulatory closure for the MCFR. At the adjacent Historical Outfall 4S the presence of MEC and radiological items were expected based on previous investigations at other dredge outfalls on MINS. A high density of metallic debris along with MEC items associated with the dredged sediment had accumulated at the Historical Outfall 4S and then later buried and spread during construction of a levee for a new dredge pond. To efficiently remove metallic items and MEC from the soil WESTON implemented a mechanical sifting operation.

The sifting system included magnets to remove ferrous items and double vibratory screens to remove items 3/4 inch or larger. Excavators and loaders were armored with plexiglas to provide protection to the operators. Recovered metal items and oversized fractions from the screen plant were 100% investigated by WESTON UXO technicians to separate MEC and MDAS from scrap metal. WESTON performed incremental radiation surveys for each 1-foot layer of soil during the excavation layer to remove radiological items (primarily luminescent deck markers containing radium or strontium) prior to mechanical sifting. and completed a final post-excavation radiation survey to obtain regulatory closure of the site.

The mechanical sifting operation successfully processed over 36,000 yd^3 of soil and removed over 1,300 MEC items during the TCRA. Over 18,000 field labor hours were performed without incident or injury. WESTON also assisted the Navy in negotiating an alternative leaching procedure with the regulators for the lead-contaminated soil and established a Corrective Action Management Unit status at a former landfill site on MINS undergoing closure by WESTON under a separate action, saving the Navy over $4M in off-site disposal costs. The Navy rated the work performed by WESTON as "Outstanding" under the Construction Contractor Appraisal Support System (CCASS).

Time Critical Removal Action at Four Sites, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Project Manager for this $16.8M Time Critical Removal Action (TCRA) project for the Navy. Work included excavation of chemically contaminated soils, abrasive blast material, detection and removal of munitions and radiological items from four separate sites on the former Mare Island Naval Shipyard (MINS). At one of the TCRA sites, the Paint Waste Area (PWA), WESTON detected numerous radiological items and a MEC item not expected to be present based on a precautionary radiological survey and magnetometer-assisted visual survey performed prior to soil excavation. Based on a subsequent radiological survey and digital geophysical mapping (DGM) survey it was determined that the PWA site was a historical disposal area. Due to the high density of metallic debris WESTON utilized incremental radiological surveys during the excavation and an efficient mechanical sifting operation, processed over 28,000 cubic yards of soil and removed a total of 1,201 radiological items, 52 MEC items, and 237 MDAS items. In support of the TCRA, WESTON prepared the EE/CA, Action Memorandum, and individual workplans and completion reports for each of the four sites to support regulatory closure. For the PWA site, WESTON also prepared the Radiation Survey Plan in accordance with regulations and the Multiagency Radiation Survey and Site Investigation Manual (MARSSIM) guidance for approval by the Navy Radiological Affairs Support Office (RASO), and prepared and obtained approvals from NOSSA and DDESB for the Explosives Safety Submission (ESS) to address the MEC discovered at the site.

WESTON personnel performed over 35,400 field labor hours during the TCRA without incident or injury. Based on completion of the field activities the Navy provided WESTON with an "Outstanding" interim rating under their Construction Contractor Appraisal Support System (CCASS).

NTCRA, Excavation of Contaminated Soil, Defense Reutilization and Marketing Office (DRMO) Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Project Manager for a $1.1M non-time-critical removal action (NTCRA) at the DRMO. Completed expedited plans to begin work prior to the rainy season, and excavated approximately 6,500 cubic yard of contaminated soil. Performed confirmation sampling to verify compliance with site total cleanup goals (TCGs). WESTON facilitated favorable discussions between the Navy and regulators to allow disposal of the excavated soil and an additional 15,000 yd^3 of soil previously stockpiled at the DRMO at the IA-H1 Containment Area on Mare Island. This resulted in an estimated savings of over two million dollars by avoiding off-island commercial disposal. Over 4,300 field labor hours were performed without incident or injury.

Geophysical Survey and Conceptual Site Model, EE/CA and Action Memorandum, Production Manufacturing Area and Site Shore Area, Former Mare Island Naval Shipyard, Vallejo, CA, US Navy BRAC Program Management Office West, Project Manager. Project Manager for a $1.1M geophysical survey of the entire Production Manufacturing Area and South Shore Area on Mare Island. Developed the survey Work Plan, including the preparation of a Geophysical Prove-Out (GPO) Plan and a conceptual site model (CSM). The survey identified over 30,000 geophysical anomaly targets that could represent munitions items. Added value by utilizing a historical photo interpretation process to correlate past MEC finds and historical operations to focus the future munitions response action and

reduce anomaly investigation costs. The work also included the preparation of an EE/CA and Action Memorandum to serve as the basis for a follow-on Non-Time Critical Removal Action to address the geophysical anomaly investigation/removal.

MEC Removal and Solidification/Stabilization of MC-Contaminated Soil, Umatilla, OR, US Army Corps of Engineers Seattle District, Project Manager. Managed a $5.8M lump sum/unit rate contract involving solidification/stabilization of over 30,000 cubic yards of soil contaminated with munitions constituents and MEC at the former Ammunition Disposal Area on the Umatilla Chemical Depot in Umatilla, Oregon. The work included excavation and mechanical sifting of soil from burial trenches at the Ammunition Disposal Area to remove MEC. Over 2,000 MEC items and over 100,000 MDAS items were recovered. MEC items were detonated on-site, and MDAS items inspected for off-site demilitarization. The excavated soil was treated onsite using a pugmill to mix portland cement and activated carbon to met stringent leachability requirements prior to placement in a former landfill. Over 1,200 excavation area and treated soil samples were collected and analyzed during the project. The project received an "Outstanding" CCASS rating from Army Corps of Engineers, Seattle District.

OSHA 600260724

U.S. Department of Labor
Occupational Safety and Health Administration

DWIGHT GEMAR

has successfully completed a 30-hour Occupational Safety and Health Training Course in

Construction Safety & Health

Jennifer Auton U05147469 — 08/2008
(Trainer) (Date)

OSHA recommends Outreach Training courses as an orientation to occupational safety and health for workers. Participation is voluntary. Workers must receive additional training on specific hazards of their job. This course completion card does not expire.

For further information see our web site at www.osha.gov/outreach.html

CERTIFICATION FORM — OHM-OSHA-01-TCF

O.H. MATERIALS CORP.
OSHA 40-HOUR SAFETY TRAINING COURSE
29 CFR 1910.120

NAME: Dwight Gemar — EMPLOYEE NO.: 2752

DIVISION ASSIGNED TO: TAC — JOB TITLE: Proj. Eng. II

CLASS NO.: 89-09 — DATES: 6/5/89 - 6/9/89

AGE: 31 — EDUCATION LEVEL: B.S. Ch.E. (16)

TRAINING SUBJECTS	DATE	INSTRUCTOR
INTRODUCTION & REGULATIONS	6/5-6/9/89	JB
TOXICOLOGY - HAZARDOUS MATERIALS (PART I)		
RESPIRATORY PROTECTION		
FIT TEST		
RESPIRATOR TYPE A.O. Commander		
PROTECTIVE CLOTHING		
TOXICOLOGY - (PART II)		
DECONTAMINATION & WORK ZONES		
PROTECTIVE EQUIPMENT FAMILIARIZATION		
LEVEL "C"		
LEVEL "B" SCBA		
EGRESS & AIR LINE		
LEVEL "A" DEMONSTRATION		
RESPIRATOR CLEANING		
SITE SAFETY		
CHEMICAL SAFETY		
LEAK SEALING		
CONFINED SPACE ENTRY		
MONITORING INSTRUMENTS		
FIRST AID & HEALTH FACTORS		
MSDS & LABELING		
ELECTRICAL SAFETY		
EYE SAFETY		
FIRE PROTECTION		
BASIC RESPONSE PROCEDURES		
PROPER LIFTING TECHNIQUES		
SLIPS, TRIPS & FALLS		
HEARING SAFETY		
GENERAL SAFETY		
TEST SCORE 95%		

I HAVE RECEIVED THE ABOVE TRAINING ON THE DATES SHOWN.

Dwight Gemar
STUDENT SIGNATURE

SPECIAL SKILLS: Pilot, Nuclear Criticality Safety Training

WESTON SOLUTIONS®

Restoring Resource Efficiency

This Certifies That

DWIGHT GEMAR

Has Completed the

8-Hour HAZWOPER Refresher Training Course

In accordance with 29 CFR 1910.120(e)(8) completed on 12/16/2014 in Walnut Creek, CA

TRAINING MANAGER

Alanna Garrison- Kast, CSP, CHMM, CET

INSTRUCTOR

James E. Davis II CSP, PG

1_1414_12162014

Weston Solutions, Inc • 1400 Weston Way • West Chester, PA • 19380

06P-0910-2

CERTIFICATION FORM

OSHA, 8-HR-SUPER-TCF
REVISED 09/29/89

OSHA 8-HOUR SUPERVISORS TRAINING PROGRAM
29 CFR 1910.120

NAME: Dwight Geman EMPLOYEE NO.: 2752

DIVISION: Walnut Creek JOB TITLE: _____

TRAINING SUBJECTS	INSTRUCTOR	DATE
OSHA INSPECTIONS & CITATIONS	[signature]	6/5/90
REVIEW 29 CFR 1910.120		
HEALTH & SAFETY PROGRAM		
o Employee Training Program		
o Personal Protective Equipment		
o Health Hazard Monitoring		
EMERGENCY RESPONSE PROCEDURES		
HAZARD COMMUNICATION PROGRAM		
SPILL CONTAINMENT PROCEDURES		
REVIEW 29 CFR 1926		

I HAVE RECEIVED THE ABOVE TRAINING ON THE DATE SHOWN.

Dwight Geman
STUDENT SIGNATURE

WESTON SOLUTIONS®

Restoring Resource Efficiency

This Certifies That

DWIGHT GEMAR

Has Completed the

Bloodborne Pathogens Training Course Refresher

In accordance with 29 CFR 1910.1030 completed on 12/16/2014 in Walnut Creek, CA

TRAINING MANAGER

Alanna Garrison- Kast, CSP, CHMM, CET

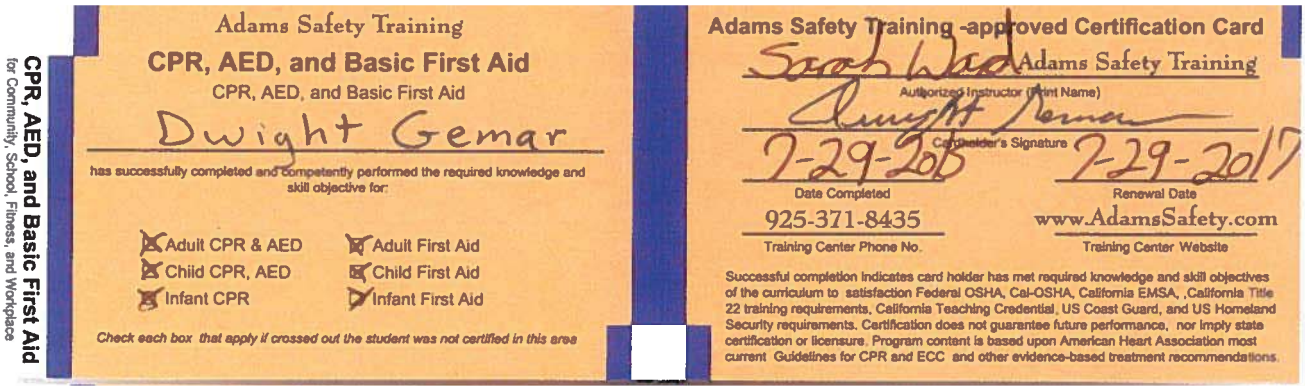
INSTRUCTOR

James E. Davis II CSP, PG

2_1414_12162014

Weston Solutions, Inc • 1400 Weston Way • West Chester, PA • 19380

06P-0910-2


CPR, AED, and Basic First Aid
for Community, School, Fitness, and Workplace
Adams Safety Training
CPR, AED, and Basic First Aid
CPR, AED, and Basic First Aid
Dwight Gemar
has successfully completed and competently performed the required knowledge and skill objective for:
Adult CPR & AED
Child CPR, AED
Infant CPR
Adult First Aid
Child First Aid
Infant First Aid
Check each box that apply if crossed out the student was not certified in this area
Adams Safety Training -approved Certification Card
Sarah Ward
Adams Safety Training
Authorized Instructor (Print Name)
Dwight Gemar
Cardholder's Signature
7-29-16
Date Completed
7-29-2017
Renewal Date
925-371-8435
Training Center Phone No.
www.AdamsSafety.com
Training Center Website
Successful completion indicates card holder has met required knowledge and skill objectives of the curriculum to satisfaction Federal OSHA, Cal-OSHA, California EMSA, ,California Title 22 training requirements, California Teaching Credential, US Coast Guard, and US Homeland Security requirements. Certification does not guarantee future performance, nor imply state certification or licensure. Program content is based upon American Heart Association most current Guidelines for CPR and ECC and other evidence-based treatment recommendations.

Gregory B Clark

2307 E 16th Street
Vancouver WA. 98661
Phone: (831) 915-1169
Email: mauiclarks@hotmail.com

QUALIFICATIONS: 13 Years Military Experience with training in Canada, USA and United Kingdom
20 Years Civilian Projects
USACE DATA BASE # 1582

EMPLOYMENT

2013 – Present UXO Safety Officer, Former Camp Bonneville, Vancouver WA., Weston Solutions, Inc.
Supervise all safety aspects of brush clearing and UXO analog clearance for future development. Ensure site conformance with all state and federal regulations, development of safety plans and approaches, and coordination with local outside agencies and sub-contractors. Maintain and coordinate medical and training qualifications and records for site personnel.

2007-2013 UXO Safety Officer/Senior UXO Supervisor, Fort Ord Ca., Weston Solutions Inc.
Supervise all safety aspects of UXO clearance using digital towed array, hand operated EM61, and analog sweeps of future residential and commercial development properties. Ensure site conformance with all state and federal regulations, development of safety plans and approaches, and coordination with local outside agencies. Maintain and coordinate medical and training qualifications and records for site personnel.

2005-2007 Safety Officer/Quality Control Officer, Schofield Barracks Hawaii, Sierra Army Depot California, UXO Tech III Fort Hood Texas, & UXO Tech II Fort Belvoir Virginia, Zapata Engineering Inc.
Schofield Barracks is a modified Chemical Clearance Project where I was employed as an Intrusive Team Leader for subsurface clearance operations and was then promoted to a Site Health and Safety Officer. I finished out the project as a combination Quality Control/Safety Officer. Texas, Nevada and Virginia projects were all pre-construction clearance sites.

2004-2005 UXO Tech II/ Tech III, USA Environmental, Fort Ord Ca.
Performed as a team member by conducting analog and digital operations for locating, identifying and disposing of numerous types of ordnance and remnants. As Team Leader performed QC operations, conducted safety briefs, and completed all logistical duties of that position.

2001-2004 UXO Specialist Supervisor, UXB International, Kahoolawe Hi.
As an Area Preparation Team Supervisor I was responsible for control of all aspects of an AP team consisting of 8 team members. These duties included brush cutting, digital and analog clearance operations, ordnance location, identification, disposition, and UXO remnant removal. I was also responsible for all safety, infield training, administration, and coordinating team activities.

1996-2001 Associate Instructor, RAMDAR Consulting, Victoria BC Canada
Instructed clients in the identification of basic military and commercial explosives and related materials. Demonstrated telephone bomb threat scenarios and responses through lecture and practical demonstration.

1996-1996 EOD Specialist, SNC Technologies, Montreal Que. Canada
Located, identified and disposed of numerous types of ordnance and related materials. Performed quality control and certified scrap to be Free From Explosives.

GREGORY B CLARK

1982-1995 Clearance Diver, Canadian Armed Forces
Performed as an Instructor at Explosive Ordnance Disposal School for 3 years, instructed up to 20 students on identification, hazards, safety precautions, and disposal of explosive ordnance and improvised devices. I was responsible for coordinating all aspects of administration and training scenarios for basic EOD and Improvised Device Disposal courses. I also acted as a range safety officer and conducted range clearance operations. Operated as EOD and IEDD (Improvised Explosive Device Disposal) operator for various areas of Canada recovering and disposing of numerous types of military, Improvised devices, and commercial explosives.

OTHER QUALS: First Aid & CPR Training
Automatic External Defibrillator
Fork Lift and Backhoe Operator
Diver
30 Hour Construction Safety
Construction Site Manager/Field Safety Manager

UXB International, Inc. • Kahului Heliport, Hanger 104 • Kahului, Hawaii 96732

Training Certificate

Presented to:

Gregory Clark

Has successfully met the requirements set forth by the United States Occupational Safety and Health Administration Title 29 Code of Federal Regulations Section 1910.120 (e)(3)(I) for:

40-Hour Hazardous Waste and Emergency Response Operations Site Specific for Kaho'olawe Island Restoration Project

August 3, 2001
Date Completed

R. C. Lahm, UXOST, STS

Certificate of Completion

This certifies that

Greg Clark

Has Successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

This certification alone does NOT indicate INITIAL 8 Hour OSHA Supervisor Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(8)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs
Julius P. Griggs
Instructor #892

150715514179
Certificate Number

7/15/2015
Issue Date

SAFETY **UNLIMITED, Inc.**
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

WESTON SOLUTIONS®

Restoring Resource Efficiency

This Certifies That

GREGORY CLARK

Has Completed the

Construction Site Manager/Field Safety Officer Compliance Course

completed on 01/31/2008 in Marina, CA

TRAINING MANAGER
Conrad W. Lehr, CET, CIT

INSTRUCTOR
Michael S. Stuart

560_15668_01312008 *Weston Solutions, Inc • 1400 Weston Way • West Chester, PA • 19380*

06P-0910-2

WESTON
MANAGERS DESIGNERS/CONSULTANTS

RECORD OF TRAINING

To be used to document site specific training that is required by OSHA.
Provide employee with a copy and maintain original in project record files.

Training Subject: 30-Hr OSHA Construction Course Date: 7/29/08 thru 7-31-08

Topics Covered:

Training Requirement: CFR, CCR

Instructor: Cal-Inc. Signature/ Date 7/31/08

Employee Name	Employee Number	Employee Signature/Date
Mark Major	017861	M. Major 7-29-08
Cirilo Lacson	015627	Cirilo Lacson 7-29-08
Charles F. Smith	016758	Charles F Smith 7/29/08
Dwight Gemar	016975	Dwight Gemar 7/29/08
GREG CLARK	019365	Greg Clark 7/29/08
Cirilo Lacson	015627	Cirilo Lacson 7/30/08
Mark Major	017861	M. Major 7-30-08
GREG CLARK	019B65	Greg Clark 7-30-08
Dwight Gemar	016975	Dwight Gemar 7/30/08
Charlie Smith	016758	Charles F Smith 7/30/08
Charles Smith	016758	Charles F Smith 7/31/08
Cirilo Lacson	015627	Cirilo Lacson 7/31/08
Mark Major	017861	Mark Major 7-31-08
Greg Clark	019365	Greg Clark 7-31-08
Dwight Gemar	016975	Dwight Gemar 7/31/08

Training Certificate

Presented to

Greg Clark

Has successfully completed 4 Hours PUXB-JV Supervisor Training in:

HazWoper, Leadership Skills and Project Supervision

for Kaho`olawe Island Reserve, Hawaii
UXO Clearance Project

July 19th , 2002
Date of Completion

Dana Smith, CSP
Health & Safety Manager

NAVAL FACILITIES ENGINEERING COMMAND SOUTHWEST

NAVFAC

PRESENTS THIS CERTIFICATE TO

Greg Clark

WHO HAS SUCCESSFULLY COMPLETED

CONSTRUCTION QUALITY MANAGEMENT (CQM) FOR CONTRACTORS

AGC San Diego, Education Class

Instructors
Walter Buchanan PE / Kugan Panchadsaram PE, PMP

October 7 & 8, 2010

NAVFAC SW Field Training Officer
Michael Haliburton PE, PMP

"This Certificate expires in 5 years from Class Date"

American Red Cross

Greg Clark

has successfully completed requirements for

Adult First Aid/CPR/AED: valid 2 Years

Date Completed: 05/14/2015

conducted by: American Red Cross

Instructor: Danny Miller Digges

ID: GRP7O0

Scan code or visit:

redcross.org/confirm

Naval School
Explosive Ordnance Disposal

This Certificate is awarded to

Petty Officer Second Class Gregory Clark

for the successful completion of the prescribed course of study for

Explosive Ordnance Disposal Phase One

on this 6th *day of* May *19* 94

BY: J. R. Lake
Commanding Officer

NAVSCOLEOD 1500/1 (REV 7-93)

17424 State Hwy 287 · Grey Eagle, MN 56336 · Cell: 320 282-7361 · · blazzter2727@gmail.com ·

Clark Sorenson

Objective

A position as an Unexploded Ordnance Technician capable of supervising the detection, avoidance, clearance and disposal of unexploded ordnance. Able to function as the SUXO, Site Safety Officer, and Quality Control and Assurance.

Experience

US Army

March 1985 - February 1987 *EOD Technician* Fort Drum, NY

- Participated in range clearance operations.

Technical Escort Unit

March 1987 - November 1991 *EOD Technician/Supervisor* Aberdeen Proving Grounds, MD

- Participated in, and conducted several range clearance operations.
- Supervised the safe handling and packaging of potentially lethal chemical filled munitions.

57th Ordnance Detachment

November 1991 - June 1995 *EOD Supervisor* Ft Belvoir, VA

- Supervised several range clearance operations.
- Deployed to Somalia.
- Conducted technical intelligence on foreign unexploded ordnance
- Supervised destruction by detonation of foreign unexploded ordnance

706th Ordnance Company (EOD)

June 1995 - June 1998 *EOD Supervisor* Schofield Barracks, HI

- Supervised daily unit operations and managed subordinate personnel.
- Deployed to Cambodia in support of Joint Task Force/Full Accounting, conducting ground clearance operations for MIA/KIA recovery mission.
- Identified and destroyed foreign unexploded ordnance found within crash sites.

774th Ordnance Company (EOD)

June 1998 - January 2001 *EOD Supervisor* Ft Riley, KS

- Planned and supervised all aspects of EOD support to include several range clearance.
- Deployed to Bosnia from September 1998 - March 1999.
- Gathered technical intelligence on foreign unexploded ordnance to include land mines.
- Supervised the disposal by detonation of over 50,000 foreign land mines and various other munitions.

USA Environmental, Inc

June 2001 - July 2001 *UXO Technician II* Carrollton, AR

- Performed UXO support to an EE/CA project at the former camp. Responsibilities included site preparation, escort service to the survey and geophysical crews and clearance of all surface UXO and UXO related scrap.

USA Environmental, Inc

July 2001 - September 2001 *UXO Technician II* Amchitka (Aleutian Island), AK

- Performed UXO support to an EE/CA project at the former camp. Responsibilities included site preparation, escort service to the survey and geophysical crews and clearance of all surface UXO and UXO related scrap. Conducted explosive demolition operations.

USA Environmental

October 2001 - October 2001 *UXO II* Ft Wingate, NM

- Assisted in the clearance and disposal of ordnance along a 13,000 foot fenceline located near a previously used OBOD range on Ft Wingate, NM.

USA Environmental

October 2001 - November 2001 *UXO II* Ft Polk, LA

- Assisted in the ground clearance and down-hole operations for twenty ground water sampling wells near the Red Leg Impact Area on Ft Polk.

USA Environmental INC

November 2001 - December 2001 *UXO Technician II* Blue Grass Army Depot, KY

- Conducted down hole monitoring and ordnance avoidance in support of installation of ground water monitoring drilling operations.

USA Environmental Inc

December 2001 - January 2002 *UXO Technician II* Camp Pendleton, CA

- Assisted in locating, marking, recovering and disposal by detonation of over 3,000 60mm and 81mm high explosive mortars on Camp Pendleton, CA. Operated heavy equipment during this operation.

USA Environmental

January 2002 - April 2002 *UXO Technician III* Little Rock, AR

- Team Leader of UXO team during anomoly investigation at former Camp Robinson.
- Supervised anomaly excavation, identification, and the destruction of suspect UXO's.

USA Environmental

May 2002 - June 2002 *UXO Technician II* Falmouth, MA

- Team member of UXO team supporting installation of monitoring wells and soil sampling project at Massachusetts Military Reservation.
- Activities included personnel and equipment escort for investigation of conaminates; clearance access routes and well pads of UXO and ordnance related scrap.

USA Environmental

June 2002 - October 2002 *UXO Technician II* Pine Ridge, SD

- Team member of UXO team providing support for ongoing EE/CA process at the Badlands Bombing Range, SD.
- Support included escort of geophysical teams, site preparation, UXO excavation and disposal.

EOTI

November 2002 - December 2002 *UXO Technician II* Seneca Falls, NY

- Team member of UXO team providing support for ongoing EE/CA process at Seneca Army Depot, NY

Foster Wheeler/Tetra Tech

December 2002 - May 2003 *UXO Technician II* Aurora, CO

- Team member of a UXO team conducting total clearance operations for a private contract for US Homes of Denver Colorado
- Operated Tractor Backhoe and Tracked Excavator in recovery and removal of UXOs

Tetra Tech

May 2003 - July 2003 *UXO Technician II* Savanna, IL

- Team member of a UXO team conducting EE/CA operations at the former Savanna Army Dept, Illinois
- Set-up and operated Geo-Physical equipment in aquiring target anomollies

USA Environmental

July 2003 - September 2003 *UXO Technician III* Savanna, IL

- Performed duties as team leader for a 6 man team during clearance and sifting operations at the former Savanna Army Dept, Illinois
- Certified 4 personnel on operation of Tractor Backhoe

USA Environmental

September 2003 - March 2004 *UXO Technician III* Aurora, CO

- Performed duties as down range team leader for a CMC project at the former Lowry Bombing Range in Aurora, Colorado

USA Environmental

March 2004 - April 2004 *UXO Technician III* Anniston, AL

- Assisted in the excavation, removal and disposal of UXO's at Anniston Army Depot

USA Environmental

May 2004 - August 2004 *UXO Technician II* Pine Ridge, SD


Team member of UXO team providing support for ongoing EE/CA process at the Badlands Bombing Range, SD.

Support included escort of geophysical teams, site preparation, UXO excavation and disposal

USA Environmental

August 2004 - July 2005 | *Site Safety Officer* | Tampa, FL

- Site Safety Officer for Mobile Team 3 in Iraq supporting the CMC project throughout the entire theater of operations.
- No serious injuries or deaths occured during my one year tenure in Iraq

USA Environmental

September 2005 - September 2005 | *UXO Technician II* | Pine Ridge, SD

- escorted geophysical personnel assets into uxo contaminated areas
- assisted in the locating, excavating and removal of uxo hazards, debris, and components

USA Environmental

September 2005 - October 2005 | *UXO Technician III* | Elk River, MN

- supervised a six man team in the sweeping of UXO's and their components

USA Environmental

November 2005 - April 2006 | *UXO Technician III* | Aurora, CO

Supervised a 6 person team in the location, excavation and recovery of UXO and Non-UXO items at the Former Lowry Bombing Range in Aurora, Colorado.

USA Environmental

April 2006 - August 2006 | *UXO Technician III* | Flagstaff, AZ

Supervised a 3 man team in the location, excavation, and removal of surface and sub-surface UXO and Non-UXO items from the OBOD area of Camp Navajo, AZ.

USA Environmental

August 2006 - December 2006 | *Site Safety Officer* | Flagstaff, AZ

Safety Officer for a lead contaminated soil removal operation. Oversaw soil and air monitoring during the excavation. No injuries or property damage incurred during the operation.

USA Environmental

August 2006 - December 2006 | *Site Safety Officer* | Flagstaff, AZ

Safety Officer for a lead contaminated soil removal operation. Oversaw soil and air monitoring during the excavation. No injuries or property damage incurred during the operation.

USA Environmental

February 2007 - December 2007 | *UXO Technician III* | Vieques

Supervised a 20 man local hire vegetation removal team. Insured the operatoins of chainsaws, and weed trimmers were conducted safely and without incident.

EOTI

January 2008 - February 2008 *UXO Technician III* Raritan, NJ

- Team Leader for a UXO team responsible for investigating, and excavating point anomalies safely.

USA Environmental

February 2008 - May 2008 *UXO Technician II and III* Anniston, AL

- Worked in the capacity of UXO II and UXO III during intrusive operations for a Mag and Dig Operation at former Ft McClellan.

USA Environmental

June 2008 - July 2008 *UXO Technician III* Washington, DC

Led a UXO Chemical team in the excavating, recovery and packaging of Chemical Surety materials and ordnance

USA Environmental

August 2008 - September 2008 *UXO Technician III* Rapid City, SD

Supervised a team during a surface clearance operation at the former Badlands Bombing range.

USA Environmental

September 2008 - September 2008 *UXO Technician II* Adak, AK

Assisted in the investigation and removal of point anomalies on the island of Adak, Alaska for a 10 day period.

USA Environmental

October 2008 - November 2008 *UXO Technician III* Umatilla, OR

Supervised a team in the investigation, removal, and identification of point anomalies at the Umatilla Army Dept.

EOTI

November 2008 - December 2008 *UXO Tech II* Port Clinton, OH

Conducted surface sweep and underwater surface sweep along Lake Erie at Camp Erie, OH

USA Environmental

January 2009 - May 2009 *UXO Tech III* Yuma, AZ

Supervised a UXO team during surface clearance operations at Yuma Marine Corp Air Station, Yuma, AZ.
Also supervised all Demolition operations.

USA Environmental

May 2009 - July 2009 *UXO Tech III* Rapid City, SD

Supervised a UXO team conducting intrusive operations at the Badlands Bombing Range in South DAkota.

USA Environmental Inc

October 2009 - January 2010 *UXO Tech II* El Paso, TX

Assisted in location and removal of various ordnance items while performing Mag and Dig operations.

USA Environmental Inc

February 2010 - March 2010 *UXO Tech II* Gadsden, AL

- Assisted in the location, excavation and removal of UXO items and ferrous anomalies.

Bay West Inc

April 2010 - May 2010 *UXOSO* Tullahoma, TN

Safety Officer for a UXO clearance and removal operation at Camp Arnold AFB.

ERT Inc

May 2010 - November 2010 *UXO Tech III* Newburgh, NY

UXO construction support of the building of the USMAPS at West Point, NY.
Trained construction workers to recognize Unexploded Ordnance.

ERT Inc

January 2011 - April 2011 *UXO Tech III* Fort Hancock, NJ

Supervised and led the investigation and removal of point anomalies at the former military base at Fort Hancock, NJ. Also supervised brush cutting insuring many endangered plant species were not disturbed or damaged.

Weston Solutions Inc *UXO Tech III* Fort Ord, CA

Supervised the investigation and removal of point and analog anomalies at Fort Ord, CA.

Operated heavy equipment.

June 2011 – May 2013

Weston Solutions Inc *UXO Tech III* Camp Bonneville, WA

Supervised a UXO team in Mag and Dig Operations. Responsible for investigation, identification, removal and possible disposal of Unexploded Ordnance. Perform as Demolition Supervisor for the Explosive disposal of live ammunition.

January 2014 - Present

Education

Navy School, Explosive Ordnance Disposal

High School Indian Head, MD

Received certificate for succesful completion of all course requirements

Non-Commisioned Officer Academy

Redstone Arsenal, AL+

Received certificate for successful completion of all course requirements

US Army Logistics Management College

Aberdeen Proving Grounds, MD

Received certificate for successful completion of all course requirements

Naval School, Explosive Ordnance Disposal

Indian Head, MD

Received certificate for successful completion of all course requirements

OSHA HAZARDOUS WASTE OPERATION

June 2001 *Other* Tampa, FL

Received certificate for successful completion of all course requirements.

US Army FORSCOM

Ft McPherson, GA

Received certificate for course

Proficiencies

- Organized the safe shipment, storage, and handling of military and civilian explosives, ammunition and other hazardous materials.
- Supervised,planned and executed extensive range clearance operations.
- Oversaw daily operation of seven vital areas within the company.
- Possess a multitude of computer skills to include Word Processing, Spread Sheets and Graphics.
- Managed and updated all coorespondence and files.
- Mentored and motivated all employees in a professinal manner.
- Proficeint in the operation of metal detecting equipment
- Operates heavy equipment

Awards

Master Explosive Ordnance Disposal Badge
Received five Army Acheivment medals for duties at various locations
Received three Army Commendation medals for duties at various locations

Security Clearance

Have held a Top Secret Security Clearance for 15 years.

40-HR

United States Army

Logistics Management College

For successful completion of the
8B-F7(JT) DEFENSE PACKAGING OF HAZARDOUS MATERIALS
21 FEBRUARY - 3 MARCH 1989
this
Certificate
is awarded to

SSG CLARK C. SORENSON

John A. Antal
COURSE DIRECTOR

David L. Asbury
COMMANDANT, U. S. ARMY
LOGISTICS MANAGEMENT COLLEGE

Certificate of Completion

This certifies that

Clark Sorenson

Has Successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

This certification alone does NOT indicate INITIAL 8 Hour OSHA Supervisor Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	150119595339	1/19/2015
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY **UNLIMITED, Inc.**
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

Certificate of Completion

Presented to:

CLARK SORENSON

On 6/13/2011, CLARK SORENSON successfully completed the OSHA 30 Hour Outreach Training for the Construction Industry.

OSHA TRAINING INSTITUTE EDUCATION CENTER

USF UNIVERSITY OF SOUTH FLORIDA

American Safety Council .com

OSHA Authorized Trainer

As an OSHA authorized trainer, I verify that I have conducted this OSHA outreach training class in accordance with OSHA Outreach Training Program requirements. I will document this class to my authorizing OSHA training organization. Upon successful review of my documentation, I will provide each student their completion card within 90 days of the end of the class.

Certificate of Completion

This certifies that

Clark Sorenson

Has Successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	150907495339	9/7/2015
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Annual Refresher Training NOT Required
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

WESTON SOLUTIONS
Restoring Resource Efficiency

TRAINING ACKNOWLEDGEMENT FORM

SUBJECT: First Aid, CPR, and AED			
By placing my signature below, I certify that I have received training concerning the subject listed above, and fully understand its contents and requirements.			
NAME	**SIGNATURE**	**DATE**	**COMPANY**
Andrew Caldwell		5/7/15	Weston Solutions, Inc. Andrew.Caldwell@WestonSolutions.com
Clark Sorenson		5/7/15	Weston Solutions, Inc. blazzter2727@Gmail.com
Holysnap@comcast.net Bill RAASCH		5-7-15	Weston Solutions, Inc.
Wes Bain		5-7-15	Weston Solutions, Inc. WTBthree5@Aol.com
Andrew Burross		5/7/15	Weston Solutions, Inc. drewburr@live.com
Erick Gonzalez		5/7/15	Weston Solutions, Inc. e.a.gonzalez@icloud.com
Wilson Behling		5/7/15	Weston Solutions, Inc. wbehling28@gmail.com
Joshua Gipson		5/7/15	Weston Solutions, Inc. UXOJrGipson@gmail.com
M.R. HARRISON		5/7/15	Weston Solutions, Inc. M_R_HARRISON@hotmail.com
TYLER SZELIGA		5/7/15	Weston Solutions, Inc. TYLERFO@GMAIL.COM
Bennett Fulton		5/7/15	Weston Solutions, Inc. bennett.fulton@gmail.com
Jared Daniels		5/7/15	Weston Solutions, Inc. daniels'jared@live.com
Karl Christiansen		5/7/15	Weston Solutions, Inc. HotKarl1249@gmail.com
JosephSWilder@		5/7/15	Weston Solutions, Inc. jsphwilder@yahoo.com
DONALD KEAN		5/7/15	Weston Solutions, Inc. djkean65@gmail.com
Jason Shippy		5-7-15	Weston Solutions, Inc. Jason.Shippy@hotmail.com

Naval School
Explosive Ordnance Disposal

This certifies that

Specialist Five
Clark C. Sorenson, USA

468-78-1346

having successfully completed
the prescribed course of study for

BASIC EXPLOSIVE ORDNANCE DISPOSAL - SURFACE/NUCLEAR PHASES

is awarded this
Certificate

this 16th day of March A.D. 1985

[illegible], CAPT, CEC, USN
COMMANDING OFFICER

Andrew C. Caldwell

13220 96th Ave Ct E, Puyallup, WA 98373 | 831-359-8331 | Andrew.Caldwell@WestonSolutions.com

Training

- Naval School Explosive Ordnance Disposal
- US Army Phase III Explosive Ordnance Disposal
- US Army Nuclear Biological and Chemical Non-Commissioned Officer Course (Distinguished Honor Graduate)
- US Army Ammunition Specialist Course (Honor Graduate)
- OSHA 40hr HAZWOPER
- OSHA HAZWOPER Supervisor Course
- OSHA 8hr Supervisor Refresher
- OSHA 30hr Construction Safety Course
- Licensed Washington Blaster
- First Aid/CPR

*Certificates available upon request

Civilian Experience

SENIOR UXO SUPERVISOR (SUXOS)| WESTON SOLUTIONS – CAMP BONNEVILLE, WA | 4/13-CURRENT

- Responsible for management, planning, logistics, performance, safety and day to day operations for analog clearance.

UXO TECH III/UNEXPLODED ORDNANCE SAFETY OFFICER (UXOSO) | WESTON SOLUTIONS – CAMP BONNEVILLE, WA | 7/12-4/13

- Supervised UXO clearance team (analog and digital) and filled in as Safety officer. Supervised demolition operations as a licensed WA blaster.

UXO TECH III | WESTON SOLUTIONS – FORT ORD, CA/MATHER AFB, CA/MARE ISLAND, CA | 3/09-4/13

- Supervised UXO clearance operations, both analog and digital. Supervised demolitions operations as a licensed CA blaster.

UXO TECH II | WESTON SOLUTIONS – FT ORD, CA/TOBYHANNA, PA | 12/07-2/09

- Performed UXO clearance operations, operated heavy equipment and utilized GPS/EM-61.

UXO TECH III | HUMAN FACTORS ALLIANCE – MATHER AFB, CA | 10/07-11/07

- Supervised analog UXO clearance operations on 40mm grenade range.

UXO TECH II | USA ENVIRONMENTAL – MISSION TRAILS, CA | 8/07-9/07

- Supervised local hires for surface UXO sweep.

UXO TECH II | ECC – 29 PALMS, CA | 6/07

- Performed UXO clearance operations in support of new MOUT site.

UXO TECH II | USA ENVIRONMENTAL – VIEQUES, PR | 11/06- 5/07

- Performed analog UXO clearance and demolition operations. Backhoe operator.

UXO TECH II | USA ENVIRONMENTAL – CAMP NAVAJO, AZ | 6/06- 11/06

- Member of quality control team, backhoe operator.

UXO TECH II | USA ENVIRONMENTAL – MARYSVILLE, WA | 4/06- 6/06

- Chemical weapons cleanup site, performed investigations in Level B and Level C. Trackhoe and CAT operator.

UXO TECH II | USA ENVIRONMENTAL – FT ORD, CA | 7/03- 11/05

- Performed analog and digital UXO clearance operations. Backhoe operator.

UXO TECH II | UXB INTERNATIONAL – KAHO'OLAWE | 4/02- 7/03

- Performed analog UXO clearance operations. Worked as part of Survey and Range Clearance Teams. Supervised local hires in UXO sweep operations.

Military Experience

761ST ORDNANCE COMPANY (EOD), FT SILL, OK | 2/97- 11/99

- Safely conducted Explosive Ordnance Disposal operations in support of the US Army, Secret Service, State Department, ATF, FBI and local law enforcement. Performed numerous UXO and IED response missions, range clearances, VIP protection details and served as the unit's Nuclear/Biological/Chemical Non-Commissioned Officer. Served 30 day White House rotation (Old Executive Office Building). Assisted in, and have commendations for, protection details of Pope John Paul II and the NATO 50th Anniversary Conference.

BASIC TRAINING/AMMUNITION SPECIALIST SCHOOL/ NAVAL SCHOOL EXPLOSIVE ORDNANCE DISPOSAL 11/95- 2/97

Parsons-UXB Joint Venture • Kahului Heliport Hangar 104 • Kahului, Hawaii 96732

TEAMWORK COMMITMENT TRUST

Training Certificate

Presented to

Andrew Caldwell

Has successfully met the requirements set forth by the United States Occupational Safety and Health Administration Title 29 Code of Federal Regulations Section 1910.120 (e)(3)(i) for:

40-Hour Hazardous Waste and Emergency Response Operations General Site Worker's Course for Kaho'lawe Island Reserve Restoration Project

April 26, 2002

Date Completed

Larry Kennedy, UXOST, CQA

Certificate of Completion

This certifies that

Andrew Caldwell

Has Successfully completed

8 Hour HAZWOPER Supervisor Training

This certificate does not in itself indicate initial 24 or 40 Hour HAZWOPER Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(4)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	**150811414294**	**8/11/2015**
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY **UNLIMITED, Inc.**
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Annual Retresher Training NOT Required
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

Certificate of Completion

This certifies that

Andrew Caldwell

Has Successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

This certification alone does NOT indicate INITIAL 8 Hour OSHA Supervisor Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(8)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	150426514294	4/26/2015
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

WESTON SOLUTIONS
Restoring Resource Efficiency

TRAINING ACKNOWLEDGEMENT FORM

SUBJECT: First Aid, CPR, and AED			
By placing my signature below, I certify that I have received training concerning the subject listed above, and fully understand its contents and requirements.			
NAME	**SIGNATURE**	**DATE**	**COMPANY**
Andrew Caldwell		5/7/15	Weston Solutions, Inc. Andrew.Caldwell@WestonSolutions.com
Clark Sorenson		5/7/15	Weston Solutions, Inc. blazzter2727@Gmail.com
Holysnap@comcast.net Bill RAASCH		5-7-15	Weston Solutions, Inc.
Wes Bain		5-7-15	Weston Solutions, Inc. WTbthree5@Aol.com
Andrew Burross		5/7/15	Weston Solutions, Inc. drewburr@live.com
Erick Gonzalez		5/7/15	Weston Solutions, Inc. e.a.gonzalez@icloud.com
Wilson Behling		5/7/15	Weston Solutions, Inc. wbehling28@gmail.com
Joshua Gipson		5/7/15	Weston Solutions, Inc. UXOJrGipson@gmail.com
M.R. HARRISON		5/7/15	Weston Solutions, Inc. M_R_HARRISON@hotmail.com
TYLER SZELIGA		5/7/15	Weston Solutions, Inc. TYLERFO@GMAIL.COM
Bennett Fulton		5/7/15	Weston Solutions, Inc. bennett.fulton@gmail.com
Jared Daniels		5/7/15	Weston Solutions, Inc. daniels'jared@live.com
Karl Christiansen		5/7/15	Weston Solutions, Inc. HotKarl1249@gmail.com
JosephSWilder@		5/7/15	Weston Solutions, Inc. jsphwilder@yahoo.com
DONALD KEAN		5/7/15	Weston Solutions, Inc. djkean65@gmail.com
Jason Shippy		5-7-15	Weston Solutions, Inc. Jason.Shippy@hotmail.com

Naval School
Explosive Ordnance Disposal

Certificate of Completion

Presented to:

PFC ANDREW T. CALDWELL, USA

For having successfully completed the prescribed course of study for
EXPLOSIVE ORDNANCE DISPOSAL
Phase I & II - Surface (CINs A-431-0009/A-431-0012)
on this 20th day of December, 1996.

CDR J. C. McLAWHORN, USN
Commanding Officer

DONALD JOSEPH KEAN

Qualifications Summary

- Over 25 years of professional experience.
- Over 25 years of EOD/UXO experience including 11 years of active-duty military and 5 years reserve duty impact/demolition range operations as an EOD/mine-warfare/demolitions instructor, performing UXO, mine, booby-trap search, detection, identification, clearance, and disposal operations.
- Fifteen years of civilian UXO industry experience.
- UXO Operations Supervisor and Quality Control Supervisor.
- UXO Safety Officer.

Registration

UXO Certification, USACE Huntsville Center (No. 1581)
Certified EOD Technician, Canadian Military (1990)
Certified EOD Technician Phase I and II, U.S. Navy EOD School (1996)
Construction Quality Management for Contractors, USACE (2008)
Blaster License, State of California (No. 9411, 2013)
Blaster License, State of Arkansas (No. 020, 2013)

Credentials

40-Hour Hazardous Waste and Emergency Response Operations Course, OSHA 29 CFR 1910.120(e)(3), UXB International, Inc. (2001)
Kaho'olawe Island Restoration Project, UXB International HazWoper,Leadership Skills and Project Supervision (2002)
8-Hour Hazardous Waste Refresher Course, OSHA 29 CFR 1910.120(e)(8), WESTON (2013)
Hydrogen Sulfide Awareness Training (2013)
GHS Hazard Communication Training (2013)
OSHA 30 Hour Construction Safety Course (2013)
RCRA Generator, OSHA 40 CFR 262.34 and 265.16, WESTON (2007)
Explosive Ordnance Disposal, U.S. Navy (1996)
Behavior-Based Safety – Phase I Training, WESTON (2008)
Bloodborne Pathogens Refresher Training, OSHA 29 CFR 1910.1030, WESTON (2013)
First Aid/CPR, American Red Cross (2015)
Graduate, Canadian Forces EOD School, Borden, Ontario, Canada (1990)
Graduate, U.S. Navy EOD School Phase I, Eglin AFB, FL (1996)
Graduate, U.S. Navy EOD School Phase II, Indian Head, MD (1996)

Employment History

2014 – WESTON [5-5 to Present] Camp Bonneville, Vancouver, Washington.Tech 3 team Leader/Senior UXO Supervisor (SUXOS)/UXO Safety Officer (UXOSO)
2014- WESTON [4-1 to 5-4] Fort Ord (UXO) Quality Control (QC) Supervisor and UXO Safety Officer (UXOSO).

Employment History (Continued)

2014-WESTON [1-15 To 3-31] Makua Military reservation RI Oahu Hawaii Senior UXO Supervisor (SUXOS)
2013- Present WESTON [10-31 to 1-14-2014] Fort Ord (UXO) Quality Control (QC) Supervisor and UXO Safety Officer (UXOSO).
2013- WESTON [9-29 to 10-30] Former South Western Proving Grounds RI/FS Hope, Arkansas (UXO) Quality Control (QC) Supervisor and UXO Safety Officer (UXOSO).
2013- WESTON [8-30 to 9-28] Fort Ord (UXO) Quality Control (QC) Supervisor and UXO Safety Officer (UXOSO).
2013 – WESTON [5-20 to 8-29] Waikakalaua Ammunition Storage Tunnels and Wheeler Army Airfield RI, Oahu, HI. Team Leader, UXO Quality Control Supervisor (UXOQCS) Senior UXO Supervisor (SUXOS)
2007 – 2013 WESTON [6-07 to 5-17] Fort Ord (UXO) Quality Control (QC) Supervisor, Senior UXO Supervisor (SUXOS) and UXO Safety Officer (UXOSO).

2006-2007	WESTON [8-06 to 6-07; Vallejo, CA; UXO/High Hazard Specialist]
2006	Zapata Engineering, Inc. [6-06 to 8-06; Schofield Barracks, Oahu, HI; Technician 3 Supervisor]
2006	Environmental Chemical Corporation [3-06 to 6-06; Mare Island Naval Shipyard; Vallejo, CA; Technician 3 Supervisor]
2005-2006	Zapata Engineering, Inc. [6-05 to 3-06; Schofield Barracks, Oahu, HI; Technician 3 Supervisor]
2004-2005	USA Environmental, Inc. [5-04 to 6-05; Fort Ord, Marina, CA; Technician 2]
2001-2004	UXB International, Inc. [4-01 to 4-04; Kaho'olawe, HI; Technician 3 Supervisor/UXOQCSS]
2000	European Landmine Solutions [2-00 to 12-00; Kurdistan, Northern Iraq; UXO/Demining QC Supervisor]
1996-2000	Canadian Forces School of Military Engineering [5-96 to 2-00; CFB Gagetown, New Brunswick, Canada; SGT]
1989-1996	Canadian Army, Various Tours of Duty [1-89 to 5-96; Various Locations]

Key Projects

High-Hazard RI/FS Operations ,Makua Military Reservation Beach Assualt Training Area (BATA).Oahu,HI, Senior UXO Supervisor (SUXOS),UXO Technician 3). Responsible for supervision and guidance of the daily operations of the UXO teams.

High-Hazard Remediation Operations, Former South Western Proving Grounds RI/FS, Hope, Arkansas, Unexploded Ordnance (UXO) Quality Control (QC) Supervisor and UXO Safety Officer (UXOSO). Responsible for QC inspections of all ordnance and explosives (OE) and explosives operations for compliance with established procedures. Also responsible for supervision and guidance of the daily operations of the UXO teams and overall site health and safety plan (HASP).
High-Hazard RI/FS Operations , Waikakalaua Ammunition Storage Tunnels and Wheeler Army Airfield.Oahu,HI, Unexploded Ordnance (UXO) Quality Control (QC) Supervisor,

Employment History (Continued)

Senior UXO Supervisor (SUXOS),UXO Technician 3). Responsible for QC inspections of all ordnance and explosives (OE) and explosives operations for compliance with established procedures. Also responsible for supervision and guidance of the daily operations of the UXO teams.

High-Hazard Remediation Operations, Fort Ord, Marina, CA, Unexploded Ordnance (UXO) Quality Control (QC) Supervisor, Senior UXO Supervisor (SUXOS) and UXO Safety Officer (UXOSO). Responsible for QC inspections of all ordnance and explosives (OE) and explosives operations for compliance with established procedures. Also responsible for supervision and guidance of the daily operations of the UXO teams and overall site health and safety plan (HASP). [WESTON] **06-07 to 04-13**

High-Hazard Remediation Operations, City of Vallejo, CA, Mare Island Naval Shipyard, UXO Technician 3, SUXOS and QC. Performed remedial investigation (RI), detection, identification, and removal of potentially hazardous UXO items at Mare Island Naval Shipyard. [WESTON] **8-06 to 6-07**

Munitions Response/Construction Support Work, Schofield Barracks Cleanup Project, Oahu, HI, U.S. Army, UXO Technician 3. Responsible for daily team safety briefings, search, detection, and identification of munitions and explosives of concern (MEC) and chemical warfare munitions (CWM) items during surface and subsurface detection. Also responsible for the inspection and removal of ordnance scrap and range-related debris. [Zapata Engineering, Inc.] **6-06 to 8-06**

MEC Project, Vallejo, CA, Mare Island Naval Shipyard, MEC/UXO Technician 3. Conducted RI of MEC at Mare Island Production of Munitions Area, Mare Island Naval Shipyard. [Environmental Chemical Corporation] **3-06 to 6-06**

Munitions Response/Construction Support Work, Schofield Barracks Cleanup Project, Oahu, HI, U.S. Army, UXO Technician 3. Responsible for daily team safety briefings, search, detection, and identification of munitions and explosives of concern (MEC) and chemical warfare munitions (CWM) items during surface and subsurface detection. Also responsible for the inspection and removal of ordnance scrap and range-related debris. [Zapata Engineering, Inc.] **6-5 to 3-06**

High-Hazard Remediation Operations, Fort Ord, Marina, CA, Unexploded Ordnance UXO Technician 3

Performed remedial investigation (RI), detection, identification, and removal of potentially hazardous UXO items [USA] **5-04 to 6-05**

Kaho'olawe Island Ordnance Cleanup Project, Hawaii, U.S. Navy, UXO QC Specialist Supervisor. Responsibilities included the supervision of a QC team conducting MIL-STD 1916 surface and subsurface clearance inspections. Also responsible for conducting visual inspections of 5X material, thermally processed material, and Lightweight Ordnance and Armaments Demilitarization Systems (LOADS®) processes. [UXB International] **4-01 to 4-04**

Course Development and Instruction, Kurdistan, Northern Iraq, United Nations Office for Project Services (UNOPS), UXO Instructor/Supervisor. Responsible for course supervision, development of standard operating procedures (SOPs), lesson preparation, and instruction of UXO package for UNOPS. Also responsible for supervision and guidance of the daily operations of the UXO team. [2-00 through 12-00; European Landmine Solutions]

Key Projects (Continued)

QC Inspections, Kurdistan, Northern Iraq, UNOPS, Demining Group Supervisor. Responsible for QC inspections of several minefield operations. [2-00 through 12-00; European Landmine Solutions]

Mine Warfare and Demolition Course Training, Gagetown, New Brunswick, Canada, Canadian Forces School of Military Engineering, Instructor. Responsible for the administration, management, and training of various courses associated with demolition and explosive ordnance disposal (EOD) operations. Other responsibilities included planning and preparation of instruction material for EOD training packages, which encompassed conducting and managing both live and practice EOD/demolition range exercises. [Canadian Forces School of Military Engineering]

EOD/Mine Awareness Operations, Iraq-Kuwait and Croatia, Canadian Military Under United Nations, Section Commander. Responsible for management and supervision of section members while conducting EOD/mine clearance operations while deployed overseas. [Canadian Army]

UXB International, Inc. • Kahului Heliport, Hanger 104 • Kahului, Hawaii 96732

Training Certificate

Presented to:

Donald Kean

Has successfully met the requirements set forth by the United States Occupational Safety and Health Administration Title 29 Code of Federal Regulations Section 1910.120 (e)(3)(I) for:

40-Hour Hazardous Waste and Emergency Response Operations
Site Specific for Kaho'olawe Island Restoration Project

April 27, 2001
Date Completed

R. C. Lahm, UXOST, STS

Certificate of Completion

This certifies that

Donald J Kean

Has Successfully completed

8 Hour HAZWOPER Supervisor Refresher Training

This certification alone does NOT indicate INITIAL 8 Hour OSHA Supervisor Training

In Accordance With Federal OSHA Regulation 29 CFR 1910.120(e)(8)

And all State OSHA/EPA Regulations as well

This course is approved for 8 Contact Hours (0.8 CEUs) of continuing education per the California Department of Public Health for Registered Environmental Health Specialist (REHS) issued by Safety Unlimited, Inc. (Accreditation # 044)

Julius P. Griggs	1508015117201	8/1/2015
Julius P. Griggs Instructor #892	Certificate Number	Issue Date

SAFETY UNLIMITED, Inc.
OSHA Compliant Safety Training Since 1993

2139 Tapo St., Suite 228 Simi Valley, CA 93063
888 309-SAFE (7233) or 805 306-8027 866-869-7097 (fax)
www.safetyunlimited.com

Proof of initial certification and subsequent refresher training is NOT required to take refresher training
Want to be sure this certificate is valid? Visit safetyunlimited.com/verification

CLICKSAFETY®

certifies that

DONALD KEAN

has successfully completed ClickSafety's web-based training course:

OSHA 30 Hour Construction

This course was developed and presented by ClickSafety.com, Inc.

I attest to personally completing the above course.

9988803	12/5/2013	30.25 HOURS	
SERIAL NUMBER	COMPLETION DATE	COURSE DURATION	STUDENT SIGNATURE

Training Certificate

Presented to

Donald Kean

Has successfully completed 4 Hours PUXB-JV Supervisor Training in:

HazWoper, Leadership Skills and Project Supervision

for Kaho`olawe Island Reserve, Hawaii
UXO Clearance Project

July 19th , 2002
Date of Completion

Dana Smith, CSP
Health & Safety Manager

STATE OF CALIFORNIA
DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
MINING AND TUNNELING UNIT
1367 E. LASSEN AVENUE, SUITE B-4
CHICO, CA 95973
(530) 895-6938 FAX (530) 895-6941

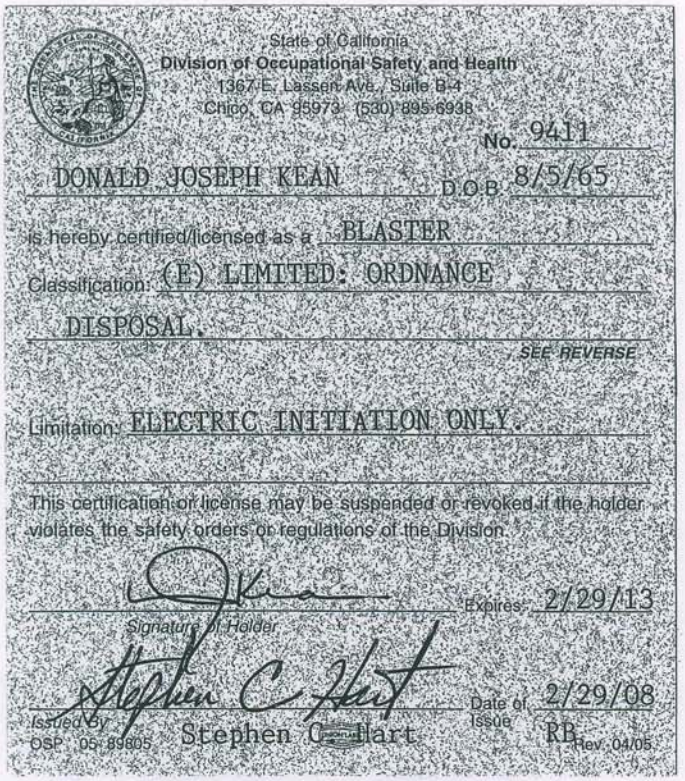
Dear Applicant:

Congratulations on passing your Blaster's examination. Enclosed, please find your blaster's license, which is valid for five years. As a reminder of the importance and responsibility you have assumed by becoming licensed, I recommend that you read Labor Code Sections 6710, 7993, 7994, and 7995.

Please sign your license and carry it with you whenever you are performing as the licensed blaster designated by your employer. It is recommended that you have it laminated after signing since it must be carried for five years.

Sincerely,
Stephen C. Hart
Principal Engineer

SCH/tb



State of California
Division of Occupational Safety and Health
1367 E. Lassen Ave., Suite B-4
Chico, CA 95973 (530) 895-6938

No. 9411

DONALD JOSEPH KEAN D.O.B. 8/5/65

is hereby certified/licensed as a BLASTER

Classification: (E) LIMITED: ORDNANCE DISPOSAL.

SEE REVERSE

Limitation: ELECTRIC INITIATION ONLY.

This certification or license may be suspended or revoked if the holder violates the safety orders or regulations of the Division.

Signature of Holder

Expires: 2/29/13

Issued by Stephen C. Hart Date of Issue 2/29/08

OSP 05-89805 RB Rev. 04/05

U.S. ARMY CORPS OF ENGINEERS

PROFESSIONAL DEVELOPMENT SUPPORT CENTER
HUNTSVILLE, ALABAMA

CERTIFICATE

This is to certify that

DONALD KEAN

has completed the Corps of Engineers Training Course

CONSTRUCTION QUALITY MANAGEMENT FOR CONTRACTORS

Given at **Sacramento, CA** (Location) By **Sacramento** (Instructional District) **06 & 07 FEBRUARY 2008** (Date)

Facilitator

Expires: February 7, 2013
Verification (916) 557-7708

THIS CERTIFICATE EXPIRES FIVE YEARS FROM DATE OF ISSUE

Chief, USACE Professional Development Support Center

Naval School Explosive Ordnance Disposal

Presented to

MCPL Kean D. J.

For having successfully completed the prescribed course of study for
EXPLOSIVE ORDNANCE DISPOSAL
Phase II - Surface (CIN A-431-0020)
on this, 24th day of October, 1996.

EXPLOSIVE ORDNANCE DISPOSAL
U.S. NAVAL SCHOOL
USA • USMC • USN • USAF

CDR J. R. Lake, USN
Commanding Officer

WESTON SOLUTIONS
Restoring Resource Efficiency

TRAINING ACKNOWLEDGEMENT FORM

SUBJECT: First Aid, CPR, and AED			
By placing my signature below, I certify that I have received training concerning the subject listed above, and fully understand its contents and requirements.			
NAME	**SIGNATURE**	**DATE**	**COMPANY**
Andrew Caldwell		5/7/15	Weston Solutions, Inc. Andrew.Caldwell@WestonSolutions.com
Clark Sorenson		5/7/15	Weston Solutions, Inc. blazzter2727@Gmail.com
Holysnap@comcast.net Bill RAASCH		5-7-15	Weston Solutions, Inc.
Wes Bain		5-7-15	Weston Solutions, Inc. WTBthree5@Aol.com
Andrew Burross		5/7/15	Weston Solutions, Inc. drewburr@live.com
Erick Gonzalez		5/7/15	Weston Solutions, Inc. e.a.gonzalez@icloud.com
Wilson Behling		5/7/15	Weston Solutions, Inc. wbehling28@gmail.com
Joshua Gipson		5/7/15	Weston Solutions, Inc. UXOJrGipson@gmail.com
M.R. HARRISON		5/7/15	Weston Solutions, Inc. M_R_HARRISON@hotmail.com
TYLER SZELIGA		5/7/15	Weston Solutions, Inc. TYLERFO@GMAIL.COM
Bennett Fulton		5/7/15	Weston Solutions, Inc. bennett.fulton@gmail.com
Jared Daniels		5/7/15	Weston Solutions, Inc. daniels'jared@live.com
Karl Christiansen		5/7/15	Weston Solutions, Inc. HotKarl1249@gmail.com
JosephSWilder@		5/7/15	Weston Solutions, Inc. jsphwilder@yahoo.com
DONALD KEAN		5/7/15	Weston Solutions, Inc. djkean65@gmail.com
Jason Shippy		5-7-15	Weston Solutions, Inc. Jason.Shippy@hotmail.com

APPENDIX B
SITE-SPECIFIC SAFETY AND HEALTH PLAN

SITE-SPECIFIC SAFETY AND HEALTH PLAN APPROVALS

By their signature, the undersigned certify that they concur with this Site-Specific Safety and Health Plan for utilization during the Remedial Action Unit 3 Phase 2 Surface and Subsurface Clearance for Munitions and Explosives of Concern at the former Camp Bonneville Military Reservation, Vancouver, Washington.

Plan Preparation:

Claudia Gemar

11/20/2015

Claudia Gemar, PE
Project Engineer
Weston Solutions, Inc.
(925) 948-2607

Date Prepared

Plan Approval:

Dwight Gemar

11/20/2015

Dwight Gemar, PE
Project Manager
Weston Solutions, Inc.
(925) 948-2612

Date Approved

Plan Concurrence:

Herold S Hannah Jr

11/20/2015

Herold Hannah, CIH, CSP
Director Environmental Health and Safety
Weston Solutions, Inc.
(610) 701- 3024

Date Concurred

SITE-SPECIFIC SAFETY AND HEALTH PLAN
SURFACE AND SUBSURFACE CLEARANCE FOR MUNITIONS AND EXPLOSIVES OF CONCERN
REMEDIAL ACTION UNIT 3 PHASE 2

Former Camp Bonneville Military Reservation, Vancouver, Washington

I understand, agree to, and will conform to the information set forth in this Site-Specific Safety and Health Plan as discussed in the Personnel Safety and Health briefing(s).

Name	Signature	Date

I understand, agree to, and will conform to the information set forth in this Site-Specific Safety and Health Plan as discussed in the Personnel Safety and Health briefing(s).

Name	Signature	Date

I understand, agree to, and will conform to the information set forth in this Site-Specific Safety and Health Plan as discussed in the Personnel Safety and Health briefing(s).

Name	Signature	Date

TABLE OF CONTENTS

TABLE OF CONTENTS (CONTINUED)

TABLE OF CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LIST OF ATTACHMENTS

ABBREVIATIONS AND ACRONYMS

AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
BBP	blood-borne pathogen
BIP	blown in place
BCRRT	Bonneville Conservation Restoration and Renewal Team, LLC
CAP	Cleanup Action Plan
CBMR	Camp Bonneville Military Reservation
CFR	Code of Federal Regulations
CPR	cardiopulmonary resuscitation
DA1	Demolition Area 1
DA2	Demolition Area 2
EAP	Emergency Action Plan
EHS	Environmental Health and Safety
ESS	Explosives Safety Submission, Amendment 3
EZ	exclusion zone
FBI	Federal Bureau of Investigation
MDEH	material documented as an explosive hazard
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
NAVSEA	Naval Sea Systems Command
OHP	Occupational Health Program
OSHA	Occupational Safety and Health Administration
PDR	Personal DataRAM
PPE	personal protective equipment
RAU	Remedial Action Unit
SDS	Safety Data Sheets
SSHO	Site Safety and Health Officer
SSHP	Site-Specific Safety and Health Plan
SUXOS	Senior Unexploded Ordnance Supervisor
USACE	United States Army Corps of Engineers
UTV	utility vehicle
UXO	unexploded ordnance
UXOSO	Unexploded Ordnance Safety Officer
WESTON	Weston Solutions, Inc.

1 INTRODUCTION

This Site-Specific Safety and Health Plan (SSHP) has been prepared to support the Remedial Action Unit (RAU) 3 Phase 2 Remedial Action at the former Camp Bonneville Military Reservation (CBMR). This work is described in the RAU 3 Cleanup Plan (Bonneville Conservation Restoration and Renewal Team, LLC, [BCRRT], 2010) and the RAU 3 Phase 2 Work Plan (Weston Solutions, Inc. [WESTON], 2015).

1.1 PURPOSE

This SSHP is Appendix B of the Accident Prevention Plan (APP) and provides the information and requirements to help ensure the safety and health of workers during project activities. The APP and SSHP meet the requirements of the U.S. Army Corps of Engineers (USACE) Safety and Health Requirements Manual EM 385-1-1 (USACE, 2014). All project activities will be performed in accordance with the APP and SSHP and referenced documents, pertinent to each specific task to be accomplished. This SSHP will be maintained on site during the entire course of work and will apply to all work performed by WESTON and associated subcontractors.

The levels of personal protection and procedures specified in this SSHP are based on the best information available from reference documents and current site data. Therefore, these recommendations represent the minimum health and safety requirements to be observed by all project personnel. Unforeseeable site conditions or changes in scope of work may warrant a reassessment of protection levels and controls stated.

1.2 PROJECT OVERVIEW AND SUMMARY OF MAJOR RISKS

The former CBMR comprises approximately 3,840 acres and is located in southwestern Washington, approximately 5 miles east of the Vancouver City limits and approximately 3.5 miles north of the city limits of Camas. The former CBMR is approximately seven miles north of the Columbia River. The site is located in Township 2 North and Township 3 North of Range 3 East in the Washington Public Lands Survey system. Together the RAU 3 Phase 2 clearance areas comprise approximately 124 acres (Figure 2).

During the RAU 3 Phase 2 Remedial Action, WESTON will provide clearance for detectable munitions and explosives of concern (MEC), munitions potentially presenting an explosive hazard (MPPEH), and non-munitions-related items for the following specific work areas:

- Former Demolition Areas 1 and 2 (DA1 and DA2); surface clearance (0 to 3 inches); using Schonstedt ferromagnetic metal detector
- Former Training Range Target Areas: Hand Grenade Range, Rifle Grenade Range, and 3.5-inch Rocket Range; surface clearance (0 to 3 inches); using Schonstedt ferromagnetic metal detector
- Former Firing Positions and Firing Points: Artillery Positions 1, 2, 3, 4 and 7, Mortar Positions 1, 2, 5, and 6, Rifle Grenade Range Firing Point, and 3.5-inch Rocket Range Firing Point; subsurface clearance (0 to 14 inches); using Minelab all-metals detector (small head)

If directed by Clark County, WESTON will perform stepouts to ensure that isolated discoveries of MEC within boundary grids are not evidence of additional areas of concern.

The anticipated phases of field work are described in Section 3. Physical hazards associated with this project include hazards associated with brush cutting operations (a subcontracted task) and MEC hazards during all phases of the work.

1.3 SUMMARY OF BRIEFINGS, APP/SSHP REVIEWS AND INSPECTIONS

1.3.1 Site-Specific Safety Training

All employees assigned to the RAU 3 Phase 2 Remedial Action will receive initial project orientation and safety training. The APP and SSHP will be reviewed, including site-specific hazards, the Activity Hazard Analyses (AHAs), heat illness prevention, and the Emergency Action Plan. Site-specific munitions hazards and related requirements specified in the Explosives Safety Submission, Amendment 3 (ESS) will be reviewed. The ESS is included in Appendix I of the RAU 3 Phase 2 Work Plan (WESTON, 2015). All work crews will also be briefed on environmental protection and cultural resources protection. Field personnel will assist in preparing and reviewing the AHAs.

1.3.2 Safety Meetings

At a minimum, safety briefings (prior to start of work for the day) will be given daily by the Site Safety and Health Officer (SSHO)/Unexploded Ordnance Safety Officer (UXOSO) or Senior Unexploded Ordnance Supervisor (SUXOS) on days when field work is conducted. Topics will include proposed work scheduled, associated hazards and controls, and other topics pertinent to the on-going work such as inspections or training. WESTON, subcontractor field personnel, and authorized visitors are required to attend the daily safety meetings, which will be documented by the SSHO/UXOSO.

1.3.3 Visitor Orientation

Visitors who enter the active remediation areas during site operations will meet the same medical clearance and Occupational Safety and Health Administration (OSHA) training requirements specified for all site personnel. Visitors who do not enter the active remediation areas are required to be briefed in the following:

- Location and description of potential hazards and risks
- Areas of the site that are closed to visitors
- The site evacuation plan and emergency procedures
- Other topics as deemed appropriate

1.3.4 APP/SSHP Reviews and Updates

The APP and SSHP will be reviewed as needed (at least annually) and updated. The Revision Sheet at the beginning of the APP will be used to document changes and approvals, and revisions will be incorporated into field copies of the APP. Periodic inspections by the SSHO/UXOSO will be performed to assess the effectiveness of the SSHP, noting deficiencies and corrective actions. Additional information about safety and health inspections is provided in Section 7 of the APP. AHAs will be reviewed and updated as required using a revision number. Updated AHAs will be substituted in all field copies of the APP/SSHP.

2 SITE DESCRIPTION AND RISK IDENTIFICATION

2.1 SITE BACKGROUND/HISTORY

The Army used CBMR for live fire of small arms, assault weapons, artillery, and field and air defense artillery between 1910 and 1995. Since 1947, CBMR has also provided training for a variety of military and nonmilitary units from the National Guard, Reserves, U.S. Air Force, and federal, state, and local law enforcement agencies. In the early 1950s the Defense Department arranged to lease an additional 840 acres from the State of Washington Department of Natural Resources to expand training possibilities of the post. The facility has also been used for weekend and summer training by the U.S. Army Reserve units in southern Washington and northern Oregon.

In July of 1995, CBMR was selected for closure under the 1995 Base Realignment and Closure process. Since CBMR was closed in October 1995, investigations have been ongoing to characterize and clean up contamination from munitions and other hazards substances, and to develop a plan for reuse of the site after cleanup is completed.

2.2 SITE DESCRIPTION

The 3,840-acre CBMR site is located northeast of Vancouver, Washington, in the southeastern region of Clark County. The property is approximately five miles northeast of the corporate limits of the City of Vancouver, Washington and approximately seven miles north of the Columbia River. The CBMR is located along the western foothills of the Cascade Mountain Range, with Camp Hill and Little Elkhorn Mountain to the northwest, Munsell Hill to the west, and Little Baldy Mountain to the south. Vehicular access to the CBMR is restricted to a single entrance from NE Pluss Road. The entrance is gated and monitored by site security and facility managers. In its last years of service as an active military base, the facility had been used for weekend and summer training by Army Reserve and National Guard components from Southern Washington and Northern Oregon and by the Federal Bureau of Investigation (FBI) and local law enforcement units. Since its closing by the U.S. Army in 1995, CBMR has not been actively used with the exception of training for FBI and local law enforcement personnel conducted at the designated FBI Firing Range.

CBMR is situated between the Cascade Mountains to the east and the Coast Range to the west. These two mountain ranges influence the local climate, which is otherwise a mild marine climate, typical of the region. The Coast Range keeps the area from feeling the full effect of the winter storms from the Pacific Ocean. The Cascade Mountains Protects the area from the strong temperature contrasts between summer and winter that occur in eastern Washington. The summers in this area are warm and dry. The winters are mild and wet, with an average of approximately 6.1 inches of rain per month during the winter months.

The geology of this area generally consists of Eocene and Miocene volcanic and sedimentary rock types overlain by unconsolidated clays, silts, sands, and gravels of the Troutdale Formation (Phillips, 1987).

The area surrounding CBMR is sparsely populated with scattered residences and is used primarily for agriculture and livestock grazing. The nearest town is Proebstel, an unincorporated community about 2.5 miles to the southwest of the western entrance to CBMR.

The two cantonments, Camp Killpack and Camp Bonneville, are located on the valley floor. The remainder of CBMR consists of moderately steep, heavily vegetated slopes that have been used primarily as firing ranges. The valley floor is a relatively narrow floodplain, which ranges from an elevation of about 290 feet National Geodetic Vertical Datum on the western end of CBMR to about 360 feet National Geodetic Vertical Datum on the east. The adjoining slopes rise moderately steeply to elevations between approximately 1,000 and 1,500 feet National Geodetic Vertical Datum along ridge tops within the property boundaries. The entire installation is heavily vegetated.

Former CBMR is a heavily wooded area with Douglas fir, western red cedar, western hemlock, and red alder as the dominant tree species. Depending primarily on moisture gradients, the understory is composed of salal, Oregon grape, viney maple, and sword fern (Larson, 1980 and GeoRecon International, 1981). Special-status species present at or near former CBMR include the Hairy-stemmed checker-mallow (state endangered species) and Small-flowered trillium (state sensitive species).

The site is easily accessible by existing roads. As described in the Emergency Action Plan, (Section 15 of this SSHP), the local hospital Sutter PeaceHealth Southwest Medical Center is located approximately 12 miles from the site in Vancouver, WA. Emergency response will be provided by calling 911.

2.2.1 Former Demolition Areas DA1 and DA2

DA1 is located in the northwest quadrant of the site, east of Little Elkhorn Mountain. DA1 sits atop Landfill 4. Based on information provided in the RAU 3 Cleanup Action Plan (CAP) (BCRRT, 2010), Landfill 4 was used for disposal of building demolition debris from the Vancouver Barracks and possible military wastes. In 2004, the USACE physically removed the contents and associated contaminated soils at DA1, as part of the Landfill 4 Interim Removal Action. In the RAU 3 CAP, DA1 clearance area is identified as a 1200-foot radius kickout area (approximately 103.8 acres) centered on the original DA1/Landfill 4. The area is accessible by roads and trail; however it is located outside the boundary of the proposed regional park and within the Wildlife Management Area and was therefore classified as low reuse intensity in the RAU 3 CAP. As shown on Figure 2, the DA1 clearance area includes creeks and a wetland area.

As shown on Figure 2, the DA2 clearance area is a 500 foot by 500-foot area (approximately 5.7 acres) centered on the original location of DA2. It is located east of the Central Valley Floor, within the proposed Wildlife Management Area. The area was classified as low reuse intensity in the RAU 3 CAP (BCRRT, 2010).

2.2.2 Former Training Range Target Areas

As shown on Figure 2, three former training range target areas located east of the Central Valley Floor will be surface cleared during RAU 3 Phase 2: the hand grenade range, the rifle grenade range and the 3.5-inch rocket range. Together these training range target areas comprise approximately 7.6 acres.

2.2.3 Former Firing Point Areas

As shown on Figure 2, five artillery position areas, four mortar position areas and firing point areas associated with the rifle grenade range and 3.5-inch rocket range are included in RAU 3 Phase 2. In total these areas comprise approximately 6.7 acres.

2.3 MUNITIONS RISK CHARACTERIZATION

Between 1909 and 1995, live and practice munitions including artillery and mortar rounds, shoulder-fired rockets, land mines (practice only), grenades, and small-arms ammunitions were stored and used on the CBMR.

The RAU 3 CAP stated that while the Supplemental Remedial Investigation/Feasibility Study was being conducted, numerous MEC and MD findings were reported in areas of the CBMR where such findings were not anticipated, based on the results of the Army's previous site work. These findings led to the discovery of a number of new target impact areas and waste disposal areas. Analysis of these findings in the Supplemental Remedial Investigation/Feasibility Study (BCRRT, 2009) led to the conclusion that additional cleanup actions are required for some areas.

The ESS (Appendix I of the RAU 3 Phase 2 Work Plan [WESTON, 2015]) addresses the work to be performed during the RAU 3 Phase 2 and provides information about the site history and previous investigations. The ESS describes the clearance survey techniques to be used during RAU 3 Phase 2 and addresses minimum separation distances, exclusion zone control, demolition operations, storage of explosives, and inspections and certification for disposal of scrap and small arms.

3 HAZARD AND RISK ANALYSIS

This section describes the hazard and risk analysis for activities included in the RAU 3 Phase 2 field work.

3.1 ACTIVITY HAZARD ANALYSIS PROCESS

Activity Hazard Analysis (AHA) is an ongoing process from the initiation of the SSHP preparation through the implementation and completion of the project. Site-specific AHAs are provided in Attachment 1. Any activities not initially identified will be amended to this plan, if necessary.

Work Phase	Work Description
Activity 1: Land Surveying Anomaly Avoidance	– Unexploded Ordnance (UXO) technicians will provide anomaly support escort (AHA1) – The Land Surveyor will provide an AHA for the work they will perform
Activity 2: Brush Cutting Anomaly Avoidance	– UXO technicians will provide anomaly support escort (AHA2) – The Brush Cutting Subcontractor will provide an AHA for the work they will perform
Activity 3: Analog Geophysical Anomaly Detection and Removal	– UXO technicians will conduct detection and removal of MPPEH/MEC/non-munitions-related metallic items to a maximum depth of 14 inches for subsurface and 3 inches for surface clearance (AHA3)
Activity 4: MEC/MPPEH Identification and Disposal	– MEC/MPPEH Inspection and Segregation: MEC will be separated for disposal by on-site demolition. MPPEH will be subjected to a three-tiered inspection process to segregate it as either material documented as an explosive hazard (MDEH) or material documented as safe (AHA4, Jobstep 1) – Explosive Disposal: Dispose of MEC/MDEH by utilizing on-site demolition procedures (AHA4, Jobstep 2)
Activity 5: Soil Excavation/ Mechanical Screening (if used)	– Heavy Equipment Operations (AHA5, Jobstep 1) – Mechanical Soil Screening (AHA5, Jobstep 2) – MEC Handling (AHA5, Jobstep 3)

AHA tables provide a task-specific evaluation of the known or potential hazards associated with performing individual tasks within the scope of work. Each analysis also contains task-specific

information related to hazard control and mitigation, including the use of specific engineering control measures, specific standard operating procedures to be implemented, and personal protective equipment (PPE) to be used as required. If site conditions or work activities change, the UXOSO will evaluate the new conditions or task, and will contact the Corporate Environmental Health and Safety (EHS) Director for assistance in developing amendments to the SSHP. Amendments made to the SSHP will be submitted to Clark County for concurrence, and all field personnel will be made aware of any changes.

Site-specific AHA tables are presented in Attachment 1 for each phase/activity associated with the project. Health and safety equipment such as PPE is described in Section 6 of this SSHP.

3.2 OVERVIEW OF SITE-SPECIFIC HAZARDS

3.2.1 Biological Hazards

Biological hazards at the CBMR site include: stinging and biting insects (bees, wasps, mosquitoes, ticks, spiders, etc.), poisonous pants (ivy and oak) and exposure to blood-borne pathogens (BBPs). Large animals such as black bears and cougars may also be present on the site. Personnel will be briefed regarding the site-specific biological hazards. Site personnel will be instructed to be alert for and avoid wild animals, to wear long pants and shirts while working in brush, and to use insect repellent as well as poison-ivy block and cleanser. Any site worker who is knowingly allergic to insect bites will be required to inform the UXOSO, and to carry an allergy response kit. First-aid providers will also be required to know how to use the response kit.

3.2.2 Chemical/Radiation Hazards

Chemical hazards for the RAU 3 Phase 2 Remedial Action are expected to be limited to hazards from products brought on site. The SSHO/UXOSO will maintain onsite a file of Safety Data Sheets (SDSs) for products brought onsite such as (but not limited to): detonating cord, detonators, pentolite boosters, gasoline, diesel fuel, gear oil, hydraulic oil, grease, survey paint, wasp and hornet insecticide, chain lubricant, and engine oils lubricants for equipment. Additional information about the Hazard Communications Program is provided in the Section 9.13 of the APP.

Ionizing radiation is not expected to be encountered at CBMR. The most likely exposure to non-ionizing radiation is the sun. Personnel will receive instruction in using appropriate PPE and/or the use of sunscreen and hats.

3.2.3 Physical Hazards

Exposure to physical hazards may include manual lifting; slips, trips, falls; heat/cold stress; hand tools (manual and power); terrain or vegetation; uneven walking surfaces; weather hazards, such as snow and ice; and poor visibility. Additional physical hazards common while performing brush cutting activities or using soil moving equipment include hands or fingers caught between objects; electrical hazards; caught in/between/struck by or against an object; and traffic.

When strenuous work is being performed in hot weather (i.e., when the heat index exceeds 75 °F) monitoring for heat stress will be performed. Section 9.19 of the APP includes a description of WESTON's heat/cold stress monitoring program and a description of symptoms and responses to different types of heat stress (heat rashes, heat cramps, heat exhaustion, and heat stroke).

Before any machinery or mechanized equipment is placed in use each day, it will be inspected and verified to be in safe operating condition. Any machinery or equipment found to be unsafe will be removed from service, its use prohibited until unsafe conditions have been corrected, and re-use inspected before being placed in service again in accordance with EM 385 1-1 18.A.04 (USACE, 2014). Only designated qualified personnel will operate machinery and mechanized equipment. Equipment deficiencies observed at any time that affect their safe operation will be corrected before continuing operation.

Mini-excavators or backhoes may be used for anomaly overburden excavation as dictated by soil conditions. If a screen plant is used to sift soil, larger excavators, loaders and haul trucks may be used. Hazards associated with heavy equipment operation include slipping and falling of the machine operator during entry/exit, tipping or overturning of the machine, striking ground personnel, and contacting energized power lines with the machine. Operators will maintain three points of contact when climbing on or off equipment, and only designated qualified personnel will operate heavy equipment. Personnel working in the vicinity of heavy equipment will

maintain eye contact with the operator and use radio and/or hand signals to ensure safe operations. Field personnel will stay out of the swing radius of moving equipment and establish eye contact with operators when in close proximity to moving heavy equipment.

MEC-related hazards. Qualified UXO Technicians will be responsible for MEC clearance. Every effort will be made to identify a suspect MEC item. The MEC item will be visually examined for markings and other external features such as shape, size, and external fittings. If an unknown unexploded ordnance (UXO) item is encountered, the U.S. Army Corps of Engineers (USACE) representative will be notified immediately. Under no circumstances will any fused MEC be moved in an attempt to make a definitive identification. As a general rule, all fused UXO will be detonated in the original position found (blown-in-place [BIP]). This is the safest method to effect final disposition of munitions. Any item to be BIP will be sandbagged to mitigate blast effects and fragmentation projection. Only UXO personnel will handle MEC items, and only during daylight hours. Personnel who will be handling MEC items will not wear outer or inner garments having static-electricity generating characteristics such as nylon.

WESTON personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards associated with MEC items. Subcontractors will be provided with UXO anomaly avoidance support. Field personnel will be under the direct supervision of a UXO Technician III or higher.

Specific requirements for explosives safety are presented in the ESS Amendment 3 (Appendix I of the RAU 3 Phase 2 Work Plan [WESTON, 2015]).

Hazards of Electromagnetic Radiation to Ordnance. Radio, radar, and other electronic transmitting equipment produce electromagnetic radiation, which can cause an induced electrical current that can result in propellant ignition or projectile detonation of an MPPEH item. Encountered MPPEH items must be considered Hazards of Electro Magnetic Radiation to Ordnance unsafe because their condition and history are unknown. If a MPPEH item is encountered, the use of devices that emit electromagnetic radiation (including cellular phones, radio transceivers, etc.) will be strictly controlled by the SUXOS in accordance with the requirements of Naval Sea Systems Command (NAVSEA) Operating Procedure 3565 Volume 2 (NAVSEA, 2008) regarding Hazards of Electromagnetic Radiation to Ordnance. Radio

transceivers and cellular phones (in either standby or talk mode) shall not be used within 25 feet of suspected MEC.

Noise Hazards. Heavy equipment used on this project will be initially monitored for noise (inside equipment cabs and in the immediate vicinity) using a noise level meter. If noise levels exceed 85 decibels A-weighted, hearing protection will be worn. The SSHO/UXOSO will maintain records of noise level readings and will notify personnel regarding the need for hearing protection. The SSHO/UXOSO will review safety records of personnel assigned to the project and adjust the action level to 80 decibels A-weighted, where appropriate to protect employees with standard threshold shifts.

Electrical Hazards. Any overhead wire will be considered energized. Operations adjacent to overhead lines are prohibited unless at least one of the following conditions is satisfied:

- Power has been shut off and positive means taken to prevent the lines from being energized.
- Equipment, or any part, does not have the capability of coming within the minimum clearance from energized overhead lines as specified in the table below or the equipment has been positioned and blocked to assure no part, including cables, can come within the minimum clearances as specified below; a notice of the minimum required clearance has been posted at the operator's position (electric line derrick trucks and aerial lifts are not required to comply with this requirement).
- In transit with the boom lowered and no load, the equipment clearance will comply with the following table.

MINIMUM CLEARANCE FROM ENERGIZED OVERHEAD ELECTRIC LINES Source: EM 385-1-1 Table 11-1 (USACE, 2014)	
Voltage (nominal, kilovolts, alternating current)	Minimum Clearance Distance (feet)
Up to 50	10
51 - 200	15
201 - 350	20
351 - 500	25
501 - 750	35
751 – 1,000	45
Over 1,000	(As established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

Note: All dimensions are distances from live part to equipment and components at any potential reach.

Geophysical anomaly excavations will not exceed 14 inches. Therefore, underground utilities are not expected to present a hazard during the RAU 3 Phase 2 Remedial Action.

4 PROJECT ORGANIZATION AND RESPONSIBILITIES

All personnel (WESTON, subcontractors, client, or other personnel) having the potential for exposure to site hazards are subject to the requirements of this SSHP.

4.1 KEY PERSONNEL

Key project personnel are identified in Section 4 of the APP. Their responsibilities, qualifications and lines of authority are provided. Resumes and certifications of health and safety personnel are included in Appendix A of the APP.

4.2 PERSONNEL ASSIGNED TO THE PROJECT

All WESTON, subcontractor, and other personnel who will be involved in onsite activities are responsible for the following:

- Taking all reasonable precautions to prevent injury to themselves and to their fellow employees, and being alert to potentially harmful situations
- Performing only those tasks they believe they can do safely and have been trained/qualified to do
- Notifying the SSHO/UXOSO of any special medical conditions (i.e., allergies, contact lenses, diabetes)
- Notifying the SSHO/UXOSO of any prescription and/or nonprescription medication the worker may be taking that might cause drowsiness, anxiety, or other unfavorable side effects
- Preventing spillage of materials to the greatest extent possible
- Practicing good housekeeping by keeping the work area neat, clean, and orderly
- Immediately reporting all injuries to the SSHO/UXOSO
- Complying with the APP/SSHP and all safety and health recommendations and precautions, and properly using PPE as determined by the SSHP and/or the SSHO/UXOSO

First aid/cardiopulmonary resuscitation (CPR)/BBP responders will be trained and qualified to perform those tasks. At least two people with this training will be onsite while work is ongoing.

5 EMPLOYEE TRAINING

Personnel assigned to or regularly entering a project site will have received the required training. A record of this training is maintained in the WESTON Corporate EHS database. As required by EM 385-1-1 and in accordance with applicable Washington Industrial Safety and Health Act or OSHA regulations, applicable required training for all site workers will be in accordance with the following sections. Training certificates for key WESTON safety personnel are included in Attachment A of the APP. If training is not current, employees will not be allowed to work or supervise at the site until they have successfully completed training requirements.

5.1 NEW HIRE SAFETY ORIENTATION AND INDOCTRINATION

New employees participate in WESTON's orientation program. All personnel receive training on WESTON's EHS policy including environmental aspects, Behavior-Based Safety, and site-specific/job-specific training. New employees will not be permitted to work at any site until they have received proper project training for their specific role (see also the site-specific training described in Section 5.5.1). New hire orientation will include the following topics:

- WESTON's Behavior Based Safety Program – "We will actively care for the well-being of ourselves, co-workers, families, clients, and subcontractors."
- Company safety policies
- Emergency Action Plans
- EHS Track overview
- Safe Driver Awareness overview
- Ergonomics Awareness overview
- Notice of Incident Reporting Program overview
- WorkCare Incident Intervention Program
- Mishap Management Program
- Health and Safety Plans and Task Hazard Risk Analysis overview
- Medical Programs overview
- Environmental Compliance overview

Note: Site-specific training is also provided for new and existing employees (Section 5.5.1).

5.2 UXO PERSONNEL TRAINING

All UXO technicians and personnel will meet the minimum training requirements of Department of Defense Explosive Safety Board TP-18. UXO technicians will receive training on the use and procedures for functionality and quality control testing of all UXO survey instruments used on-site.

5.3 OSHA TRAINING

All personnel working onsite will have completed 40-hour Hazardous Waste Operations Emergency Response training, an additional 3 days of field experience under the direct supervision of a trained experienced supervisor, and annual 8-hour refresher training, as required. The SUXOS and UXOSO will also have an additional 8 hours of specialized site supervisory training, the OSHA 30-hour Construction Safety and Health Course, and function-specific Competent Person, first aid, CPR, and BBP training. All workers will have initial training completed or refresher training within the required regulatory time frame. All training is documented.

5.4 FIRST AID AND CPR TRAINING

At least two employees assigned to the site will have current certifications in first aid and CPR. The training will be equivalent to what is provided by the American Red Cross.

Personnel trained in first aid and expected to administer first aid will receive training in controlling exposures to BBPs. This training will address the following topics:

- The BBP standards
- Requirements of the Exposure Control Plan (APP Section 9.7)
- Description of the risks of exposure and how BBPs are transmitted
- Management and employee responsibilities
- Protection methods against exposure and decontamination procedures
- Post-exposure procedures
- Labeling and color-coding of infectious waste

5.5 PROJECT SITE-SPECIFIC SAFETY AND HEALTH TRAINING

5.5.1 Initial Project Briefing

Project site-specific training will be provided to all workers prior to onsite operations. This training may include (as applicable for the specific tasks to be performed) the following:

- Training specific to other sections of EM 385-1-1 or OSHA standards in 29 Code of Federal Regulations (CFR) 1910 and 29 CFR 1926 that are applicable to site operations (construction)
- Training covering relevant elements in the APP and SSHP:
    - Emergency Action Procedures including list of emergency contacts, emergency assembly location, and hospital route
    - Identification of personnel with first aid/CRP/BBP training
    - Contaminants of concern
    - Site-specific biological, chemical, and physical hazards
    - Site-specific hazard communications (potential safety/health effects of exposure to chemicals used, e.g., gasoline/diesel; labeling of containers; current inventory of hazardous chemicals; location/use of SDSs; procedures to inform employees when a new chemical is brought on site; current quantities of hazardous chemicals; location of chemicals on site)
    - Site-specific action levels
    - Site control zones
    - Heat/Cold Stress (including heat illness prevention)
    - Hearing conservation training
    - Personal protective equipment/respiratory protection training
    - Natural resources training/wetland protocol
    - Cultural and historical resources training
    - Visitor orientation requirements
- Training covering elements of the Munitions Standard Operating Procedures and ESS Amendment 3 (Appendices G and I of the RAU 3 Phase 2 Work Plan, respectively [WESTON, 2015]):

- Potential site-specific munitions hazards
- Anomaly excavation protocols
- Anomaly data recording requirements
- MPPEH categorization and disposition guidelines
- Exclusion zone restrictions
- Analog geophysical survey instrument calibration and use

- Buddy system training:
  - All work will be performed using the buddy system
  - Team members will keep in visual contact with each other at all times.

Note: The APP/SSHP will be provided to all employees for review and signature prior to work.

5.5.2 Activity-Specific/AHA Training

At the start of each definable feature of work the AHA (Attachment 1) will be reviewed by all site personnel involved in that task. Once field work has commenced, all site personnel will participate in daily tail-gate safety meetings, reviewing safety concerns pertinent to the work assigned for that day. AHAs will be reviewed at least monthly and updated/revised as needed (revisions will be tracked using revision numbers, with updated versions inserted in all field copies of the APP/SSHP).

5.5.3 Daily Safety Briefings

The SUXOS and UXOSO will present daily site safety briefings (i.e., tailgate meetings) to on-site personnel prior to the start of the work shift. The purpose of the briefings is to assist personnel in safely conducting the scheduled work activities. The briefings will include the following:

Tasks to be performed, work method and general description of job scope.

- Work location
- Equipment usage
- Control of hazards
- Weather conditions

- Emergency response review

The briefings provide an opportunity for individuals to share observed safety deficiencies and recognitions. Attendance at these daily safety briefings is mandatory and will be documented by the UXOSO.

5.5.4 Backhoe and Utility Vehicle Use and Training

The SUXOS will ensure that operators of the backhoe and utility vehicles (UTVs) receive specific training before being permitted to use this equipment. Training will be conducted in accordance with appropriate manufacturer recommendations and will be documented.

6 PERSONNEL PROTECTIVE EQUIPMENT

All personnel performing onsite operations will be required to use the appropriate level of protection. Based on a task-specific hazard analysis, Level D PPE is considered appropriate for all tasks. If contaminants are encountered in the field, the SSHO/UXOSO may increase the PPE requirements to Modified Level D (or higher in consultation with the EHS Director) based upon the hazards associated with a given task and the identified contaminant levels.

6.1 LEVEL D PERSONAL PROTECTIVE EQUIPMENT

Level D PPE will consist of the following:

- Work clothes, e.g., long pants, long-sleeve shirts
- High-visibility vest when in the vicinity of excavators, loaders, etc.
- Work gloves-leather or cotton as necessary for physical hazards
- Boots that provide adequate protection from physical and environmental conditions.
- Safety glasses
- Hard hat when overhead or struck-by hazards exist
- Hearing protection (when noise levels are at or exceed 85 decibels)

6.2 MODIFIED LEVEL D PERSONAL PROTECTIVE EQUIPMENT

Modified level D PPE will be worn when conducting activities with known contact with contaminated materials (note: not expected during the RAU 3 Phase 2 Remedial Action). In addition to the Level D PPE, modified Level D may also include chemical resistant coveralls (Tyvek).

The need for special equipment will be determined by the SSHO/UXOSO based on the planned activities for the day. The EHS Director will be consulted if conditions change and the need for special equipment arises.

6.3 PERSONAL PROTECTIVE EQUIPMENT PROGRAM

WESTON's Corporate EHS Manual includes a discussion of the PPE Program which is summarized below:

The objective of the PPE Program is to protect employees from the risk of injury by creating a barrier against workplace hazards. Personal protective equipment is not a substitute for good engineering or administrative controls or good work practices, but should be used in conjunction with these controls to ensure the safety and health of employees. Personal protective equipment will be provided, used, and maintained when it has been determined that its use is required and that such use will lessen the likelihood of occupational injury and/or illness.

The use of PPE can itself, create significant worker hazards, such as heat stress, physical and psychological stress, impaired vision, reduced mobility, and distorted communication. In general, the higher the level of PPE, the greater these risks. For any given situation, PPE must be selected to provide the appropriate level of protection without creating unnecessary risk to the wearer.

PPE selection shall be based on an evaluation of the performance characteristics of the PPE relative to the characteristics of the site, task-specific conditions, duration of exposure to those conditions and other safety hazards to which the employee is, or may be exposed. PPE requirements are to be discussed with each worker prior to the start of work. Employees will be trained in the proper use, maintenance, and care and cleaning of PPE. Defective and/or damaged PPE shall not be used.

7 MEDICAL SURVEILLANCE

WESTON utilizes a comprehensive Occupational Health Program (OHP) that complies with all OSHA and USACE EM 385 1-1 28.E requirements (USACE, 2014). All site personnel and subcontractors working on the site and potentially exposed to site-specific hazards must comply with a comparable OHP.

To comply with OSHA and USACE requirements, WESTON has designated WorkCare to oversee the site-specific medical surveillance and OHP. The WorkCare medical surveillance program is performed under the direct supervision of a licensed physician, board-certified in occupational medicine. The purpose of the OHP is to ensure suitable job placement of employees, to monitor the health effects of hazards encountered in the work place, and to maintain and promote good health through preventative measures. Medical examination criteria are established by WorkCare in compliance with 29 CFR 1910.120.

WESTON provides the following occupational health services for WESTON employees assigned to work onsite:

Initial and Periodic Medical Testing and Certification—Upon assignment to field work and periodically, as appropriate and determined by WESTON Medical Director, WESTON employees are examined by qualified medical facilities and certified as able to work on hazardous sites and to wear respiratory protection. Copies of certifications are maintained by the SSHO/UXOSO. Subcontractors are required to provide certifications proving employees have medical clearance to work at a hazardous waste site.

Termination Examination—Upon termination of employment, WESTON personnel who have worked continuously at a hazardous waste project site for more than six months are given the opportunity to undergo a termination examination equivalent to the baseline health assessment. All personnel who terminate employment within a 6-month period undergo an examination based upon their exposure at the site. The physician will determine specific examination tests.

Supplemental Examination—Any worker receiving a potentially harmful level of exposure to hazardous chemical/biological material or exhibiting signs or symptoms of possible exposure

will undergo a supplemental examination. The physician will certify in writing that the employee is fit to return to work. If necessary, activity restrictions are specified in writing. Additional tests are conducted if contaminants/potential exposures so dictate and as determined by the examining physician.

Medical records are established and maintained by WorkCare in support of the WESTON Medical Monitoring Program. These records are treated as private and confidential information and include enough data for use in health maintenance, treatment, and epidemiologic studies, and in helping WESTON with program evaluation and improvement. The medical record contains sufficient information to identify the patient, support the diagnosis, justify the treatment, and document additional follow-up treatment or referrals. The physician's written opinion for all medical examinations is provided as specified in 29 CFR 1910.120, Subpart (f)(7).

8 EXPOSURE MONITORING AND ACTION LEVELS

Based on the hazard/risk assessment of the site, the nature of the work, and previous experience performing MEC clearance operations at the site, it is not expected that any airborne contaminants or nuisance dust level exposure limits will be exceeded under normal circumstances. As a result, no air monitoring or air sampling will be performed for routine tasks. However, if soil excavation, grading, and sifting operations are performed, action levels have been established for nuisance dust and that will be monitored as described below.

8.1 AIR MONITORING AND ACTION LEVELS – DURING EXCAVATION WITH HEAVY EQUIPMENT AND SIFTING ACTIVITIES ONLY

Soil excavation using heavy equipment and sifting activities are the only activities expected to generate dust. Nuisance dust action level for respirable dust as measured using a Personal DataRAM^{TM} (PDR) will be as follows:

General Site and Inside Heavy Equipment Cabs

- If respirable dust exceeds 1.0 mg/m^3, then dust control measures will be increased.
- If respirable dust exceeds sustained readings (two readings within a 10 minute interval) of 5.0 mg/m^3, then work will be stopped or PPE upgraded to Level C.

PDRs will be capable of data logging results every ten minutes. At all times heavy equipment will be operated with windows closed, and air conditioners will be on (positive flow) with high efficiency particulate air cabin filters in working order. Safety boots will be cleaned prior to entry into cabs to prevent dust and dirt from being tracked into the cab. A PDR will be rotated daily among different equipment to monitor personnel exposure. The PDR will be calibrated before and after each use according to the manufacturer's directions and standard industrial hygiene practice.

8.2 NOISE LEVEL MONITORING AND ACTION LEVELS

Heavy equipment, if used on this project, will be initially monitored for noise (inside equipment cabs and in the immediate vicinity) using a noise level meter. If noise levels exceed 85 decibels A-weighted, hearing protection will be worn. Hearing protection will consist of disposable

earplugs with a noise reduction rating of at least 30 decibels. The SSHO/UXOSO will maintain records of noise level readings and will notify personnel regarding the need for hearing protection. The SSHO/UXOSO will review safety records of personnel assigned to the project and adjust the action level to 80 decibels A-weighted if appropriate to protect employees with standard threshold shifts.

9 HEAT AND COLD STRESS/WEATHER

9.1 HEAT AND COLD STRESS

Section 9.19 of the APP presents the Heat/Cold Stress Monitoring Plan to be used during the project. If the heat index is forecast to exceed 75 ºF (i.e., ambient temperature of 75 ºF and relative humidity of 55%), workers will perform baseline pulse rate monitoring at the beginning of the shift, documented by the SSHO/UXOSO. Monitoring will be repeated at the beginning of each scheduled break. When the heat index exceeds 75 ºF, monitoring will occur hourly or when any individual exhibits symptoms. Refer to Section 9.19 of the APP for a description of the monitoring procedures and work/rest cycles and a discussion of heat illnesses and their symptoms. Because of the temperate climate in Vancouver, Washington, extreme cold weather is not anticipated. However, during cold weather it may be necessary to protect personnel from the effects of cold temperatures and wind, as well as wetting from precipitation. The UXOSO is responsible for monitoring personnel for cold stress and evaluating the conditions, work tasks, and requirements for PPE.

9.2 WEATHER HAZARDS

In the event of unseasonably warm weather, personnel should be closely monitored for signs of heat stress or heat stroke, particularly whether PPE is required. During cold weather, it may be necessary to protect personnel from the effects of cold temperatures and wind, as well as wetting from precipitation. The UXOSO is responsible for evaluating the conditions, work tasks, and requirements for PPE.

9.3 LIGHTNING AND HIGH WINDS

Section 9.35 of the APP presents the Contingency Plan for Severe Weather to be used during the project. The SUXOS and SSHO/UXOSO will monitor for lightning and high winds and take appropriate action as described in the APP.

10 STANDARD OPERATING SAFETY PROCEDURES, ENGINEERING CONTROLS, AND WORK PRACTICES

10.1 SITE RULES/PROHIBITIONS

Using common sense, operating under the "buddy system" (or two-person rule), and following safe practices can reduce hazards due to normal project activities. In addition to the general site safety procedures contained in the WESTON Corporate EHS Program field operating procedures guide (which will be on-site), the following procedures will be used:

- No running or horseplay will be allowed.
- Hot work will be restricted in the work zone without the proper hot-work permit. Equipment will be bonded, grounded, and explosion-resistant, as appropriate.
- UXO technicians will visually examine MEC for markings and other external features such as shape, size, and external fittings. If an unknown MEC item is encountered, the on-site USACE representative will be notified immediately. Under no circumstances will any fuzed MEC be moved in an attempt to make a definitive identification.
- MEC detonated in the original position found (BIP) will be sandbagged to mitigate blast effects and fragmentation projection.
- Only UXO technicians will handle MEC, and only during daylight hours. Personnel who will be handling MEC will not wear outer or inner garments having static-electricity-generating characteristics such as nylon.
- WESTON and subcontractor personnel engaged in field operations will be thoroughly trained and capable of recognizing the specific hazards associated with MEC. All field personnel will be under the supervision of a UXO Technician III or higher.
- General MEC safety guidelines are included below:
  - Projectiles containing base-detonating fuses are to be considered armed if the round is fired.
  - Arming wires and pop-out pins on unarmed fuses should be secured prior to moving MEC.

- Do not depress plungers, turn vanes, or rotate spindles, levers, setting rings, or other external fittings on MEC.
- Do not attempt to remove or dismantle any components of MEC.
- UXO personnel are not authorized to render inert any MEC found on-site.
- MEC will not be taken from the site.
- Consider MEC, which may have been exposed to fire and detonation, as extremely hazardous.
- Do not rely on the color-coding of munitions for definitive identification.
- Assume that a practice munitions contains a live charge until investigation proves otherwise.
- Do not approach smoking munitions.

The site-specific MEC Standard Operating Procedures and Explosives Safety Submission, presented in Appendix G and Appendix I, respectively of the RAU 3 Phase 2 Work Plan (WESTON, 2015), provide additional site-specific information regarding MEC hazards and precautions.

10.1.1 Buddy System

Work at the site will be performed using the buddy system. Team members will keep in visual contact with each other at all times. Team members will be made aware of any slip, trip, and lifting hazards along with any potential exposure to chemical substances, heat or cold stress, and general hazards within their work area.

10.1.2 Designated Eating/Break Areas

Eating/break areas will be located away from the active work area. No food or beverages will be allowed in any toxic work environments.

10.1.3 Designated Smoking Areas

Regulations governing approved areas for smoking and spark generation will be strictly followed. Smoking is prohibited except in designated smoking areas. The UXOSO will identify designated smoking areas. Discarding tobacco materials other than into designated tobacco receptacles is considered littering and is subject to fines.

10.2 WORK PERMITS

No work requiring permits (e.g., radioactive, confined space, hot work) are associated with this project.

10.3 MATERIAL HANDLING PROCEDURES

Employees will not be handling contaminated soils, liquids, or radioactive materials as part of the scope of this project. Work areas and means of access will be maintained safe and orderly. Tools, materials, extension cords, hoses or debris will not cause tripping or other hazards. Storage and construction sites will be kept free from the accumulation of combustible materials. There are no radioactive materials present on-site. Drum, container, and/or tank handling is not anticipated during this project. Spill contingencies are listed in Section 10.5.

10.4 DRUM/CONTAINER/TANK HANDLING

Drums used for scrap metal containment will be UN approved open-top 55-gallon reconditioned drums. The drums will not be filled beyond the 800 pound weight capacity specific to the drum (1A2/X425/S/02). Personnel will use proper tools, lifting techniques, and mechanical equipment (i.e., drum dolly) while using/moving drums to containerize debris.

10.5 SPILL CONTROL, PREVENTION, AND RESPONSE

Only a small volume of fuel will typically be on site: gasoline in pickup trucks and diesel fuel in the backhoe. Fueling and repair of vehicles will be performed off-site when feasible. Should the storage of fuel, hazardous waste, or materials with hazardous constituents be necessary, a storage tank constructed primarily of non-earthen materials, or a stationary device designed to contain an accumulation of hazardous waste would be placed within an approved secondary containment of adequate size to contain a spill (110% of storage tank size). The tank would be managed in accordance with the APP and the Clark County PWD Prevention, Control, and Countermeasures Plan.

Because of the nature of the operations, the potential for a spill of pollutants during operations is low. The highest probability for a spill will occur during re-fueling operations of equipment (e.g., filling a chainsaw's gas and oil tanks). In the event of a spill, WESTON will notify appropriate

emergency responders and the Clark County Munitions Safety Advisor of the Clark County Public Works Department. Clark County would complete any required notifications to the Washington State Department of Ecology. The WESTON Project Manager and Corporate EHS will be informed of any injuries, minor or serious. The UXOSO will file an incident report within 24 hours of the accident.

WESTON will be equipped with spill kits on-site for immediate cleanup if a petroleum product is inadvertently spilled. Any spills originating from small containers (e.g., gasoline cans) would be contained using absorbent materials. If fuel or oil is spilled, the following measures will be taken:

- The spill area will be isolated and contained.
- The Clark County Munitions Safety Advisor of the Clark County Public Works Department will be notified during a spill response.
- The liquid and affected soil will be shoveled into a plastic bag and subsequently placed into a U.S. Department of Transportation-approved shipping container.
- Each container will be labeled to identify its contents.
- The container(s) will be shipped off-site and disposed of at a permitted facility in accordance with the CFR 260 – 270.
- Fire-extinguishing equipment meeting 29 CFR Part 1926, Subpart F, shall be on hand and ready for use to control fires if deemed safe to do so by appropriately trained personnel.

10.6 MEC OPERATIONS

The requirements for MEC operations are described in the RAU 3 Phase 2 Work Plan (WESTON, 2015) and the Site-Specific MEC Standard Operating Procedures and approved Explosives Safety Submission presented in Appendices G and I, respectively of the Work Plan.

10.7 TRAFFIC

Care must be taken to avoid motor vehicle accidents at all times. Whether on CBMR or off-post, posted speed limits will be obeyed at all times, and seat belts will be worn when driving. Daily review of traffic hazards and work patterns will be discussed. All drivers will be licensed.

10.8 UTILITY VEHICLE USE

UTVs may be utilized at this site to aid in transporting personnel and work materials to physical locations from the trailer area. A copy of the operator's manual will be kept with the vehicle at all times and protected from the elements. UTV operators and passengers will wear seat belts. It is expected that UTVs will be equipped with windshields, seatbelts, and rollover protection. Operators and passengers shall wear goggles at all times when a utility vehicle, not equipped with a windshield, is in motion. Occupancy in the UTV is limited to manufacturer-designated seating that has built-in seatbelts. Passengers may not ride in the vehicle's back cargo area unless it is manufacturer-equipped with built-in seatbelts.

10.9 SECURITY PLAN

10.9.1 Site Access

Because of the widespread work zones and site access, UXO personnel will monitor the work areas where MEC operations are in progress to ensure that no unauthorized personnel access the work locations.

Site control procedures will be established to ensure site access to unauthorized personnel is limited. This will prevent persons who may be unaware of site conditions from being exposed to inherent hazards. Munitions debris (materials documented as safe) will be containerized and secured in a central storage area to prevent unauthorized tampering. Any field equipment that may cause potential injury when left unattended will be removed from the site or otherwise rendered non-dangerous. Field team leaders will be responsible to ensure that the specific work areas are secure during nonworking hours.

10.9.2 Site Control

The work area is located within a fenced reservation which is secured by locked gates during non-working hours. Two Clark County employees reside on site.

10.9.3 Theft

Although the probability of on-site equipment theft is low, steel Conex containers with reinforced locks may be used for equipment storage. If it is necessary that equipment remain inside a vehicle, the vehicle will be secured at the end of the work day with doors locked and all windows closed.

In the event a theft does occur, local authorities will be promptly notified and appropriate WESTON personnel will be notified.

10.9.4 Personal Confrontation

Personnel will be observant of their surroundings. They should ensure their own safety, the safety of their co-workers, and the safety of the public by not confronting or challenging aggressive perpetrators. Authorities should be contacted if they observe any unusual circumstances.

10.10 MOTOR VEHICLE SAFETY

Safety is of utmost importance at WESTON. Employees must act responsibly every day to ensure the safety of themselves and others. This safety commitment also applies when driving vehicles. All employee drivers are required to operate vehicles safely, obeying federal, state, and local laws, and company policies. Driving is a privilege, not a right.

10.10.1 Employee Requirements/Responsibilities

Drivers of WESTON vehicles must possess a current, valid driver's license of the appropriate class required for their driving needs, e.g., class C, or Commercial Driver's License with HAZMAT endorsement. Driving duties and functions are to be performed in a safe, legal, and professional manner. WESTON personnel are to attend periodic defensive driving training and

other driver safety meetings as scheduled through their local Health and Safety Officers. Driving requires a high level of skill and alertness. When fatigue, illness, or medication impact alertness, reflexes, and decision-making capabilities, an employee driver should cease driving until the situation improves or is corrected and contact his/her manager to discuss the situation.

Compliance with all federal, state, and local laws is expected. Unsafe vehicles and related equipment will be reported and repaired. Unsafe vehicles are not to be driven on WESTON business.

Report any vehicle accident while on the job, or any accident occurring at any time if involving a company-owned or insured "allowance" vehicle.

10.10.2 Compliance Issues/Driving Practices

10.10.2.1 Speed Limits

Drivers are required to obey posted speed limits and other traffic laws. Fines for any traffic violations are the employee's responsibility.

10.10.2.2 Seat Belts

WESTON drivers and their passengers are required to wear seat belts at all times while the vehicle is in operation.

10.10.2.3 Distracted Driving

It is recognized that distracted driving can contribute to accidents. Accordingly, WESTON employees are to exercise caution and good judgment when driving. Reading maps, eating, placing or receiving a call on a cell phone, and other activities may contribute to an accident. Cell phone use while driving, including the use of hands-free devices, creates a distraction and driver inattention. The following basic guidelines should always be observed:

- Make outgoing calls after you have pulled over to a safe area.
- Let incoming calls go to voice mail, or if answering the phone is necessary, make sure the caller knows you are driving and keep the call short.

- At all times, drivers are to operate vehicles in a safe, legal, and professional manner.

10.10.2.4 Transporting Weapons

Transporting weapons (such as firearms, large knives) or dangerous property (significant or placardable quantities of regulated hazardous materials or substances) is prohibited, unless specifically authorized.

10.11 SANITATION

Employers shall establish and maintain hygienic sanitation provisions for all employees in all places of employment. General housekeeping activities will occur daily.

10.11.1 Drinking Water

An adequate supply of potable water shall be provided in all places of employment, for both drinking and personal cleansing. Non-potable water shall be identified with markings and be kept separate from potable water.

Cool drinking water shall be provided during hot weather. Only approved potable water systems may be used for the distribution of drinking water. Construction trailers and other temporary or semi-permanent facilities shall be properly connected to the local municipal water supply unless the remoteness of the location makes this prohibitive. When unable to connect into the municipal supply, temporary potable water systems shall be utilized, with the services provided by a licensed potable water contractor. “Reclaimed water” (treated wastewater) use in potable systems is strictly prohibited.

10.11.2 Toilets

Toilets are required to be present in all places of employment. The job site shall be provided with chemical toilets. Hand soap or similar cleansing agents shall be provided. The requirements do not apply to mobile crews or to normally unattended work locations if employees working at these locations have transportation readily available to nearby toilet and/or washing facilities. Portable toilets and washing facilities will be located adjacent to the project field office.

10.11.3 Procedures for Vermin Control

The site will be kept clean and organized. Organics such as foods will be wrapped and then discarded to avoid attracting pests.

10.11.4 Waste Disposal

All sweepings, solid or liquid wastes, refuse, and garbage will be removed in a manner that avoids creating a menace to health and should be discarded as often as necessary or appropriate to maintain sanitary conditions in the place of employment. All waste will be disposed in the dumpster on-site

11 SITE CONTROL

The SUXOS coordinates access control and security on-site. Because of the hazardous nature of MEC, the SUXOS will establish an exclusion zone (EZ) during work activities in accordance with the approved ESS and procedures detailed in the Work Plan. The EZ is the work site and will encompass an area large enough to prevent personnel injuries from fragmentation resulting from unintentional or intentional detonations. Only essential personnel are allowed in the EZ during MEC operations. Authorized personnel are those who have completed the required training and meet medical requirements.

During on-site operations, the SUXOS will order operations to cease if nonessential personnel are observed within the EZ. To ensure safety, site controls include the following:

- Eating, drinking, and smoking are prohibited except in designated areas.
- ME operations cease if nonessential personnel are present.
- The SUXOS, UXOSO, or their designee, will escort authorized site visitors.
- All personnel entering the site, including visitors, shall wear the proper PPE and sign in and out on the site visitors' log.
- The UXOSO maintains the Site Control Log to ensure accurate accountability of personnel on-site.
- The UXOSO provides a safety briefing to all personnel entering the site to inform them of potential site hazards. All personnel must acknowledge this briefing by signing the safety log.
- In case of an emergency, personnel will exit the site and move to a designated safe area. The UXOSO will determine the designated safe area that is located upwind of the site outside of the fragmentation area. The SUXOS will notify the Clark County Munitions Safety Advisor and Project Manager if an emergency warrants site evacuation.

The support zone will be established as the area outside the exclusion zone, and is the location of the administrative and other support functions such as material and equipment staging. The support zone includes facilities such as the office spaces and supply storage areas. Specific areas

within the support zone will be designated for smoking, chewing, eating, and drinking. The potential of cross contamination is not applicable to this project based on the project characterization; therefore, a contamination reduction zone will not be required.

12 PERSONAL HYGIENE AND DECONTAMINATION

Hand sanitizers will be available at portable toilets. Water is available adjacent to the Field Office and will be used, together with soap, for decontamination if required.

13 EQUIPMENT DECONTAMINATION

Instruments and tools will be routinely wiped down with a clean, damp rag or towel to prevent mud and/or debris accumulation. Such accumulations can adversely affect equipment operation.

14 EMERGENCY EQUIPMENT AND FIRST AID

14.1 FIRST AID

Trained WESTON personnel will provide on-site first aid/CPR support. In the event specialized/elevated care is necessary, either WESTON or the on-call emergency medical technician/ambulance service will transport the injured person to the appropriate medical facility.

The size and number of first-aid kits will be sufficient to accommodate the maximum number of people (including visitors) on-site at any given time. The kits will be located in the field office and in support vehicles. Water and soap will be available adjacent to the field office to cleanse and decontaminate burns and other wounds. An eye wash is available at the field office. Any site worker who is knowingly allergic to insect bites will be required to inform the UXOSO, and to carry an allergy response kit.

14.2 FIRE EXTINGUISHERS

The field office will be equipped with a dry-chemical type 4A:20B:C fire extinguisher. In addition, a fire extinguisher rated at least 2A:10B:C will be located in each project vehicle and piece of heavy equipment on-site. Fire extinguishers in the cabs of all vehicles must be mounted or secured.

14.3 RADIOS

The SUXOS, SSHO/UXOSO, and all UXO Team Leaders will have radios.

15 EMERGENCY ACTION PLAN

This Emergency Action Plan (EAP) provides the minimum requirements and actions WESTON management and employees will take in the event of fires, natural disasters, and other emergencies to comply with the requirements of 29 CFR 1910.38 and EM 385-1-1 Section 01.E. In the event of an emergency, employees are expected to evacuate to a safe location and allow emergency/first responders to react to the emergency.

15.1 EMERGENCY CONTACTS

Prior to start of field work, the SSHO/UXOSO will inform potential emergency responders of the planned site activities. In the event of an emergency requiring outside emergency services, WESTON personnel will immediately dial 911 to request assistance. Table 1 provides other personnel to be notified in case of an emergency. This listing will be posted at the job site.

15.2 HOSPITAL ROUTE

For medical emergencies, injured personnel will be taken to PeaceHealth Southwest Medical Center. Figure 3 provides the hospital route map and turn-by-turn directions from the CBMR site to PeaceHealth Southwest Medical Center. The Emergency Assembly Area will be the CBMR WESTON field office. All onsite personnel and subcontractors will be made aware of the hospital location and the location of the Emergency Assembly Area during the initial health and safety briefing. Additionally, Figure 3 will be kept onsite. The hospital is located at the following address:

PeaceHealth Southwest Medical Center
400 NE Mother Joseph Place
Vancouver, WA 98664
Phone (360) 256-2000

15.3 EMERGENCY EQUIPMENT

The location of emergency equipment will be discussed during the initial health and safety orientation before RAU 3 Phase 2 Remedial Action activities are initiated. Employees working onsite are responsible for becoming familiar with the location of the emergency equipment.

- **First Aid Station**—A first-aid kit will be located in the field office and in all project trucks. The kit will contain supplies for minor injuries and an infection control kit to protect the caregiver against BBPs (i.e. hepatitis and AIDS).
- **Fire Extinguisher**—Fire extinguishers are located in the field office and in project vehicles and are clearly visible in conspicuous locations. The extinguishers are inspected monthly at a minimum.
- **Fire/Emergency Alarm System**—The fire/emergency alarm system will be by radio announcement.
- **Eyewash Station**—An emergency eyewash station is located in the field office.
- **Emergency Transport Eyewash Bottle**—Emergency transport eyewash bottles will be located with the first-aid kits.

15.4 FIRE REPORTING AND EVACUATION PROCEDURES

Workers will not fight any fires other than incipient stage fires and will only fight fires if they have been trained and feel safe doing so. The only work-related fires on the project site that are likely to occur would be related to the vehicles and equipment used onsite. As stated in the fire prevention plan, there will be at least one fire extinguisher at each work site where work is being performed. Fire extinguishers will also be located (mounted or secured) in each piece of heavy equipment and in the crew vehicle. The fire extinguishers are intended to only fight fires that have recently occurred and can be reasonably extinguished immediately.

In the event of an emergency requiring evacuation, WESTON employees and any subcontractors will proceed immediately to the designated Emergency Assembly Area (the WESTON field office) to be accounted for by the SSHO/UXOSO or SUXOS. The alternative Emergency Assembly Area is the CBMR south gate if access to the field office is unsafe. The evacuation procedure will be exercised during the initial safety briefing. The exercise will be documented in the daily production report.

15.5 NATURAL DISASTERS AND OTHER EMERGENCIES

In the event of a natural disaster or other emergency in the work areas, the alarm will be a radio announcement. Emergency evacuation procedures are discussed in Section 15.4.

15.6 EMERGENCY ACTION PLAN TRAINING

All employees assigned to the RAU 3 Phase 2 Remedial Action will receive initial training that includes project safety training as well as site-specific EAP training. The EAP training will cover the locations of the emergency equipment and emergency information in their work areas, including telephone numbers, emergency assembly area and evacuation routes, fire extinguishers, first-aid equipment, and directions to the medical center emergency room. The SSHO/UXOSO will maintain the personnel records of training.

The SSHO/UXOSO will conduct an exercise of the EAP, including an evacuation drill, prior to initiating field work and will critique the exercise for lessons learned. Additional training will be provided if any of the following conditions prevail:

- When employees are re-assigned or relocated appropriate emergency training will be provided
- When the EAP is revised

16 REFERENCES

29 Code of Federal Regulations (CFR) Part 1910. "Occupational Safety and Health Standards."

29 CFR Part 1926. "Safety and Health Regulations for Construction."

Bonneville Conservation Restoration and Renewal Team, LLC (BCRRT). 2009. *Draft Supplemental Remedial Investigation/Feasibility Study for RAU3.* Revision 2. May.

BCRRT. 2010. *Final Remedial Action Unit 3 (RAU 3) Cleanup Action Plan. Vancouver, WA*. April.

Geo Recon International. 1981. Cultural Resources Survey, Forest Management Project, Ft. Lewis and Camp Bonneville, Washington, for U.S. Army, Ft. Lewis.

Larson, Lynn L. 1980. Cultural Resource Reconnaissance of Forest Management Tracts on Fort Lewis and Camp Bonneville. Office of Public Archaeology, Institute for Environmental Studies, University of Washington, Reconnaissance Report No. 34.

Naval Sea Systems Command (NAVSEA). 2008. NAVSEA OP 3565 Volume 2 Seventeenth Revision - Technical Manual, Electromagnetic Radiation Hazards (Hazards to Ordnance). July 1.

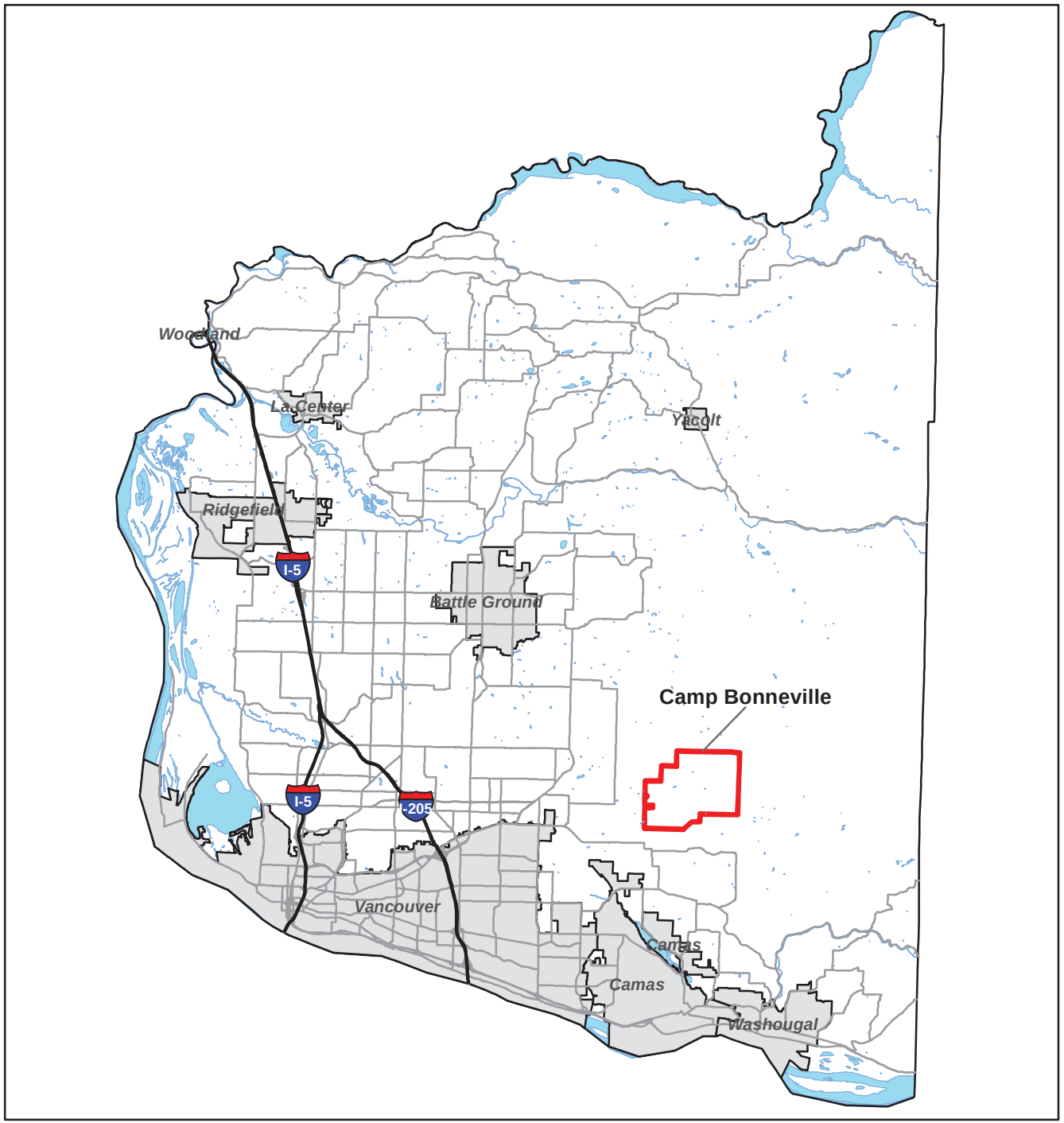
NAVSEA. 2011. NAVSEA OP 5 Seventh Revision Change 8 - Ammunition and Explosives Ashore. July 1.

Phillips, WIMP. 1987. Geologic Map of the Vancouver Quadrangle, Washington and Oregon.

U.S. Army Corps of Engineers (USACE). 2014. EM 385-1-1 *Safety and Health Requirements Manual*. 30 November.

Weston Solutions, Inc. (WESTON). 2015. *Work Plan, Surface and Subsurface Clearance Munitions and Explosives of Concern, Remedial Action Unit 3 Phase 2, Former Camp Bonneville Military Reservation, Vancouver, Washington.*

FIGURES



N

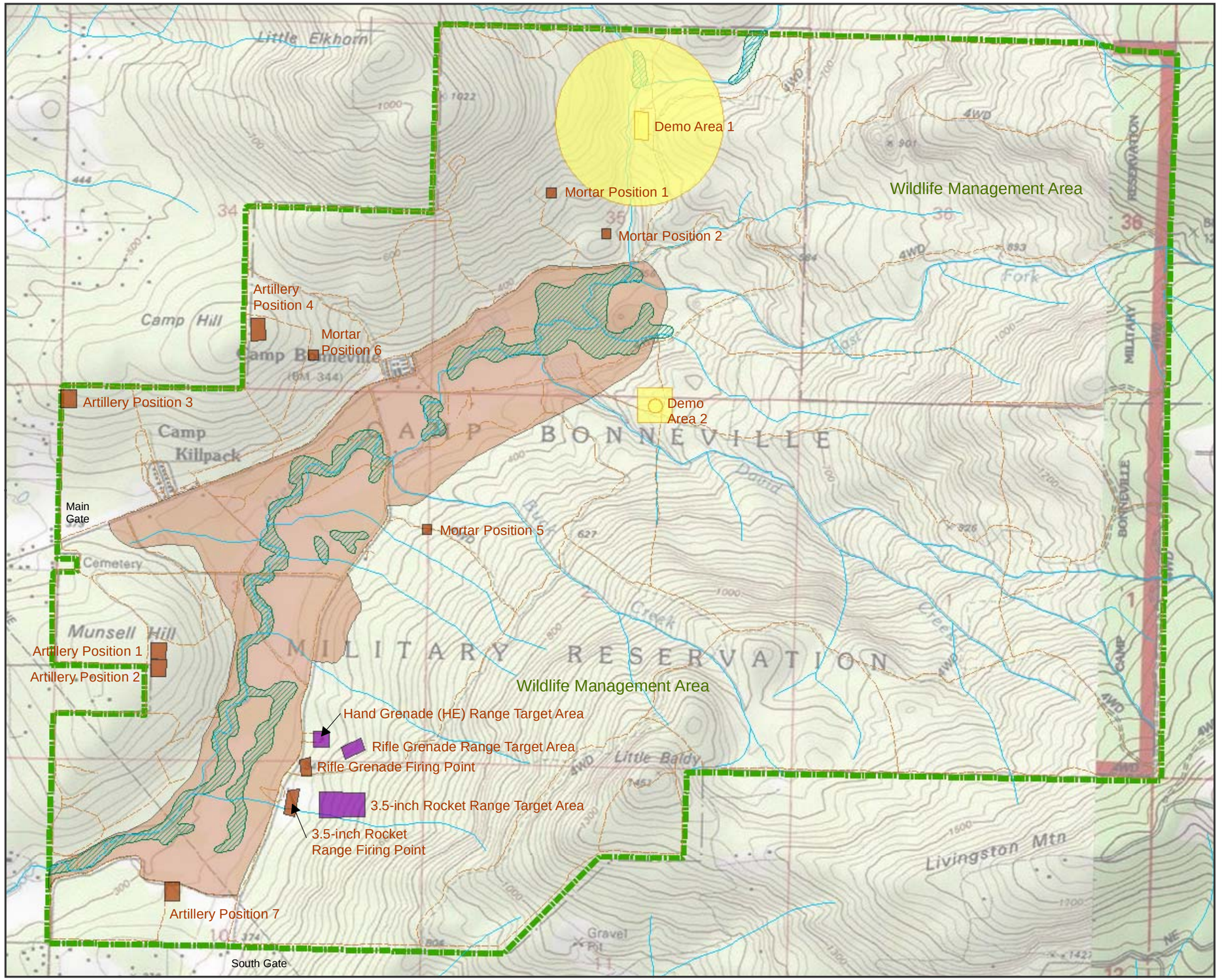
0 2.5 5 10 Miles

Clark County Public Works

FIGURE 1
SITE LOCATION

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Property Boundary
- Central Valley Area (RAU3 Phase 1)
- Demolition Area (RAU 3 Phase 2)
- Training Range Target Area (RAU3 Phase 2)
- Firing Position/Firing Point (RAU3 Phase 2)
- Wetland Area
- Roads
- Streams / Rivers

N

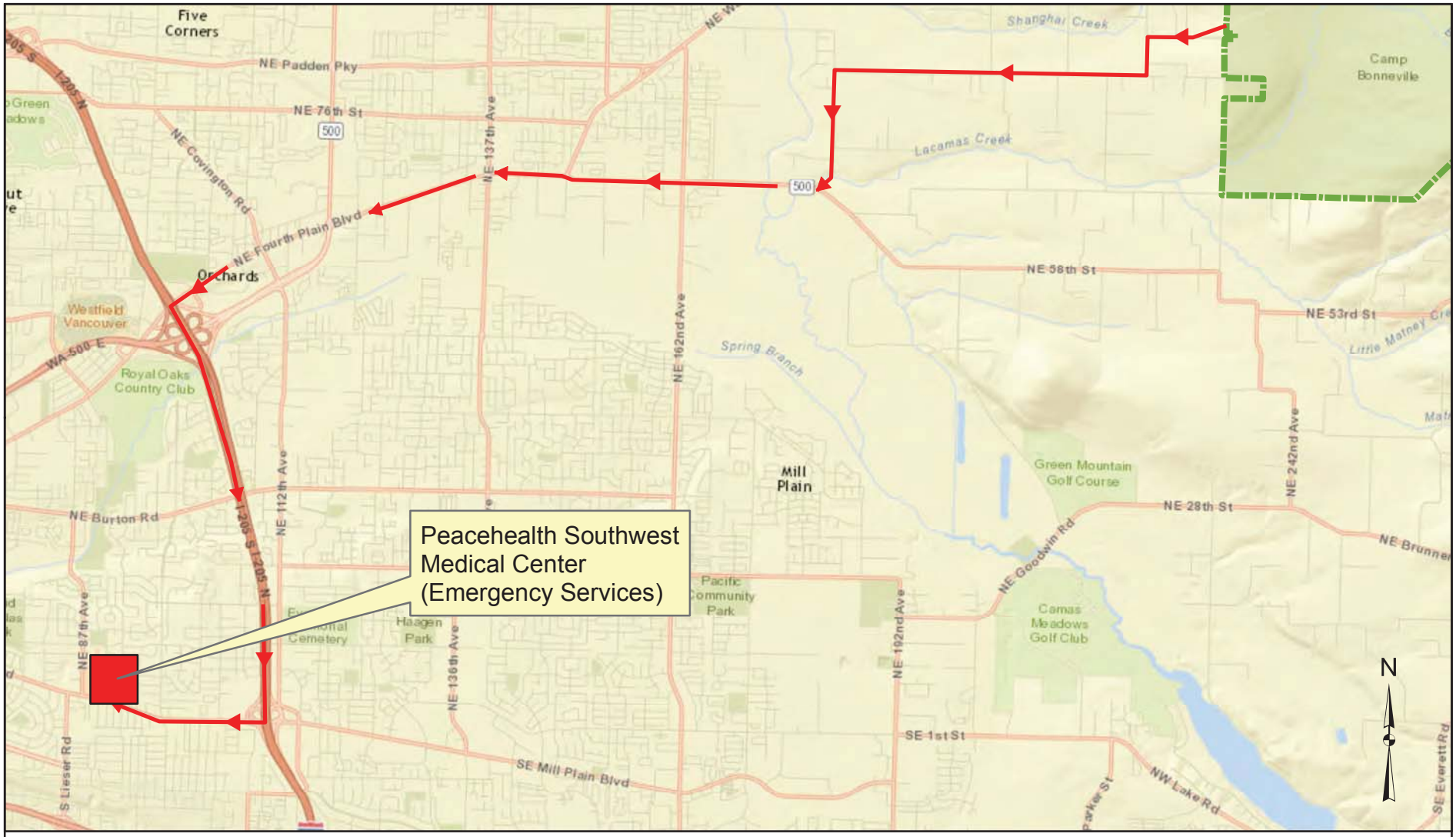
0 1,000 2,000 4,000 Feet

Clark County Public Works

FIGURE 2
RAU 3 PHASE 2
CLEARANCE LOCATIONS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



1. Exit Camp Bonneville from west on NE Pluss Rd.
2. Slight right onto NE 88th St. (0.3 mi)
3. Left turn onto NE 222nd Ave. (0.2 mi)
4. Right turn onto NE 83rd St. (2.0 mi)
5. Left turn onto NE 182nd Ave. (0.8 mi)
6. Right turn onto NE Fourth Plain Blvd. (3.1 mi)
7. Left turn onto WA-500 W (2 left lanes - 1.3 mi)
8. Exit and merge onto Interstate 205 S towards Salem (2.5 mi)
9. Exit 28 for Mill Plain Blvd. (0.3 mi)
10. Right turn onto SE Mill Plain Blvd. (0.9 mi)
11. Right turn onto NE Mother Joseph Place.

PeaceHealth Southwest Medical Center
400 NE Mother Joseph Place
Vancouver, WA 98664
(360) 256-2000

0 0.5 1 2 Miles

Clark County Public Works

FIGURE 3
HOSPITAL ROUTE TO PEACEHEALTH SOUTHWEST MEDICAL CENTER

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS

TABLES

Table 1
Emergency Contact and Notification Numbers

Organization/Point of Contact	Telephone Number	Comment(s)
Ambulance Police/Security Med Evac Fire	911	
PeaceHealth Southwest Medical Center	360-256-2000	400 NE Mother Joseph Place Vancouver, WA 98664
National Response Center	800-424-8802	
Poison Control Center	800-222-1222	
Clark County, WA POC – Greg Johnson	360-229-0529	
WorkCare WESTON Medical Director: Dr. Peter Greaney WorkCare WESTON Program Administrator: Eoin Greaney (Team Delta)	888-449-7787 (24 hours a day, 7 days a week for emergency injury or illness) 800-455-6155, ext. 2219 (Team Delta) for administrative information	
EPA Region 10 Environmental Emergency Response	206-553-1263	
Weston PM – Dwight Gemar, P.E.	925-899-4674 (cell) 925-948-2612 (office)	
Weston Corporate EHS Director – Herold Hannah, CIH, CSP	267-516-0274 (cell) 610-701-3024 (office)	

ATTACHMENT 1
ACTIVITY HAZARD ANALYSES

Activity Hazard Analysis (AHA)

Activity/Work Task: (1) Land Survey Anomaly Avoidance	Overall Risk Assessment Code (RAC) (Use highest code)	**L**
Project Location: Camp Bonneville, Vancouver WA	**Risk Assessment Code (RAC) Matrix**	
Contract Number: RAU 3 Phase 2, Agreement Mod 3	**Severity** / **Probability**	
Date Prepared: 10/15/15		
Prepared by (Name/Title): Andrew Caldwell, SUXOS		
Reviewed by (Name/Title): Dwight Gemar, P.E, Project Manager and Herold Hannah, CIH, EHS Director		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)
Land surveyor will provide their own AHA and will be responsible for supervision and safety of their own personnel. Land surveyor AHA will be reviewed by WESTON and will be discussed by the Land Surveyor in the daily safety meeting.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
Land Survey Anomaly Avoidance	***Chemical/Radiological Hazards:*** ▪ None anticipated		
Land Survey Anomaly Avoidance, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**

Land Survey Anomaly Avoidance, continued	***Physical Hazards:*** ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) ▪ Slips, trips, and falls ▪ Heat or cold stress	***Controls for MEC/MPPEH*** ▪ General awareness training and MEC avoidance escort ▪ No intrusive work is allowed ***Controls to avoid slips, trips, and falls*** ▪ Alert employees to hazards of uneven terrain ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet	**L**

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
▪ PPE: Level D; hearing protection when noise is above 85dB Other equipment: ▪ Surveying Equipment (subcontractor) ▪ Portable eyewash bottle ▪ Schonstedt detectors ▪ Fire extinguisher ▪ First aid kit ▪ Hygiene supplies ▪ Hand tools as needed ▪ Pickup trucks ▪ Spill containment supplies	▪ Initial site-specific including emergency action plan briefing and APP checklist ▪ Daily tailgate safety meetings ▪ General and site specific MEC hazards, precautions and notifications procedures ▪ First Aid and CPR ***Supervisory Personnel:*** ▪ OSHA supervisor's training ***Motor Vehicle:*** ▪ Operators will hold a valid license for the type and class of vehicle they are operating ***Instrumentation and Equipment General:*** ▪ Employees will be qualified, trained, and competent to operate or service mechanical equipment per EM 385-1-1 18.G ***Names of Competent or Qualified Personnel:*** *SSHO/UXOSO – Greg Clark* *SUXOS – Andrew Caldwell* *UXOQC- Mike Everman* *First Aid/CPR (certified and qualified)- Greg Clark, Andrew Caldwell, others (list maintained on site)*	***Site Inspection:*** ▪ Daily inspection by Safety and Health Officer and Quality Control Manager per EM 385-1-1 01.A.12b ▪ Daily safety briefings ***Motor Vehicles:*** ▪ Before initial use vehicles will be inspected and found to be in a safe operating condition per EM 385-1-1 18.G.02 and daily/shift inspections when in use per EM 385-1-1 18.G.04. ***Instrumentation and Equipment General:*** ▪ Qualified, trained, and competent personnel will inspect instrumentation and equipment as required.

Activity/Work Task: (2) Brush Cutting Anomaly Avoidance	Overall Risk Assessment Code (RAC) (Use highest code)					**L**
Project Location: Camp Bonneville, Vancouver WA	**Risk Assessment Code (RAC) Matrix**					
Contract Number: RAU 3 Phase 2, Agreement Mod 3	**Severity**	**Probability**				
Date Prepared: 10/15/15		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Andrew Caldwell, SUXOS	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Dwight Gemar, P.E, Project Manager and Herold Hannah, CIH, EHS Director	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**
Notes: (Field Notes, Review Comments, etc.) Brush cutting subcontractor will provide their own AHA and will be responsible for supervision and safety of their own personnel. Brush cutting AHA will be reviewed by WESTON and will be discussed by the Land Surveyor in the daily safety meeting.	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**RAC Chart**				
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk**				
		H = High Risk				
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk**				
		L = Low Risk				

Job Steps	Hazards	Controls	RAC
1. Brush Cutting Anomaly Avoidance	***Chemical/Radiological Hazards:*** ▪ None anticipated		
1. Brush Cutting Anomaly Avoidance, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
1. Brush Cutting Anomaly Avoidance, continued	***Physical Hazards:*** ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH)	***Controls for MEC/MPPEH*** ▪ Site specific training conducted upon arrival and before work commences ▪ Non-UXO workers know the three "R"s: Recognize a suspect MEC/MPPEH item, Report its location and Retreat to a safe area ▪ Do not touch a suspect MEC/MPPEH item	**L**

	▪ Injury due to moving equipment ▪ Slips, trips, and falls ▪ Caught in/between/struck by or against moving equipment ▪ Noise exposure ▪ Heat or cold stress	▪ Notify the SUXOS and UXOSO if suspect MEC/MPPEH is found ▪ Observe general and site specific MPPEH hazards and precautions ▪ Know the different types of MEC (UXO, DMM, and MC) and MPPEH (MDEH and MDAS) ***Controls to avoid injury due to moving equipment*** ▪ Only trained, authorized, and experienced operators ▪ Equipment inspected daily ▪ Personnel restricted in area of operation ▪ Backup alarms functional ▪ Use of hand signals, radios, and equipment horns for communications ***Controls to avoid slips, trips, and falls*** ▪ Alert employees to hazards of uneven terrain ***Controls for caught between/struck by or against moving equipment*** ▪ Stay out of swing radius of equipment ▪ Ground personnel near operating heavy equipment will wear traffic vests ▪ Do not walk, work, or stand near equipment being loaded or unloaded ▪ Backup alarms to be in operable condition and use of radios. No unnecessary backing ***Controls for noise exposure*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted noise level meter readings for equipment in use at the time are above 85 dbA ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
▪ PPE: Level D; hard hat (optional for UXO personnel if no overhead risk), high visibility vest or shirt (if spotting for heavy equipment), hearing protection when noise is above 85dB Other equipment: ▪ Brush cutting equipment (subcontractor – see separate AHA) ▪ Schonstedt detectors ▪ First aid kit ▪ Hygiene supplies ▪ Pickup trucks	▪ Initial site-specific including emergency action plan briefing ▪ Daily tailgate safety meetings ▪ General and site specific MEC hazards, precautions and notifications procedures ▪ First Aid and CPR ***Supervisory Personnel:*** ▪ OSHA supervisor's training ***Motor Vehicle:*** ▪ Operators will hold a valid license for the type and class of vehicle they are operating ***Instrumentation and Equipment General:*** ▪ Employees will be qualified, trained, and competent to operate or service mechanical equipment per EM 385-1-1 18.G ***Names of Competent or Qualified Personnel:*** *SSHO/UXOSO – Greg Clark* *SUXOS – Andrew Caldwell* *UXOQC – Mike Everman* *First Aid/CPR (certified and qualified)- Greg Clark, Andrew Caldwell, others (list maintained on site)*	***Site Inspection:*** ▪ Daily inspection by Safety and Health Officer or Quality Control Manager per EM 385-1-1 01.A.12b ▪ Daily safety briefings ***Motor Vehicles:*** ▪ Before initial use vehicles will be inspected and found to be in a safe operating condition per EM 385-1-1 18.G.02 and daily/shift inspections when in use per EM 385-1-1 18.G.04. ***Instrumentation and Equipment General:*** ▪ Qualified, trained, and competent personnel will inspect instrumentation and equipment as required.

Activity/Work Task: (3) Analog Geophysical Anomaly Detection and Removal	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: Camp Bonneville, Vancouver WA	**Risk Assessment Code (RAC) Matrix**	
Contract Number: RAU 3 Phase 2, Agreement Mod 3	**Severity** / **Probability**	
Date Prepared: 10/15/15		
Prepared by (Name/Title): Andrew Caldwell, SUXOS		
Reviewed by (Name/Title): Dwight Gemar, P.E, Project Manager and Herold Hannah, CIH, EHS Director		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Notes: (Field Notes, Review Comments, etc.)
Jobstep 1 may include mechanical or manual cutting of vegetation within or adjacent to habitat areas. This work would be performed with UXO Construction Support
Trained UXO technicians only will perform all other tasks associated with this activity.

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. Identify Geophysical Anomalies (analog survey)	***Chemical/Radiological Hazards:*** ▪ None anticipated		
1. Identify Geophysical Anomalies, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
	Physical Hazards: ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH)	***Controls for MECMPPEH*** ▪ Site specific training conducted upon arrival and before work commences ▪ Notify the SUXOS and UXOSO if suspect MEC/MPPEH is found ▪ Observe general and site specific MEC/MPPEH hazards and precautions ▪ Know the different types of MEC (UXO, DMM, and MC)	**M**

	▪ Heat or cold stress ▪ Noise exposure ▪ Slips, trips, and falls ▪ Repetitive motion injury	and MPPEH (MDEH, and MDAS) ▪ Maintain separation distances identified in the explosives safety submission between intrusive teams and all other essential personnel ▪ No radio transmissions or cell phone use within 25ft of suspect MEC/MPPEH items ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet ***Controls for noise exposure*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted noise level meter readings for equipment in use at the time are above 85 dbA ***Controls to avoid slips, trips, and falls*** ▪ Alert employees to hazards of uneven terrain ***Controls for Repetitive Motion Injury*** ▪ Alternate between detection and digging	
2. Anomaly excavation using manual tools and methods	***Chemical/Radiological Hazards:*** ▪ None anticipated		
2. Anomaly excavation using manual tools and methods, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**

2. Anomaly excavation using manual tools and methods, continued	***Physical Hazards:*** ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) ▪ Slips and trips ▪ Heat and cold stress ▪ Noise exposure ▪ Repetitive motion injury	***Controls for MEC/MPPEH*** ▪ Site specific training conducted upon arrival and before work commences ▪ Notify the SUXOS and UXOSO if suspect MEC/MPPEH is found ▪ Observe general and site specific MEC/MPPEH hazards and precautions ▪ Know the different types of MEC (UXO, DMM, and MC) and MPPEH (MDEH, and MDAS) ▪ Maintain separation distances identified in the explosives safety submission between intrusive teams and all other essential personnel ▪ No radio transmissions or cell phone use within 25ft of suspect MEC/MPPEH items ***Controls to avoid slips and trips:*** ▪ Alert employees to hazards of uneven terrain ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet ***Controls for avoiding exposure to high noise:*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted by noise level readings for equipment in use at the time above 85 dbA ***Controls for Repetitive Motion Injury*** ▪ Trade off with others while performing surveying and digging activities ▪ Use hand magnets if effective in reducing effort	**M**
3. Anomaly excavation using earth moving machinery	***Chemical/Radiological Hazards:*** ▪ None anticipated		

3. Anomaly excavation using earth moving machinery, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
3. Anomaly excavation using earth moving machinery, continued	***Physical Hazards:*** ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) ▪ Injury due to moving equipment ▪ Caught between/struck by or against hazards	***Controls for MEC/MPPEH*** ▪ Site specific training conducted upon arrival and before work commences ▪ Notify the SUXOS and UXOSO if suspect MEC/MPPEH is found ▪ Observe general and site specific MEC/MPPEH hazards and precautions ▪ Know the different types of MEC (UXO, DMM, and MC) and MEC (MDEH, and MDAS) ▪ Maintain separation distances identified in the explosives safety submission between intrusive teams and all other essential personnel ▪ No radio transmissions or cell phone use within 25ft of suspect MEC/MPPEH items ***Controls to avoid injury due to moving equipment:*** ▪ Trained, experienced operators ▪ Equipment to be inspected daily ▪ Personnel restricted in area of operation ▪ Back up alarms functional ▪ Use of hand signals, radios, and equipment horns for communications ***Controls for caught between/struck by or against hazards*** ▪ Stay out of swing radius of equipment ▪ Ground personnel near operating heavy equipment will wear hard hats and traffic vests ▪ Do not walk, work, or stand near equipment being loaded or unloaded ▪ Backup alarms to be in operable condition. No unnecessary backing	**M**

	▪ Slips, trips, and falls ▪ Wetland areas ▪ Heat and cold stress ▪ Noise exposure ▪ Fall from elevations ▪ Hazards associated with fueling operations	***Controls to avoid slips, trips, and falls:*** ▪ Keep walking and working surfaces dry ▪ Housekeeping - remove trip hazards ▪ Alert employees to hazards of uneven terrain ***Controls for wetland areas*** ▪ Use long-reach excavators where warranted or crane mats to support heavy equipment based on surface conditions ▪ Avoid areas with standing water ▪ Avoid areas where there is excessive sinking in mud ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet ***Controls for avoiding exposure to high noise:*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted by noise level readings for equipment in use at the time above 85 dbA ***Controls to avoid falls from elevations:*** ▪ Maintain three points of contact when climbing on or off equipment. ***Controls for hazards associated with fueling operations*** ▪ All equipment will be shut down prior to fueling ▪ All spilled fuel will be wiped up immediately ▪ No smoking in the area of fueling operations ▪ Fueling will be accomplished in well ventilated areas away from ignition sources ▪ Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of equipment's fuel tank (All equipment will be bonded or grounded during fueling operations)	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
▪ PPE: Level D; high visible vest or shirt (if spotting for heavy equipment), hearing protection when noise is above 85dB Other equipment: ▪ Mini-excavator or backhoe ▪ Pickup truck ▪ GPS equipment ▪ MineLab and Schonstedt detectors ▪ Fire extinguisher ▪ First aid kit and eyewash bottle ▪ Hygiene supplies ▪ Hand tools as needed ▪ 6 mil plastic sheet/sandbags ▪ Spill containment supplies ▪ Two-way radios ▪ Sandbags	▪ Emergency action plan briefing ▪ General and site specific MEC precautions and notification procedures ▪ Explosives Safety Submission ▪ Daily tailgate safety briefing ▪ HAZWOPER certification (40-hr, 8-hr) ▪ OSHA supervisory (for site managers) ▪ First Aid and CPR ▪ General site safety (daily) ***Names of Competent or Qualified Personnel:*** *SSHO/UXOSO – Greg Clark* *SUXOS – Andrew Caldwell* *UXOQC – Mike Everman* *Competent Person for Mini-excavator or backhoe – Andrew Caldwell* *First Aid/CPR (certified and qualified)- Greg Clark, Andrew Caldwell, others (list maintained on site)*	***Site Inspection:*** ▪ Daily site inspections by SSHO/UXOSO or QC Manager. ***Motor Vehicles:*** ▪ Before initial use vehicles will be inspected and found to be in a safe operating condition per EM 385-1-1 18.G.02 and daily/shift inspections when in use per EM 385-1-1 18.G.04 ***Heavy Equipment:*** ▪ Before equipment is placed in use it will be inspected and tested by a qualified person ▪ Inspections and tests will be done in accordance with manufacturer's instructions. ▪ All equipment will be inspected daily when in use by the operator

Activity/Work Task: (4) MEC/MPPEH Identification and Disposal	Overall Risk Assessment Code (RAC) (Use highest code)	**M**
Project Location: Camp Bonneville, Vancouver WA	**Risk Assessment Code (RAC) Matrix**	
Contract Number: RAU 3 Phase 2, Agreement Mod 3	**Severity** / **Probability**	
Date Prepared: 10/15/15		
Prepared by (Name/Title): Andrew Caldwell, SUXOS		
Reviewed by (Name/Title): Dwight Gemar, P.E, Project Manager and Herold Hannah, CIH, EHS Director		
Notes: (Field Notes, Review Comments, etc.) Trained UXO technicians only will perform this activity.		

Severity	Frequent	Likely	Occasional	Seldom	Unlikely
Catastrophic	E	E	H	H	M
Critical	E	H	H	M	L
Marginal	H	M	M	L	L
Negligible	M	L	L	L	L

Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)

"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.

"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible

Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.

RAC Chart

- **E = Extremely High Risk**
- **H = High Risk**
- **M = Moderate Risk**
- **L = Low Risk**

Job Steps	Hazards	Controls	RAC
1. MEC/MPPEH inspection and segregation	***Chemical/Radiological Hazards:*** ▪ Munitions constituents	***Controls for munitions constituents*** ▪ Stop work and immediately notify the SSHO/UXOSO if discolored soil or odors are observed as these may be indicators of soil contamination associated with munitions constituents and may require an upgrade of PPE	**L**
	Biological Hazards: ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
	Physical Hazards: ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH)	***Controls for MEC/MPPEH Hazards*** ▪ Verify that MDAS storage containers contain only "material documented as safe" (MDAS) items. Use two-step inspecting procedure and custody seals/locks	**L**

	▪ Back injury ▪ Slips, trips, and falls ▪ Caught in/between/struck by or against moving equipment ▪ Heat and cold stress	▪ Verify MEC or MPEH are not placed in MDAS containers ***Controls to avoid back injury:*** ▪ Observe proper lifting techniques setting up or putting away equipment ▪ Get help if lifting more than 40 lbs ▪ Use your legs to lift when shoveling ▪ Avoid repetitive stress movements ***Controls to avoid slips, trips, and falls:*** ▪ Alert employees to hazards of uneven terrain ***Controls for caught between/struck by or against moving equipment:*** ▪ Ground personnel guiding heavy equipment will wear traffic vests ▪ Do not walk, work, or stand near equipment being loaded or unloaded ▪ Backup alarms to be in operable condition and use of radios. No unnecessary backing ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet	
2. Explosive disposal	***Chemical/Radiological Hazards:*** ▪ None identified		**L**
	Biological Hazards: ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
	Physical Hazards: ▪ MEC and MDEH transportation and handling	***Controls for MEC and MDEH Hazards*** ▪ Do not roughly handle MEC and MPPEH ▪ Non-conductive transport surface in vehicle bed	**M**

2. Explosive disposal, continued	▪ Slips and trips ▪ Heat and cold stress ▪ Noise exposure ▪ Inadvertent or unplanned detonation	▪ Secure items in transport vehicle with tie downs or sandbags ▪ Chock vehicle on uneven surfaces ▪ Don't leave vehicle unattended with explosives loaded ▪ Observe general and site specific MEC hazards and precautions. ▪ Positive identification MEC and MPPEH (safe to move?) ▪ Maintain MEC accountability ▪ Establish Exclusion Zone (EZ) based on Explosives Safety Submission (ESS) ▪ Use the minimum number of personnel (not less than two) to conduct operations and minimize exposure time to MEC ▪ Verify all personnel are qualified UXO Technicians IAW DDESB TP-18 ▪ Establish road guards as needed to stop non-essential personnel from entering EZ ▪ Observe general MEC and site specific safety precautions and reporting procedures ▪ Compliance with the Demolition SOP ▪ No radio transmissions or cell phone use within 25ft of MEC, MPPEH, or donor explosives ***Controls to avoid slips and trips:*** ▪ Keep walking and working surfaces dry ▪ Housekeeping - remove trip hazards ▪ Alert employees to hazards of uneven terrain ***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet ***Controls for avoiding exposure to high noise:*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted noise level meter readings for equipment in use at the time are above 85 dbA ***Controls for inadvertent or unplanned demolition:*** ▪ No rough handling ▪ Keep blasting caps separated from MEC/ MPPEH and other donor explosives by 50 ft.	

	▪ Disposal Operations	▪ No static producing clothing will be worn during handling of any explosives ▪ Use only sharp locking or fixed blade knife/cutter to cut det cord ▪ Secure explosives during transportation and setup ▪ Comply with Demolition SOP ▪ Smoking is not allowed except during breaks and in a designated safe area ***Controls for disposal operations hazards:*** ▪ Disposal operations shall be performed during daylight hours only ▪ Non-essential personnel in the area will be contacted and informed of the disposal operation and approximate timeframe it is being conducted ▪ The demolition supervisor will conduct a safety briefing prior to operations beginning ▪ Identify road guards and locations to deny access to unauthorized personnel ▪ Take precautions for fire following detonations ▪ Following detonation, do not approach the area for 5 minutes ▪ Have safety equipment placed near treatment area for immediate use ▪ Vegetation height within 500 ft of treatment site will be cut if excessive and/or water spray used to reduce fire hazard ▪ Do not wear static producing clothing ▪ Use of Sandbags for Mitigation Of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions, for BIP procedures ▪ Comply with the demolition SOP ▪ If firing line is used, check continuity before and after unreeling ▪ Blasting caps will be covered with a sandbag and have the electrical leads extended to their maximum length prior to conducting the continuity test ▪ Personnel will ground themselves prior to breaking shunt of blasting caps ▪ The demolition supervisor will maintain control of the blasting machine or the RFD firing key until ready to initiate ▪ Warning notifications will be announced over the radio prior to initiation	

		▪ Misfire procedures in the Demolition SOP will be complied with in the event of a misfire	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
▪ PPE: Level D: high visible vest or shirt (if guiding heavy equipment), hearing protection when noise is above 85dB ▪ Welders apron and gloves as needed Other equipment: ▪ Two-way radios ▪ Remote firing device/continuity tester ▪ Alternate firing system (if available) ▪ Day box for transport explosives ▪ WP Safety kit ▪ Portable eyewash bottle ▪ MineLab and Schonstedt detectors ▪ Digging tools as needed ▪ Fire extinguishers ▪ Explosive placards ▪ First aid kit ▪ Hygiene supplies ▪ Hand tools as needed ▪ Survey stakes/flagging ribbon/6 mil plastic sheet ▪ Sandbags/plywood ▪ Pickup trucks ▪ Spill containment supplies	▪ Emergency action plan briefing ▪ General and site specific MEC, precautions and notification procedures ▪ Explosives Safety Submission ▪ Daily tailgate safety briefing ▪ HAZWOPER certification (40-hr, 8-hr) ▪ OSHA supervisory (for site managers) ▪ First Aid and CPR ***Names of Competent or Qualified Personnel:*** *SSHO/UXOSO – Greg Clark* *SUXOS – Andrew Caldwell* *UXOQC- Mike Everman* *First Aid/CPR (certified and qualified)- Greg Clark, Andrew Caldwell, others (list maintained on site)*	***Site Inspection:*** ▪ Daily site inspections by UXOSO or UXOQC. ***Motor Vehicles:*** ▪ Before initial use vehicles will be inspected and found to be in a safe operating condition per EM 385-1-1 18.G.02 and daily/shift inspections when in use per EM 385-1-1 18.G.04

Activity/Work Task: (5) Soil Excavation and Mechanical Screening – if used	Overall Risk Assessment Code (RAC) (Use highest code)					**M**
Project Location: Camp Bonneville, Vancouver WA	**Risk Assessment Code (RAC) Matrix**					
Contract Number: RAU 3 Phase 2, Agreement Mod 3	**Severity**	**Probability**				
Date Prepared: 10/15/15		Frequent	Likely	Occasional	Seldom	Unlikely
Prepared by (Name/Title): Andrew Caldwell, SUXOS	Catastrophic	**E**	**E**	**H**	**H**	**M**
	Critical	**E**	**H**	**H**	**M**	**L**
Reviewed by (Name/Title): Dwight Gemar, P.E, Project Manager and Herold Hannah, CIH, EHS Director	Marginal	**H**	**M**	**M**	**L**	**L**
	Negligible	**M**	**L**	**L**	**L**	**L**
Notes: (Field Notes, Review Comments, etc.) This is an optional activity that will only be used if warranted by field conditions.	Step 1: Review each **"Hazard"** with identified safety **"Controls"** and determine RAC (See above)					
	"Probability" is the likelihood to cause an incident, near miss, or accident and identified as: Frequent, Likely, Occasional, Seldom or Unlikely.	**RAC Chart**				
	"Severity" is the outcome/degree if an incident, near miss, or accident did occur and identified as: Catastrophic, Critical, Marginal, or Negligible	**E = Extremely High Risk**				
		H = High Risk				
	Step 2: Identify the RAC (Probability/Severity) as E, H, M, or L for each "Hazard" on AHA. Annotate the overall highest RAC at the top of AHA.	**M = Moderate Risk**				
		L = Low Risk				

Job Steps	Hazards	Controls	RAC
1 Heavy Equipment Operations (equipment that may be used- Loader, Excavator, Haul Trucks)	***Chemical/Radiological Hazards:*** ▪ None anticipated.		
	Biological Hazards: ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
	Physical Hazards: ▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH) ▪ Injury due to heavy equipment	***Controls for heavy equipment hazards, continued:*** ▪ Heavy equipment used for excavation and handling of soil before screening will be furnished with appropriate shielding. ***Controls for heavy equipment hazards, continued:*** ▪ Only trained, authorized, qualified, and competent personnel will operate heavy equipment.	**M**

		▪ Owner's manuals will be maintained with each piece of equipment in operation. ▪ When equipment is used to load trucks operators will remain in their cab with windows up and heater/air conditioner on. ▪ Equipment will be inspected before each shift and documented (see attached inspection checklist). ▪ Equipment with serious safety hazards (problems with breaks, etc.) will immediately be taken out of service and repaired before used. ▪ Operators are responsible for the equipment or trucks they operate. ▪ Ground personnel and operators will be familiar with appropriate hand signals in the work area. ▪ All personnel in the controlled area where heavy equipment is operating will wear high visibility vests or an equivalent as approved by the contractor. ▪ Manufacturer's safety and operations manual will be reviewed and followed. ▪ Heavy equipment will be equipped with roll over protection and back up alarms. ▪ The operations will separate ground and heavy equipment operations as much as possible. ▪ Employees will remain at least ten feet away from the back or front of heavy equipment, and at least 50 feet from the sides of equipment during soil moving operations. ▪ Equipment repair noted on the inspection sheet will be scheduled for maintenance during the shift first noted, as appropriate.	
	▪ Traffic Flow/vehicle accidents	***Controls for traffic flow/vehicle accidents:*** ▪ The traffic truck/route plan will be followed. ▪ When two-way traffic travels through intersections with poor visibility or short visibility, the speed limits will be slow enough to prevent accidents (15 MPH max while on site), and/or flag personnel will be used to control traffic congestions. ▪ Field foot traffic will be kept away from equipment/truck traffic to the extent possible. ▪ Traffic patterns, traffic plans and right-of-ways will be covered in safety meetings.	

	▪ Dropped tools or supplies	***Controls for dropped tools or supplies:*** ▪ Steel-toe boots for equipment operators, high visible reflective vests, safety glasses, and hardhat meeting ANSI Standards will be worn in all construction areas.	
	▪ Eye injury due to flying particulate	***Controls to prevent eye injury due to flying articulates:*** ▪ Safety glasses with side shields will be worn in all construction work areas. ▪ If material gets into employee's eye, the eye should be flushed for 15-minutes at an emergency eye wash station immediately. UXOSO will be notified immediately whenever material gets in an eye. ▪ An eye wash station will be in the area where work is being performed.	
	▪ Worker struck by vehicle	***Controls to prevent vehicular accidents:*** ▪ Spotters will be used when backing up trucks, heavy equipment and earth moving equipment adjacent to excavation areas. ▪ High visibility vests will be worn. ▪ Heavy equipment and vehicles will have safety features (back-up alarms), brakes, windows, and windshields) in-place and maintained according to regulations and good practices. ▪ Vehicle inspection program implemented which inspects for safe operation and condition each shift before use.	
	▪ Heat or cold stress	***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F. ▪ Dressing appropriately for the weather, workload, and site conditions. ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet	
	▪ Noise exposure	***Controls for noise exposure*** ▪ Noise monitoring, training and hearing protection based on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted noise level meter readings for equipment in use at the time are above 85 dbA ▪ All equipment will be equipped with manufacturer's required mufflers.	
	▪ Slips, trips, and falls	***Controls to avoid slips, trips, and falls***	

	▪ Fueling Hazards ▪ Fire/HazMat spills ▪ Dust ▪ Back injury from lifting heavy loads	▪ Alert employees to hazards of uneven terrain ***Controls for hazards associated with fueling operations*** ▪ All equipment will be shut down prior to fueling ▪ All spilled fuel will be wiped up immediately ▪ No smoking in the area of fueling operations ▪ Fueling will be accomplished in well ventilated areas away from ignition sources ▪ Equipment and fuel tank do not need to be bonded or grounded if the metal nozzle is in contact with the metal of equipment's fuel tank ***Controls to avoid fire/HazMat spills:*** ▪ Any spills or leaks of petroleum products will be reported to the safety officer and SUXOS ▪ Spill and absorbent materials will be readily available ▪ Spilled HazMat will immediately be cleaned up and containerized ▪ All heavy equipment will be equipped with an ABC type fire extinguisher that will be inspected daily, monthly and documented ***Controls for dust:*** ▪ Safety technicians will monitor airborne dust levels in the work area. Airborne dust will be suppressed by application of a water-based mist, as necessary, to keep levels below action level of 1.5 mg/m^3. If particulate levels are at or above the action levels additional wet methods will be used to reduce the dust levels. "No Visible Emissions Rule will be in effect". ***Controls to prevent back injury from lifting heavy loads:*** ▪ Site personnel will be instructed on proper lifting techniques. ▪ Mechanical devices should be used to reduce manual handling of materials. ▪ Employees will follow the WESTON requirement of not lifting more than 40 pounds or unusually awkward materials by themselves. Team lifting should be utilized if mechanical devices are not available.	

2 Mechanical Soil Screening Process (equipment that may be used- /Double-Deck Vibratory Power Screen)s	***Chemical/Radiological Hazards:*** ▪ None anticipated.		
2 Mechanical Soil Screening Process, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
2 Mechanical Soil Screening Process, continued	***Physical Hazards:*** ▪ Injury during Grizzly/Double-Deck Vibratory Power Screen operations	***Controls to prevent injury from the Grizzly/Double-Deck Vibratory Power Screen operations:*** ▪ Only qualified/Authorized personnel will operate Power Screen ▪ Safety Officer will determine the need for hearing protection and conduct monitoring if needed. Noise monitoring will be conducted for those activities involving difficulty communicating in a normal voice or at or above 85 dBA Sound Pressure Level ▪ All equipment will be equipped with manufacturer's required mufflers ▪ All screens and guards will be in place to prevent personnel from entering or being caught inside machine ▪ Mechanical screening equipment with appropriate shielding ▪ The area around loading/unloading will be kept clear of obstructions and Slip/Trip/Fall hazards ▪ When handling any of the metal debris, care will be taken to prevent puncture/cuts from the sharp/ill regular edges ▪ During the screening process only qualified and authorized personnel will handle MEC hazards ▪ Safety technicians will monitor airborne dust levels in the work area. Airborne dust will be suppressed by application of a water-based mist, as necessary, to keep levels below action level of 1.5 mg/m^3. If particulate	**M**

	▪ Injury during conveyor operations	levels are at or above the action levels additional wet methods will be used to reduce the dust levels. "No Visible Emissions Rule will be in effect" ▪ All personnel will know the emergency shut off/Kill Switch locations and how to operate them ***Controls for injury from conveyor operations:*** ▪ Only qualified/Authorized personnel will operate Conveyors ▪ No maintenance will be performed while the conveyor is in operation except when lubrication/adjustments are necessary while the conveyor needs to be in motion and only when all safeguards are in place and is done by experienced/trained maintenance personnel ▪ Inspect Emergency shut off switches and all guards on the conveyor belt systems, all employees working on Power Screen Plant will have a through working knowledge of the Kill Switches and their locations ▪ Inspection, maintenance and repairs will be in accordance with manufacturer's recommendations ▪ Where reversing, runaway or uncontrolled lowering are potential hazards-anti runaway devices, breaks, backstops or other safeguards will be installed ▪ Safety devices will be arranged to operate in such a manner that if a power failure or a failure of the device occurs a hazardous condition would not result ▪ All Take-up mechanisms, (contact with cables, chains, belts), nip and shear points will be guarded ▪ Keep hands and all body parts away from moving parts and pinch points ▪ Riding on conveyors is prohibited ▪ The area around loading/unloading will be kept clear of obstructions ▪ Safety technicians will monitor airborne dust levels in the work area. Airborne dust will be suppressed by application of a water-based mist, as necessary, to keep levels below action level of 1.5 mg/m3. If particulate levels are at or above the action levels additional wet methods will be used to reduce the dust levels. "No Visible Emissions Rule will be in effect"	

		▪ Shut off switches will be tested and witnessed by the SUXOS prior to starting work	
	▪ Caught in/between/struck by or against moving equipment	***Controls for caught between/struck by or against moving equipment:*** ▪ Stay out of swing radius of equipment ▪ Ground personnel near operating heavy equipment will wear hard hats and traffic vests ▪ Do not walk, work, or stand near equipment being loaded or unloaded ▪ Backup alarms to be in operable condition and use of radios. No unnecessary backing ▪ Safety toe footwear required for equipment operators	
	▪ Munitions and explosives of concern (MEC) and material potentially presenting an explosive hazard (MPPEH)	***Controls for MEC/MPPEH*** ▪ Site specific training conducted upon arrival and before work commences ▪ UXO trained observers will provide construction support ▪ Non-UXO workers know the three "R"s: Recognize a suspect MEC/MPPEH item, Report its location and Retreat to a safe area ▪ Do not touch a suspect MEC/MPPEH item ▪ Notify the SUXOS and UXOSO if suspect MEC/MPPEH is found ▪ Observe general and site specific MEC/MPPEH hazards and precautions	
	▪ Fall from elevations	***Controls to avoid falls from elevations:*** ▪ Maintain three points of contact when climbing on or off equipment.	
	▪ Slips and trips	***Controls to avoid slips and trips:*** ▪ Keep walking and working surfaces dry ▪ Housekeeping - remove trip hazards ▪ Alert employees to hazards of uneven terrain	
	▪ Heat and cold stress	***Controls for heat or cold stress*** ▪ Monitoring of personnel to be instituted when relative heat index reaches 75 deg. F ▪ Dressing appropriately for the weather, workload, and site conditions ▪ Training in heat and cold stress recognition ▪ Proper hydration, electrolyte replacement and diet	
	▪ Noise exposure	***Controls for avoiding exposure to high noise:*** ▪ Noise monitoring, training and hearing protection based	

		on the Hearing Control Program in the SSHSP; hearing protection will be worn if warranted by noise level readings for equipment in use at the time above 85 dbA	
3 MEC Handling at the Screen Plant	***Chemical/Radiological Hazards:*** ▪ None anticipated.		
3 MEC Handling at the Screen Plant, continued	***Biological Hazards:*** ▪ Stinging and biting insects (spiders, bees, etc.) ▪ Poisonous plants (ivy and oak) ▪ Personal injury with blood exposure	***Controls for Biological Hazards*** ▪ Use insect repellants (i.e., DEET) and PPE as above, wear long sleeve shirts and long pants ▪ Notify supervisor prior to work if allergic to bee stings ▪ Poisonous plant avoidance and identification training ▪ Use of Tecnu and isopropyl alcohol for post exposure decontamination ▪ BBP-based PPE and First Aid with Universal Precautions	**L**
3 MEC Handling at the Screen Plant, continued	***Physical Hazards:*** ▪ Injury from MEC/MPPEH handling at the screen plant	***Controls for MEC/MPPEH Handling at the Screen Plant*** ▪ Only qualified UXO technicians will handle materials that are potential MEC/MPPEH items ▪ Assume that MEC/MPPEH contains a live charge until it can be determined otherwise ▪ Avoid inhalation of, and skin contact with, smoke fumes and vapors of explosives and related hazardous materials ▪ Make every effort to identify the MEC/MPPEH item ▪ Carefully examine the item for markings and other identifying features such as shape, size, and external fittings. Do not move the suspected MEC/MPPEH item. ▪ Plan for, provide, and know the measures to be taken in the event of an accident ▪ Provide a designated emergency vehicle in the area in case of an accident or incident ▪ Do not handle, use, or remain near explosives during the approach or progress of an electrical storm. All personnel should move to a safe place until the storm passes. ▪ Do not allow unauthorized or unnecessary personnel to be	**M**

		present near the MEC/MPPEH. ▪ Always base operational plans on minimizing the exposure of site personnel to MEC/MPPEH items, consistent with efficient operations ▪ Do not rely on color-coding of MEC/MPPEH for positive identification of contents. Munitions having none, incomplete or improper color codes have been encountered. ▪ Avoid the area forward of the ammunition's nose (if applicable) until it can be determined that the item is not a shaped-charge. (The explosive jet produced by these rounds can be fatal to great distances forward of those items' longitudinal axis.) Assume all shaped-charge munitions contain a piezoelectric fuzing system until otherwise identified. Piezoelectric fuzes are extremely sensitive; they can be functioned by the slightest physical change in attitude or surroundings, and may remain hazardous for an indefinite period. ▪ Exclusion Zones will be set up prior to all excavation phases of work ▪ At no time will non-UXO trained employees or subcontractors be responsible for identifying, handling, or removing MEC/MPPEH items ▪ All MEC/MPPEH items will be removed from the sifting area (at least daily) and taken to the MEC/MPPEH storage magazine for storage utilizing an approved Explosive Transport Vehicle	

Equipment to be Used	Training Requirements/Competent or Qualified Personnel name(s)	Inspection Requirements
▪ PPE: Level D; Hard hat, safety glasses w/side shields or goggles, safety boots for equipment operators, reflective vests, leather/rubber/cotton gloves, as necessary; hearing protection when noise is above 85dB Other equipment: ▪ Excavator ▪ Loader ▪ Haul trucks ▪ Mechanical Screen Plant ▪ Pickup trucks ▪ Hand tools	▪ Emergency action plan briefing ▪ General and site specific MPPEH hazards, precautions and notification procedures ▪ Explosives Safety Submission ▪ Daily tailgate safety briefing ▪ HAZWOPER certification (40-hr, 8-hr) ▪ OSHA supervisory (for site managers) ▪ First Aid and CPR ▪ General site safety (daily) ***Names of Competent or Qualified Personnel:*** *SSHO/UXOSO – Greg Clark* *Heavy Equipment and Screen Plant Operation– Charlie Smith or Mark Major* *SUXOS – Andrew Caldwell* *UXOQC – Mike Everman* *First Aid/CPR (certified and qualified)- Greg Clark, Andrew Caldwell, others (list maintained on site)* *UXO Technicians – a list of qualified UXO technicians and their certifications are maintained on site.*	***Site Inspection:*** ▪ Daily site inspections by SSHO/UXOSO or UXOQC ***Motor Vehicles:*** ▪ Before initial use vehicles will be inspected and found to be in a safe operating condition per EM 385-1-1 18.G.02 and daily/shift inspections when in use per EM 385-1-1 18.G.04 ***Heavy Equipment:*** ▪ Before equipment is placed in use it will be inspected and tested by a qualified person ▪ Inspections and tests will be done in accordance with manufacturer's instructions. ▪ All equipment will be inspected daily when in use by the operator

APPENDIX E
MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS PLAN (NOT REQUIRED)

APPENDIX F
CONTRACTOR FORMS

RAU 3 PHASE 2 LIST OF FORMS

01 SUXOS Daily Report

02 UXO QC Daily Report

03 QC Surveillance Report

04 Daily Safety Inspection Log

05 Environmental Health and Safety Inspection Checklist

06 Safety Sign in Roster

07 Site Visitors Log

08 Sub-contractor Daily Report

09 MEC M1 Form

10 Grid Log

11 Demo Material Log

12 Magazine Data Card

13 Weekly Analog Locator Checklist

14 DD 1348-1A

15 Heavy Equipment Inspection Report

16 Vehicle Inspection Checklist

17 Motor Vehicle Inspection Checklist (vehicles carrying explosives)

18 Field Variance Form

Daily Report

Date:	Contract Number:
Delivery Order Number:	Location: Former Camp Bonneville Military Reservation
Weather Conditions:	
I. Work Summary:	
Equipment comments:	
II. Instructions Received:	
III. Safety Comments: All personnel attended the daily safety brief.	
IV. UXO Summary	

Type	**Location**

Demolition Supplies Used:

Electric blasting caps		Detonation cord (feet)		Explosive boosters		Perforators	

V. Personnel/Equipment Utilization:

a. Personnel On-site	Position	Location/ Work	Hours
1.	**SUXOS**		
2.	**UXOSO**		
3.	**UXOQCS**		
4.	**Team Leader**		
5.	**Asst Team Leader**		
6.	**Tech II**		
7.	**Tech II**		
8.	**Tech I**		
9.	**Tech I**		
10.	**Team Leader**		
11.	**Asst Team Leader**		
12.	**Tech II**		
13.	**Tech II**		
14.	**Tech I**		
15.	**Tech I**		
16.	**Geo**		
17.	**Escort**		
18.	**Escort**		
19.	**Escort**		

b. Equipment	On hand	Used	hours used this week
WESTON PICKUP TRUCKS			
F3 UXO METAL DETECTORS			
ML3 MAGETIC LOCATORS			
HAND HELD RADIOS			
GPS (TRIMBLE)			
PDA's			
BACKHOE			
KUBOTA ATV			
EM-61 (hand held)			
EM-61 Sled			
EM-61 Cart			

VI. Comments/Concerns:	
VII. Signature(s)/ Date	
Senior UXO Supervisor	Task Manager

UXO QUALITY CONTROL REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

Contract:	**LOCATION** Former Camp Bonneville Military Reservation	**DATE** **Report #** 15048-0000
CONTRACTOR Weston Solutions, Inc.	**UXOQCS**	

EQUIPMENT USED	**WEATHER**	**MAX TEMP (F)**	**MIN TEMP (F)**	**PRECIP (IN)**
EM-61 HH, F3 UXO, ML3	**SUNNY/CLOUDY**			0.00

WORK PERFORMED TODAY

UXOQCS -	**DATE**	Task Manager	DATE

QUALITY CONTROL SURVEILLANCE REPORT	Report Number:
Project Name: Former Camp Bonneville Military Reservation-Vancouver, WA	Contract No:
Client: Clark County	Project Manager: Dwight Gemar

1 - Activity

☐ Project Management ☐ Geophysical Data Collection ☐ Data Management ☐ Brush Cutting/Clearing

☐ Intrusive Investigation ☐ Geophysical Data Processing ☐ Demolition ☐ UXO Avoidance

☐ Surface Sweep ☐ Anomaly Reacquisition ☐ Transect Activity ☐ Scrap Processing

☐ Survey ☐ Donovan Blast Chamber ☐ Water Jet Cutting ☐ Other:

2 - Phase

☐ Preparatory ☐ Initial ☐ Follow up

3 - References

4 - Observed Condition/Activities:

5 - Results of Surveillance

☐ Acceptable	☐ Unacceptable	Deficiency #: NCR #:

Conducted By: Michael Everman	Signature:	Date:

6 – Task Manager Review

☐ Concur ☐ Non-Concur	Signature:	Date:

7 - Distribution

☐ PM ☐ Site Superintendent ☐ SUXOSS ☐ QC Manager ☐ Safety ☐ Other: Clark County

Safety Inspection Log

Date: _____ Time: _____ Contract Number: _____

Delivery Order Number: _____ Location: _____

Weather Conditions: _____

Type of Inspections: Daily _____ Weekly _____ Special _____ Reinspection _____

Location inspected: (List by grid number, coordinates, or description) _____

Activity inspected: _____

II. Inspection Requirement	Satisfactory	Unsatisfactory	N/A
Surface Sweep			
Subsurface Sweep			
Evacuation Technique			
Personal Protection Equipment			
Work Practices			
Site Control			
First Aid Equipment			
Fire Fighting Equipment			
Explosives Transportation			
Explosives Storage			
Disposal Operations			

Overall Inspection Results: Satisfactory _____ Unsatisfactory _____

III. Comments: _____

- Work stopped due to safety violation: Yes _____ No _____
- Safety violations noted: _____
- Personnel involved: _____
- Corrective Measures _____
- Re-inspection required Yes _____ No _____

IV. Signatures: I acknowledge that I have been briefed on the results of this inspection and will take corrective actions (if necessary).

_____ _____

Site Safety Officer Sr. UXO Supervisor/Project Manager

ENVIRONMENTAL HEALTH AND SAFETY INSPECTION CHECKLIST

Project Name: _____

Inspector: _____

Submit to: _____

Date: _____

THE WESTON SITE APPEARANCE

YES	NO		COMMENT
		Is the site secured to prevent inadvertent, unnecessary, or unauthorized access? Are gates closed and locked at any time that the access point is not occupied or visible to site workers?	
		Are access points posted with signs to indicate client and end-user client name, WESTON's name and logo, names of other contractors and sub-contractors, project name and location, and appropriate safety messages?	
		Are required postings in place (e.g., Labor Poster, Emergency Phone Numbers, Site Map, etc.)?	
		Are site trailers tied down per local code and provided with stairs that have a landing platform with guard and stair railings?	
		Is a Site Safety file system established in the office to maintain records required by applicable safety regulations	
		Is the Health and Safety Plan (HASP) or Accident Prevention Plan (APP) amended as scope of work changes, hazards are discovered or eliminated or if risk change?	
		Is the Site Safety Plan and the Safety Officers Field Manual on site?	
		Is new employee indoctrination provided?	
		Have site Rules been provided, discussed and signed off on by all employees	
		Incident Reporting procedure explained to all?	
		Is site management trained in the WESTON (and client as applicable) Incident Reporting system?	
		Are NOI and Supplemental Report forms and OSHA 300 Log available on site?	
		Is Site Management aware of the Case Management and Incident Investigation Procedures?	
		Is there a list of preferred provider medical facilities available?	
		Has the "Inspection By A Regulatory Agency" procedure been reviewed by all site management?	
		Will Competent Persons be required because of activities to be performed, equipment to be used or hazards to be encountered?	

POLICIES

YES	NO		COMMENT
		Each individual employee is aware that he or she responsible for complying with applicable safety requirements, wearing prescribed safety equipment and preventing avoidable accidents.	
		Do employees understand that they will wear clothing suitable for existing weather and work conditions and the minimum work uniform will include long pants, sleeved work shirts, protective footwear, hard hat, and safety glasses unless otherwise specified via the HASP.	
		Are employees provided safety and health training to enable them to perform their work safely ? Is all training documented to indicate the date of the session, topics covered, and names of participants?	
		Safety meetings are conducted daily. The purpose of the meetings are to review past activities, review pertinent tailgate safety topics and establish safe working procedures for anticipated hazards encountered during the day.	
		Training has been provided to all personnel regarding handling of emergency situations that may arise from the activity or use of equipment on the project.	
		Employees/contractors are informed and understand that they may not be under the influence of alcohol, narcotics, intoxicants or similar mind-altering substances at any time. Employees found under the influence of or consuming such substances will be immediately removed from the job site.	
		Site workers and operators of any equipment or vehicles are able to read and understand the signs, signals and operating instructions of their use.	
		Have contractors performing work provided copies of relevant documentation (such as medical fit-for-duty, training certificates, fit-tests, etc.) prior to initiation of the project?	

SANITATION
29 CFR 1926 Subparts C, D. EM 385-1-1, Section 2

YES	NO		COMMENT
		Is an adequate supply of drinking water provided. Is potable/drinking water labeled as such? Are there sufficient drinking cups provided?	
		Is there a sufficient number of toilets?	
		Are washing facilities readily available and appropriate for the cleaning needs?	
		Are washing facilities kept sanitary with adequate cleansing and drying materials?	
		Waste is secured so as not to attract rodents, insects or other vermin?	
		Is an effective housekeeping program established and implemented?	

ACCIDENT PREVENTION SIGNS, TAGS, LABELS, SIGNALS, AND PIPING SYSTEM IDENTIFICATION
29 CFR 1926 Subpart G. EM 385-1-1, Section 8

YES	NO		COMMENT
		Are signs, tags, and labels provided to give adequate warning and caution of hazards and instruction/directions to workers and the public?	
		Are all employees informed as to the meaning of the various signs, tags and labels used in the workplace and what special precautions are required?.	
		Are construction areas posted with legible traffic signs at points of hazard?	
		Are signs required to be seen at night lighted or reflectorized?	
		Tags contain a signal word (“danger” or “caution”) and a major message to indicate the specific hazardous condition or the instruction to be communicated to the employee. Tags follow requirements as outlined in 29 CFR 1926.200.	

MEDICAL SERVICES AND FIRST AID
29 CFR 1926 Subparts C, D. EM 385-1-1, Section 3

YES	NO		COMMENT
		Is a local medical emergency facility (LMEF) identified in the HASP or APP?	
		Has the LMEF been visited to verify the directions and establish contacts?	
		Has site management reviewed WESTON’s incident management procedures?	
		Have clinics and specialists that will help WESTON manage injuries and illnesses been identified?	
		Is there at least two (2) people certified in First Aid and CPR?	
		Are first aid kits available at the command post and appropriate remote locations?	
		Are first Aid Kits and Eyewash/Safety Showers inspected weekly?	
		Are 15 minute eyewash/safety showers in place if required.	

FIRE PREVENTION AND PROTECTION
29 CFR 1926 Subpart F. EM 385-1-1, Section 9

YES	NO		COMMENT
		Is an Emergency Response and Contingency Plan in place?	
		Are emergency phone numbers posted?	
		Are fire extinguishers selected and provided based on the types of materials and potential fire classes in each area.	
		Are fire extinguishers provided in each administrative and storage trailer, within 50 ft but no closer than 25 ft of any fuel or flammable liquids storage, on welding and cutting equipment, on mechanical equipment?	
		Are fire extinguishers checked daily and inspected monthly?	
		Do site personnel know the location of fire extinguishers and how to use them?	
		Are flammable and combustible liquids stored in approved containers?	
		Safety cans are used for dispensing flammable or combustible liquids in 5 gallon or less volumes.	
		Are flammable and combustible liquids stored in flammable storage cabinets or appropriate storage areas?	
		Are flammable materials separated from oxidizers by at least 20 feet (or 5 foot tall, ½ -hour rated fire wall) when in storage?	
		Are fuel storage tanks double walled or placed in a lined berm?	
		Spills are cleaned up immediately and wastes are disposed of properly.	
		Combustible scrap, debris and waste material (oily rags) are stored in closed metal containers and disposed of promptly.	
		Vehicle fueling tanks are grounded and bonding between the tank and vehicle being fueled is provided?	
		LPG is stored, handled and used according to OSHA regulations 29 CFR 1926.	
		LPG cylinders are not stored indoors.	
		Is a hot work permit program in place? See WESTON FLD-36	
		Is smoking limited to specific areas, prohibited in flammable storage areas and are signs posted to this effect?	

HAZARDOUS SUBSTANCES, AGENTS AND ENVIRONMENTS
29 CFR 1926 Subparts D, Z. EM 385-1-1, Sections 6, 28

YES	NO		COMMENT
		Are operations, materials and equipment evaluated to determine the presence of hazardous contaminants or if hazardous agents could be released in the work environment?	
		Are MSDS for substances made available at the work-site when any hazardous substance is procured, used, or stored?.	
		Are all containers and piping containing hazardous substances labeled appropriately?	
		Is there an inventory of hazardous substances?	
		Is there a site Specific Hazard Communication Program?	
		Spill kits appropriate for the hazardous materials present are on site and their location is known to spill responders.	
		Is disposal of excess hazardous chemicals performed according to WESTON's guidelines and RCRA regulations.	
		Before initiation of activities where there is an identified asbestos or lead hazard, is there a written plan detailing compliance with OSHA and EPA asbestos or lead abatement requirements? Does the plan comply with state and local authority, and USACE requirements, as applicable?	
		Are personnel trained and provided with protection against hazards from animals, poisonous plants and insects?	

PERSONAL PROTECTIVE AND SAFETY EQUIPMENT, RESPIRATORY AND FALL PROTECTION
29 CFR 1926 Subparts D, E, M. EM 385-1-1, Section 5

YES	NO		COMMENT
		Do employees understand that the minimum PPE is hard hat, safety glasses with side shields and safety shoes or boots and that long pants and a sleeved shirt are required?	
		Has the SSHC reviewed the PPE requirements in the HASP against actual site conditions and certified that the PPE is appropriate? (see Field Manual, PPE Program)	
		PPE is inspected, tested and maintained in serviceable and sanitary condition as recommended by the manufacturer. Is defective or damaged equipment taken out of service and repaired or replaced?	
		Are workers trained in the use of the PPE required?	
		Are personnel exposed to vehicular or equipment traffic, including signal persons, spotters or inspectors required to vests or apparel marked with a reflective or high visibility material?	
		Is there a noise hazard? If yes, hearing protection will be required.	
		Is there a splash or splatter hazard? Face shields or goggles will be required.	
		Will personnel be working in or over water? Personnel Floatation devices will be required.	
		Is there a welding hazard? Welding helmet and leathers will be required. Is there a cutting torch hazard? Goggles and protective clothing will be required.	
		Is each person on a walking/working surface with an unprotected side or edge which is 6 feet (1.8 m) or more above a lower level protected from falling by the use of guardrail systems, safety net systems or personal fall arrest systems? See WESTON FLD 25 (Note General Industry standard is four feet).	
		Guardrail systems are used as primary protection whenever feasible. Guardrail construction meets criteria in 29 CFR 1926.502(b).	
		Personal fall arrest systems (PFAS) are inspected and appropriate for use.	
		Ropes and straps (webbing) used in lanyards, lifelines, and strength components of body belts and body harnesses are from synthetic fibers.	
		Safety nets and safety net installations are constructed, tested and used according to 29 CFR 1926.502.c	
		Is respirator use required? See WESTON Respiratory Protection Program	
		Persons using respiratory protection have been successfully medically cleared, trained and fit tested.	
		Respirators are used according to the manufacturer's instructions, regulatory requirements, selection criteria and health and safety plan provisions.	
		For Level C operations with organic vapor contamination, is the cartridge change-out schedule documented?	
		Is breathing certified as Grade D, or better, and certification available on-site?	

MACHINERY AND MECHANIZED EQUIPMENT
29 CFR 1926 Subparts N, O. EM 385-1-1, Sections 16, 17, 18

YES	NO		COMMENT
		Are inspections of machinery by a competent person established?	
		Is equipment inspected daily before its next use?	
		Equipment inspection reports are reviewed, followed-up on negative findings and records of inspections are maintained?	
		Machinery or equipment found to be unsafe is taken out of service until the unsafe condition has been corrected.	
		Is there a preventive maintenance program established?	
		Are operators of equipment qualified and authorized to operate?	
		Is all self-propelled construction and industrial equipment equipped with a reverse signal alarm?	
		Are seats or equal protection provided for each person required to ride on equipment. Are seatbelts installed and worn on motor vehicles, as appropriate.	
		All equipment with windshields is equipped with powered wipers. If fogging or frosting is possible, operable defogging or defrosting devices are required.	
		Internal combustion engines are not operated in enclosed areas unless adequate ventilation are made. Air monitoring is conducted to assure safe working conditions.	
		Is each bulldozer, scraper, dragline, crane, motor grader, front-end loader, mechanical shovel, backhoe, or similar equipment equipped with at least one dry chemical or carbon dioxide fire extinguisher with a minimum rating of 5-B:C?	
		Will cranes or other lifting devices be used? If so, are the following documents available on site: 1) a copy of the operating manual, 2) load rating chart, 3) log book, 4) a copy of the last annual inspection and 5) the initial on-site inspection?	
		Do operators have certificates of training to operate the type of crane(s) to be used?	
		Is a signal person provided when the point of operation is not in full view of the vehicle, machine or equipment operator? When manual (hand) signals are used, is only one person designated to give signals to the operator?	
		Signal persons back one vehicle at a time. While under the control of a signal person, drivers do not back or maneuver until directed. Drivers stop if contact with the signal person is lost.	
		Is a critical lift plan prepared by a competent person whenever: a lift is not routine, or a lift exceeds 75% of a crane's capacity, a lift results in the load being out of the operator's line of sight, or a lift involves more than one crane, a man basket is used, or the operator believes there is a need for a critical lift plan.	
		Fork Lifts (Powered Industrial Trucks) - Will forklifts be used on site?	
		All fork lifts meet the requirements of design, construction, stability, inspection, testing, maintenance and operation as indicated in ANSI/ASME B56.1 Safety Standards for Low Lift and High Lift Trucks.	
		Do forklift operators have certificates of training?	
		Are pile driving operations conducted according to EM 385-1-1, Section 16.L?	
		Is drilling equipment operated, inspected, and maintained as specified in the manufacturer's operating manual? Is a copy of the manual available at the work-site? See also the Drilling Safety Guide in the Safety Officers Field Manual.	
		Are flag persons provided when operations or equipment on or near a highway expose workers to traffic hazards? Do flag persons and persons working in proximity to a road wear high visibility vests? Are persons exposed to highway vehicle traffic protected by signs in all directions warning of the presence of the flag persons and the work? Do signs and distances from the work zone conform to federal and local regulations?	

MOTOR VEHICLES
29 CFR 1926 Subpart O. EM 385-1-1, Section 18

YES	NO		COMMENT
		Motor vehicle operators have a valid permit, license, or certification of ability for the equipment being operated.	
		Inspection, maintenance and repair is according to manufacturer's requirements by qualified persons.	
		Vehicles are inspected on a scheduled maintenance program.	
		Vehicles not in safe operating condition are removed from service until defects are corrected.	
		Glass in windshields, windows, and doors is safety glass. Any cracked or broken glass is replaced.	
		Seatbelts are installed and worn.	
		The number of passengers in passenger-type vehicles does not exceed the number which can be seated.	
		Trucks used to transport personnel have securely anchored seating, a rear endgate, and a guardrail.	
		No person is permitted to ride with arms or legs outside of a vehicle body; in a standing position on the body; on running boards; seated on side fenders, cabs, cab shields, rear of the truck or on the load.	
		ATV operators possess valid state drivers license, have completed an ATV training course prior to operation of the vehicle, and wear appropriate protective equipment such as helmets, boots, and gloves.	

EXCAVATING AND TRENCHING
29 CFR 1926 Subpart P. EM 385-1-1, Section 25

YES	NO		COMMENT
		Has the known or estimated location of utility installations such as sewer, telephone, fuel, electric, water lines, or any other underground installations that may be expected to be encountered during excavation been determined before excavation? Have utility locations been verified by designated state services according to state regulations? Has the client provided clearance where state jurisdiction doesn't apply?	
		Have overhead utilities in excavation areas been identified and either de-energized, shielded or barricaded so excavating equipment will not come within 10 feet?	
		Are inspections of the excavation, the adjacent areas, and protective systems made daily and as necessary by a competent person?	
		Are Protective systems in place as prescribed by the competent person?	
		Is material removed from excavations managed so it will not overwhelm the protective systems?	
		Are barriers provided between excavations and walkways?	
		Are excavations by roadways barricaded to warn vehicles of presence or to prevent them from falling in?	
		Is there a means of exit from the excavation every 25 feet?	
		Is air monitoring required? If yes, Is it performed?	

CONFINED SPACES
29 CFR 1910 Subpart J. EM 385-1-1, Section 6

YES	NO		COMMENT
		Is there a Confined Space Entry Program in place?	
		Are the confined Spaces identified and labeled?	
		Will the Confined Spaces be entered?	
		Is appropriate entry documentation used and on-file?	

ELECTRICAL
29 CFR 1926 Subpart K. EM 385-1-1, Section 11

YES	NO		COMMENT
		Are electrical installations made according to the National Electrical Code and applicable local codes?	
		Qualified electricians make all connections and perform all work within 10 feet of live electric equipment.	
		Location of underground, overhead, under floor, behind wall electrical lines is known and communicated. Lines are documented by qualified person as de-energized where necessary.	
		Workers understand they must not work near live parts of electric circuits, unless they are qualified as required by OSHA or are protected by de-energizing and grounding the parts, guarding the parts by insulation, or other effective means?	
		Employees who regularly work on or around energized electrical equipment or lines are instructed in the cardiopulmonary resuscitation (CPR) methods.	
		Workers are prohibited from working alone on energized lines or equipment over 600 volts.	
		Are Ground-fault circuit interrupters (GFCI's) or is ground fault circuit protection provided to protect employees from ground-fault hazards for all 115 – 120 Volt, 15 and 20 amp receptacle outlets which are not a part of the permanent wiring of a building or structure at construction sites?	
		Circuit breakers are labeled.	
		Circuit breaker and all cabinets with exposed electric conductors are kept tightly closed.	
		Unused openings (including conduit knockouts) in electrical enclosures and fittings are closed with appropriate covers, plugs or plates.	
		Sufficient access and working space is provided and maintained about all electrical equipment to permit ready and safe operations and maintenance.	
		Motors are located within sight of their controllers or controller disconnecting means are capable of being locked in the pen position or is a separate disconnecting means installed in the circuit within sight of the motor.	
		Are visual inspections of extension cords and cord-and plug-connected equipment conducted daily? Is equipment found damaged or defective tagged and removed from service, and not used until repaired?	
		Wet Areas - Is portable lighting used in wet or conductive locations, such as tanks or boilers operated at no more than 12 volts and protected by GFCIs.	
		Are electrical installations in hazardous areas to NEC?	
		Metal ladders and tools including tape measures or fabric with metal thread are prohibited where contact with energized electrically parts is possible.	
		All extension cords are the three-wire type, designed and rated for hard or extra hard usage?	
		Worn or frayed electrical cords or cables are taken out of service. Fastening with staples, hanging from nails or suspending extension cords by wire is prohibited.	
		Electric wire/flexible cord passing through work areas is protected from damage such as foot traffic, vehicles, sharp corners, projections and pinching? Flexible cords and cables passing through holes are protected by bushings or fittings?	
		Before an employee or contractor performs any service or maintenance on a system where the unexpected energizing, start up, or release of kinetic or stored energy could occur and cause injury or damage, the system is to be isolated. Only authorized persons may apply and remove lockouts and tags.	
		Contractors planning to use hazardous energy control procedures submit their hazardous energy control plan to the WESTON site safety officer or designee before implementing lockout/tagout procedures.	
		There is a site specific hazardous energy control plan that clearly and specifically outlines the scope, purpose, authorization, rules and techniques to be used for the control of hazardous energy.	
		Workers possess the knowledge and skills required for the safe application, usage and removal of energy controls.	

WELDING AND CUTTING
29 CFR 1926 Subpart J. EM 385-1-1, Section 10

YES	NO		COMMENT
		Prior to performing welding, cutting or any other heat or spark producing activity, an assessment of the area is made by a competent person to identify combustible materials and potential sources of flammable atmospheres.	
		Welders, cutters and their supervisors are trained in the safe operation of their equipment, safe welding and cutting practices, hot work permit requirements, and fire protection.	
		Welding and cutting equipment is inspected daily before use. Unsafe equipment is taken out of use, replaced or repaired.	
		Workers and the public is shielded from welding rays, flashes, sparks, molten metal and slag.	
		Employees performing welding, cutting or heating are protected by PPE appropriate for the hazards (e.g., respiratory, vision and skin protection).	
		Compatible fire extinguishing equipment is provided in the immediate vicinity of welding or cutting operations.	
		Drums, tanks, or other containers and equipment which have contained hazardous materials shall be thoroughly cleaned before welding or cutting. Cleaning shall be performed in accordance with NFPA 327, Cleaning or Safeguarding Small Tanks and Containers, ANSI/AWS F4.1, Recommended Safe Practices for the Preparation for Welding and Cutting of Containers That Have Held Hazardous Substances, and applicable health and safety plan requirements.	

HAND AND POWER TOOL SAFETY
29 CFR 1926 Subpart I. EM 385-1-1, Section 13

YES	NO		COMMENT
		Power tools are from a manufacturer listed by a nationally recognized testing laboratory for the specific application for which they are to be used.	
		Hand & power tools are inspected, maintained, tested and determined to be in safe operating condition before use.	
		Tools found to be unsafe are not used, tagged and repaired or destroyed.	
		Users of tools are trained in safe use.	
		Electrical tools have cords and plug connections in good repair.	
		Electrical tools are effectively grounded or approved double insulated.	
		Reciprocating, rotating, and moving parts of equipment are guarded if they may be accessed by employees or they otherwise create a hazard.	
		Safety clips/retainers are installed and maintained on pneumatic impact tool connections.	
		Chain saws have an automatic chain brake or anti-kickback device.	
		Pneumatic and hydraulic hoses and fittings are inspected regularly.	
		Employees who operate powder actuated tools are trained and carry valid operators cards.	
		Powder activated tools are stored in individual locked containers, when not in use and are not loaded until ready to use.	
		Powder actuated tools are inspected for obstructions or defects daily before use.	
		Powder actuated tool operators have appropriate PPE.	

RIGGING
29 CFR 1926 Subpart H. EM 385-1-1, Section 15

YES	NO		COMMENT
		Rigging equipment is inspected as specified by the manufacturer, by a qualified person, before use on each shift and as necessary to assure that it is safe.	
		Defective equipment is removed from service.	
		Rigging not in use is removed from the work area, properly stored, and maintained in good condition.	
		Wire rope removed from service for defects is cut up or plainly marked as unfit for use as rigging.	
		The number of saddle clips used to form eyes in wire rope conforms with Table H-20, are spaced evenly and the saddles are on the live side.	
		Chain rigging has a tag clearly indicating load limits, is inspected before initial use, then weekly, and is of alloyed metal.	
		Fiber rope rigging is not used if it is frozen or has been subject to acids or excessive heat.	
		Slings and their fittings and fastenings are inspected before use on each shift and as needed during use.	
		Drums, sheaves, and pulleys on rigging hardware are smooth and free of surface defects that can damage rigging.	

MATERIAL HANDLING, STORAGE, AND DISPOSAL
29 CFR 1926 Subpart H. EM 385-1-1, Section 14

YES	NO		COMMENT
		Employees are trained in and use safe lifting techniques.	
		Materials are not moved or suspended over workers unless positive precautions have been taken to protect workers.	
		Conveyors are constructed, inspected, & maintained by qualified persons according to manufacturer's recommendations.	
		All conveyors are to be equipped with emergency stopping devices.	
		Hazardous exposed moving machine parts are guarded mechanically, electrically or by location.	
		Controls are clearly marked and/or labeled to indicate the function controlled.	
		Taglines are used for suspended loads where the movement may be hazardous to persons.	
		Material in storage is protected from falling or collapse by effective stacking, blocking, cribbing, etc.	
		Walkways and aisles are to be kept clear.	
		Materials are not stored on scaffolds or runways in excess of normal placement or in excess of safe load limits.	
		Work areas and means of access are maintained safe and orderly.	
		Tools, materials, extension cords, hoses or debris do not cause tripping or other hazards.	
		Storage and construction sites are kept free from the accumulation of combustible materials.	
		Waste materials and rubbish are placed in containers or, if appropriate, in piles. Waste materials are disposed of in accord with applicable local, state, or federal requirements.	

FLOATING PLANT AND MARINE ACTIVITIES
29 CFR 1926 Subpart O. EM 385-1-1 Section 19

YES	NO		COMMENT
		Floating plants that are regulated by the USCG have current inspections and certificates.	
		Before any floating plant is brought to the job site and placed in service it is inspected and determined to be in safe operating condition	
		Periodic inspections are made such that safe operating conditions are maintained. Strict compliance with EM 385-1-1, Section 19 is expected.	
		Plans are in place for removing or securing the plant and evacuation of personnel endangered by severe weather and other marine emergencies such as; fire, flooding, man overboard, hazardous materials incidents, etc..	
		Means of access are properly secured, guarded, and maintained free of slipping and tripping hazards.	
		Dredging operations follow guidelines as established in EM 385-1-1, Section 19.D.	

PRESSURIZED EQUIPMENT AND SYSTEMS
29 CFR 1926 Subparts I, F. EM 385-1-1, Section 20

YES	NO		COMMENT
		Pressurized equipment and systems are inspected before being placed into service.	
		Pressurized equipment or systems found to be unsafe are tagged “Out of Service-Do Not Use”.	
		Systems and equipment are operated, inspected and maintained by qualified, designated personnel.	
		Safe clearance, lockout/tagout procedures are followed as appropriate during maintenance or repair.	
		Air hose, pipes, fittings are pressure-rated for the activity. Defective hoses are removed from service.	
		Hoses aren’t laid over ladders, steps, scaffolds, or walkways in a manner that creates a tripping hazard.	
		The use of compressed air for personal cleaning is prohibited. The use of compressed air for other cleaning is restricted to less than 30 psig.	
		Compressed gas cylinders are stored in well-ventilated locations.	
		Cylinders in storage are separated from flammable or combustible liquids and from easily ignitable materials by at least 40 feet or by a minimum five feet tall, ½ -hour fire resistive partition.	
		Stored cylinders containing oxidizing gases are separated from fuel gas cylinders by at least 20 feet or by a minimum five feet tall, ½ -hour fire resistive partition.	
		Cylinder valve caps are in place when cylinders are in storage, in transit, or a regulator is not in place.	
		Compressed gas cylinders in service are secured in substantial fixed or portable racks or hand trucks.	
		Oxygen cylinders and fittings are kept away from, and free from oil and grease.	
		Cylinder Storage areas are posted with the names of the gases in storage and with signs indicating "No Smoking or Open Flame".	
		Cylinders are to be stored such that mechanical and corriosion damage is avoided. Cylinders are not to be stored in areas required as an egress path.	
		Cylinders may be stored in the open outdoors, however, they must be protected from the ground to prevent corrosion and must be protected from temperatures that may exceed 125 degrees F.	

WORK PLATFORMS/SCAFFOLDS
29 CFR 1926 Subparts L, M, N. EM 385-1-1 Sections 21, 22

YES	NO		COMMENT
		Work platforms are erected, used, inspected, tested, maintained and repaired according to manufacturer's requirements.	
		Construction, inspection, and disassembly of scaffolds is under the direction of a competent person.	
		Workers on scaffolding have been trained by a qualified person.	
		Scaffolds are erected on a firm and level surface and are square and plumb.	
		Scaffolds are not loaded in excess of rated capacity.	
		Working levels of work platforms are fully planked or decked.	
		Planks are in good condition and free from obvious defects.	
		Fabricated frame scaffolding four times higher than the base width is secured to building/structure according to manufacturer's instruction and/or OSHA requirements.	
		Working platforms of scaffolding over ten feet in height have guard rails meeting OSHA specifications. Fall protection is suggested at four feet or greater.	
		Scaffolding/work platforms are accessed by means of a properly secured ladder or equivalent. Built on ladders conform to scaffold ladder requirements. Climbing of braces is not allowed.	
		Crane supported work platforms are designed and used in accordance with OSHA standards.	
		Elevating work platforms are operated, inspected and maintained according to the equipment operations manual.	
		Employees working in aerial lifts remain firmly on the floor of the basket. Employees use fall protection while in an aerial lift basket.	

WALKING AND WORKING SURFACES AND STAIRS
29 CFR 1926 Subparts L, M, X. EM 385-1-1, Sections 21, 22, 24

YES	NO		COMMENT
		Work areas are clean, sanitary, and orderly	
		Work surfaces are kept dry or appropriate means are taken to assure the surfaces are slip-resistant	
		Accumulations of combustible dust are routinely removed.	
		Aisles and passageways are kept clear and marked as appropriate.	
		There is safe clearance for walking in aisles where motorized or mechanical handling equipment is operating.	
		Materials or equipment is stored in such a way that sharp projections will not interfere with the walkway.	
		Changes of direction or elevation are readily identifiable.	
		Aisles or walkways that pass near moving or operating machinery, welding operations or similar operations are arranged so employees will not be subjected to potential hazards.	
		Standard guardrails are provided wherever aisle or walkway surfaces are elevated more than 30 inches above any adjacent floor or the ground and bridges provided where workers must cross over conveyors and similar hazards.	
		There are standard stair rails or handrails on all stairways having four or more risers or with an elevation of 30 or more inches.	
		Stairways are at least 22 inches wide. (General Industry Standard)	
		Stairs angle no more than 50 and no less than 30 degrees, risers are uniform from top to bottom (plus or minus 1/4 inch) and are provided with a surface that renders them slip resistant.	
		Stairway handrails are not less than 36 inches above the leading edge of stair treads and have at least 3 inches of clearance between the handrails and the wall or surface they are mounted on.	
		Where doors or gates open directly on a stairway, there is a platform provided so the swing of the door does not reduce the width of the platform to less than 20 inches.	
		Where stairs or stairways exit directly into any area where vehicles may be operated, there are adequate barriers and warnings provided to prevent employees stepping into the path of traffic.	
		Signs are posted showing the load capacity of elevated storage areas.	
		An appropriate means of access and egress is provided for surfaces with 19 or more inches of elevation change.	
		Material on elevated surfaces is minimized, with that necessary for immediate work requriements piled, stacked or racked in a manner to prevent it from tipping, falling, collapsing, rolling or spreading.	

FLOOR AND WALL HOLES AND OPENINGS
29 CFR 1926 Subpart M. EM 385-1-1, Section 24

YES	NO		COMMENT
		Floor and roof openings that persons can walk into or fall through are guarded by a physical barrier or covered.	
		Holes (defined as equal to or greater than 2 inches in least dimension) where person could trip must be covered/protected.	
		Unprotected sides and edges on a walking/working surface six feet or more (note four feet in General Industry) are protected by guardrail system, safety net or Personal Fall Arrest System (PFAS).	
		Unused portions of service pits and pits not actually in use are either covered or protected by guardrails or equivalent.	
		Coverings for holes or other openings must be constructed of sufficient strength to support any anticipated load, must be secured in place to prevent accidental removal or displacement and must be marked indicating purpose (e.g., stenciled "Hole" or painted contrasting color to surroundings).	

LADDERS
29 CFR 1926 Subpart X. EM 385-1-1, Section 21

YES	NO		COMMENT
		Portable ladders are used for their designed purpose only.	
		Portable ladders are examined for defects prior to, and after use.	
		Ladders found to be defective are clearly tagged to indicate "DO NOT USE" if repairable, or destroyed immediately if no repair is possible.	
		Workers are trained in hazards associated with ladder use and how to inspect ladders.	
		Ladders have secure footing provided by a combination of safety feet, top of ladder tie-offs and mud cills or a person holding the ladder to prevent slipping.	
		The handrails of a straight ladder used to get from one level to another extend at least 36 inches above the landing.	
		Ladders conform to construction criteria of ANSI Standards A-14.1 and A-14.2.	
		Wooden ladders are not painted with an opaque covering such that signs of flaws, cracks or drying are obscured.	
		Fixed ladders are constructed and used according to OSHA Standards, 29 CFR 1910.27 and ANSI A-14.3.	
		Rungs, cleats or steps, and side rails that may be used for handholds when climbing, offer adequate gripping surface and are free of splinters, slivers or burrs, and substances that could cause slipping.	
		Fixed ladders of greater than 24 feet have cages or other approved fall protection devices. (note General Industry is 20 feet).	
		Where fall protection is provided by ladder safety systems (body belts or harnesses, lanyards and braking devices with safety lines or rails), systems meet the requirements of and are used in accordance with WESTON Fall Protection Standard Practices and are compatible with construction of the ladder system.	

DEMOLITION
29 CFR 1926 Subpart T. EM 385-1-1, Section 23

YES	NO		COMMENT
		Prior to initiating demolition activities an engineering survey (by a competent person) and a demolition plan (by a competent person) is completed.	
		All employees engaged in demolition activities are instructed in the demolition plan.	
		It has been determined through the engineering survey and outlined in the plan, if any hazardous materials, or conditions (e.g., asbestos, lead, utility connections, etc.) exist. Such hazards are controlled or eliminated before demolition is started.	
		Continued inspections, by a competent person, are conducted to ensure safe employee working conditions.	

TREE MAINTENANCE AND REMOVAL
29 CFR 1910 Subpart R. EM 385-1-1, Section 31

YES	NO		COMMENT
		Tree maintenance or removal is done is under the direction of a qualified person.	
		Tree work, in the vicinity of charged electric lines, is by trained persons qualified to work with electricity and tree work. Appropriate distances are maintained for all workers who are not qualified.	
		Equipment is inspected, maintained, repaired and used in accordance with the manufacture's directions.	
		Prior to felling actions are planned to include clearing of the area to permit safe working conditions and escape.	
		Employees must be trained in the safe operation of all equipment.	
		All equipment and machinery is inspected and determined safe prior to use.	
		Work is performed under requirements of FLD 43.	

BLASTING
29 CFR 1926 Subpart U. EM 385-1-1, Section 29

YES	NO		COMMENT
		A blasting safety plan is developed prior to bringing explosives on-site.	
		The transportation, handling, storage, and use of explosives, blasting agents, and blasting equipment must be directed and supervised by a person with proven experience and ability in blasting operations. Licensing of person is verified.	
		Blasting operations in or adjacent to cofferdams, piers, underwater structures, buildings, structures, or other facilities must be carefully planned with full consideration to potential vibration and damage.	

HAZARDOUS, TOXIC, AND RADIOACTIVE WASTE AND UNDERGROUND STORAGE TANK (UST) ACTIVITIES
29 CFR 1926 Subpart D. EM 385-1-1, Section 28

YES	NO		COMMENT
		All construction activities performed with known or potential exposure to hazardous waste are conducted in accordance with Hazardous Waste Operations and Emergency Response requirements.	

CONCRETE and MASONRY CONSTRUCTION
29 CFR 1926 Subpart Q. EM 385-1-1, Section 27

YES	NO		COMMENT
		Construction loads are not placed on a concrete or masonry structure or portion of a concrete or masonry structure unless the employer determines, based on information from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.	
		Employees are not permitted to work above or in positions exposed to protruding reinforcing steel or other impalement hazards unless provisions have been made to control the hazard.	
		Sections of concrete conveyances and airlines under pressure are secured with wire rope (or equivalent material) in addition to the regular couplings or connections.	
		Structural and reinforcing steel for walls, piers, columns, and similar vertical structures is supported and/or guyed to prevent overturning or collapse	
		All form-work, shoring, and bracing is designed, fabricated, erected, supported, braced, and maintained so it will safely support all vertical and lateral loads that may be applied until the loads can be supported by the structure.	
		Shoring equipment is inspected prior to erection to determine that it is specified in the shoring design. Any equipment found to be damaged is not used.	
		Erected shoring equipment is inspected immediately prior to, during, and immediately after the placement of concrete. Any shoring equipment that is found to be damaged, displaced, or weakened is immediately reinforced or re-shored.	
		Shoring, vertical slip forms and jacks conform with requirements of Section 27.B.08-13 of USACE EM 385-1-1.	
		Forms and shores (except those on slab or grade and slip forms) are not removed until the individual responsible for forming and/or shoring determines that the concrete has gained sufficient strength to support its weight and all superimposed loads.	
		Precast concrete members are adequately supported to prevent overturning or collapse until permanent connections are complete	
		No one is permitted under pre-cast concrete members being lifted or tilted into position except employees required for the erection of those members.	
		Lift slab operations are planned and designed by a registered engineer or architect.	
		Hydraulic jacks used in lift slab construction have a safety device that causes the jacks to support the load in any position if the jack malfunctions	
		No one is permitted under the slab during jacking operations.	
		A limited access zone is established whenever a masonry wall is being constructed.	
		Fall protection is provided to masonry workers exposed to falls of 6 feet or more.	

STEEL ERECTION
29 CFR 1926 Subpart R. EM 385-1-1, Section 27

YES	NO		COMMENT
		Impact wrenches have a locking device for retaining the socket. Containers shall be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.	
		Structural and reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent collapse	
		No loading is placed upon steel joists until all bridging is completely and permanently installed.	
		Workers are provided fall protection whenever they are exposed to falls of 1.8 m (6 ft) or more (EM 385-1-1).	
		Temporary flooring in skeleton steel erection conforms with Section 27.F of USACE 385-1-1	

ROOFING
29 CFR 1926 Subpart M. EM 385-1-1, Sections 21, 22, 24, 27

Yes	No		Comments
		In the construction, maintenance, repair, and demolition, of roofs, fall protection systems is provided that will prevent personnel from slipping and failing from the roof and prevent personnel on lower levels from being struck by falling objects	
		On all roofs greater than 4.8 m (16 ft) in height, a hoisting device, stairways, or progressive platforms are furnished for supplying materials and equipment.	
		Roofing materials and accessories that could be moved by the wind, including metal roofing panels, that are on the roof and unattached are secured when wind speeds are greater than, or are anticipated to exceed, 10 mph.	
		Level, guarded platforms are provided at the landing area on the roof.	
		When their use is permitted, warning line systems comply with USACE Section 27.07 of EM 385-1-1.	
		Workers involved in roof-edge materials handling or working in a storage area located on a roof with a slope -/= to four vertical to twelve horizontal and with edges 6 ft or more above lower levels are protected by the use of a guardrail, safety net, or personal fall arrest system along all unprotected roof sides and edges of the area.	

ENVIRONMENTAL COMPLIANCE

Yes	No		Comments
		Environmental Compliance and Waste Management Plan on file.	
		Waste Determination Made.	
		Manifest and/or Shipping Papers prepared and filed.	
		Manifest Exception Reports Prepared, as necessary. Procedures to track manifests in place.	
		State Annual and EPA Biennial Reporting Information Available.	
		RCRA Personnel Training Records on file.	
		CAA Permits on file.	
		CWA Permits on file.	
		RCRA Permits on file.	
		State and/or Local Permits on file.	
		RCRA Inspections conducted and Documentation on file.	
		Transporter and TSD compliance information on file.	
		Waste Accumulation Areas Managed Properly.	
		Wetlands Areas Identified and Protected.	
		Endangered, Threatened or Special Concern Species or Areas Identified and Protective Methods Determined.	
		Runon and Runoff Concerns Identified and Managed.	
		Adjacent Land Areas Protected as Necessary.	
		Non-Hazardous Solid Wastes Managed Properly.	

MISCELLANEOUS REGULATORY and POLICY COMPLIANCE

Yes	No		Comments
		Personnel Training Records for DOT Materials Handling on file.	
		Noise Control Issues Addressed and Managed.	
		Site Security Issues Identified and Managed.	
		Known Historical, Archeological and Cultural Resources Identified and Managed.	
		WESTON EHS Analysis Checklist In Use.	
		Safety Observation and Recognition Program in place.	
		Weekly EHS Report Card System in place.	
		Federal, State and Local Required Postings in place.	
		Site specific Lockout/Tagout Program is in place.	
		Site-specific Confined Space Program is in place.	
		Site Safety Officer filing system is in place and up to date.	

SAFETY MEETING ATTENDANCE

Date:	Time:	**Contract**:
Location: Former Camp Bonneville Military Reservation – Vancouver, Washington		
Weather Conditions:		
Safety Meeting Topics: UXO SAFETY, SLIPS TRIPS AND FALLS,		

NAME	SIGNATURE	COMPANY

I certify that the personnel listed on this roster received the briefing described above. Site personnel not attending this meeting will be briefed before beginning their assigned duties.

_____ _____

UXO Safety Officer Date

Site Visitors Log

Contract No. _____ Delivery Order No. _____ Location: _____

Date	Name	Company	Telephone Number	Safety Briefing Received	Time		Escort Required
					In	Out	

Sub-CONTRACTOR DAILY PRODUCTION REPORT

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

CONTRACT NO	**LOCATION** Former Camp Bonneville Military Reservation	**DATE** / **REPORT NO**
Sub-CONTRACTOR:	**FORMAN:**	

AM Weather (data listed Monday through Friday)	PM Weather	MIN TEMP (F)	MAX TEMP (F)	PRECIP (IN)

WORK PERFORMED TODAY

WORK LOCATION AND DESCRIPTION	EMPLOYEE NAME	NUMBER	Title/Position	HRS

JOB SAFETY

WAS A JOB SAFETY MEETING HELD THIS DATE?	☐ YES	☐ NO	TOTAL WORK HOURS ON JOB SITE, THIS DATE, INCL CON'T SHEETS	
WERE THERE ANY LOST TIME ACCIDENTS THIS DATE? (If YES attach copy of completed OSHA report)	☐ YES	☐ NO	CUMULATIVE TOTAL OF WORK HOURS FROM START OF CONTRACT	
WAS CRANE/MANLIFT/TRENCHING/SCAFFOLD/HV ELEC/HIGH WORK/ HAZMAT WORK DONE? (If YES attach statement or checklist showing inspection performed.)	☐ YES	☐ NO		
WAS HAZARDOUS MATERIAL/WASTE RELEASED INTO THE ENVIRONMENT? (If YES attach description of incident and proposed action.)	☐ YES	☐ NO		

LIST SAFETY ACTIONS TAKEN TODAY/SAFETY INSPECTIONS CONDUCTED ☐ SAFETY REQUIREMENTS HAVE BEEN MET.

Description of Equipment/Material Received

Owner	Description of Equipment Used Today	Model and Make	Hours Idle	Hours Used	Comments

VISITORS

NAME	TITLE	COMPANY/AGENCY	PURPOSE OF VISIT

Tasks Performed Today

AM TASKS

PM TASKS

Problems encounter and solutions employed:

Sub-Contractor:	Foreman/Supervisor:	Date:

Form M-1
Munitions and Explosives of Concern Information Form

Date/Time:

Tracking Number:

1. Were item(s) recovered from grid: ☐ Yes ☐ No

2. Items removed by:

3. Items moved to Magazine ☐ Yes ☐ No

4. Were item(s) destroyed on Site? ☐ Yes ☐ No

5. If yes, who destroyed the item(s)? Name:

6. MEC ITEM(S) ENCOUNTERED:

MEC Nomenclature	Qty			Disposition

7. WESTON PERSONNEL NOTIFIED AT (TIME):

8. CLARK COUNTY PERSONNEL NOTIFIED AT (TIME):

_____

WESTON UXO Representative: Name and Signature

Grid Sweep Log

Project: Former Camp Bonneville Military Reservation

Area/ Grid # _____ PDA # _____ UXO Supervisor: _____
Date Started: _____ Cam # _____ UXO Technicians: _____
Date Completed: _____ Pic #s _____ _____

Total Anomalies	Total MD	Total MEC	Pounds Non-MEC Scrap

# MEC	#MD	NOMENCLATURE	DEPTH

ACTION:	DATE	SIGNATURE	REMARKS:
Analog Sweep Complete			
Excavation Complete			
Quality Control Complete			
Client Quality Assurance Complete			

Weston Solutions, Inc

Demolition Material Accountaility Form

1. Project Name: _____ 2. Project Location: _____ 3. Project No. _____

4. Explosive Description: _____ 5. Marks and Identification: _____

6. Manufacturer _____ 7. Storage Location: _____

8. Date Received	9. Quantity In	10. Unit of Issue	11. Quantity Out	12. Balance	13. Date Expended	14. Printed Name and Initials

Demolition Material Accountability Form -- Instructions

1. Project Name - Name assigned project. (For example: Tobyhanna Artillery Ranges)
2. Geographical location. (For example: Tobyhanna, PA)
3. Project Number - Assigned by Weston Corporate office
4. Explosives Description - Item name (For example: blasting caps, boosters, and detonating cord)
5. Marks and Identification - Identification as specified by the Manufacturer; Lot number for US military explosives
6. Manufacturer - manufacturer of item and country of origin (For example: Atlas Powder, USA; Govt
7. Storage Location - Proper name of storage magazine (For example: Igloo J180; Bldg. #18; COE Bunker #1; Mag 2)
8. Date Received - Date that the transaction occurs.
9. Quantity In - Quantity gained by the transaction; if no quantity is lost, mark column with -0-.
10. Unit of Issue - Unit of measure (For example: each, case, foot)
11. Quantity Out - Quantity lost by the transaction; if no quantity is gained, mark column with -0-.
12. Balance - Running balance of quantity on hand after the transaction.
13. Printed Name and Initials - Name and initials of individual performing the transaction (Print clearly).

Additional Instruction:

1. All data entered on Demolition Material Accountability Form should be entered in ink.
2. Lines not used on Demolition Material Accountability Form should be marked through with a line and marked “not used”.
3. When a mistake is written on Demolition Material Accountability Form, DO NOT ERASE OR WHITE OUT--- mark through data with single line, initial change, and make correct entry on new line.

Weston Solutions, Inc.

Magazine Data Card

1. Project Name, Location:	Project Number:	3. Explosive Manufacturer	4. Marks of Identification:
5. Storage Location:	6. Explosive Description:		

7. Date	8. Action/Purpose	9. Qty In	10. Qty Out	11. Balance	12. Printed Name	13. Signature

Magazine Data Card Instructions

1. Project Name, Location - Name assigned project and geographical location. (For example: TOAR Artillery Ranges,Pennslyvania)
2. Project Number - Assigned by Weston Corporate office
3. Explosive Manufacturer - Manufacturer of item and country of origin (For example: Atlas Powder, USA; Govt
4. Marks and Identification - Identification as specified by the Manufacturer; Lot number for US military explosives
5. Storage Location - Proper name of storage magazine (For example: Igloo J180; Bldg. #18; COE Bunker #1; Mag 2)
6. Explosives Description - Item name (For example: blasting caps, boosters, and detonating cord)
7. Date - Date the transaction occurs.
8. Action/Purpose - Purpose for transaction. (For example: intial receipt, inventory, demolition use, return to inventory, transfer, and previous balance.)
9. Quantity In - Quantity gained by the transaction; if no quantity is lost, mark column with -0-.
10. Quantity Out - Quantity lost by the transaction; if no quantity is gained, mark column with -0-.
11. Balance - Running balance of quantity on hand after the transaction.
12. Printed Name and Initials - Name of the individual performing the transaction (Print clearly).
13. Signature - Signature of the individual performing the transaction.

Additional Instruction:

1. All data entered on Magazine Data Card Form should be entered in ink.
2. Lines not used on Magazine Data Card Form should be marked through with a line and marked “not used”.
3. When a mistake is written on Magazine Data Card Form, DO NOT ERASE OR WHITE OUT--- mark through data with single line, initial change, and make correct entry on new line.

WEEKLY ANALOG LOCATOR CHECKLIST AND RETURN PROCEDURE

FORMER CAMP BONNEVILLE MILITARY RESERVATION

MONTH/ YEAR: _____

INSTRUMENT: _____

SERIAL #:_____

ASSIGNED TO: _____

Day	Check for Damage	Check Battery Level	IVS Check	Clean Instrument	Comments
Monday					
Tuesday					
Wednesday					
Thursday					
Friday					

DD FORM 1348-1A, JUL 91 (EG) ISSUE RELEASE/RECEIPT DOCUMENT

PREVIOUS EDITION MAY BE USED

1 2 3	4 5 6	7	23 24	25 26 27 28 29	45 46 47 48 49 50	51	52 53	54 55 56	57 58 59	60 61	62 63 64	65 66	67 68 69	70	71	72 73	74 75 76 77 78 79 80
DOC IDENT	RI FROM	M&S	UNIT ISS	QUANTITY	SER SUPPLEMENTARY ADDRESS	SIG	FUND	DISTRIBUTION	PROJECT	PRI	REQD DEL DATE	ADV	RI	O/P	COND	MGT	UNIT PRICE (DOLLARS, CTS)

1. TOTAL PRICE (DOLLARS, CTS)	2. SHIP FROM	3. SHIP TO		
4. MARK FOR				
5. DOC DATE	6. NMFC	7. FRT RATE	8. TYPE CARGO	9. PS
10. QTY. REC'D	11 UP	12. UNIT WEIGHT	13. UNIT CUBE	14. UFC / 15. SL
16. FREIGHT CLASSIFICATION NOMENCLATURE				
17. ITEM NOMENCLATURE				
18. TY CONT	19. NO CONT	20. TOTAL WEIGHT	21. TOTAL CUBE	
22. RECEIVED BY			23. DATE RECEIVED	

24. DOCUMENT NUMBER & SUFFIX (30-44)

25. NATIONAL STOCK NO. & ADD (8-22)

26. RIC (4-6)
UI (23-24)
QTY (25-29)
CON CODE (71)
DIST (55-56)
UP (74-80)

27. ADDITIONAL DATA

Adobe Designer 7.0

Heavy Equipment Inspection Report

Date:	Vehicle Make:	Model:
Lic Plate #:	Veh VIN#:	
Starting Mileage/Hours for Week:	Ending Mileage/Hours for Week:	

General Vehicle Inspection

Check { } with R for repair needed; X for OK; / for adjustment made or N/A as applicable

1. Windshield	{ }	**3. Vehicle Interior**	{ }
2. Vehicle Exterior	{ }	**4. Leaks**	{ }

5. Fitted Equipment:

a. Cutting head	{ }	d. Mirrors	{ }
b. Hydraulic lines/hoses	{ }	e. Seat/belt	{ }
c. Fire Extinguisher	{ }		

6. Brakes	{ }	**10. Belts**	{ }
7. Horn	{ }	**11. Guards**	{ }
8. Tires/Tracks	{ }	**12.Radiator/Hoses** (DON'T check when hot)	{ }
9. Controls	{ }	**13. Battery**	{ }

14. Fluid Levels: (Circle approximate level)

a. Oil	Full		_____Added	e. Hydraulic Fluid	Full		_____Added
b. Coolant:	Full		_____Added				
c. Fuel:	Full	½	Empty				

Comments/Repairs/Service(s) Needed: **Next Service @ hrs**

Notes: Daily consists of : Clean/check the filter for the air cleaner.
Checking the oil, and checking the coolant levels. Add when needed.
Grease all grease points.
Safety and Health Requirements Manual (EM 385-1-1) will be followed.

WESTON SOLUTIONS, Inc.
VEHICLE INSPECTION CHECKLIST
Seat Belt Use Is Required

General Instructions:

The Driver is to perform the following inspection prior to vehicle operation. Comments to "Not OK" must be documented, corrective actions for critical items are required prior to use of vehicle. If the item is not applicable, indicate "N/A" in the comments section. Remember that your "Before Starting" items must include a visual of the area and the things near your vehicle that could cause problems upon vehicle movement. Cell phone use or use of other items that contribute to driver distraction are strictly prohibited. A copy of the completed form must be forwarded to the project manager or project FSO daily.

Vehicle Make/Model:

License Number:

Name of Operator:

CHECKLIST

ITEM	OK	**NOT** OK	COMMENTS
Before Starting			
Overall body condition (check for dents, scrapes, etc.)			
Tires and Wheels (check for missing lug nuts, loose bolts, cracks/dents in rims, air pressure, etc.)			
Fluids Levels (oil, radiator, washer fluid, etc.)			
Fuel Cap in place			
Check for obvious fluid leaks			
Check windshield (cracked or broken)			
Check windshield wipers			
Check towing/coupling devices (as applicable)			
Check safety devices (if any)			
Check mirrors and adjust as necessary.			
Verify Blind Spots for vehicle type.			
Check seat belts			
Check GVWR to determine if CMV (10,001 pounds or greater is Commercial Vehicle. See OP 11-01-017)			
If Transporting a Load/Cargo			
Verify load secure			
Verify proper documentation if hazmat			
Verify proper storage if hazmat			
If Towing			
Verify trailer in safe condition			
Verify trailer to vehicle connections proper			
Verify load secure			

After Starting Engine			
Engine appears to run properly			
Engine gauges or lights appear to function properly			
Horn functions properly			
Windshield wiper and washer works properly			
Heater and/or Air Conditioner works properly			
Defroster works properly			
Lights Function Properly			
- Headlights			
- Turn signals			
- Tail lights			
- Stop lights			
- Back-up lights			
- Emergency flashers			
Operation Checks			
Steering (check if loose, hard to steer, shimmy)			
Engine noise (check if knocks, misses)			
Transmission (check if slips, noisy)			
Brakes (check if noisy, pulls to side, soft, etc.)			
Parking Brake operational			
DATE:		TIME:	
FUEL LEVEL (circle): F, ¾ , ½, ¼, E		ODOMETER:	
Are Corrective Actions Required? If so, indicated date corrected in appropriate comment line above.			
Operator Name (print):			
Operator Signature:			

Motor Vehicle Inspection Checklist

This form must be filled out for any vehicle carrying explosives, prior to loading.			
This form is for use on site only.			
DRIVERS NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	SAT.	UNSAT.	COMMENT
HORN			
STEERING SYSTEM			
WIPERS			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE			
TIRES, WHEELS, RIMS			
TAILGATE			
TARPAULIN			
INSPECTION RESULTS (INSPECTOR INITIAL)			
ACCEPTED:			
REJECTED:			
REMARKS			
DRIVERS SIGNATURE/DATE			INSPECTORS SIGNATURE/DATE

FIELD VARIANCE FORM

DATE: _____ **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: _____

SUBJECT: _____

FIELD CHANGE CONDITION:

RECOMMENDED APPROACH / CHANGE:

IMPACT ON PRESENT AND COMPLETED WORK:

REQUESTED BY:

☐ **CLARIFICATION/FOR INFORMATION ONLY** ☐ **MINOR CHANGE** ☐ **MAJOR CHANGE**

WESTON TEAM APPROVALS: DREW CALDWELL, MICHAEL EVERMAN, JEREMY HANEY

COMMENTS

ACKNOWLEDGED BY:

DREW CALDWELL		
SENIOR UXO SUPERVISOR (WESTON)	**SIGNATURE**	**DATE**

ACKNOWLEDGED BY:

MICHAEL EVERMAN		
UXO SAFETY OFFICER (WESTON)	**SIGNATURE**	**DATE**

	JEREMY HANEY		
ACKNOWLEDGED BY:	**MEC RESPONSE AND REMOVAL TASK MANAGER (WESTON)**	**SIGNATURE**	**DATE**

STAKEHOLDER APPROVAL: JERRY BARNETT, BEN FORSON

COMMENTS

☐ **APPROVED** ☐ **REJECTED** **JERRY BARNETT, PE**

CLARK COUNTY PROJECT MANAGER | **SIGNATURE** | **DATE**

☐ **APPROVED** ☐ **REJECTED** **BEN FORSON, PE, PHD**

DEPARTMENT OF ECOLOGY PROJECT MANAGER | **SIGNATURE** | **DATE**

ATTACHMENTS:

APPENDIX G
STANDARD OPERATING PROCEDURES

SOP-1 MEC Anomaly Avoidance

SOP-2 Mechanical Brush Cutting

SOP-3 Analog Geological Survey and Anomaly Removal

SOP-4 Field Documentation

SOP-5 Backhoe Operations

SOP-6 Unanticipated Chemical Contamination Conditions

SOP-7 MEC with Unknown Filler

SOP-8 MEC/MDEH Detonation

SOP-9 MEC/MPPEH Characterization and MDAS/Small Arms Disposal

SOP-1
MEC ANOMALY AVOIDANCE
CAMP BONNEVILLE

TABLE OF CONTENTS

1. SCOPE AND APPLICATION

The objective of this standard operating procedure (SOP) is to provide guidance and general reference information for the avoidance of potential Munitions and Explosives of Concern (MEC) during performance of professional survey, grid stake out, and brush cutting. This SOP pertains only to anomaly avoidance activities. If an anomaly is detected, it must be avoided, including relocation of proposed activities.

WESTON shall provide all labor, materials, and equipment necessary to perform anomaly avoidance support for performance of the required site activities in accordance with EM 385-1-97 (U.S. Army corps of Engineers [USACE], 2013). WESTON shall furnish the required unexploded ordnance (UXO)-qualified personnel, equipment, instruments, and transportation, as necessary, to accomplish the required services and furnish reports and other data, together with supporting material developed while providing MEC support services.

Anomaly avoidance support will be provided by a UXO Technician to prevent accidental exposure to potential MEC while performing field work. The UXO Technician(s) will accompany all personnel while working within the boundaries of the Former Camp Bonneville Military Reservation.

No single detection system can effectively detect all types of military munitions at all locations and depths. There are many cases where UXO can penetrate deeper than geophysical instruments can currently reliably detect. On such sites, it is possible that undetected UXO remains deeper than it can be detected from the existing ground surface.

2. EQUIPMENT

- Field logbook
- Flagging
- Magnetometer (e.g., Schonstedt 52Cx detector)
- Time-domain conductivity electromagnetics (e.g., Minelabs F3 UXO All-Metals Detector)

3. PROCEDURE

3.1 GENERAL PROCEDURE

USACE has set forth personnel standards applicable to all UXO personnel. These qualifications and standards, which detail the educational, experience, and training requirements for UXO personnel, are available in EP 1110-1-18 (USACE, 2000) and ER 385-1-95 (USACE, 2014a). WESTON personnel shall be in compliance with these requirements prior to conducting MEC support and/or avoidance activities.

The UXO-qualified personnel shall precede the escorted personnel and visually search the surface of the proposed pathway for items of concern. The UXO-qualified personnel shall communicate visual observations to escorted personnel and avoid contact with any discovered MEC or MEC-related items by leading the group around them. The UXO-qualified personnel shall place flagging adjacent to any discovered MEC for subsequent visual reference.

An access survey must precede any type of investigation activity or ingress/egress within an area with known or suspected MEC. The UXO escort shall locate an access route and investigation site that is free of anomalies, using an appropriate geophysical detection instrument. The access route shall be at least twice as wide as the widest vehicle that will use the route. If anomalies or surface MEC are encountered, they shall be marked with flagging, and the access route or investigation area shall be relocated to avoid contact. The boundary of each access route and investigation site shall be marked using survey flagging and pin flags.

The UXO escort shall establish a system of flagging colors that will distinguish anomalies, surface MEC, and route boundaries from each other as well as from any utility markings at the site. No personnel shall be allowed outside of the surveyed areas.

3.1.1 Professional Survey

The UXO escort must conduct an access survey of the routes to and from the proposed survey site as well as an area around the survey site. The UXO escort must visually survey the surface of each proposed survey marker or control point for any indication of MEC. In addition, the UXO escort must conduct an analog sweep of the proposed survey stake locations using

geophysical instruments capable of detecting the smallest known or anticipated MEC to a depth of 1 foot below ground surface. If anomalies are detected at a proposed surveying location or too many anomalies are detected in a general area of interest, the UXO escort will direct the surveyors to select a different location to place the survey monument or control point.

3.1.2 Brush Cutting

The UXO escort must conduct an access survey of the routes to and from the proposed site as described above. The UXO escort must ensure the area is clear of surface MEC prior to the start of brush cutting activities. If surface MEC is detected, the UXO escort must mark the location to ensure the brush cutters stay away from that area and contact the SUXOS for further instructions.

3.2 GENERAL CONSIDERATIONS

During a comprehensive review of archival records, no evidence of the potential existence of recovered chemical warfare material (RCWM) or agent breakdown products byproducts was discovered. In the event that RCWM or munitions with unknown fillers are encountered, all work shall immediately cease, and project personnel shall be evacuated along cleared paths upwind from the discovery. A team consisting of a minimum of two personnel shall immediately secure the area to prevent unauthorized access.

Since the purpose of MEC support during escort activities is anomaly avoidance, the UXO escort is not tasked to perform MEC disposal. MEC disposal will not be covered in the planning documents for the project; therefore, the UXO escort is not capable or equipped to perform MEC disposal. In the event that MEC is encountered that cannot be avoided or, based on its fuzing or current condition, presents an imminent hazard requiring immediate attention, the UXO escort shall notify the SUXOS. The UXO escort shall not destroy any of the MEC encountered. The SUXOS will notify the appropriate UXO team of the MEC discovery, and the UXO team will respond in an appropriate manner.

All mishaps associated with execution of project activities shall be investigated and analyzed. Information reflected on the report forms provides the basis to investigate the accident, analyze the cause, and identify what corrective actions may be implemented to prevent similar

occurrences. All mishaps shall be reported in accordance with USACE Supplement 1 to AR 385-40 (USACE, 1993) and EM 385-1-1 (USACE, 2014b).

For anomaly avoidance, the senior UXO-qualified person on-site is responsible for mishap reporting. For contracts under the supervision of the district, mishaps shall be reported to the district safety office. USACE district personnel will report through Command channels to the Headquarters, USACE Safety and Occupational Health Office.

4. REFERENCES

U.S. Army Corps of Engineers (USACE). 1993. Accident Reporting and Records. Change 1, USACE Supplement 1 to AR 385-40. April 1.

USACE. 2000. Ordnance and Explosives Response. EP 1110-1-18. April 24.

USACE. 2013. Explosives Safety and Health Requirements Manual. EM 385-1-97. Change 1 dated 12 April 2013 and Errata Sheet. May 17.

USACE. 2014a. Safety and Health Requirements for Operations and Activities Involving Munitions and Explosives of Concern. EP 385-1-95. December 31.

USACE. 2014b. Safety and Health Requirements. EM 385-1-1. November 30.

SOP-2
MECHANICAL BRUSH CUTTING
CAMP BONNEVILLE

TABLE OF CONTENTS

1. PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the minimum procedures and safety and health requirements applicable to the conduct of mechanical brush cutting operations.

2. SCOPE

All personnel performing operations utilizing mechanical equipment for brush cutting will conform to this SOP. This SOP is not a stand-alone document, and all personnel will become familiar with associated documents and/or manuals related to this operation.

3. REGULATORY REFERENCES

Weston Solutions, Inc., Corporate Safety and Health Program

Washington Industrial Safety and Health Act Safety and Health Core Rules (Chapter 296-800, Washington Administrative Code)

OSHA General Industry Standards, 29 CFR 1910

OSHA Construction Standards, 29 CFR 1926

USACE EM 385-1-1, Safety and Health Requirements Manual

Operator's Manual and Manufacturer's Recommendations

4. RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The PM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training.

4.3 UXO SAFETY OFFICER (UXOSO)

The UXOSO ensures that all mechanical brush cutting operations are being conducted in a safe manner in accordance with the work plan and this SOP.

4.4 UXO ESCORT/GROUND SAFETY OBSERVER

The UXO Escort/Ground Safety Observer ensures that personnel and equipment remain within the site, and marks any munitions and explosives of concern (MEC) encountered and reports their location to the SUXOS.

5. MECHANICAL BRUSH CUTTING OPERATIONS

Brush cutting operations will be consistent with the operator's manual and terrain features, and permits the UXO Escort/Ground Safety Observer to perform those duties as directed to include a visual search/survey of the area(s) to be worked in.

- Equipment inspections shall be performed in accordance with the Activity Hazard Analysis for brush cutting.
- Personnel will not enter within 50 feet of an operating piece of equipment. If, at any time, personnel enter closer than 50 feet, the operator will immediately stop, return the engine to idle speed, and disengage power to all attachments.
- A communications check with the team personnel prior to operations commencing will be conducted. Hand signals are devised and used as a secondary means of communication. All team personnel must know these hand signals prior to operations commencing.
- The direction and manner in which the brush is to be removed will be directed by the UXO Escort/Ground Safety Observer. Prior to cutting operations commencing, a visual search/survey is conducted to determine the hazards that may be encountered, including MEC, terrain slope, vegetation, wildlife, and environmental concerns. The UXO Escort/Ground Safety Observerwill also determine the personal protective equipment (PPE) requirements based on the identified hazards.
- The UXO Escort/Ground Safety Observer precedes the equipment and performs a visual search for MEC, ordnance scrap, rats' nests, surface debris, and any other obstruction/object that may pose a hazard to team personnel. Hazardous items, impassable terrain, or vegetation that may affect operations will be marked and team personnel notified. The operator shall follow a route selected by the UXO Escort/Ground Safety Observer while operations are ongoing.

- Team personnel will ensure that a 6-inch ground clearance is maintained during cutting operations. Those areas marked as hazards are to be avoided.
- MEC or MEC-related items encountered are marked and avoided. Notification of these items will be made to the SUXOS.

5.1 SAFETY

Safety is paramount. All personnel will observe those safety precautions/warnings that apply, or may apply, to brush cutting operations. Those listed below are general in nature and personnel will need to review applicable publications for more specific safety precautions/warnings. Distances are the minimum required.

- Maintain 200 feet from essential non-UXO personnel; UXO personnel engaged in intrusive work; and other mechanical equipment (e.g., backhoe).
- Maintain 50 feet between equipment and team personnel.
- Distances may be increased by the UXOSO, as determined by site history, MEC items encountered, terrain features, and other factors that may apply.
- Use equipment safety features (e.g., guards).
- Safety precautions/warnings found in the operator's manual(s)/manufacturer's publication(s) will be observed.
- Maintain 6 inches of ground clearance during cutting operations.
- Communications will be maintained between the UXO Escort and the operator at all times.
- Maintain site control.
- Observe safety precautions for items encountered or suspected.
- Ensure PPE is serviceable and worn/used in a proper manner.

5.2 PERSONAL PROTECTIVE EQUIPMENT

Level D PPE will be required for personnel engaged in mechanical brush cutting. Clothing includes, but is not limited to:

- Coveralls or work clothing as prescribed
- High-visibility safety vests
- Work gloves, leather or canvas as appropriate
- Safety glasses

- Face shields when appropriate
- Hard hats when working within 100 feet of equipment
- Hearing protection, noise attenuators or ear plugs when within 50 feet of equipment
- Dust mask, as required by wind conditions and/or the presence of airborne particulate matter
- Other PPE as needed (e.g., face shield, Kevlar chaps, etc.)

6. TRAINING

All personnel who work on a mechanical brush cutting crew will be qualified and certified through machine-specific, site-specific, and on-the-job training. This training will consist of:

- Mechanical operations and maintenance of the brush cutting equipment
- Features of the equipment and its operational limits and characteristics
- Safety parameters relevant to mechanical operations

SOP-3
ANALOG GEOPHYSICAL SURVEY AND ANOMALY REMOVAL
CAMP BONNEVILLE

TABLE OF CONTENTS

1. PURPOSE

This procedure outlines the requirements for analog locator operations.

2. APPLICABILITY AND SCOPE

The analog locator will be used during the following operations:

- Analog Locator Daily QC Checkout
- Analog Surveys
- Analog Locator QC Surveys

3. TERMS USED TO DESCRIBE MUNITIONS

The following terms are used to describe potential munitions identified during clearance actions.

Discarded Military Munitions (DMM)—DMM includes military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance (UXO), military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations (10 USC 2710(e)(2)).

Material Documented as Safe (MDAS)— Material potentially presenting an explosive hazard (MPPEH) that has been assessed and documented as not presenting an explosive hazard and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Documented as an Explosive Hazard (MDEH)—MPPEH that cannot be documented as MDAS, that has been assessed and documented as to the maximum explosive hazards the material is known or suspected to present, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH.

Material Potentially Presenting an Explosive Hazard (MPPEH)—Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; range-related debris) or potentially contains a high enough concentration of explosives that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are (1) military munitions and military munitions-related materials, including wholly inert components (e.g., fins, launch tubes, containers, packaging material), that are to be used or reused for their intended purpose and are within a DOD Component-established munitions management system; (2) non-munitions-related material (e.g., horseshoes, rebar, other solid objects) and munitions debris that are solid metal fragments that do not realistically present an explosive hazard; (3) other items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Munitions and Explosives of Concern (MEC)—This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks, means UXO, as defined in 10 USC 101(e)(5)(A) through (C); DMM, as defined in 10 USC 2710(e)(2); or MC (e.g., TNT, cyclotrimethylenetrinitramine), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC)—MC include any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3)).

Unexploded Ordnance (UXO)—UXO includes military munitions that have been primed, fuzed, armed, or otherwise prepared for action; have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and remain unexploded either by malfunction, design, or any other cause. (10 USC 101(e)(5)(A) through (C)).

4. INSTRUMENT CHECKOUT

The Instrument Verification Strip (IVS) will be used as the analog locator checkout area. The IVS Plan identifies the number and type of items buried in the IVS. Each UXO Technician must test the analog instrument to be used at the beginning of each shift and successfully detect the IVS targets prior to commencing field data collection. The UXO technician will report to the SUXOS or Team Leader if the analog instrument fails to detect any target within the IVS.

An Analog Locator Checkout and Return Form (Appendix F of the RAU 3 Phase 2 Work Plan) will be filled out daily by UXOQCS to record the results of the analog locator QC checkout and document the condition of the equipment.

5. ANALOG SURVEY PROCEDURE

The following procedure will be used to conduct analog clearance operations with a handheld analog detectors:

- Each UXO Team Leader will direct the UXO Technicians to establish individual search lanes that are suitable for the equipment and terrain. The search lane widths will be optimized based on site conditions, although they will be no greater than five feet wide. Lanes will be delineated with line, flags, marking paint and/or marking tape.
- Each UXO Technician will start at one end of each lane and move forward toward the opposing baseline.
- During the forward movement, each UXO Technician will move the analog locator back and forth in a sweeping motion from one side of the lane to the other as close to the ground as possible. Both forward movement and the swing of the analog locator are performed at a pace that ensures that the entire lane is searched and that the instrument is able to appropriately respond to subsurface anomalies.
- Whenever a subsurface anomaly or metallic surface object is encountered, the UXO Technician will halt and investigate the anomaly immediately or place a flag for later investigation. Throughout this operation, the UXO Team Leader will closely monitor

individual performance to ensure these procedures are being performed with due diligence and attention to detail.

- Overburden soil will be carefully removed adjacent to the anomaly to expose and identify the metallic item. If the item cannot be positively identified as MEC, determine if the item is MDAS or non-munitions related material. Items that cannot be positively identified as MEC, MDAS, or non-munitions related material will be classified as MDEH.
- After removal of anomaly items, smooth out or replace removed soil into excavations to eliminate open holes, which can represent safety hazards.

6. BATTERY CHANGE FREQUENCY

Only high quality alkaline batteries are used with the Minelab detectors. Schonstedt detectors can use either high quality alkaline batteries or lithium batteries. If the batteries can no longer supply the necessary power to sustain correct performance of the detector, a Low Battery Alarm will sound and the operator will immediately stop sweeping operations to change the batteries. Alkaline batteries will be changed every 3 working days that the instrument is used, or as needed to avoid interruption in sweep operations (lithium batteries, if used, can be changed less frequently).

7. ANALOG QUALITY CONTROL SURVEYS AND REPORTS

Quality control surveys will be performed after intrusive operations have been completed. A 10 percent QC survey will be performed by the UXOQCS using an analog instrument for all grids originally surveyed using analog detectors. Failure criteria for any sub-grid will be any MEC or MD item found in a sub-grid or 5 or more non MEC/MD metal items that are greater than 2 square inches. Results of the 10 percent analog locator QC survey will be documented by the UXOQCS in the daily UXO quality control (QC) report.

Failure criteria for the subsurface clearance areas are detailed in Field Variance #5, i.e., grid failures occur for any one of the following reasons:

1. Any 1 MEC item remaining in a grid
2. Any inert blind seed item of 1 whole MDAS item equal to or larger than a 14.5 millimeter sub caliber projectile remaining in a grid
3. 5 metal items or MDAS fragments ranging in size from 2 square inches up to 8 square inches remaining in a grid
4. 1 metal item or MDAS fragment equal to or greater than 8 square inches remaining in a grid
5. Small arms equal to or greater than 0.50 caliber (projectile and case) will be considered MEC and fail a grid if 1 remains in a grid
6. Small arms casings equal to or greater than 0.50 caliber will be considered MDAS and fail a grid if 5 or more remain in a grid
7. Small arms less than 0.50 caliber (projectile only) will not be considered MDAS and not count toward the 5 metal item limit

Failure criteria for surface clearance areas will be consistent with the failure criteria described above, but limited to ferromagnetic items within the upper 3 inches detectable using a Schonstedt detector.

Any deficiencies that are identified will require a corrective measure, and a root-cause analysis will be performed to document the issue, analysis, and corrective action. Such root-cause analyses will be submitted to Clark County as memorandums. A corrective action will include reinvestigation of the grid and may also include resurvey of the grid or adjusting analog instrument settings.

Once a grid has passed the QC check, the Clark County Munitions Safety Officer will be notified for QA inspection. After Clark County QA, the WDOE will be notified to perform their QA.

SOP-4
FIELD DOCUMENTATION
CAMP BONNEVILLE

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1. SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) describes procedures for proper field documentation. The field logbook serves as a permanent and traceable record of all field activities related to a project and will become a part of the project files. The information presented in this SOP focuses on the completion of field logbooks and/or field forms for documenting field activities conducted by WESTON.

All data collection will be documented in either a bound field logbook or on appropriate field forms. Field logbooks will be assigned to individual field personnel for daily entries. Notes in the bound field logbooks will be made legibly, written in black or blue ink, and be as detailed and descriptive as possible so that a particular situation may be recalled without reliance on the collector's memory. No blank pages or sections of pages will be allowed. If a page is not completely filled in, a line will be drawn through the blank portion and initialed by the person keeping the log. There should be no erasure or deletions from the field notes. At the end of each day, the logbook will be signed and dated.

2. EQUIPMENT

Field logbooks

Field forms

3. RELATED PROCEDURES

None

4. PROCEDURES

4.1 FIELD LOGBOOK

The field logbook is the primary means of documenting field activities. It must be completed concurrent with field activities and present a thorough but concise summary of the activities conducted. The field logbook should enable the field activities to be reconstructed without relying on the field member's memory. Refer to the Logbook Operating Practices (Attachment 1)

for detailed descriptions of field logbook entry procedures. Logbooks should be kept in the field member's possession or in a secure place during field work. General provisions for field logbooks include:

- Project name/location and sequential logbook number should appear on the cover.
- Contact information should be recorded inside the front cover in case the logbook is misplaced.
- Write legibly and use a black or blue ink pen for all logbook entries.
- Corrections should be made by crossing out the data with a single strike mark, which will be initialed and dated by the person making the correction. Ensure that the original entry being struck out is still readable.
- Each page of the logbook should be sequentially numbered, dated, and signed by the field team member.
- Time should be recorded in military time (24-hour clock).
- For field data collection events documented in the logbook, entries should include but not be limited to:
  - Name of author, date, and time of entry
  - Name, company/agency affiliation, and responsibility of field team members
  - Names, titles, and arrival/departure times of any site visitors
  - Weather (e.g., temperature, cloud cover, humidity, wind)
  - Health and safety briefings, personal protection equipment (PPE) level, or changes or issues encountered
  - Calibration of field equipment
  - Description of task
  - Information concerning changes, scheduling modifications, and change orders
  - Details of sampling locations and visual observations of matrix sampled (e.g., soil description, odors, discolorations)
  - Field observations
  - Any field measurements made
  - Decontamination procedures
  - Documentation for investigation derived wastes (IDW) (e.g., contents and approximate volume of waste, disposal method)
  - Documentation of any scope of work changes required by field conditions
  - Description of photographs taken

- For oversight activities of consultants and contractors, entries should include, but not be limited to:
  - Name of author, date, and time of entry
  - Name, company/agency affiliation, and responsibility of field team members
  - Oversight location and task
  - Names, titles, and arrival/departure times of any site visitors
  - Weather (e.g., temperature, cloud cover, humidity, wind)
  - Arrival and departure times of oversight staff
  - Observations of ongoing activities
  - Compliance with or deviation from approved plans
  - Description of photographs taken

4.2 FIELD FORMS

Various field data collection forms, such as those provided in Appendix F of the Work Plan, may be used to streamline the documentation of field data. Field forms may also be customized for large data collection efforts. If field data are recorded on a field form, this data entry should be documented in the daily field logbook entry. Field form data entry should be executed with the same quality standards as field logbook data entry. Entries should be neatly written in black or blue ink and corrections made with single line strike-out and initials. Original field forms should be submitted daily to the Task Manager and be incorporated into the project file.

Only the SUXOS, UXOQCS and UXOSO are required to keep daily logs in log books.

Attachment 1
Logbook Operating Practices

Procedure

- Logbooks are permanently bound, all pages numbered.
- Entries should begin on page 1.
- Use only blue or black ink (waterproof).
- Sign entries at the end of the day, or before someone else writes in the logbook.
- If a complete page is not used, draw a line diagonally across the blank portion of the page and initial and date the bottom line.
- If a line on the page is not completely filled, draw a horizontal line through the blank portion.
- Ensure that the logbook clearly shows the sequence of the day's events.
- Do not write in the margins or between written lines, and do not leave blank pages to fill in later.
- If an error is made, draw a single line through the error and initial it.
- Maintain control of the logbook and keep in a secure location.

General Information

- Date on every page.
- Team members and initials listed at beginning of day.
- Other personnel and affiliation (e.g. OSC-Smith, OSC-Jones).
- Written legibly.
- Signatures of author at bottom of every page.
- Signatures when change of recorder.
- Corrections are single lined and corrections are initialed.
- Team members' site entries and exits are documented.
- Chargeable off-site activities are documented.
- Note End of Logbook on last page ("End of Logbook").
- Late entries noted appropriately.

Field Logbooks

- General information.
- Name, location of site, and work order number.
- Name of the Site Manager or Field Team Leader.
- Names and responsibilities of all field team members using the logbook (or involved with activities for which entries are being made).
- Weather conditions.
- Objective narratives written.
- Field observations.
- Names of any site visitors, including entities that they represent.
- Summary of equipment preparation and decontamination procedures.
- Sample description including depth, color, texture, moisture content, and evidence of waste material or staining.
- Air monitoring (field screening) results.
- Types of laboratory analyses requested.

Photo Logs

- Camera and PDA (IDs).
- Grid or location of photo
- Date of pictures.
- Time of pictures.
- Directions of photos.
- Description of photos.
- Photographer/witness.

Safety

- All safety, accident, and/or incident reports.
- Real-time personnel air monitoring results, if applicable, or if not documented in the SSHP.
- Heat/cold stress monitoring data, if applicable.
- Level of protection for tasks.
- Reasons for upgrades or downgrades in personal protective equipment.
- Health and safety inspections, checklists (drilling safety guide), meetings/briefings.
- Equipment make, model, and serial number for monitoring instruments
- Calibration records for monitoring instruments.
- Site safety meeting (time/topics).
- Site objectives/ plan of activities.
- Chemical/physical hazards.
- Personnel attending.
- Special personnel information (allergies, etc.).

Equipment

- Equipment type (make and model).
- Serial nos.
- Calibration records.
- Background readings and locations.
- Monitoring readings and locations.
- Sampler(s) initials.

Contractor Oversight Activities

- Progress and activities performed by contractors including operating times.
- Deviations of contractor activities with respect to project governing documents (i.e., specifications).
- Contractor sampling results and disposition of contingent soil materials/stockpiles.
- Excavation specifications and locations of contractor confirmation samples.
- General site housekeeping and safety issues by site contractors.
- Equipment and personnel on-site.
- Duration of equipment use vs. standby.
- Inventory of shipments received (or verification of items on packing slip).
- Document inspection of disposal trucks arriving at site (e.g., visual observation of clean tankers or truck trailers, etc.).

SOP-5
BACKHOE OPERATIONS
CAMP BONNEVILLE

TABLE OF CONTENTS

1. BACKGROUND

Backhoes may be used at the former Camp Bonneville to excavate during investigation of subsurface magnetic anomalies.

2. SCOPE

This standard operating procedure (SOP) contains information specific to the former Camp Bonneville. It is incumbent upon all designated operators to familiarize themselves with this SOP, and to periodically review them in an effort to remain current with safe, productive backhoe procedures.

3. OPERATIONS

Employees who operate backhoes on the former Camp Bonneville will be qualified through on-the-job training (OJT) consisting of equivalent OJT that was documented through previous employment or experience, or documented through formal training. When engaged in backhoe operations the operator will perform daily inspection and maintenance functions and operate the backhoe as directed. Inspections will be documented using the Equipment Inspection Form or forms from the Operation's Manual. The operator will also conduct OJT for other operators at the team leader's discretion.

3.1 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Modified Level D PPE will be required for personnel engaged in backhoe operations. Clothing items will be:

- Coveralls or work clothing as prescribed
- Work gloves, leather, canvas or rubberized, as appropriate
- Safety glasses - as wind conditions and airborne particulate matter dictate
- Hard hats
- High-visibility safety vest
- Work boots (sturdy and of sufficient height to aid in ankle support)
- Dust masks - as wind conditions and airborne particulate matter dictate

3.2 GENERAL SAFETY PRECAUTIONS

Maintain minimum separation distances as identified in the appropriate work No personnel are allowed within the extent of swing radius of the boom, known as the safety arc, during excavation operations. Prior to anyone entering the safety arc, the operators will:

- Swing the boom arm fully to one side
- Lower the bucket to the ground
- Return the engine to idle speed
- Hold her/his hands clear of the controls or in the "hands up" position

3.2.1 Equipment Safety Precautions

See the operator's manual.

3.3 TEAM COMPOSITION

One UXO Technician will serve as a safety observer and director for other team personnel and all members of the backhoe team will be UXO qualified. The minimum team makeup will be:

- One operator
- One safety spotter

Team members working on a backhoe team will perform such tasks as magnetometer checks, manual excavation, and checks of the excavated hole and soil spoils.

3.4 TRAINING

Training will be documented in SUXOS field notebooks and in on-site records.

3.5 GENERAL OPERATIONAL PROCEDURES

The operator will have a radio to monitor radio transmissions while operating the backhoe. Prior to excavation operations the UXO Team Leader will review established hand signals with all members of the team. The backhoe will not be used to excavate closer than 12 inches from MEC in accordance with EP-385-1-95A, Section 14, Paragraph b. Removed dirt will be placed at least

2 feet from the expected edge of the excavation, and on the uphill side when working on a slope. Excavations will not be deeper than 14 inches without authorization from the Project Manager, and will not be deeper than 4 feet without authorization from the UXO Safety Officer. Such excavations require a competent person as defined by 29 CFR 1926.651-653 to determine step/slope requirements.

SOP-6
UNANTICIPATED CHEMICAL CONTAMINATION CONDITIONS CAMP BONNEVILLE

TABLE OF CONTENTS

1. PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the step-by-step procedures applicable in the event that unanticipated chemical contamination conditions are encountered or suspected.

Unanticipated chemical contamination conditions may include, but are not limited to:

- oily, shiny, pigmented, or saturated soil or free product
- soil with a strong chemical odor
- discovery of objects or structures of environmental concern such as underground storage tanks and associated piping, buried drums, sumps, etc.
- discovery of suspected debris of environmental concern such as buried refuse, painted building materials, asbestos-containing pipes, or Transite™
- other conditions that vary materially from those documented during previous investigations
- discovery of areas containing a high concentration of spent ammunition
- discovery of bulk explosives

2. SCOPE

This SOP applies to all personnel involved in operations that have the potential to disturb or expose soil.

3. REFERENCE DOCUMENTS

Weston Corporate Safety and Health Program (FLD47)

ESCA RP Waste Management SOP

Washington Industrial Safety and Health Act Safety and Health Core Rules (Chapter 296-800, Washington Administrative Code)

29 CFR 1910.120

29 CFR 1926.65

4. RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The PM is responsible for ensuring that Clark County is notified (contact information is provided in the Contact List, Appendix C of the Work Plan).

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training. The SUXOS will be responsible for providing notification to the UXOSO and PM (contact information provided in Appendix C of the Work Plan).

4.3 UXO SAFETY OFFICER (UXOSO)

The UXOSO ensures that all operations are being conducted in a safe manner and in accordance with the appropriate work plan and this SOP. The UXOSO conducts safety audits of the operations and ensures that all personnel are properly trained and utilizing the appropriate personal protective equipment (PPE).

4.4 FIELD PERSONNEL

Field personnel will be conducting the fieldwork activities. Personnel conducting fieldwork activities are responsible for completing their tasks according to specifications outlined in this SOP and associated work plans. In the event that suspected soil contamination is encountered during fieldwork activities, field personnel must notify the SUXOS immediately.

5. OPERATIONS

If suspected soil contamination is encountered during the fieldwork activities, the following procedures will be followed:

1. All field activities that may potentially disturb the unanticipated chemical contamination will be immediately stopped. Field personnel encountering the unanticipated chemical contamination must immediately notify the SUXOS and move to a safe location to avoid odors or leaking fluids (i.e., upwind or uphill).

2. If there is no immediate danger to personnel, field personnel will create an appropriate exclusion zone with markers and/or barricades around the suspect area to prevent further soil disturbance in this area.
3. If an emergency situation requiring medical attention, containment assistance, or other emergency assistance arises, the emergency procedures specified in the Site Safety and Health Plan will be followed.
4. The SUXOS will immediately notify the UXOSO and the PM.
5. An environmental professional on the WESTON Team will be mobilized to visually assess the suspect area. If it is determined by the environmental professional that contamination by chemical compounds is possible (based upon visual observation or the analytical results of initial screening-level sampling), the environmental professional will notify the PM.

Examples of suspect contamination include the discovery of:

- oily, shiny, or saturated soil or free product
- significant areas (greater than 3 square feet) of pigmented soil that do not appear to be related to native soil coloring
- soil with a strong chemical odor
- objects or structures of environmental concern such as underground storage tanks and associated piping, buried drums, sumps, etc.
- significant quantities of suspect debris of environmental concern such as asbestos-containing pipes, Transite™, or similar ACM
- significant quantities of suspected debris of environmental concern such as treated wood waste, chipping, cracking, or alligatoring paint (indicative of LBP), or electrical components
- other conditions that vary materially from those documented during previous investigations
- areas of high concentrations of spent ammunition
- bulk explosives

The PM will notify the County within 24 hours.

6. PERSONAL PROTECTIVE EQUIPMENT

Appropriate PPE for the particular fieldwork activity will be utilized in accordance with the appropriate work plan. Equipment and clothing coming in contact with the potential contamination will be decontaminated in accordance with the appropriate work plan.

7. NOTIFICATIONS AND REPORTING

If unanticipated contamination is encountered or suspected in the field, the SUXOS, UXOSO, and PM must be notified immediately. The PM is responsible for additional notifications per Section 4.1.

SOP-7
MEC WITH UNKNOWN FILLER
CAMP BONNEVILLE

TABLE OF CONTENTS

1. PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the step-by-step procedures and safety and health requirements applicable in the event ordnance items are discovered and the filler cannot be positively determined at the former Camp Bonneville.

A Chemical Warfare Material (CWM) Risk Assessment has been completed for the former Camp Bonneville. The results indicated that the probability of encountering CWM munitions is "unlikely" while the probability of encountering CWM Chemical Identification Sets is "seldom."

2. SCOPE

This SOP applies to all personnel involved in the conduct of munitions and explosives of concern (MEC) clearance on the former Camp Bonneville.

3. REGULATORY REFERENCES

AR 385-61, AR 385-64, DA Pam 385-61, and DA Pam 385-64 for safety concerning Recovered Chemical Warfare Material (RCWM) containing explosives

AR 50-6, Chemical Surety

AR 190-11 Security for RCWM

EP 75-1-3 RCWM Response Process

4. RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The PM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS)

The SUXOS is responsible for incorporating this SOP in plans, procedures, and training and ensuring that all personnel conducting MEC operations are familiar with and comply with this SOP.

4.3 UXO SAFETY OFFICER (UXOSO)

The UXOSO ensures that all operations pertaining to MEC clearance are being conducted in a safe manner and in accordance with the appropriate work plans and this SOP. The UXOSO conducts safety audits of the operations and ensures that all personnel are properly trained and utilizing the appropriate personal protective equipment (PPE).

4.4 UXO TEAM LEADER

The UXO Team Leader is responsible for supervision of the team conducting the clearance operation. The UXO Team Leader is required to conduct training of personnel involved in MEC operations to ensure that every member of the MEC team thoroughly understands this SOP.

5. OPERATIONS

5.1 GENERAL

There are three ordnance items of concern that require positive identification of the filler prior to any disposition, the Livens Projector, the 4-inch Stokes mortar, and the 4.2-inch mortar.

Visual recognition of the Livens Projector, 4.2-inch mortar, and the 4-inch Stokes is necessary and requires training on recognition features to ensure everyone uses the same techniques. The 4-inch Stokes mortar of concern is 19.56 (19/16) inches in length, measured from the end of the tail boom to the top of the threaded fuze well. 4-inch Stokes mortars of lesser lengths contain known fillers and will be treated as any other MEC item.

- All Livens Projectors and all 4.2-inch mortars are common in dimensions and have different fillers. These ordnance items along with the 19.56-inch-long, 4-inch Stokes will be treated as MEC with unknown fillers.

- Upon recognition/identification of a Livens Projector, a 4.2-inch mortar, or a 4-inch Stokes by any UXO team member conducting a MEC clearance operation, the team member will immediately notify the Team Leader who will measure the item. If the measurements indicate a possible CWM-filled Stokes, or if the item recognized/identified is a 4.2-inch mortar or a Livens Projector, the Team Leader will notify the SUXOS and the UXOSO.
- The UXO team and any other teams in the area will evacuate the area, proceeding at least 200 feet upwind, and await the UXOSO and the SUXOS.
- Upon arrival of the UXOSO, the UXO Team Leader will accompany her/him to the location of the suspect item.
- In the event the UXOSO and SUXOS determine that the item contains a known filler other than CWM, it shall be disposed of in accordance with the work plan.
- Upon verification by the UXOSO and SUXOS of an MEC item with an unknown filler, the exact location will be recorded using a Global Positioning System unit and backfilled with excavated material. The UXO Team Leader will evacuate to the safe area upwind, and the UXOSO and SUXOS will notify the PM who will notify the Clark County Project Manager and Munitions Safety Officer who will notify the Technical Escort Unit (TEU).
- In the event TEU or the EOD unit positively identifies the filler as CWM, or the filler remains unknown, TEU or the EOD unit will make the determination for and conduct a safe disposal of the item.
- In the event TEU or the EOD unit positively identifies the filler as non-CWM, they will release the item to WESTON for disposal in accordance with the work plan.

6. SAFETY

6.1 GENERAL

At no time will a Livens Projector, a 4.2-inch mortar, or a 4-inch Stokes mortar measuring 19.56 inches in length (fuzed or unfuzed) be moved prior to disposition determination by TEU.

6.2 PPE

Standard PPE for field MEC operations will be utilized in accordance with the work plan.

SOP-8
MEC/MDEH DETONATION
CAMP BONNEVILLE

TABLE OF CONTENTS

LIST OF ATTACHMENTS

1. PURPOSE

The purpose of this standard operating procedure (SOP) is to provide the step-by-step procedures for personnel to safely perform periodic disposal of munitions and explosives of concern (MEC) and/or material documented as an explosive hazard (MDEH), related to either immediate response blow-in-place (BIP) operations or pre-planned demolition operations, during the field activities at the former Camp Bonneville.

MEC/MDEH hazards are unique and require a greater level of awareness and attention-to-detail than everyday construction projects. These procedures provide step-by-step instructions. References contain comprehensive procedures for conducting demolition operations and should be referred to for any situation not covered by this instruction. This SOP complies with the requirements of all applicable Army and U.S. Department of Defense instructions and safety regulations, Federal, State and local requirements and applicable Occupational Safety and Health Administration (OSHA) Standards.

2. SCOPE

This SOP applies to all Weston Solutions, Inc. (WESTON) personnel involved in MEC demolition/disposal operations at the former Camp Bonneville Military Reservation.

3. REFERENCE DOCUMENTS

Washington Industrial Safety and Health Act Safety and Health Core Rules (Chapter 296-800, Washington Administrative Code)

OSHA General Industry Standards, 29 CFR 1910

OSHA Construction Standards, 29 CFR 1926

General Dynamics Military Hardened Remote Firing Device (RFD) Operating Manual ("RFD Operating Manual")

TM 60A-1-1-31 Explosive Ordnance Disposal Procedures

4. RESPONSIBILITIES

4.1 PROJECT MANAGER (PM)

The PM is responsible for ensuring availability of resources required to safely implement this SOP.

4.2 SENIOR UNEXPLODED ORDNANCE SUPERVISOR (SUXOS)

The SUXOS is responsible for ensuring that all disposal operations involving MEC are conducted in a safe and professional manner. The SUXOS will assign a Demolition Supervisor and other essential personnel as required for the disposal operation. The SUXOS has the authority to suspend, withdraw, or otherwise de-certify personnel unable to fulfill training, qualification, and/or operational requirements. The SUXOS will initiate all public telephone notifications and act as an independent safety observer during disposal operations if the Unexploded Ordnance Safety Officer (UXOSO) is unavailable.

4.3 UNEXPLODED ORDNANCE SAFETY OFFICER (UXOSO)

The UXOSO is responsible for ensuring that unexploded ordnance (UXO) disposal operations involving hazardous and/or explosive materials are conducted in a safe and professional manner. The UXOSO will act as an independent safety observer during disposal operations. If the SUXOS is unavailable, the UXOSO will initiate all public telephone notifications.

4.4 DEMOLITION SUPERVISOR

The demolition supervisor will work under the supervision of or be a licensed Washington State Blaster and will be responsible for the supervision of drawing of explosive stores, preparation, placement, and firing of all explosive charges. A Demolition Supervisor is required for all demolition operations. The Demolition Supervisor will be selected prior to the start of any demolition operation and is the primary supervisor for the disposal operation and will report to the SUXOS.

5. TELEPHONE NOTIFICATION

The following individuals will be notified via telephone by the SUXOS or designate:

Organization	Contact	Phone Number:
Hockinson Dispatch	Clark County Fire Station 31	(360) 892-2331
Non-Emergency Dispatch	Clark County Sheriff Department	(360) 696-4461
N/A	Portland International Airport	(877) 739-4636

6. ELECTRONIC NOTIFICATION

6.1 WESTON

WESTON will initiate all electronic notifications upon the event of MEC detonation.

6.2 NOTIFICATION LIST

The following individuals will be notified via electronic mail:

Recipient:	Email Address:
Jerry Barnett, PE, Clark County PM	Jerry.Barnett@clark.wa.gov
Greg Johnson, Clark County Munitions Safety Officer	Greg.Johnson@clark.wa.gov
Tina Redline, Clark County Commissioners' Office	Tina.Redline@clark.wa.gov
Ben Forson, WA Dept of Ecology PM	bfor461@ecy.wa.gov
Ronnie Johnson, WA Dept of Ecology Munitions Safety Advisor	ronj461@ ecy.wa.gov
Scott Armstrong, Army BRAC Senior Analyst, Calibre	Scott.Armstrong@calibresys.com
Copied:	**Email Address:**
Dwight Gemar, WESTON PM	Dwight.Gemar@westonsolutions.com
Drew Caldwell, WESTON SUXOS	Andrew.Caldwell@westonsolutions.com
Greg Clark, WESTON UXOSO	Greg.Clark@westonsolutions.com
Michael Everman, WESTON UXOQCS	Michael.Everman@westonsolutions.com

6.3 NOTIFICATION LANGUAGE

The following standard language will be used in electronic notifications:

"The WESTON Team will conduct a detonation of a (INSERT ITEM(s) TO BE DETONATED). The detonation will be conducted (INSERT GENERALIZED LOCATION). This operation will occur between (INSERT TIME AND DATE). If you have any questions please contact the WESTON Senior UXO Supervisor."

7. EQUIPMENT AND MATERIALS

7.1 PERSONAL PROTECTIVE EQUIPMENT

- leather gloves
- safety glasses with side shields (ANSI Z87.1 standard)
- Level D PPE

7.2 EQUIPMENT

- backhoe, as required
- water supply/dust control vehicle, as required
- 4-wheel-drive pickup or other off road vehicle
- Explosives transport vehicle (safety inspected, properly equipped, fire extinguishers etc.)
- digital photograph or video camera
- Two way radios
- binoculars

7.3 COMMUNICATION EQUIPMENT

The primary method of communication on the range will be handheld radios with cellular phones as a secondary backup. A minimum of two working radios are required to be on site and radios will be tested prior to the start of disposal operations. The following communication equipment is approved for use:

- radios - transceivers up to 5 watts
- cellular phones (all)

Communication Equipment	Hazards of Electromagnetic Radiation to Ordnance (HERO) Unsafe Distance
Radios	Within 25 feet
Cellular phones	Within 25 feet

CELLULAR PHONES WILL BE TURNED COMPLETELY OFF WHEN WORKING NEAR HERO-SENSITIVE MUNITIONS AND DEMOLITION MATERIALS.
(PHONES TRANSMIT RADIO FREQUENCY ENERGY EVEN WHILE IN STANDBY MODE)

7.4 SAFETY EQUIPMENT

- siren/horn
- road barricades (hazard communication)
- first aid kit in each truck
- fire extinguisher

7.5 HAND TOOLS

- shovels
- rakes
- mattocks, as required
- other tools, as required

7.6 DEMOLITION MATERIALS

- blasting machine (quantity 1)/RFD (quantity 1 with 2 receivers)
- galvanometer (quantity 1)
- electrical tape (minimum 1 roll)
- duct tape (minimum 1 roll)
- water jug (5-gallon)
- firing wire
- sand/sandbags

8. SAFETY

8.1 GENERAL SAFETY PRECAUTIONS

All personnel conducting range operations involving the use of explosives, pyrotechnics, and cartridge actuated devices will follow the approved guidance provided in this instruction and associated references. Any deviation from the approved SOP must be authorized by the SUXOS.

The following "General Safety Precautions" apply to all ordnance disposal work:

- A copy of this instruction will be maintained at the Field Operations Office.
- Smoking or spark/flame producing devices will not be permitted within 100 feet of any explosive material.
- The Demolition Supervisor will supervise the control of all blasting caps or initiating devices.
- The Demolition Supervisor will control the RFD Key.
- All crimping and priming procedures will be directed and supervised by the Demolition Supervisor.
- The preparation of initiators will be performed at a distance of not less than 50 feet from any other explosives.
- Use the minimum number of personnel necessary to perform the demolition operation safely (a minimum of two is required).
- Ensure the area is clear of any unauthorized personnel, vehicles, or low flying aircraft before beginning any demolition procedure.
- Do not handle, use, or remain near explosives during the approach or egress of an electrical storm. All personnel involved in any demolition operation in such a case should immediately retreat to a place of safety.
- Always point the explosive end of blasting caps, detonators, and other explosive devices away from the body and any other person who may be in close proximity. These items are extremely dangerous and may cause serious injury if they detonate.
- Use only approved tools when handling demolition materials.
- Personnel conducting demolition operations will wear cotton clothing to minimize the risk of static electricity.
- Personnel should anticipate the possible presence of accumulated static electricity and take necessary precautions to minimize the potential hazards.
- Operations will be scheduled so that the last detonation will occur at least 1 hour prior to sunset.

- Use electric blasting caps of the same manufacture, if possible, for each demolition shot involving more than one cap.
- Keep blasting caps in approved containers at least 50 feet from other explosives.
- Do not strike, tamper with, or attempt to remove or investigate the contents of a blasting cap, detonator, or explosive initiating device. A detonation may occur.
- Do not pull on the lead wires of electric blasting caps, detonators, or other electro-explosive devices (EEDs). A detonation may occur.
- Do not bury blasting caps. Buried blasting caps are subject to unobserved forces and movement which could lead to premature firing or misfires.
- Review electromagnetic radiation (EMR) precautions and electrical grounding procedures as indicated in the applicable reference publications prior to commencing any electric demolition procedure.
- Do not transmit on a radio or use a cellular phone within the HERO distance specified on the specific transmitter (typically 25 feet).
- All disposal shots will be dual primed.
- Use only the minimum amount of explosives necessary to destroy the item(s) being detonated. In accordance with historical use, a self-imposed combined Net Explosive Weight (NEW) limit of 20 pounds will be used for all disposal operations.

8.2 ELECTRIC FIRING SAFETY PRECAUTIONS (REMOTE FIRING DEVICE)

The following "Electric Firing Safety Precautions" apply to all ordnance disposal work utilizing the RFD:

- The operating procedures contained in the RFD Operating Manual will be used for reference. Wherever it deviates from TM 60A-1-1-31, TM 60A-1-1-31 will take precedence.
- Use only special silver chloride dry-cell batteries in the galvanometer. Other types of batteries may produce sufficient voltage to detonate blasting caps.
- Do not remove the shunt from the lead wires of blasting caps except to test continuity or connect into a firing circuit. The individual removing the shunt will ground himself/herself prior to this operation to prevent accumulated static electricity from firing the blasting cap.
- Unroll the lead wires so that the cap is as far as possible from the operator and pointing away from him. Place the blasting cap under a sand bag or behind a barricade before removing the shunt and testing for continuity. Make sure the cap is not pointing toward other personnel or explosives.
- Do not hold the blasting cap directly in the hand when uncoiling leads. Hold wires approximately 6 inches from the cap. The lead wires should be straightened by hand; not thrown, waved, or snapped to loosen the coils.

- Test electric blasting caps for continuity prior to connecting them to the firing circuit. Upon completion of testing, the lead wires will be shunted by twisting the bare ends of the wire together. The wires will remain shunted until they are to be connected to the firing circuit.
- Do not connect the blasting cap into the circuit unless the other end of the firing wire is shunted.
- Touch the shunted blasting cap wires to the shunted firing wires to equalize the electrical potential prior to connecting.
- Keep all parts of the firing circuit insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.
- Do not connect the RFD to the firing circuit until all pre-firing tests have been completed and the demolition charge is ready in all respects to be fired.
- Keep the power end of the firing wire shunted until ready to connect the RFD.
- Do not attempt to fire a single electric blasting cap or combination of electric blasting caps in a circuit with less than the minimum current required by the total circuit.

The Demolition Supervisor will order the firing wires to be connected to the RFD when he is certain the area is clear of personnel, animals and equipment.

9. OPERATIONS

9.1 PRE-DISPOSAL OPERATIONS

Prior to performing the MEC disposal field activities, the following actions will be completed:

- Identify the MEC item in consultation with the UXOSO and the SUXOS. The UXOSO and the SUXOS will implement the most appropriate response action that is protective of human health and the environment for the discovered item.
- Record the location of the MEC item and fill out the MEC information form in accordance with the site-specific work plan or incidental item report as appropriate.
- Identify the minimum safe distance/exclusion zones for essential and non-essential personnel for the disposal operation.
- Select the personnel to perform disposal operations involving MEC. The SUXOS will select personnel based on current qualifications and Bureau of Alcohol, Tobacco, Firearms and Explosives approval as an employee possessor. Ensure all personnel become familiar with this instruction and references. All personnel will follow the procedures outlined in this instruction and references when conducting demolition operations.
- Ensure all personnel participating in disposal operations involving the use of explosives and pyrotechnics are aware of the hazards associated with these devices.

- Notify all concerned agencies, local emergency services providers and the local community, as necessary.
  - Immediate Response BIP operation notifications will be made as soon as possible prior to the demolition activities with detonations typically occurring before 5:00 p.m.
  - Pre-planned demolition operations notifications will be made at least 4 calendar days prior to demolition activities with detonations typically occurring between 8:00 a.m. and 5:00 p.m.
- Monitor weather forecasts and notify the SUXOS whenever a hazardous weather condition exists or may develop. Demolition operations will not take place when any of the following conditions exist:
  - Electrical storms are predicted for the immediate area.
  - Lightning activity is observed visually within five miles.
  - Sand, snow or dust storms of sufficient severity to create static electric charges are within five miles.
  - During periods of low or heavy overcast with a wind velocity less than 5 knots.
  - During conditions when there is a high potential for fire (also referred to as red flag fire days) as determined by the UXOSO and SUXOS, unless fire prevention activities such as engineering controls, fuel reduction, pre-wetting, etc., can mitigate the hazard.
- Conduct UXO Demolition Operations Safety Briefings before the start of each disposal operation for all personnel participating in the disposal activities.
- Maintain a copy of this SOP instruction at the Field Operations Office. All personnel assigned to specified disposal activities will read this SOP and sign the required signature sheet.

9.2 INITIAL PREPARATIONS/RANGE PROCEDURES

Before each disposal operation, the SUXOS and the assigned work crew will inspect the disposal areas to identify any hazards not conducive to safe operations. Hazards are determined on a case-by-case basis and are dependent upon the location of the demolition operation. The work crew will stage all equipment provided by the SUXOS and other associated equipment and material necessary for operations to begin. The UXOSO will also ensure that all necessary vehicles and equipment are in compliance with State and Federal OSHA regulations.

9.2.1 UXOSO Pre-Operational Procedures

The UXOSO will conduct a Daily Safety Brief before each day's activities for all personnel participating in the open detonation/disposal operations. The UXOSO will also inspect each member of the team to ensure the following:

- No silk, wool, rayon, nylon, or other synthetic-fiber garments are worn (static electricity hazard).
- Leather palmed gloves are worn.
- Safety glasses with side shields (ANSI Z87.1 standard) are worn.
- All spark and flame producing materials are absent from the disposal site.

9.2.2 Demolition Supervisor Pre-Operational Procedures

The Demolition Supervisor will ensure the following actions are performed:

- Assign and post road guards as necessary
- Ensure the disposal operation site is secure.
- Announce "the range is hot, keep radio traffic to a minimum" over the radio whenever any explosive materials are brought onto the range area.
- Explosive materials will be drawn from the explosives safety locker (ESL) and stored in the quality control truck's magazines prior to demolition operations.
- Brief the demolition party on the sequence of events for each shot.
- Verify the area is secure and get permission from the UXOSO before any explosive procedures begin.

9.3 PROCEDURES FOR ELECTRIC INITIATION (REMOTE FIRING DEVICE)

The following actions, procedural steps, and precautions are provided for the electric initiation of explosive charges utilizing a RFD.

The Demolition Supervisor will:

- Control all initiators and blasting machines.
- Direct the preparation of all demolition charges.
- Ensure the engineering controls are ready to be put in place and the area is free of gravel, rocks, and other debris.

- Place RFD receiver with adequate protection, no less than 25 feet from the demolition site.
- Dual prime all initiating systems.
- Ensure sufficient firing line will be used so that the blasting cap workup, connection to firing wire, continuity check, and connection to receiver can be done while maintaining a 50' separation between blasting caps and all explosives.
- Direct the demolition party to proceed down range and place the prepared main charge.
- Direct the placement of engineering controls over the charge to ensure the mitigation of noise and fragmentation hazards to the surrounding public.
- Ensure compliance with all basic demolitions safety precautions and operating procedures while performing MEC disposal operations utilizing the RFD.
- Direct all members of the demolition party not involved in the actual blasting cap test/priming sequence to proceed to a safe area.
- Ensure that all personnel are accounted for and in a safe area and that the range exclusion zone is clear.
- Give the command to prime the demolition shot.
- Retire to the safe area.
- Direct one member of the crew to initiate audible warnings as per WA requirements.
    - One minute of long horn blasts 5 minutes prior to detonation
    - One minute of short horn blasts 1 minute prior to detonation
    - Give three loud, clear "Fire in the Hole" in separate directions, allowing a brief delay prior to firing to allow for a possible response
- Call for silence while the team member initiates the shot.
- Visually check the range after a five-minute wait, assuming a successful charge detonation.

ALL PERSONNEL WILL LISTEN FOR THE DETONATION AND, IF NECESSARY, START MISFIRE PROCEDURES.

9.4 MISFIRE PROCEDURES

9.4.1 General Misfire Procedures

In case of any type of "misfire", the Demolition Supervisor will designate personnel to assist during misfire procedures. The Demolition Supervisor will:

- Ensure that all personnel remain in a safe area unless specifically assigned a "misfire" function.
- Designate a safety observer to move to a place as far as possible from the demolition site while still keeping the Demolition Supervisor in sight and be prepared to render assistance in case of an accident.
- Wait a minimum of thirty minutes after the expected detonation time before proceeding to the misfire for corrective action.
- Ensure all excess personnel remain in a safe area until the misfire procedures have been completed.

9.4.2 Electric Misfire Procedures (Remote Firing Device)

In the event of an electrical misfire, the misfire procedures listed in the RFD Operating Manual will be followed:

- On the transmitter, remove the safe-arm key card. The ARM LED will extinguish. Press and hold the transmitter ON/OFF touch pad until the ON LED is extinguished.
- Maintain a safe distance from the receiver for at least 60 minutes after the misfire.
- After 60 minutes have elapsed from the time of the misfire, approach the detonator/cap. Do not touch the RFD.
- Remove any sandbags or soil covering the detonator/cap and carefully detach the detonator/cap from the main explosive charge.
- Remove and short the electric wires from the RFD receiver.
- The RFD receiver may now be safely handled. Note the status of the ARM, ON, AND BATTERY LOW LED's before pressing the ON/OFF touch pad to turn the receiver power off.
- Follow the troubleshooting procedures in RFD Operating Manual Appendix B to determine the cause of the misfire.
- If the cause of the misfire can be determined, correct the problem, perform a test fire following the procedures in Section 4.3.1 of the RFD Operating Manual. If the cause of the misfire cannot be determined, use a different RFD receiver to perform a test fire following the procedures in Section 4.3.1 of the RFD Operating Manual, replace the detonator/cap and repeat the firing procedure in Section 4.3.2 of the RFD Operating Manual.

9.5 POST-DETONATION INSPECTION

Following each detonation, an inspection of the detonation pit and surrounding area will be accomplished to identify and remove any MEC fragments, unconsumed explosives, or other

debris that may have originated from the detonation. When the shot site is determined to be safe, one short blast will be given on the air horn and the "all clear" will be called on the radio. Material suspected to contain explosives or explosive residues will be placed back in the detonation area and treated in a subsequent detonation on the same day. Debris that is free of energetic material will be segregated and managed in accordance with the site-specific work plan.

9.6 POST-OPERATIONAL REQUIREMENTS

The following actions are required for post-operational shutdown. The Demolition Supervisor will:

- Inform the SUXOS after the last detonation of the day and all explosive stores are depleted or prepared for return to the ESL – "Range is Cold" and "operations are complete."
- Inform road guards to allow normal traffic flow and return to previous assignment.
- Direct crew members to remove all trash and nonhazardous residue from the disposal area and deposit it in appropriate receptacles.
- Record the disposal of items and update the MEC information form and incidental finds forms, as appropriate.
- Inventory and replenish the Demolition Equipment Box.

Attachment 1
Demolition Notification Roster

Point of Contact	Affiliation	Phone	Comment/ email
Notify by phone at least 30 minutes before detonation			
Hockinson Dispatch	Clark County Fire Station 31	(360) 892-2331	N/A
Non-Emergency Dispatch	Clark County Sheriff Department	(360) 696-4461	N/A
Notify by email at least 30 minutes before detonation			
Jerry Barnett, PE	Clark County PM	(360) 566-6992	Jerry.Barnett @clark.wa.gov
Greg Johnson	Clark County Munitions Safety Advisor	(360) 566-6993	Greg.Johnson@clark.wa.gov
Tina Redline	Clark County Commissioners' Office	(360) 397-2232	Tina.Redline@clark.wa.gov
Ben Forson	Washington Department of Ecology	(360) 407-7227	bfor461@ecy.wa.gov
Ronnie Johnson	Washington Department of Ecology	(360) 407-6487	RONJ461@ecy.wa.gov
Scott Armstrong	Calibre	(916) 261-4577	Scott.Armstrong@calibresys.com

Attachment 2
Workers Statement

☐ **I have read and understand this SOP.**

☐ **The procedures described in this instruction can be performed in a safe and effective manner without unnecessary risk to personnel, explosive or environmental safety.**

☐ **I verify that I am qualified and can perform all tasks that are assigned to me in accordance with this SOP.**

☐ **If deviation from this instruction is necessary for equipment, or personnel safety, I will personally stop the operation until the applicable procedure is reviewed by the SUXOS and revised if necessary.**

☐ **If unexpected safety, health, or environmental hazards are encountered independent of these procedures, I will stop the evolution until the hazard(s) have been eliminated.**

Worker's Name	Signature	Date

SOP-9
MEC/MPPEH CHARACTERIZATION AND MDAS/SMALL ARMS DISPOSAL CAMP BONNEVILLE

TABLE OF CONTENTS

1. SCOPE AND APPLICATION

The objective of this standard operating procedure (SOP) is to provide guidance and general reference information for the classification of Munitions and Explosives of Concern (MEC) and Material Potentially Presenting an Explosive Hazard (MPPEH) and the storage and disposal of Material Documented as Safe (MDAS) and small arms. Onsite disposal (detonation) of MEC and Material Documented to be an Explosive Hazard (MDEH) is addressed in SOP-8.

2. CHARACTERIZATION OF MEC AND MPPEH ITEMS

Guidance in this section will be used immediately after items are identified, to first determine if items are safe to move, and then to accurately characterize them to facilitate proper handling and disposition. A three tiered inspection process will be applied to all encountered MEC and MPPEH items (UXO Tech II/III team member, Team Leader, and SUXOS). The UXOQCS will also inspect a minimum 10 percent of items to verify correct characterization.

2.1 MEC DEFINITION

MEC includes the following three specific categories of military munitions that may pose unique explosives safety hazards/risks:

- Unexploded ordnance (UXO) - Military munitions that meet all of the following criteria: (a) have been primed, fused, armed, or otherwise prepared for action; (b) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard; and remain unexploded either by malfunction, design, or other cause.
- Discarded military munitions (DMM) - Military munitions that have been abandoned without proper disposal, and that do not meet the criteria outlined above for classification as UXO.
- Munitions constituents (MC) - Any materials originating from UXO, DMM, or other military munitions including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. MC may also include soil containing more than two percent of primary (initiating) explosives or more than ten percent of secondary explosives that may pose an explosion hazard.

2.2 MPPEH DEFINITION

MPPEH is defined as material owned or controlled by the Department of Defense that, prior to determination of its explosives safety status, potentially contains explosives or munitions or potentially contains a high enough concentration of explosives that the material presents an explosive hazard. MPPEH may be comprised of either MDAS or MDEH as described below.

- MDAS – Defined as MPPEH that has been assessed, 100 percent visually verified to be free of remaining explosive or other energetic material residue (5X material), documented as not presenting an explosive hazard, and for which the chain-of-custody has been established and maintained.
- MDEH - All MPPEH items that cannot be characterized as MDAS (i.e., 1X or 3X material) because they retain some degree of explosive hazard or have cavities that cannot be 100 percent visually inspected. MDEH may include munitions-related material which potentially contains explosive residues or a high enough concentration of explosives to present an explosive hazard (e.g., munitions containers, packaging material, munitions fragments remaining after use, demilitarization/disposal and other range-related debris, and munitions processing equipment associated with munitions production, demilitarization, or disposal operations).

Note that, in the context of this SOP, unexpended small arms ammunition (ammunition 0.50 caliber or smaller having a non-explosive projectile) with live primers/propellant will be managed as MDEH pending offsite transportation for disposal.

2.3 DETERMINATION OF MEC AND MPPEH AS SAFE OR UNSAFE TO MOVE

An independent determination of whether each encountered MEC or MPPEH item is safe to move will be completed by the Team Leader and UXOSO BEFORE each encountered item is handled. Items will be categorized as SAFE or UNSAFE to move based on a careful visual examination and positive identification. The determination will be documented by the Team Leader.

2.3.1 Safe to Move

MEC and MPPEH items determined safe to move will be further categorized as described in Section 2.4 and managed as described in Sections 3 and Section 4.

2.3.2 Unsafe to Move

MEC and MPPEH items determined unsafe to move will be blown in place in accordance with SOP-8.

2.4 CHARACTERIZATION OF MPPEH AS MDEH OR MDAS

MPPEH items will be carefully inspected and characterized as MDAS or MDEH by the UXO Tech II/III Team Member, and be independently verified by the Team Leader and SUXOS. MDAS and MDEH items, once categorized, are no longer considered MPPEH. Should the chain of custody for MDAS and/or MDEH items be lost or items become comingled, the MDAS and/or MDEH items shall lose their documented explosives safety status and become MPPEH.

The UXOQCS will also inspect a minimum of 10 percent of MDAS, MDEH, and MEC items to verify correct characterization.

2.4.1 Material Documented as Safe

MPPEH will be categorized as MDAS by visual inspection which requires an independent 100 percent inspection by each certifying person.

MDAS may contain residual explosives; however these residues shall not be in concentrations or configurations sufficient to pose an explosive hazard. Items shall only be classified as MDAS through visual inspection when every surface is visible and capable of being inspected. Visual inspection is only applicable to pieces of metal that have no cavities, holes, blind spaces, rivets, cracks, or other obscured features. Probes shall NOT be used to inspect any blind cavities or used to satisfy the 100 percent visual inspection requirement.

Items categorized as MDAS will be managed as described in Section 3.2.

2.4.2 Material Documented as an Explosive Hazard

MPPEH is categorized as MDEH when it cannot be documented as MDAS due to one of the following reasons:

- Has been examined and no contamination can be visually noted on accessible surfaces, but explosives may be present in concealed housings or other hidden areas such as internal cavities or devices that contain explosives. These items are not safe to be treated with open flame, high temperature heating devices, cutting devices, or hammering devices unless the maximum potential explosives safety hazards that the material is known or expected to present are addressed.
- Is expected to be free of an explosion hazard, but not enough information is available to certify it as safe. This may be because:
  - There are potentially internal cavities or devices that contain explosives
  - The material has not been 100 percent inspected
  - The certification process has not been completed to the point of documentation with dual signatures
- Is known or suspected to pose an explosive hazard

3. HANDLING, TRANSPORTATION, AND STORAGE OF RECOVERED MEC, MDEH, AND MDAS ITEMS

3.1 MEC AND MDEH

This section describes the procedures associated with the packaging, transportation, and storage of recovered MEC/MDEH and MDAS items.

3.1.1 MEC/MDEH Handling

Recovered MEC and MDEH items shall remain under the control of a qualified UXO Technician at all times and be handled only by UXO Technicians in accordance with the procedures in this section until it can be safely stored, awaiting demolition.

3.1.2 MEC/MDEH Packaging

This section provides instructions for the packaging of MEC and MDEH items prior to transportation and storage in an onsite magazine or the Central Impact Target Area (CITA) demolition pit.

Equipment Required:

- Metal ammunition cans
- Dry sand or other inert filler
- Sandbags or tiedown straps (large items)

Procedure:

1) Smaller items will be packed in metal ammunition cans using approximately three inches of clean dry sand or other appropriate inert filler around the items to prevent contact with the container or other items. Items will not be buried in such a manner that it could present a hazard. Small arms ammunition may be bulk packed. Relatively insensitive items may be bulk packed in transport/storage containers without the use of special containers or packaging materials.
2) Larger items will be packed in a manner consistent with all safety considerations applicable to the specific item. Items too large to pack in containers may be restrained from movement during transport using tie-down straps and/or sand bags.
3) Smokeless powder and pyrotechnic devices will be packaged using approximately three inches of damp sand (or other inert fireproof material) placed in the bottom of the ammunition can. A single layer of smokeless powder grains or pyrotechnic devices will then be placed on the sand. Propellant/pyrotechnic storage containers will either be fitted with a vented lid, or the lid will be removed.

3.1.3 MEC/MDEH Transportation

This section provides instructions for the loading, onsite transportation, and unloading of recovered MEC and MDEH.

MEC and MDEH items will not be transported offsite due to the inherent hazards associated with the transportation of potentially unstable explosives over public highways. Small arms ammunition will be transferred to an authorized munitions disposal contractor for offsite disposal in accordance with all applicable federal, state, and local regulations.

Prerequisites:

- The transport vehicle will be inspected and must meet all applicable requirements for the safe transportation of MEC/MDEH .
- Items will only be transported by the SUXOS, UXOSO, or UXOQCS.
- MEC and MDEH items will be packed as described in Section 3.1.2 prior to loading for transport.

Equipment Required:

- Transport vehicle
- Fire extinguisher (10BC minimum)
- Wooden bed liner
- Tiedown straps or sand bags (as required)

Procedure:

1) The driver will park the transport vehicle on a level and stable site; turn off ignition, set parking brake.
2) The UXO Technician (assisted by team members as directed) will then place the MEC/MDEH items and/or containers into the cargo bed of the transport vehicle. A maximum of 25 pounds net explosive weight (NEW) may be transported at one time.
3) Items and/or containers shall be secured to prevent movement during transport. Individual larger items may be secured with blocking/bracing, tiedowns, sandbags, or other measures as determined by the transport vehicle operator and the SUXOS for the specific items to be transported.
4) Once the load is safely positioned on the transport vehicle to the satisfaction of the UXO Technician and transport vehicle operator, the cargo compartment will be secured.

5) The driver will start the vehicle, release the parking brake, and proceed directly to the magazine or CITA demolition pit over the designated explosive transportation route at a maximum speed of 15 miles per hour. No more than two team members may ride in the cab of the vehicle in addition to the driver (no personnel may ride in the cargo area).
6) Upon arrival at the magazine or CITA demolition pit, the driver will turn off the ignition and set the parking brake.
7) The UXO Technician will then supervise unloading of the vehicle.

3.1.4 MEC/MDEH Storage

If MEC items are acceptable to move, they will be relocated to the CITA for futre disposal. The facility is site-approved by the Department of Defense Explosives Safety Board (DDESB) for the temporary storage.

*****WARNING*****

Under no circumstances will unstable energetic materials or other items which are incompatible with stored MEC/MDEH items be placed the magazine. Unstable/incompatible items will be transported directly to the onsite CITA demolition pit and thermally treated (see SOP-8).

Procedure:

- The following actions are prohibited when placing materials in the CITA.
  - Operating cell phones or radios
  - Smoking or the possession of any matches, cigarette lighters, or any other flame or spark producing devices
  - Loitering
- The SUXOS will retain custody of the log.
- Only UXO Technicians, or authorized persons under their immediate control, shall be allowed access to the storage area. Under no circumstances shall persons other than UXO Technicians be allowed to handle MEC/MDEH items.
- A weekly inventory will be performed to ensure accountability for all items awaiting thermal treatment. Any identified discrepancies will be corrected as soon as possible.

Discrepancies affecting personnel safety or the safety/security of stored material must be corrected before additional items are placed into storage.

- The SUXOS is responsible for maintaining an up-to-date inventory of all items stored pending thermal treatment.

3.2 MDAS

MDAS items will be kept segregated from MEC/MDEH items and other non-munitions scrap.

4. DISPOSITION OF RECOVERED MATERIAL

4.1 MEC/MDEH ITEMS

MEC and MDEH items will be thermally treated at the onsite CITA demolition pit in accordance SOP-8. The final disposition of each item will be entered in the M1 form to provide a permanent record of thermal treatment.

4.2 MDAS ITEMS

MDAS may be released for offsite demilitarization (for example, mutilating, crushing, smelting) only if the integrity of the containers and the chain of custody has been maintained, and if proper explosives safety status documentation accompanies the material being released from WESTON control.

- Two UXO Technicians specifically authorized by Clark County (via signed authorization letter) to sign MDAS transfer documents will complete the Department of Defense (DOD) Form 1348-1A included in Attachment F of the Work Plan transferring MDAS to a qualified munitions scrap disposal contractor.
- MDAS items will be transported off site by the certified munitions scrap disposal contractor for recycling or disposal. Documentation of demilitarization and disposal will be provided by the contractor following final disposition.

4.3 UNEXPENDED SMALL ARMS AMMUNITION

Unexpended small arms ammunition will be transferred to a certified munitions scrap disposal contractor for demilitarization and recycling/disposal off site. Transfer will be documented using a standard DOD Form 1348-1A included in Appendix F of the Work Plan. Documentation of demilitarization and disposal will be provided by the contractor following final disposition.

4.4 NON-MUNITIONS METALLIC SCRAP

Non-munitions metallic scrap will be inspected and certified as non-munitions scrap by two UXO Technicians and segregated pending offsite recycling or disposal. All non-munitions scrap will be inspected by the site Archaeologist.

4.5 NON-MUNITIONS NON-METALLIC DEBRIS

Non-munitions non-metallic debris will be inspected and certified as non-munitions scrap by two UXO Technicians pending offsite disposal. All non-munitions scrap will be inspected by the site Archaeologist.

APPENDIX H
PERSONNEL QUALIFICATIONS CERTIFICATIONS
Certifications of UXO Techs will be maintained on site in the field office

Appendix H
Camp Bonneville Site Personnel

A current list of UXO Technicians and their certifications are kept on file on site and available for inspection at any time.

Name	**Title**
Andrew Caldwell	SUXOS
Greg Clark	UXOSO
Michael Everman	UXOQCS
A current list of UXO Technicians is maintained in the Field Office along with copies of their certifications and training records.	UXO Technicians

APPENDIX I
EXPLOSIVES SAFETY SUBMISSION AMENDMENT 3

Explosives Safety Submission
Amendment 3

MUNITIONS AND EXPLOSIVES OF CONCERN REMEDIAL ACTION

Central Valley Floor and Associated Wetlands (CVFAW),
Western Slopes Area (WSA),
Artillery Firing Positions 1, 2, 3, 4, and 7 (ARTY),
Mortar Firing Positions 1, 2, 4, 5, and 6 (MORT),
Demolition Areas 1 and 2 (DEMO),
Hand Grenade Range (HAND),
Rifle Grenade Range (RIFLE), and
3.5-inch Rocket Range (ROCK)

Camp Bonneville, Vancouver,
Washington

August 2015

Prepared by Weston Solutions, Inc.
for
Clark County Department of Public Works
Vancouver, Washington

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Section **Page**

LIST OF TABLES

LIST OF APPENDICES

1.0 BACKGROUND

This Explosives Safety Submission (ESS) is prepared in support of the munitions and explosives of concern (MEC) remedial action (RA) at the following Munitions Response Sites (MRSs) located at the former Camp Bonneville Military Reservation (CBMR) in Vancouver, Washington:

- Central Valley Floor and Associated Wetlands (CVFAW)
- Selected areas (< 25% slope) in the Western Slopes Area (WSA)
- Artillery Firing Positions 1, 2, 3, 4, and 7 (ARTY)
- Mortar Firing Positions 1, 2, 4, 5, and 6 (MORT)
- Demolition Areas 1 and 2 (DEMO)
  DEMO Area 1 (includes the area within a 1,200-foot radius centered on DEMO Area 1)
  DEMO Area 2 (includes a 500-foot x 500-foot area centered on DEMO Area 2)
- Hand Grenade Range (HAND)
- Rifle Grenade Range (RIFLE), includes firing point and target area
- 3.5-inch Rocket Range (ROCK), includes firing point and target area

Table 1-1 summarizes the total acreage, munitions response action, and institutional controls to be used during the response action for each MRS.

Table 1-1: Summary of MRSs

Area	Total Acreage	Munitions Response Action	Institutional Controls (IC)
CVFAW	449	MEC Surface and Subsurface Clearance to Depth of 14 inches	No area-specific IC required
WSA	425	MEC Surface Clearance on less than 25% slope	Area-specific IC required, signage to remain on roads and trails
ARTY	2.3	MEC Surface and Subsurface Clearance to Depth of 14 inches	No area-specific IC required
MORT	2.3	MEC Surface and Subsurface Clearance to Depth of 14 inches	No area-specific IC required
DEMO	109.5	MEC Surface Clearance	No area-specific IC required
HAND	2.5	MEC Surface Clearance	No area-specific IC required
RIFLE	2.5	MEC Surface Clearance for target area; Surface and Subsurface Clearance to Depth of 14 inches for firing point	No area-specific IC required
ROCK	5.2	MEC Surface Clearance for target area; Surface and Subsurface Clearance to Depth of 14 inches for firing point	No area-specific IC required

Between 1909 and 1995, live and practice munitions including artillery and mortar rounds, shoulder-fired rockets, land mines (practice only), grenades, and small-arms ammunitions were stored and used on the CBMR. CBMR was selected in 1995 as a Department of Defense Base Realignment and Closure (BRAC) property. Clark County Government was selected as the Local Redevelopment Authority (LRA) for the property. CBMR was transferred to Clark County in August 2006.

1.1 SITE LOCATION

The 3,840-acre CBMR site is located northeast of Vancouver, Washington, in the southeastern region of Clark County (Appendix A, Figure 1). The property is approximately five miles northeast of the corporate limits of the City of Vancouver, Washington and approximately seven miles north of the Columbia River.

1.2 SITE DESCRIPTION

The terrain within the CVFAW is generally flat with only slight upward inclines along the southern border. The Central Valley Floor (CVF) consists of 449 acres with approximately 120 acres of wetlands. Vegetation ranges from native grasses to old growth trees and forest undergrowth. Removal of vegetation will be necessary for detection and removal operations. Terrain and vegetation will not hinder detection and removal operations.

The terrain within the WSA is gently rolling to very steep terrain. This ESS covers all acreage within select areas of the WSA considered accessible (< 25% slope) totaling approximately 425 acres. Vegetation within the WSA ranges from native grasses to old growth trees and forest undergrowth. Removal of undergrowth vegetation will be necessary for MEC surface clearance operations.

The ARTY, MORT, DEMO, HAND, RIFLE, and ROCK sites are located within or immediately adjacent to the CVFAW and WSA in similar terrain and vegetation types.

1.3 SOIL CONDITION

There is a potential for encountering volcanic rock such as basalt in all MRSs; however, no significant impacts to geophysical or MEC clearance operations are anticipated.

1.4 SITE HISTORY

The CVFAW was an extensively-used target and training area as identified in historical operations reports and confirmed through the number of surface MEC and munitions debris (MD) items found and subsurface anomalies detected during previous Interim Actions. Over 750 MEC and MD items were encountered during surface removal operations in the CVFAW. Additionally over 38,000 subsurface anomalies were detected during the surface clearance of the CVFAW. A number of target areas and/or waste disposal areas in the CVFAW have been identified, including the following:

- Stokes Mortar Target Area
- MEC Disposal Area (Burial Pit)
- Open Burn/Open Demolition (OB/OD) Area
- 37-millimeter (mm) Artillery/Stokes Mortar Target Area
- Rifle Grenade Target Area
- 2.36-inch Rocket Target Area near the Former Sewage Lagoons

The WSA use was limited to non-live fire exercises where pyrotechnics and blank ammunition were typically used to train troops and convoys in tactics. However, during transect investigations in the WSA, two Stokes mortars (fired, unfuzed) were recovered.

1.5 CURRENT AND FUTURE LAND USE

1.5.1 Current Land Use

Since 1995, the CBMR has been maintained in caretaker status and the property is currently not accessible to the general public. Law enforcement agencies provide small arms training at ranges located within the CBMR.

1.5.2 Future Land Use

The CBMR will be used as a Clark County regional park. Uses will include camping and hiking. The CVFAW comprise the major portion of the proposed regional park. The CVFAW includes both future High Intensity Reuse Areas (e.g., tent camping areas/construction) as well as Accessible Medium Intensity Reuse Areas (non-intrusive activities). The WSA is classified as Limited Access Medium Intensity Reuse areas in the future Regional Park and have limited future reuse intensity due to terrain, vegetation and location outside the Central Valley in the Regional Park.

The Accessible Medium Intensity Reuse Areas differ from the High Intensity Reuse Areas only in the number of people and type of activities likely to occur in these areas.

1.6 PROJECT AREA

This ESS applies to the CVFAW MRS (Appendix A, Figure 2), the WSA MRS (Appendix A, Figure 3), the DEMO and MORT MRSs (Appendix A, Figure 4), and the ARTY, HAND, RIFLE, and ROCK MRSs (Appendix A, Figure 5).

1.6.1 General

A description of the MRSs covered by this ESS is given in Section 1 and shown in Table 1-1. This ESS covers the following munitions response actions:

- Surface removal and removal to 14 inches bgs-CVFAW, ARTY, MORT, RIFLE (firing point), and ROCK (firing point) MRSs.
- Surface removal (0 to 3 inches bgs)-WSA, DEMO, HAND, RIFLE (target area), and ROCK (target area) MRSs.

The munitions response actions remaining at CBMR include the following MRSs and will be addressed in future ESSs as funding becomes available:

- Central Impact Target Area (CITA) Clearance and Expansion.
- Western Slopes Area Surface Clearance (> 25% slope).
- Remaining stepouts from previous clearance.

1.6.2 Historical and Characterization Data Analysis

MEC and MD surface findings to date in the CVFAW include the following: 3.5-inch and 2.36-inch training rockets, 75-mm and 37-mm high explosive (HE) projectiles, HE, chlorobenzylidene malonitrile (CS), and smoke grenades, rifle grenades, training anti personnel and anti tank land mines and various sub caliber rounds. In addition to this, several previously uninvestigated MEC and MD burial pits and a disposal area were identified. Historically, the 75-mm HE projectile has been the round with the greatest fragment distance found in the CVFAW. A 105-mm HE projectile was also encountered next to the old magazines, however, it was unfuzed, in a storage configuration, and determined to be an isolated military munition.

A summary of CVFAW munitions response and related activities conducted from 1997 to 2009 are presented below.

- Archives Search Report (ASR) 1997 – The ASR outlined the nature and degree to which MEC may potentially be present contamination at CBMR.
- MEC Site Characterization 1998 – The purpose of this action was to determine the presence and density of MEC at CBMR.
- Time-Critical Removal Action (TCRA) 1999, 2000 – The purpose of this action was to remove all live and inert MEC and any MD in the two former M203 rifle grenade ranges TA 8 and TA 9. These ranges totaled approximately 12 acres combined. Both of these ranges are within the CVFAW. This action was expanded to 19 acres that included a buffer zone around the two former ranges. Geophysical surveys and munitions response removal actions were conducted at TA 8 and TA 9 to a depth of two feet.
- Instrument-aided Field Reconnaissance 2001/2002 – The action was to confirm the location and characterize any MEC-related characteristics of Areas of Concern (AOCs) and Areas of Potential Concern (AOPCs) within the CVFAW.
- Bonneville Conservation Restoration and Renewal Team, LLC (BCRRT) Remedial Action Unit (RAU) 3 site-wide munitions cleanup-2006/2009 – During the course of this cleanup, numerous MEC and MD items were found in areas of the CVFAW where they were not anticipated. Washington Department of Ecology (WDOE) required the BCRRT to conduct a supplemental Remedial Investigation / Feasibility Study (RI/FS). The results of the report determined that a much more thorough cleanup action was needed for the future land use of the CVFAW.

The results of the actions listed above have been used by the U.S. Army, regulatory agencies and other stakeholders to select and design the munitions response activities associated with this ESS within the MRSs.

1.6.3 Selected Munitions Response Actions

Table 1-1 summarizes the munitions response actions for the various MRSs.

Land Use Controls

For each MRS, those Land Use Controls selected as likely to be effective and feasible are described in Section 10.1 of this ESS.

1.7 REASON FOR MUNITIONS AND EXPLOSIVES OF CONCERN

The site history in Section 1.4 provides the reason for MEC on the property.

1.8 TYPE OF MEC

The results are detailed in Section 1.6.2 above and Table 1-2.

Table 1-2: Type and Depth of MEC Recovered

MRS	MEC Recovered	Maximum Depth of MEC Recovered During Site Investigation/RA (below ground surface [bgs])	Maximum Geophysical Detection Depth (below ground surface [bgs])
CVFAW	3-inch Stokes	13 inches	33 inches
WSA	75-mm HE Mk I	10 inches	33 inches
ARTY	3-inch Stokes	Surface	33 inches
MORT	4.2-inch M3A1 mortar round(1)	Not applicable	46 inches
DEMO	2.75-inch HE rocket	Surface	30 inches
HAND	M26A2 grenade(1)	Not applicable	26 inches
RIFLE	M9A1 rifle grenade(1)	Not applicable	24 inches
ROCK	3.5-inch M28A2 rocket(1)	Not applicable	38 inches

(1) No MEC recovered to date, item listed is suspected based on former use of the MRS.

2.0 FIGURES

Figures are presented in Appendix A. Figure 1 shows a map of the site in relation to the surrounding area. Figures 2, 3, 4, and 5 are maps showing each MRS with the Quantity Distance (Q-D) arcs that will be used during the MEC removal action in that area. Figure 6 shows the established demolition area with its Q-D arcs. Figure 7 shows the explosives storage magazine Q-D arcs and the location of the magazines within the CBMR.

3.0 EXPLOSIVES SAFETY QUANTITY-DISTANCE

3.1 MUNITION WITH GREATEST FRAGMENTATION DISTANCE

The munition with the greatest fragmentation distance (MGFD) known or suspected to be present at each MRS is identified in Table 3-1. If a MEC with a greater fragmentation distance is encountered, the minimum separation distance (MSD) will be adjusted in accordance with the Department of Defense Explosive Safety Board (DDESB) Technical Paper 16, operations will

continue, and an amendment to this ESS will be submitted for approval (a copy of this document will be available on site). Q-D arcs will be adjusted accordingly.

A two-stage clearance procedure described in Section 6.5.2, incorporating the initial manual removal of larger items and subsequent mechanized soil processing, was incorporated into Amendment 1 as an option for the CVFAW MRS. Therefore, smaller MGFDs applicable to the mechanized process in the CVFAW MRS are also designated with the MGFDs in Table 3-1.

Table 3-1: Summary of Site MGFDs

MRS	MGFDs		MSD (feet)[1]				
	Description	NEW (lbs)	Fragmentation Effects		Blast Overpressure Effects		
			HFD (feet)	MFD-H (feet)	K328	K40	K24
Primary Site MGFDs							
WSA	75-mm Mk I HE projectile	1.64	239[2]	1,873[3]	387	47[4]	28
CVFAW	3-inch Stokes mortar	2.15	225[2]	1,379[3]	423	52[4]	31
ARTY	155-mm M107 projectile	15.45	450[2]	2,630[3]	858	105[4]	63
MORT	4.2-in M3A1 mortar	8.17	316[2]	1,670[3]	661	81[4]	48
DEMO	155-mm M107 projectile	15.45	450[2]	2,630[3]	858	105[4]	63
HAND	M26A2 grenade	0.36	288[2]	312[3]	246	30[4]	18
RIFLE	M9A1 rifle grenade	0.25	113[2]	709[3]	230	28[4]	17
ROCK	3.5-in M28A2 rocket	1.88	157[2]	772[3]	425	52[4]	31
CVFAW Mechanized Process MGFDs							
CVFAW	2.36-inch M6A3 rocket warhead	0.5	133[2,5]	790[3]	290	35	21
	37-mm Mk II projectile	0.053	90[2]	982[3,5]	123	15	9

(1) Fragmentation Data Review Forms (FDRFs), DDESB database updated August 21, 2014. See Appendix B for calculation sheets and documentation of MSD.
(2) Unintentional detonations.
(3) Intentional detonations without engineering controls (200 feet using sandbag mitigation).
(4) Team separation distance.
(5) CVFAW Mechanized Process team separation distance is either the HFD of the 2.36-inch M6A3 rocket warhead (Mechanized Low-Input Operations) or the MFD of the 37-mm Mk II projectile (Mechanized High-Input Operations).

3.2 MEC AREAS

The MSD restrictions from MEC areas to non-essential personnel will be applied during all surface and subsurface MEC removal and disposal operations.

3.3 DEMOLITION EXPLOSIVES

3.3.1 Explosive Storage Magazines

Donor explosives will be stored in two Bureau of Alcohol, Tobacco, and Firearms (BATF) Type 2 magazines with attached detonator boxes. The magazines will be sited as depicted on Appendix A, Figure 7 as described in Section 7.2. No more than 100 pounds (lbs) net explosive weight (NEW) will be stored in a single magazine. The Inhabited Building Distance (IBD) for this NEW is 658 feet in accordance with the Department of Defense (DoD) 6055.09-M Table V3.E3.T2 and the Public Transportation Route (PTR) distance is 395 feet in accordance with DoD 6055.09-M Table V3.E3.T2. These distances are more safety conservative than those prescribed by the BATF. Magazines will be separated by a minimum of the Inter-Magazine Distance (IMD) K11 of 51 feet in accordance with DoD 6055.09-M V3.E3.T8. These commercial explosives will have assigned DoD hazard division/storage compatibility groups (HD/SCG) and will be stored in accordance with DoD 6055.09-M, DA Pam 385-64, and any local installation regulations.

3.4 PLANNED OR ESTABLISHED DEMOLITION AREAS

The established demolition area has been set inside the CITA on the west side near the western most target area as shown on Appendix A, Figure 6. This location will provide enhanced security for the demolition operations since it is inside the CITA fence and is accessible by only one road. There are no public traffic routes or inhabited buildings within the Q-D arcs. Sandbag mitigation or earth tamp engineering controls will be used at all times during this clearance to reduce the MSD as described in Section 7.3 of this ESS.

3.5 FOOTPRINT AREAS

3.5.1 Blow-in-Place

If MEC items are acceptable to move, they will be relocated to the CITA for later disposal, if an item is unacceptable to move, it will be blown-in-place using engineering controls. An MSD will

be established in accordance with Table 3-1 and procedures outlined in Section 7 of this ESS will be followed.

3.5.2 Collection Points

Collection points are those areas used to temporarily accumulate MEC pending destruction at the end of the day or end of the week using consolidated shots. The NEW at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the HFD for the area. MEC will not be left unattended at any location in the CVFAW or the WSA during any phase of the MEC removal action.

3.5.3 In-Grid Consolidated Shots

No in-grid consolidated shots will be conducted.

3.6 MAXIMUM CREDIBLE EVENT (MCE)

It is not anticipated that any explosive soil as defined in DoD 6055.9-M, V7 E4.4 will be encountered. Any suspected explosive contaminated soil will be sampled. If explosive soil is confirmed it will be isolated in a manner protective of the environment and a remediation plan will be designed by WESTON and Clark County. The MSD will be calculated in accordance with DoD 6055.09-M V7.E4.5.8.3.7.4.2.

4.0 START DATE

The start date for this project was 18 June 2012.

5.0 MEC MIGRATION

With the exception of frost heave and surface water erosion, there does not appear to be any other naturally occurring phenomenon that could significantly impact MEC migration. According to Unified Facilities Criteria 3-310-01 (DoD 2005), the average depth of the frost at CBMR is 14 inches.

6.0 DETECTION EQUIPMENT AND RESPONSE TECHNIQUES

6.1 REMOVAL DEPTH

The removal depth for each munitions response area is listed in Table 1-1.

6.2 DETECTION EQUIPMENT

A combination of one or more of the following detection technologies will be used at this site.

6.2.1 Analog Clearance Using Flux-Gate Magnetic Gradiometers

- Subsurface Instruments ML -3
- Magna-Trak 200® Series
- GA-52 Schonstedt

6.2.2 Analog Clearance Using Electromagnetic Induction

- Minelabs F3 UXO
- Whites Spectrum XLT

6.2.3 Digital Geophysical Mapping Using Time-Domain Electromagnetic Induction

- Geonics EM-61 MK2 time-domain electromagnetic induction instrument
- Geonics EM-61 MK2 Handheld instrument

6.3 SWEEP PROCEDURES

The visual survey portions of the MRS will be divided into search lanes that are suitable for the equipment and terrain. The search lanes will be optimized based on site conditions and lanes will be delineated with line, flags, marking paint and/or marking tape.

6.4 EXCLUSION ZONE CONTROL

Prior to initiation of on-site MEC operations, all nonessential personnel will be moved outside the appropriate exclusion zone (EZ) delineated by the MSDs provided in Tables 6-1 and 6-2. Once MEC operations commence, positive control of the EZ will be maintained, only essential personnel will be allowed inside the EZ and non-essential personnel will be prevented from entering the EZ by a combination of road closures, signage or security guards.

6.5 INTRUSIVE INVESTIGATION

The intrusive investigation of anomalies and removal of encountered MEC and Munitions potentially presenting an explosive hazard (MPPEH) will be completed using either a manual excavation technique or by utilizing a two phase manual/mechanized soil excavation process. The controlling MSDs for manual and mechanized processes are provided in Tables 6-1 and 6-2, respectively.

6.5.1 Manual Soil Excavation and MEC Removal

The investigation and removal of anomalies will be completed manually where practicable. Only unexploded ordnance (UXO)-qualified personnel and UXO Tech Is under the supervision of UXO-qualified personnel will perform the manual excavation and investigation of anomalies. Mechanized equipment such as a backhoe or tracked excavator may be used to assist in the removal of overburden to within 12 inches of an item laterally and vertically; hand tools will be used to remove remaining overburden and expose the item. Non-MEC items will be transported to an approved off-site facility. MSDs for manual operations are included in Table 6-1.

6.5.2 Two Phase Manual/Mechanized Soil Excavation and MEC Removal Process

Mechanized soil excavation and MEC removal techniques, augmenting the manual method described above, may also be employed to remove MEC, MPPEH, and other debris in areas where soil conditions and the density of metallic debris precludes the effective use of manual techniques. Soil in these areas would be cleared in a two-phase process:

- Phase 1-Preliminary manual excavation and removal of larger items.
- Phase 2-Mechanized soil excavation followed by either the manual or mechanized removal of any remaining smaller items from the excavated soil.

6.5.2.1 Manual MEC Removal (Phase 1)

The initial manual excavation step, using a process similar to that described in Section 6.5.1, will be performed to remove all 57-mm projectiles, 2.75-inch rockets, and other items 3-inch in diameter and larger. This initial step is not required at the HAND and RIFLE MRSs because the primary site MGFDs are less than 3-inches in diameter.

6.5.2.2 Mechanized Soil Excavation and MEC Removal (Phase 2)

The subsequent mechanized soil excavation and processing step will remove any remaining items down to ½-inch in size. Wet soil may be aerated (where necessary due to the heavy clay nature of the soil) utilizing a tractor and disk to facilitate drying prior to excavation. Soil will then be removed utilizing an excavator. The tractor and excavator will provide the required K24 standoff distance (K18 with appropriate hearing protection) and be fitted with appropriate fragment shielding.

The disking and subsequent removal of soil using an excavator is classified as a low-input operation based on the following rationale:

- The anticipated MEC items remaining after the preliminary manual clearance step are all smaller items that would likely not be contacted by the excavator bucket cutting edge.
- Soil will be excavated using a horizontal scooping motion of the excavator bucket toward the operator that will minimize the effect of any potential contact with MEC items.
- The relatively soft nature of the soil will cushion mechanical impact forces on any MEC items that might be present and minimize the likelihood of an unintentional detonation.

Therefore, all mechanized soil excavation and handling operations are classified as "low-input" operations by DoD 6055.09-M Section V7.E4.5.8.3.5.

The removal of remaining smaller items from the excavated soil may be performed using either a manual or a mechanized process.

Manual Removal-The excavated soil will be spread into layers to facilitate the location of remaining anomalies using handheld instruments. Items will be removed using a process similar to that described in Section 6.5.1. The primary site MGFDs will govern the manual removal process at each MRS.

Mechanized Removal-The excavated soil will be placed into trucks and transported to the nearby screen plant location. The screen plant will be located such that the resulting exclusion zone remains entirely within the existing Primary MGFD unintentional detonation arcs shown on Appendix A Figures 2, 3, 4, and 5. Soil will be stockpiled pending screening and, if excessively wet, spread out and allowed to dry or combined with drier soil using earth-moving equipment to facilitate the screening process.

Soil will be processed to remove items down to ½-inch in size. Oversized (reject) material will

be collected for later inspection and categorization by UXO Technicians. The screen plant will run unattended, except for the loading of unscreened soil and the movement of oversized (reject) material and sifted soil to maintain uninterrupted plant operation. Equipment operators performing soil handling operations, and other essential personnel inside the established exclusion zone during screen plant operations will be protected by appropriate fragment shielding (Table 6-2) and by maintaining a minimum K24 distance from the screen plant. Hearing protection devices may be used to allow a reduction in the K24 distance to K18. All other personnel will remain outside the established exclusion zone during operation of the plant. Cleaning of screens and the inspection of rejected material to remove MEC and MPPEH will be performed only while the screen plant is shut down.

Operation of the mechanized screen plant may be classified as either a "low-input" or "high-input" operation, depending on whether the screen plant configuration incorporates a mechanical "soil reducer" component to break up large clods that would otherwise plug the screens. Screen plant operation with a "soil reducer" component is classified as a "high-input" operation; operation without the "soil reducer" component is classified as a "low-input" operation. MSDs for both configurations are included in Table 6-2. Following screening and quality control inspections, the final screened material will be returned to the original excavations.

Table 6-1: Controlling MSDs for Manual Operations

CVFAW Primary MGFD (3-inch Stokes mortar)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations[1]	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	52[2]
		Public and non-essential personnel	HFD of the Primary MGFD	225[2]
WSA Primary MGFD (75-mm Mk I HE projectile)				
Operation	**Sited as**	**ES**	**Basis**	**MSD (feet)**
Manual Operations[1]	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	47[2]
		Public and non-essential personnel	HFD of the Primary MGFD	239[2]

Table 6-1: Controlling MSDs for Manual Operations (continued)

ARTY and DEMO Primary MGFD (155-mm M107 projectile)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations(1)	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	105(2)
		Public and non-essential personnel	HFD of the Primary MGFD	450(2)
MORT Primary MGFD (4.2-in M3A1 mortar round)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations(1)	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	81(2)
		Public and non-essential personnel	HFD of the Primary MGFD	316(2)
HAND Primary MGFD (M26A2 grenade)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations(1)	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	30(2)
		Public and non-essential personnel	HFD of the Primary MGFD	288(2)
RIFLE Primary MGFD (M9A1 rifle grenade)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations(1)	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	28(2)
		Public and non-essential personnel	HFD of the Primary MGFD	113(2)
ROCK Primary MGFD (3.5-in M28A2 rocket)				
Operation	**Sited as**	**Exposed Site (ES)**	**Basis**	**MSD (feet)**
Manual Operations(1)	Unintentional Detonation	UXO Teams (Team Separation Distance)	K40 of the Primary MGFD	52(2)
		Public and non-essential personnel	HFD of the Primary MGFD	157(2)

(1) Manual operations involve the excavation and removal of anomalies using hand tools.
(2) FDRFs, DDESB database updated August 21, 2014.

Table 6-2: Controlling MSDs for Mechanized Operations

Mechanized Soil Processing MGFDs Applicable to All MRSs [1] (2.36-inch M6A3 rocket warhead and 37-mm Mk II projectile)				
Operation	**Sited as**	**ES**	**Basis**	**MSD (feet)**
Mechanized Low-Input Operations[2]	Unintentional Detonation	Essential personnel (UXO Team and equipment operators)	K24 of the 2.36-inch M6A3 rocket warhead MGFD and 1.94 inches of Plexiglas or 0.37 inches of mild steel fragment shielding for the 37-mm Mk II projectile MGFD	21[3][4]
		Public and non-essential personnel and unshielded UXO Teams (Team Separation Distance)	HFD of the 2.36-inch M6A3 rocket warhead MGFD	133[3]
Mechanized High-Input Operations[5]	Intentional Detonation	Essential personnel (UXO Team and equipment operators)	K24 of the 2.36-inch M6A3 rocket warhead MGFD and 2.76 inches of Plexiglas or 0.57 inches of mild steel fragment shielding for the 37-mm Mk II projectile MGFD	21[3][4]
		Public and non-essential personnel and unshielded UXO Teams (Team Separation Distance)	MFD of the 37-mm Mk II projectile MGFD	982[3]

(1) The MGFDs selected for mechanized processing represent the items presenting the largest fragmentation and blast hazard that might reasonably be suspected to remain in any MRS after the manual removal of items larger than 3 inches in diameter.
(2) FDRFs, DDESB database updated August 21, 2014.
(3) Mechanized Low-Input Operations include the mechanized disking, excavation, and handling of soil prior to screening, and the mechanized screening of soil to remove anomalies (screening does not incorporate a "soil reducer" component).
(4) A K18 distance of 16 feet for the 2.36-inch M6A3 rocket warhead MGFD is acceptable provided that personnel wear hearing protection providing >9 decibel attenuation.
(5) Mechanized High-Input Operations include the mechanized reduction and screening of soil to remove anomalies (screening incorporates a "soil reducer" component).

6.6 QUALITY CONTROL AND QUALITY ASSURANCE

A quality program provides procedures for controlling and measuring the quality of all work performed during all site activities. All quality control (QC) and quality assurance (QA) activities will be performed and documented in accordance with all applicable technical/professional standards and the approved Work Plan and Quality Assurance Site Plan (QASP).

6.6.1 Quality Control

QC is an ongoing process that will include process observation and testing. The QC program will be managed by the project UXO Quality Control Specialist (UXOQCS). Upon completion of clearance activities in each grid, the team leader will inform the Senior UXO Supervisor (SUXOS) that the grid is ready for inspection. The SUXOS will turn the completed grid over to the UXOQCS for inspection and verification. Testing techniques include the following:

- Verification of clearance of at least 20% of completed investigation grids. This may be lowered to 10% if the QC/QA objectives are being consistently met or exceeded;
- Verification of reported no finds of DGM anomalies using the type detection instrument used in initial detection;
- A sweep of at least 20% of real time survey areas using handheld detectors with similar capabilities of those used to clear the area at the start of the project. This may be lowered to 10% if the QC/QA objectives are being consistently met or exceeded;
- Review of daily DGM QC data including coverage maps. This QC audit may be performed by an independent geophysicist contracted by Clark County;
- Ground truth of DGM data. This may include electronic sweeps of randomly selected DGM completed areas;
- Random inspection of detection instruments;
- Random inspection of MEC/MD inspection process; and
- Blind seeding of the MRS.

6.6.2 Quality Assurance

Completed work that has passed UXOQCS inspection will be submitted to Clark County for QA inspection, as applicable.

7.0 DISPOSITION TECHNIQUES

7.1 DEMOLITION OPERATIONS

All explosive operations will follow the procedures outlined in Technical Manual (TM) 60A-1-1-31. Demolition operations will be performed daily or properly secured until operations can be conducted.

7.2 EXPLOSIVE STORAGE, ACCOUNTABILITY, AND TRANSPORTATION

Explosives will be stored in BATF Type 2 explosives magazines at the location shown on Appendix A, Figure 7. Total control of explosives will be maintained while the explosives are on site. All vehicles transporting explosives will be properly inspected and equipped.

7.3 ENGINEERING CONTROLS

Sandbag mitigation or earth tamp engineering controls will be used at all times during this clearance to reduce the intentional detonation MSD. These controls will be used in accordance with HNC-ED-CS-98-7, HNC-ED-CS-S-00-3, HNC safety advisory dated 7 November 2011, and DDESB memo dated 29 November 2010 (Clarification regarding use of sandbags for mitigation of fragmentation and blast effects due to intentional detonation of munitions).

7.4 SCRAP PROCEDURES

7.4.1 Inspection and Certification

MPPEH procedures will be managed in accordance with DoD instruction (DoDI) 4140.62 and EM1110-1-4009. All MPPEH will be assessed and its explosives safety status determined and documented prior to transfer within the DoD or release from DoD control. Prior to release to the public, MPPEH will be documented by authorized and technically qualified personnel as Material Documented as Safe (MDAS) after a 100% inspection by two (2) Qualified UXO Technicians to determine that it is safe from an explosives safety perspective.

7.4.2 DD Form 1348-1A

Upon completion of all removal activities, Weston Solutions will complete a DD Form 1348-1A in accordance with EM 1110-1-4009 Chapter 14 to include the following statement.

"This certifies and verifies that the material listed has been 100 percent inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material."

7.4.3 Alternative Disposal Techniques

Small arms ammunition may be shipped to a specialized processor for disposal. The processor will be qualified to receive, manage, and process MPPEH in accordance with DoDI 4140.62. Packaging and transportation will comply with current Code of Federal Regulations (CFR).

8.0 ENVIRONMENTAL, ECOLOGICAL OR CULTURAL CONSIDERATIONS

No environmental or ecological (e.g., endangered species) impacts are expected during the munitions response actions identified in this ESS. However, while cultural considerations have not impacted or limited the munitions response actions selected for the CBMR, there is a potential for impact if cultural resources are located during the MEC removal actions. If cultural resources are identified, Clark County will be consulted to develop mitigation strategies to protect and or limit damage to the cultural resource.

9.0 TECHNICAL SUPPORT

9.1 MILITARY SUPPORT

In the event that a MEC item is encountered that cannot be positively identified, or a chemical filled munitions is suspected, the SUXOS will contact the Clark County Munitions Safety Advisor, who will be responsible for contacting the United States Army to obtain military Explosive Ordnance Disposal (EOD) assistance. WESTON shall maintain security at the site until military EOD support arrives, and will assist the military EOD as requested.

9.2 CONTRACTOR

All contractor UXO personnel will meet the training and minimum experience requirements of DDESB TP-18 for their assigned tasks.

10.0 RESIDUAL RISK MANAGEMENT

10.1 LAND USE CONTROLS

Land use controls will be required to ensure protection of human health and the environment. Restrictive Covenants for the land have been filed with the office of the Clark County Auditor. The land use controls that have been filed include:

- Residential Use Restriction;
- No Dig/Land Disturbance Restriction;
- No Public Access allowed during the Cleanup Period; and
- UXO construction support.

10.2 LONG-TERM MANAGEMENT

Clark County will be responsible for long-term maintenance (LTM). The LTM to be conducted will include but not limited to the maintenance of the fence and signs, and review and maintenance of institutional controls.

11.0 UXO SAFETY EDUCATION PROGRAM

Clark County will establish a limited MEC Awareness Safety Notification to inform the public of the dangers presented by unexploded ordnance, during cleanup, and a post remediation. MEC Awareness Safety Notification shall be implemented as an institutional control consistent with the planned reuse activities.

12.0 STAKEHOLDER INVOLVEMENT

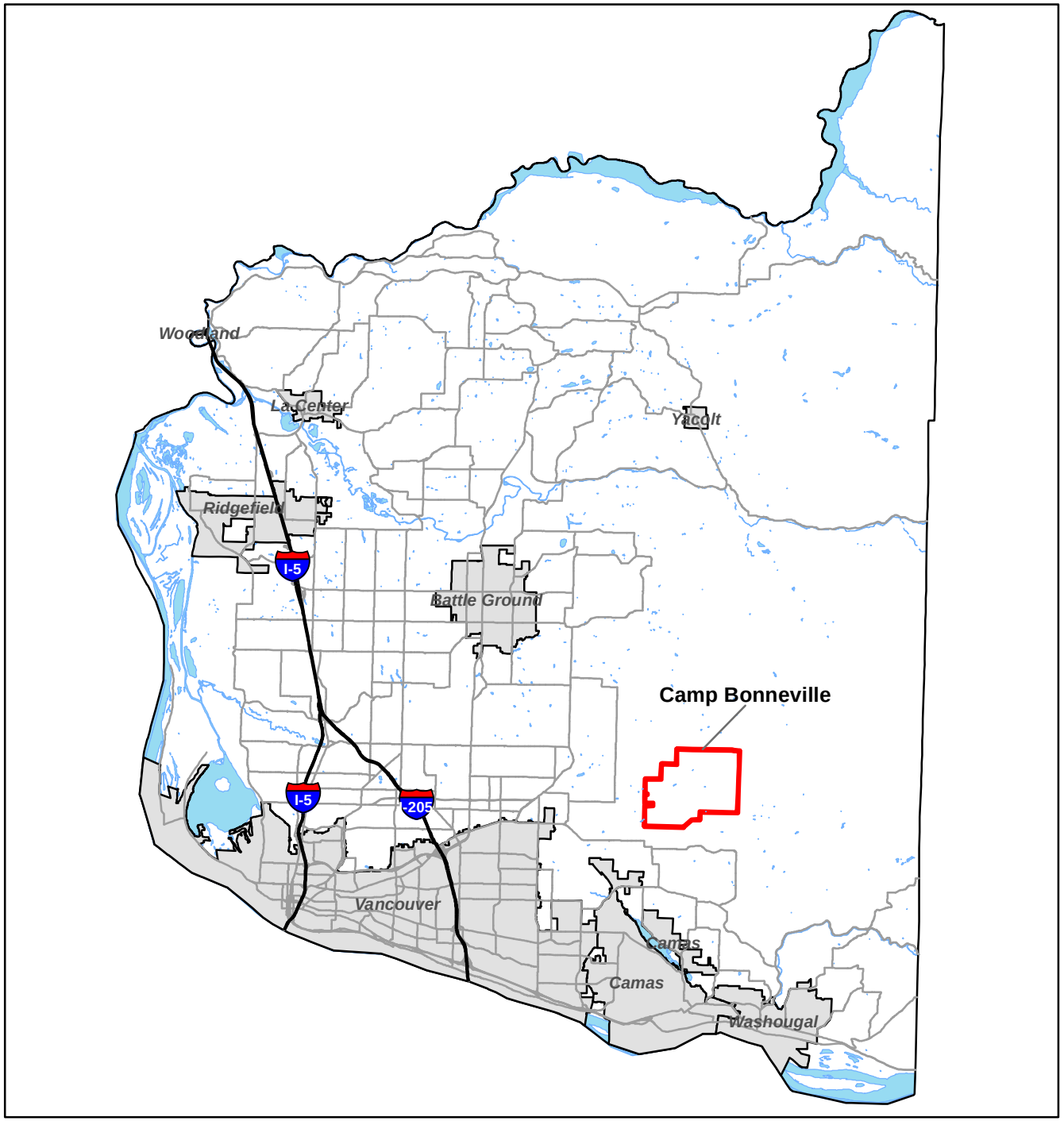
In accordance with the Prospective Purchaser Consent Decree (PPCD), a public participation plan has been approved for the stakeholders of CBMR. The stakeholders are the Army BRAC office, Clark County, WDOE, and the community advisory board. Clark County shall update this Public Participation Plan for the Property periodically and submit it to WDOE for review and approval. WDOE shall maintain the overall responsibility for public participation at the CBMR; however, Clark County shall administer and facilitate the community advisory board meetings.

13.0 CONTINGENCIES

None have been identified at this time.

APPENDIX A

MAPS



N

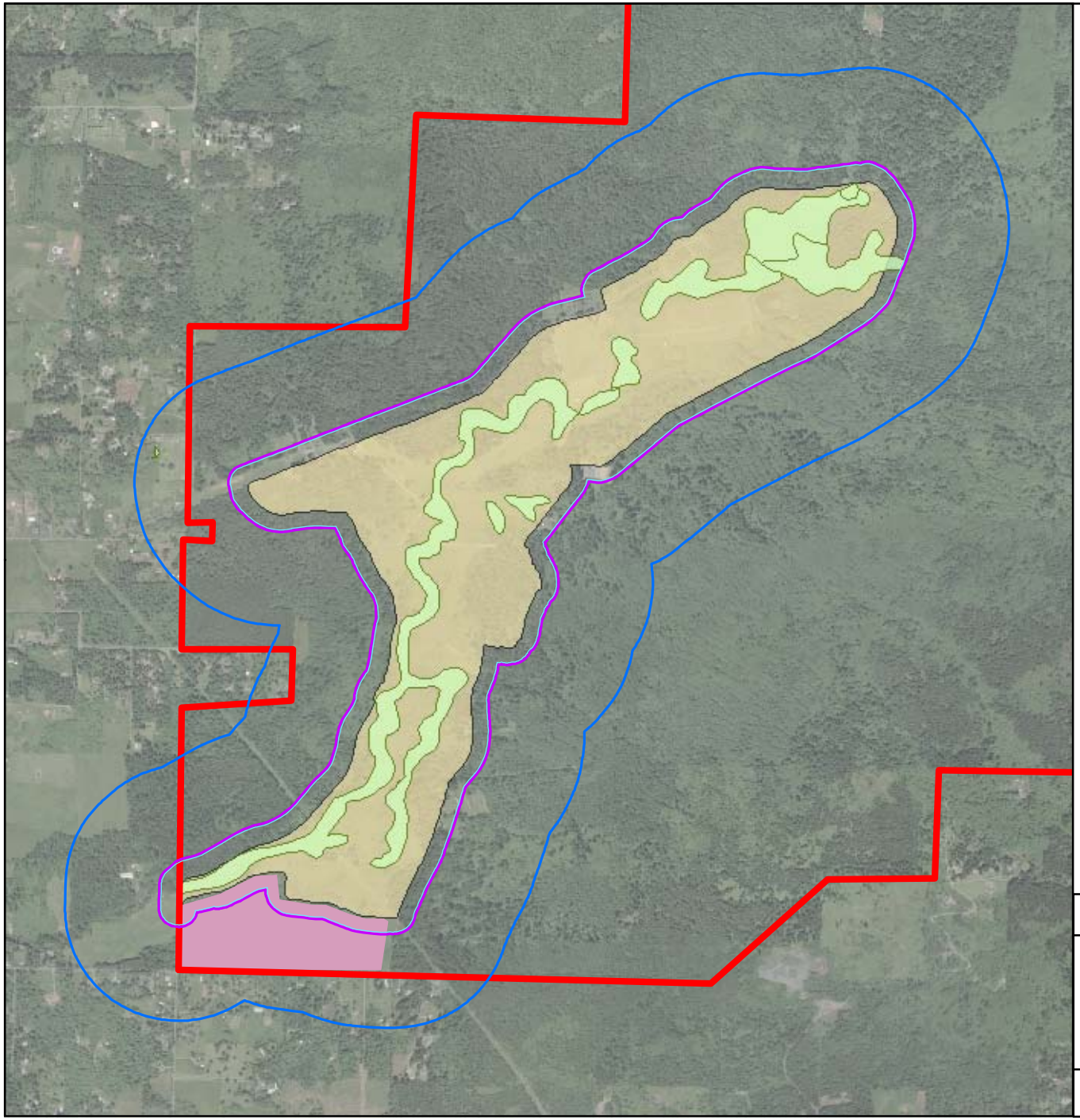
0 5 10 Miles

Clark County Public Works

FIGURE 1
SITE LOCATION

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Camp Boundary
- Environmental Study Area
- Wetland Area
- Central Valley Floor

Fragmentation Distance Based on 3-inch Stokes Mortar

- Intentional Detonation with Engineering Controls (200 ft)
- Unintentional Detonation (225 ft)
- Maximum Fragmentation Distance - Horizontal without Engineering Controls (1,379 ft)

N

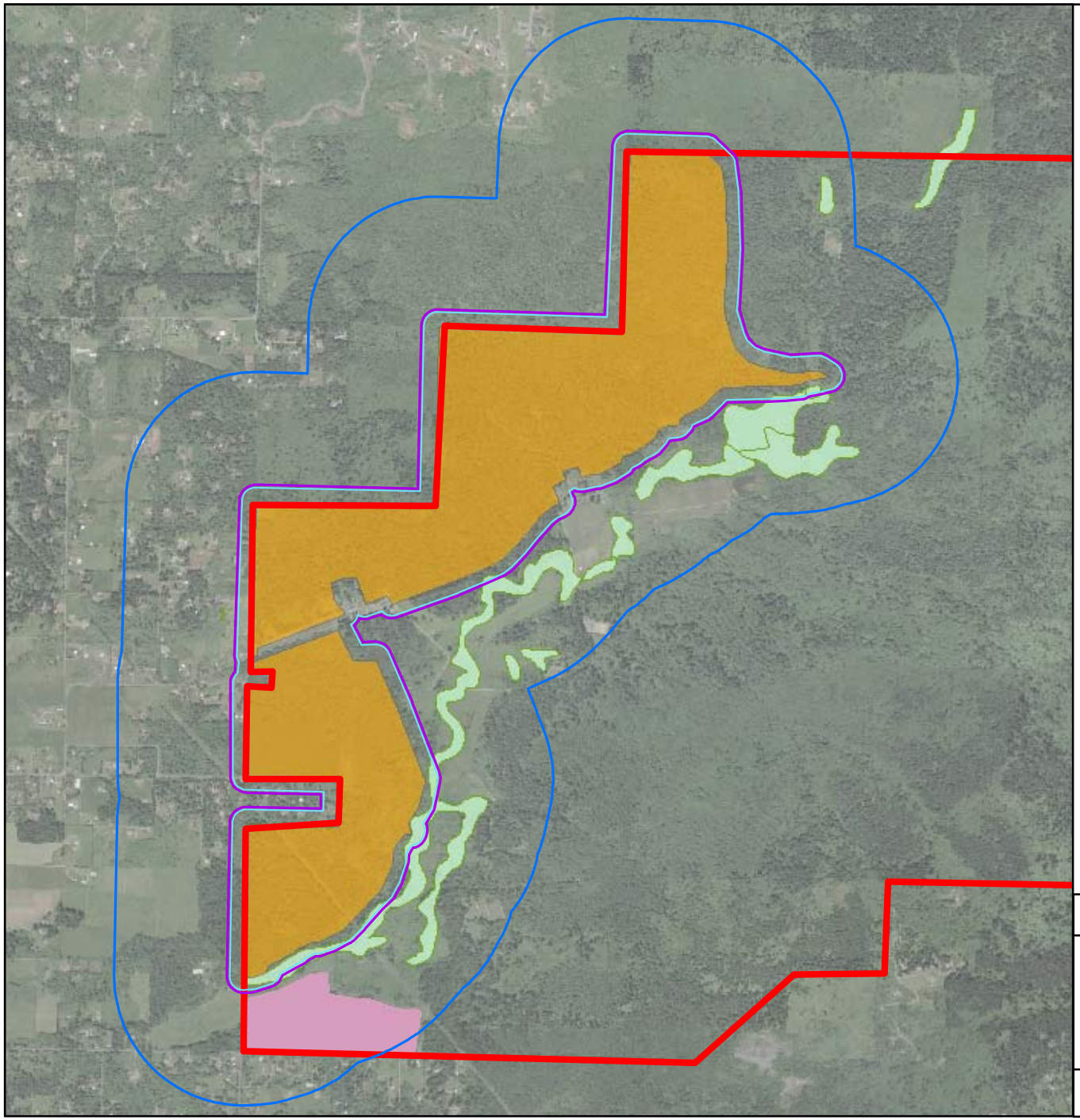
0 1,500 3,000 Feet

Clark County Public Works

FIGURE 2
CVFAW QUANTITY DISTANCE ARCS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Camp Boundary
- Slope < 25%
- Environmental Study Area
- Wetland Area

Fragmentation Distance Based on 75mm HE Mk1

- Intentional Detonation with Engineering Controls (200 ft)
- Unintentional Detonation (239 ft)
- Maximum Fragmentation Distance - Horizontal without Engineering Controls (1,873 ft)

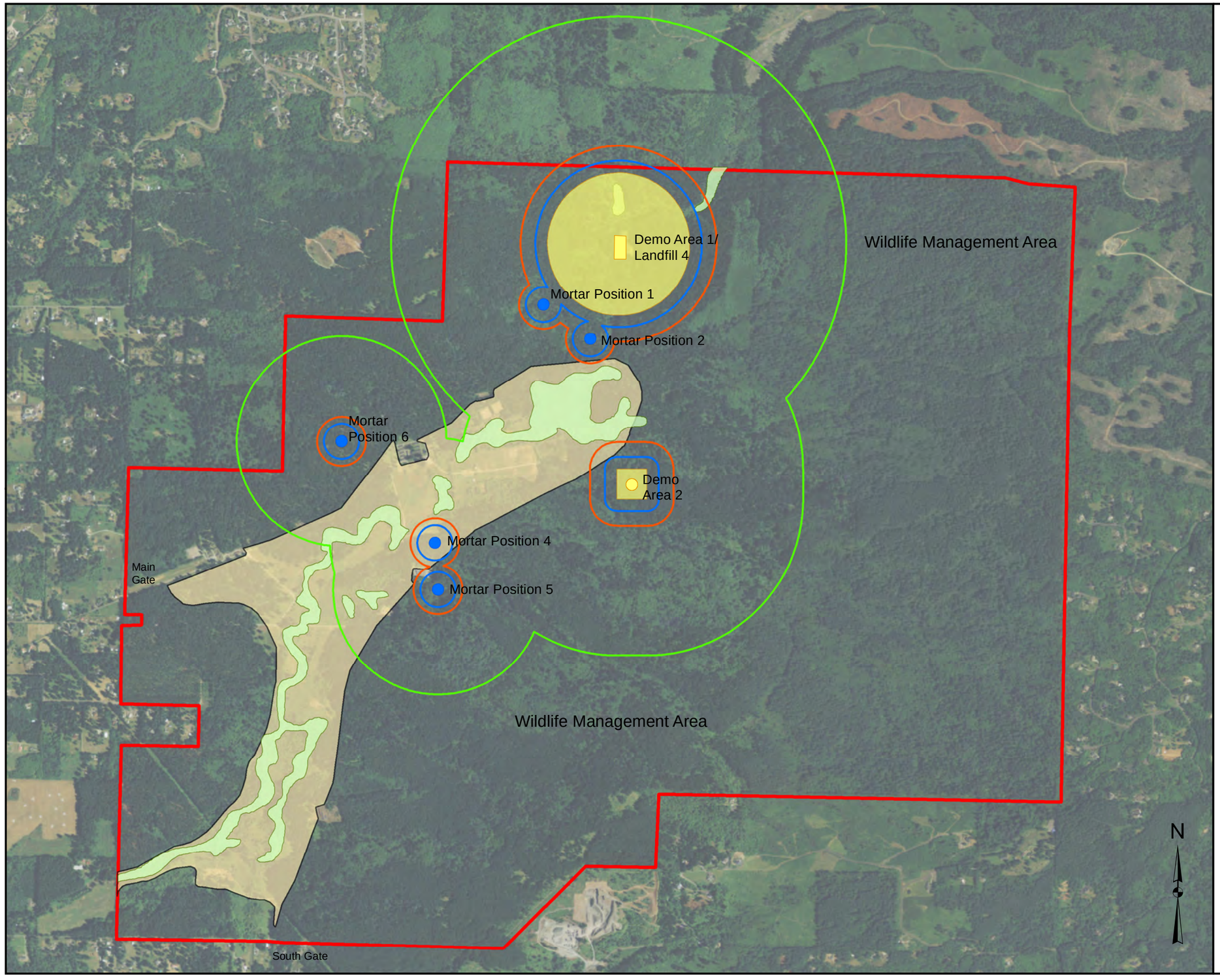
N

0 2,000 4,000 Feet

Clark County Public Works

FIGURE 3
WSA QUANTITY DISTANCE ARCS
Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

- Demolition Area
- Firing Point
- Property Boundary
- Current Work Boundary
- Wetland

Fragmentation Distance Based on 155-mm M107 projectile (DEMO) and 4.2-in M3A1 mortar (MORT)

- Intentional Detonation with Engineering Controls (200 ft)
- Unintentional Detonation (450 ft DEMO and 316 ft MORT)
- Maximum Fragmentation Distance - Horizontal without Engineering Controls (2,630 ft DEMO and 1,670 ft MORT)

0 2,200 4,400 Feet

N

Clark County Public Works

FIGURE 4
MORT AND DEMO
QUANTITY DISTANCE ARCS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS

Revised ESS Amendment 3

Artillery Position 4

Artillery Position 3

Main Gate

Artillery Position 1

Artillery Position 2

Hand Grenade (HE) Range Target Area

Wildlife Management Area

Rifle Grenade Target Area

Rifle Grenade Firing Point

3.5-inch Rocket Range Target Area

3.5-inch Rocket Range Firing Point

Artillery Position 7

South Gate

N

LEGEND

- Firing Point / Target Area
- Property Boundary
- Current Work Boundary
- Wetland

Fragmentation Distance Based on 155-mm M107 projectile (ARTY), M26A2 grenade (HAND), M9A1 rifle grenade (RIFLE), and 3.5-in M28A2 rocket (ROCK)

- Intentional Detonation with Engineering Controls (200 ft)
- Unintentional Detonation (450 ft ARTY, 288 ft HAND, 113 ft RIFLE, and 157 ft ROCK)
- Maximum Fragmentation Distance - Horizontal without Engineering Controls (2,630 ft ARTY, 312 ft HAND, 709 ft RIFLE, and 772 ft ROCK)

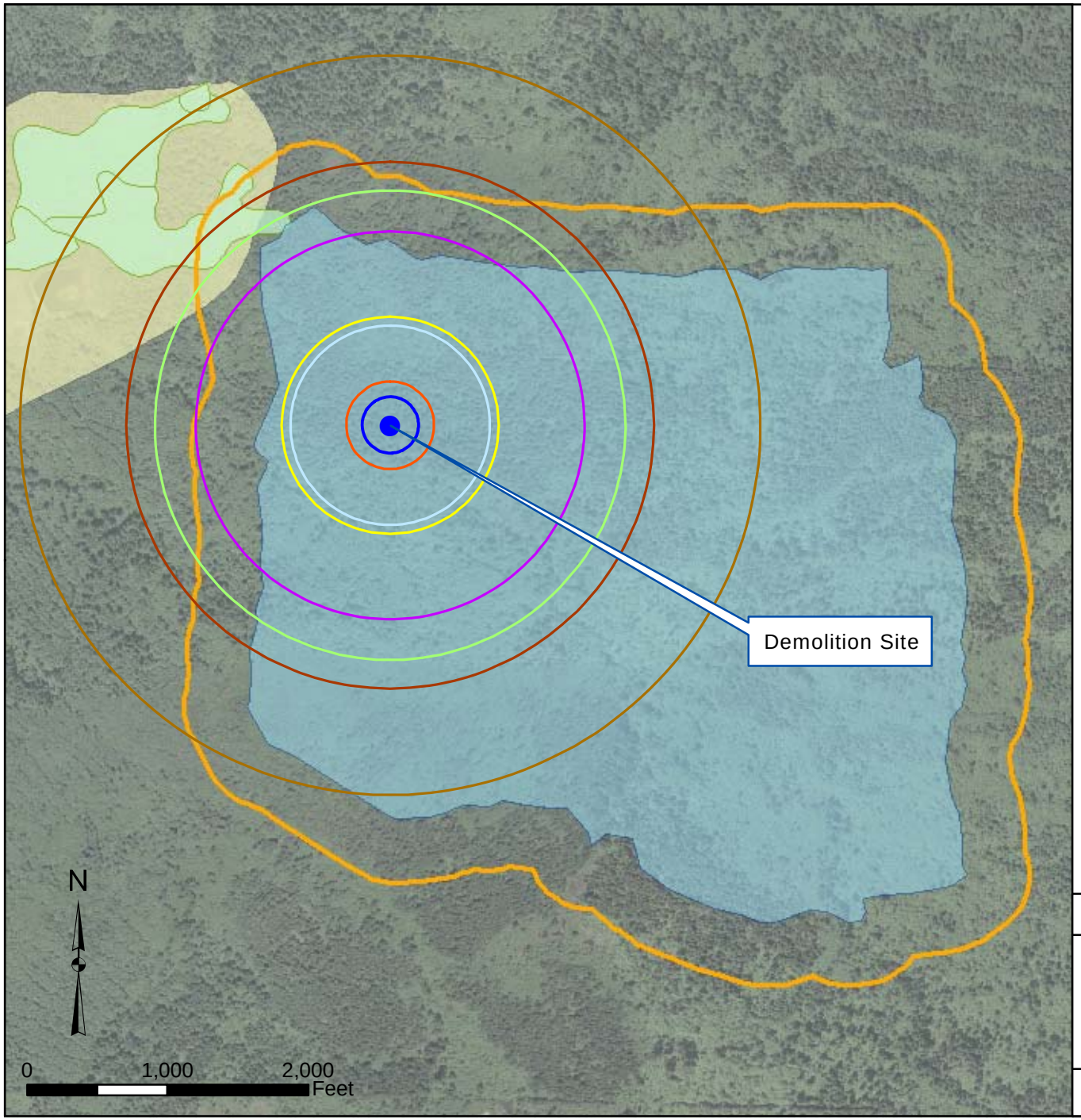
0 1,800 3,600 Feet

Clark County Public Works

FIGURE 5
ARTY, HAND, RIFLE, AND ROCK QUANTITY DISTANCE ARCS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

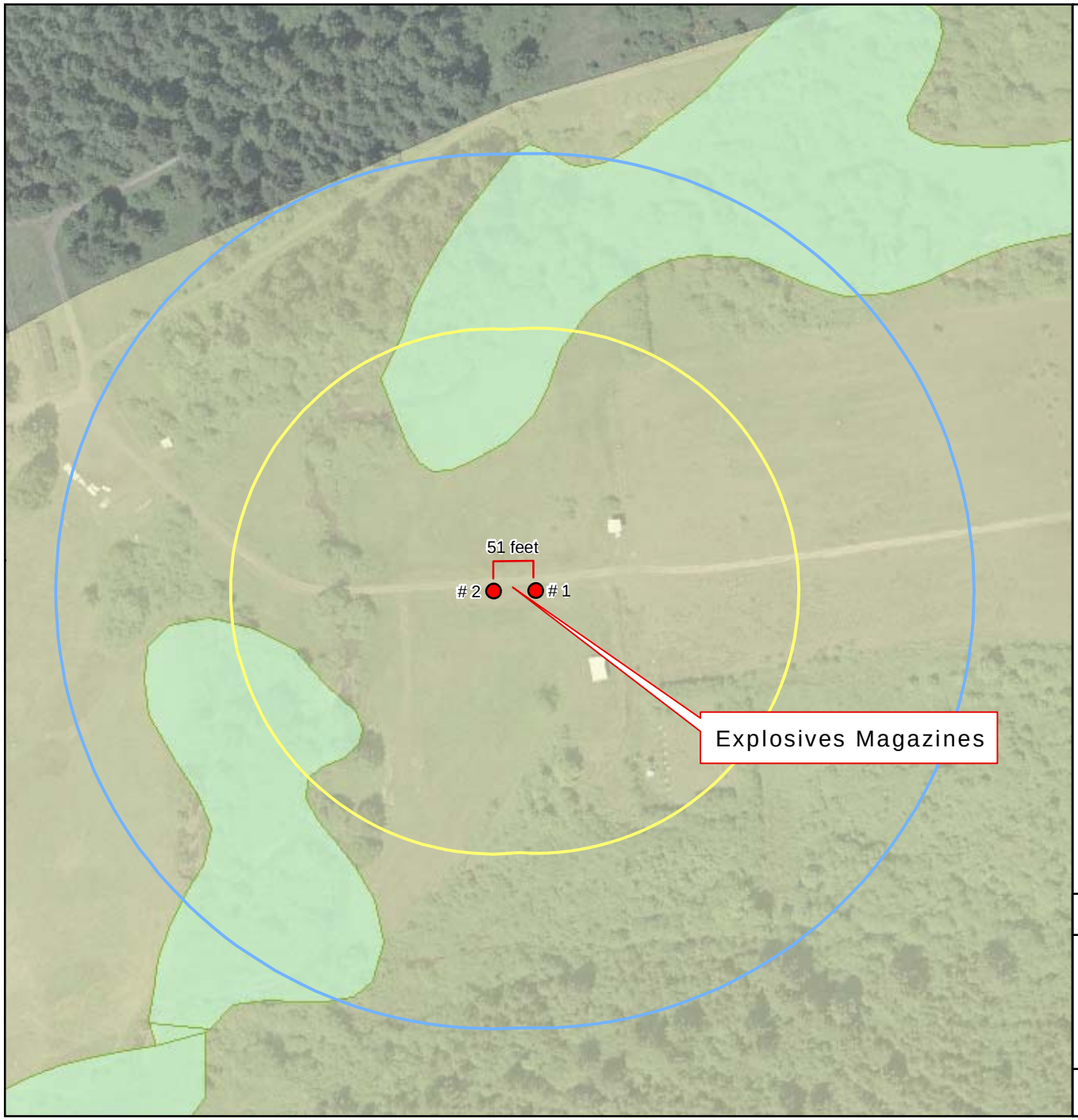
- Central Impact Target Area
- Wetland Area
- Central Valley Floor
- CITA Fence Buffer (447 ft)
- Demolition Area Maximum Fragmentation Distance with Engineering controls (200 ft)
- M26A2 Grenade Fragmentation Distance - Horizontal without Engineering Controls (312 ft)
- M9A1 Rifle Grenade Fragmentation Distance - Horizontal without Engineering Controls (709 ft)
- 3.5-in M28A2 Rocket Fragmentation Distance - Horizontal without Engineering Controls (772 ft)
- 3 inch Stokes Maximum Fragmentation Distance - Horizontal without Engineering Controls (1,379 ft)
- 4.2-in M2A1 Mortar Fragmentation Distance - Horizontal without Engineering Controls (1,670 ft)
- 75 millimeter HE Maximum Fragmentation Distance - Horizontal without Engineering Controls (1,873 ft)
- 155-mm M107 Projectile Fragmentation Distance - Horizontal without Engineering Controls (2,630 ft)

Clark County Public Works

FIGURE 6
ESTABLISHED DEMOLITION AREA WITH QUANTITY DISTANCE ARCS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS



LEGEND

Central Valley Floor

Wetland Area

Explosives Magazines

IBD (658 ft)
Inhabited Building Distance

PTRD (395 ft)
Public Transportation Route Distance

N

0 200 400 Feet

Clark County Public Works

FIGURE 7
EXPLOSIVES STORAGE MAGAZINE WITH QUANTITY DISTANCE ARCS

Former Camp Bonneville Military Reservation
Vancouver, Washington

WESTON SOLUTIONS

APPENDIX B

CALCULATION SHEETS AND DOCUMENTATION OF MINIMUM SEPARATION DISTANCES

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	2.36 in M6A3 Rocket (Warhead Only)
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Rocket
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	3/25/2010
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Pentolite (50/50)
Explosive Weight (lb):	0.5
Diameter (in):	2.3600
Cylindrical Case Weight (lb):	0.68368
Maximum Fragment Weight (Intentional) (lb):	0.0074
Design Fragment Weight (95%) (Unintentional) (lb):	0.0010
Critical Fragment Velocity (fps):	6170

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	0.570
Kinetic Energy 10^6 (lb-ft²/s²):	0.1403

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	20
Expected Max. Throw Distance (ft):	125
Minimum Separation Distance (ft):	125

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	48
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	264/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	133
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	790
MFD-V [Maximum Fragment Distance, Vertical] (ft):	634

Overpressure Distances

TNT Equivalent (Pressure):	1.38
TNT Equivalent Weight - Pressure (lbs):	0.690
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	16
Public Traffic Route Distance (2.3 psi); K24 Distance:	21
Inhabited Building Distance (1.2 psi), K40 Distance:	35
Intentional MSD (0.0655 psi), K328 Distance:	290

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	3.69	1.66
Mild Steel:	0.70	0.32
Hard Steel:	0.57	0.26
Aluminum:	1.49	0.72
LEXAN:	4.45	2.75
Plexi-glass:	2.94	1.55
Bullet Resist Glass:	2.32	1.14

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	37 mm Mk II
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Extremely Heavy Case

DODIC:	
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	0.053
Diameter (in):	1.4567
Cylindrical Case Weight (lb):	0.49264
Maximum Fragment Weight (Intentional) (lb):	0.0305
Design Fragment Weight (95%) (Unintentional) (lb):	0.0213
Critical Fragment Velocity (fps):	3307

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1
TNT Equivalent Weight - Impulse (lbs):	0.053
Kinetic Energy 10^6 (lb-ft²/s²):	0.1350

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	90
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	982
MFD-V [Maximum Fragment Distance, Vertical] (ft):	756

Overpressure Distances

TNT Equivalent (Pressure):	1
TNT Equivalent Weight - Pressure (lbs):	0.053
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	7
Public Traffic Route Distance (2.3 psi); K24 Distance:	9
Inhabited Building Distance (1.2 psi), K40 Distance:	15
Intentional MSD (0.0655 psi), K328 Distance:	123

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	2.96	1.95
Mild Steel:	0.57	0.37
Hard Steel:	0.46	0.30
Aluminum:	1.18	0.79
LEXAN:	4.23	3.25
Plexi-glass:	2.76	1.94
Bullet Resist Glass:	2.23	1.51

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	75 mm HE Mk I
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	1.64
Diameter (in):	2.9528
Cylindrical Case Weight (lb):	9.52026
Maximum Fragment Weight (Intentional) (lb):	0.2135
Design Fragment Weight (95%) (Unintentional) (lb):	0.0392
Critical Fragment Velocity (fps):	3468

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1
TNT Equivalent Weight - Impulse (lbs):	1.640
Kinetic Energy 10^6 (lb-ft²/s²):	1.2842

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	125
Minimum Separation Distance (ft):	125

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	Not Permitted
Expected Max. Throw Distance (ft):	Not Permitted
Minimum Separation Distance (ft):	Not Permitted

Water Mitigation

Minimum Separation Distance (ft):	200
Water Containment System:	1100 gal tank

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	239
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	1873
MFD-V [Maximum Fragment Distance, Vertical] (ft):	1425

Overpressure Distances

TNT Equivalent (Pressure):	1
TNT Equivalent Weight - Pressure (lbs):	1.640
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	21
Public Traffic Route Distance (2.3 psi); K24 Distance:	28
Inhabited Building Distance (1.2 psi), K40 Distance:	47
Intentional MSD (0.0655 psi), K328 Distance:	387

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	7.22	3.71
Mild Steel:	1.40	0.72
Hard Steel:	1.15	0.59
Aluminum:	2.77	1.47
LEXAN:	7.36	4.86
Plexi-glass:	5.75	3.32
Bullet Resist Glass:	5.02	2.73

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	3 in Stokes
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Mortar
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	2.15
Diameter (in):	3.0000
Cylindrical Case Weight (lb):	3.29887
Maximum Fragment Weight (Intentional) (lb):	0.0479
Design Fragment Weight (95%) (Unintentional) (lb):	0.0074
Critical Fragment Velocity (fps):	6017

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1
TNT Equivalent Weight - Impulse (lbs):	2.150
Kinetic Energy 10^6 (lb-ft²/s²):	0.8667

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	125
Minimum Separation Distance (ft):	125

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	Not Permitted
Expected Max. Throw Distance (ft):	Not Permitted
Minimum Separation Distance (ft):	Not Permitted

Water Mitigation

Minimum Separation Distance (ft):	200
Water Containment System:	1100 gal tank

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	225
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	1379
MFD-V [Maximum Fragment Distance, Vertical] (ft):	1093

Overpressure Distances

TNT Equivalent (Pressure):	1
TNT Equivalent Weight - Pressure (lbs):	2.150
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	23
Public Traffic Route Distance (2.3 psi); K24 Distance:	31
Inhabited Building Distance (1.2 psi), K40 Distance:	52
Intentional MSD (0.0655 psi), K328 Distance:	423

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	7.69	3.59
Mild Steel:	1.42	0.68
Hard Steel:	1.17	0.56
Aluminum:	2.92	1.46
LEXAN:	6.92	4.40
Plexi-glass:	5.28	2.89
Bullet Resist Glass:	4.46	2.28

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Grenades & Mines
Munition:	M9A1 Rifle Grenade
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Rifle Grenade
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	8/23/2010
Record Created By:	SDH
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Pentolite (50/50)
Explosive Weight (lb):	0.25
Diameter (in):	2.2500
Cylindrical Case Weight (lb):	0.36005
Maximum Fragment Weight (Intentional) (lb):	0.0051
Design Fragment Weight (95%) (Unintentional) (lb):	0.0009
Critical Fragment Velocity (fps):	6313

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	0.285
Kinetic Energy 10^6 (lb-ft²/s²):	0.1007

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	113
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	709
MFD-V [Maximum Fragment Distance, Vertical] (ft):	570

Overpressure Distances

TNT Equivalent (Pressure):	1.38
TNT Equivalent Weight - Pressure (lbs):	0.345
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	13
Public Traffic Route Distance (2.3 psi); K24 Distance:	17
Inhabited Building Distance (1.2 psi), K40 Distance:	28
Intentional MSD (0.0655 psi), K328 Distance:	230

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	3.26	1.62
Mild Steel:	0.62	0.31
Hard Steel:	0.50	0.26
Aluminum:	1.33	0.70
LEXAN:	4.11	2.70
Plexi-glass:	2.64	1.51
Bullet Resist Glass:	2.06	1.11

Item Notes

It is possible that this item contains Pentolite (10/90) which is 90% TNT. Since Pentolite (50/50) has a TNT equivalency greater than 1.0 and was more common during the production era, Pentolite (50/50) has been used for analysis until sources are found which prove otherwise.

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Grenades & Mines
Munition:	M26A2 Grenade
Case Material:	Steel, Mild
Fragmentation Method:	Pre-formed Fragmenting
Secondary Database Category:	Hand Grenade
Munition Case Classification:	Non-Robust

DODIC:	
Date Record Created:	9/30/2009
Record Created By:	SDH
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Composition B
Explosive Weight (lb):	0.3625
Diameter (in):	2.3750
Cylindrical Case Weight (lb):	0.30954
Maximum Fragment Weight (Intentional) (lb):	0.0003
Design Fragment Weight (95%) (Unintentional) (lb):	0.0003
Critical Fragment Velocity (fps):	7978

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	0.413
Kinetic Energy 10^6 (lb-ft²/s²):	0.0097

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	12
Expected Max. Throw Distance (ft):	25
Minimum Separation Distance (ft):	25

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	10
Minimum Separation Distance (ft):	12.5

Water Mitigation

Minimum Separation Distance (ft):	200/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	288
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	312
MFD-V [Maximum Fragment Distance, Vertical] (ft):	256

Overpressure Distances

TNT Equivalent (Pressure):	1.16
TNT Equivalent Weight - Pressure (lbs):	0.421
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	13
Public Traffic Route Distance (2.3 psi); K24 Distance:	18
Inhabited Building Distance (1.2 psi), K40 Distance:	30
Intentional MSD (0.0655 psi), K328 Distance:	246

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.42	1.42
Mild Steel:	0.26	0.26
Hard Steel:	0.22	0.22
Aluminum:	0.61	0.61
LEXAN:	2.36	2.36
Plexi-glass:	1.26	1.26
Bullet Resist Glass:	0.90	0.90

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	155 mm M107 (Composition B filled)
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Projectile
Munition Case Classification:	Robust

DODIC:	D571
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Composition B
Explosive Weight (lb):	15.448
Diameter (in):	6.1024
Cylindrical Case Weight (lb):	73.50184
Maximum Fragment Weight (Intentional) (lb):	0.6641
Design Fragment Weight (95%) (Unintentional) (lb):	0.1372
Critical Fragment Velocity (fps):	3584

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	17.611
Kinetic Energy 10^6 (lb-ft²/s²):	5.4935

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	36
Expected Max. Throw Distance (ft):	220
Minimum Separation Distance (ft):	220

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	Not Permitted
Expected Max. Throw Distance (ft):	Not Permitted
Minimum Separation Distance (ft):	Not Permitted

Water Mitigation

Minimum Separation Distance (ft):	275
Water Containment System:	1100 gal tank

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	450
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	2630
MFD-V [Maximum Fragment Distance, Vertical] (ft):	2022

Overpressure Distances

TNT Equivalent (Pressure):	1.16
TNT Equivalent Weight - Pressure (lbs):	17.920
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	47
Public Traffic Route Distance (2.3 psi); K24 Distance:	63
Inhabited Building Distance (1.2 psi), K40 Distance:	105
Intentional MSD (0.0655 psi), K328 Distance:	858

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	14.45	6.68
Mild Steel:	2.74	1.29
Hard Steel:	2.25	1.06
Aluminum:	5.30	2.61
LEXAN:	10.69	6.73
Plexi-glass:	9.43	5.10
Bullet Resist Glass:	8.58	4.39

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	4.2 in M3A1
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Mortar
Munition Case Classification:	Robust

DODIC:	
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	TNT
Explosive Weight (lb):	8.17
Diameter (in):	4.2000
Cylindrical Case Weight (lb):	10.68585
Maximum Fragment Weight (Intentional) (lb):	0.0864
Design Fragment Weight (95%) (Unintentional) (lb):	0.0119
Critical Fragment Velocity (fps):	6538

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1
TNT Equivalent Weight - Impulse (lbs):	8.170
Kinetic Energy 10^6 (lb-ft²/s²):	1.8472

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	24
Expected Max. Throw Distance (ft):	125
Minimum Separation Distance (ft):	125

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	Not Permitted
Expected Max. Throw Distance (ft):	Not Permitted
Minimum Separation Distance (ft):	Not Permitted

Water Mitigation

Minimum Separation Distance (ft):	275
Water Containment System:	1100 gal tank

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	316
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	1670
MFD-V [Maximum Fragment Distance, Vertical] (ft):	1326

Overpressure Distances

TNT Equivalent (Pressure):	1
TNT Equivalent Weight - Pressure (lbs):	8.170
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	36
Public Traffic Route Distance (2.3 psi); K24 Distance:	48
Inhabited Building Distance (1.2 psi), K40 Distance:	81
Intentional MSD (0.0655 psi), K328 Distance:	661

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	11.03	4.85
Mild Steel:	1.97	0.90
Hard Steel:	1.62	0.74
Aluminum:	3.98	1.90
LEXAN:	8.37	5.15
Plexi-glass:	6.80	3.57
Bullet Resist Glass:	5.87	2.87

Item Notes

Fragmentation Data Review Form

Database Revision Date 8/21/2014

Category:	Surface-Launched HE Rounds
Munition:	3.5 in M28A2 Rocket
Case Material:	Steel, Mild
Fragmentation Method:	Naturally Fragmenting
Secondary Database Category:	Rocket
Munition Case Classification:	Robust

DODIC:	H600
Date Record Created:	9/21/2004
Record Created By:	MC
Last Date Record Updated:	9/14/2011
Individual Last Updated Record:	SDH
Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Composition B
Explosive Weight (lb):	1.88
Diameter (in):	3.5000
Cylindrical Case Weight (lb):	1.00688
Maximum Fragment Weight (Intentional) (lb):	0.0054
Design Fragment Weight (95%) (Unintentional) (lb):	0.0007
Critical Fragment Velocity (fps):	9261

Sandbag and Water Mitigation Options

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	2.143
Kinetic Energy 10^6 (lb-ft²/s²):	0.2307

Single Sandbag Mitigation

Required Wall & Roof Thickness (in)	20
Expected Max. Throw Distance (ft):	125
Minimum Separation Distance (ft):	125

Double Sandbag Mitigation

Required Wall & Roof Thickness (in)	Not Permitted
Expected Max. Throw Distance (ft):	Not Permitted
Minimum Separation Distance (ft):	Not Permitted

Water Mitigation

Minimum Separation Distance (ft):	264/200
Water Containment System:	5 gal carboys/ inflatable pool

Note: Use Sandbag and Water Mitigation in accordance with all applicable documents and guidance. If a donor charge larger than 32 grams is utilized, the above mitigation options are no longer applicable. Subject matter experts may be contacted to develop site specific mitigation options.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	157
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	772
MFD-V [Maximum Fragment Distance, Vertical] (ft):	628

Overpressure Distances

TNT Equivalent (Pressure):	1.16
TNT Equivalent Weight - Pressure (lbs):	2.181
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	23
Public Traffic Route Distance (2.3 psi); K24 Distance:	31
Inhabited Building Distance (1.2 psi), K40 Distance:	52
Intentional MSD (0.0655 psi), K328 Distance:	425

Note: Per V5.E3.2.2.1 of DoD 6055.09-M the minimum sited K328 distance may be no smaller than 200 ft.

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	5.80	2.43
Mild Steel:	0.96	0.42
Hard Steel:	0.79	0.35
Aluminum:	2.08	0.96
LEXAN:	5.15	3.10
Plexi-glass:	3.56	1.81
Bullet Resist Glass:	2.82	1.33

Item Notes

APPENDIX J
WETLAND PROTOCOL

Restoring Resource Efficiency

FIELD VARIANCE FORM

DATE: 19-SEP-12 **PROJECT NAME:** Camp Bonneville Removal Action **PROJECT LOCATION:** Vancouver, WA

APPLICABLE DOCUMENT / SECTION: Final Work Plan Munitions and Explosives of Concern Removal Action, Remedial Action Unit 3, Central Valley Floor and Associated Wetlands, dated July 2012 – Wetlands Protocol.

SUBJECT: Wetlands Protocol

FIELD CHANGE CONDITION:

Section 1.8 Cleanup Action Plan Recommendations states: "The WDOE determined that the CVF and the wetlands areas require subsurface removal to frost depth (14-inch bgs). Therefore, MEC surface and subsurface removal in the wetland areas must be conducted in accordance with already established removal technologies as modified with a ***separate wetland protocol***. The wetland protocol will include specific brush cutting, worker safety, and MEC anomaly investigation procedures to reduce the impact to potentially sensitive habitat. The appropriate governmental oversight agencies will be consulted prior to MEC removal activities in the wetland areas."

RECOMMENDED APPROACH / CHANGE:

It is recommended that the accepted wetlands protocol (attached) be adopted for operations conducted within the wetland boundary as provided by Clark County.

IMPACT ON PRESENT AND COMPLETED WORK:

No impact to present or completed work.

REQUESTED BY: Tony Clark, MEC Task Manager, Weston Solutions, Inc.

[X] **CLARIFICATION/FOR INFORMATION ONLY** [ ] **MINOR CHANGE** [ ] **MAJOR CHANGE**

WESTON SOLUTIONS
Restoring Resource Efficiency

WESTON TEAM APPROVALS: BRUCE MOE, RANDY SCHNEIDER, MELISSA MAYER

COMMENTS

ACKNOWLEDGED BY:

Randy Schneider UXO SAFETY OFFICER (WESTON)	SIGNATURE	9/19/12 DATE
ACKNOWLEDGED BY:			
BRUCE MOE SENIOR UXO SUPERVISOR (WESTON)	SIGNATURE	9/19/12 DATE
MELISSA MAYER PROJECT QUALITY CONTROL MANAGER (WESTON)	SIGNATURE	9/19/12 DATE
ACKNOWLEDGED BY:		

STAKEHOLDER APPROVAL:

COMMENTS

☑ APPROVED ☐ REJECTED	JERRY BARNETT, PE CLARK COUNTY PROJECT MANAGER	SIGNATURE	9/19/12 DATE
☑ APPROVED ☐ REJECTED	BEN FORSON, PhD, PE DEPARTMENT OF ECOLOGY PROJECT MANAGER	SIGNATURE	9/18/12 DATE

ATTACHMENTS: ***WETLANDS PROTOCOL DOCUMENT***

WETLANDS PROTOCOL

The Central Valley Floor (CVF) comprises the major portion of the proposed regional park with a relatively gentle topographic slope, and low vegetative cover. The area covers approximately 432 acres of which 120 acres are defined as wetlands. The Wetlands extend throughout the CVF along the Lacamas Creek basin and contain sensitive ecological habitats, easily disturbed soils, flora, and fauna. Removal Action of MEC/MD and non-munitions related metallic debris in the CVF involves the need to remove vegetation, conduct Digital Geophysical Mapping (DGM), and reacquire and investigate selected subsurface anomalies in the Wetland. These activities can potentially impact the sensitive ecology of the wetland. To minimize impact to the wetlands and ensure worker safety from potential unstable saturated soil conditions and stream banks, a Wetlands Protocol has been developed to guide MEC remediation activities within the wetlands.

This Wetlands Protocol outlines guidelines to be implemented before and during MEC remedial actions to ensure that Substantive Requirements of Applicable State Laws, Regulations and Standards to minimizing impact to and protecting the wetlands are met, and to ensure worker safety.

REGULATORY

MEC remediation action within the Wetlands will be carried out following the Substantive Requirements of Applicable Federal, State and County Laws, Regulations and Standards to include the following:

Habitat Conservation Ordinance: This ordinance is detailed in Clark Counties Unified Development Code (UDC) Title 40.440 [CC 40.440]. The purpose of the Ordinance is to protect fish/ wildlife habitat while allowing reasonable use of property. Habitat areas that are protected by this ordinance include streamside riparian areas, priority habitat and species areas and species buffers for endangered, threatened or sensitive species.

Wetland Conservation Ordinance: This ordinance was designed to protect wetlands and streams that are not applicable according to the Shoreline Management and Habitat Conservation programs [CC 40.450].

Other: Protection of Federal and state listed rare, threatened or endangered species, including both animals and plant communities.

PRE-MEC REMEDIATION ACTIVITY

To comply with reasonable and prudent measures and to protect wetlands and wetland species, the Contractor will complete a training program before starting any MEC or contaminated soil removal activity within the wetlands.

Training Program

Before MEC or contaminated soil remedial activities begin in wetland areas, all supervisors and field personnel will attend a training program. The program will be presented by a qualified biologist familiar with the wetland resources at Camp Bonneville. As the project proceeds, all new personnel must attend the training before working onsite.

The training will:

- Provide a general description of wetland resources, functions, and values, including wetland-associated features that could be encountered;

- Provide an overview of pertinent state and federal laws relating to the protection of wetland areas and wetland-associated species;

- Identify guidelines that personnel must follow to avoid or reduce impacts on wetland areas; and

- Identify measures that may be taken to restore wetland areas after MEC sampling or removal activities.

Demarcation of Wetland Area Boundary

The Contractor will demarcate the wetland area boundary for remedial activities. The perimeter of wetland areas will be staked and flagged by a qualified professional, accompanied by a cleanup crew member. Flagging will be completed before vegetation, soil or MEC removal begins in or near a wetland area to alert crews that special measures need to be taken inside the flagged area.

MEASURES TO MINIMIZE DISTURBANCE

All vegetation, MEC and contaminated soil removal will be completed in accordance with reasonable and prudent measures that minimize impact to the wetlands. Implementation of measures presented below will minimize disturbance to wetland habitats during MEC removal activities and increase the probability that natural restoration processes will be sufficient to restore water bodies to their pre-disturbance function and value.

Timing of Removal Activities

i. Vegetation: To make areas accessible to cleanup crews, prescribed mechanical and manual brush clearance may be required in the wetlands. Vegetation in wetland areas must be cleared during the dry season (July through October) to minimize soil compaction and the need to drain pooled areas.

ii. Surface MEC: Removal of surface MEC and contaminated soil will require crews to pass through areas with metal detectors or other equipment. To minimize soil compaction, damage to vegetation, and the need to drain pooled water, this activity in the wetlands must be conducted during the dry season (July through October).

iii. Subsurface MEC: To remove subsurface MEC or contaminated soil found in wetland areas during sampling procedures, it may be necessary to excavate. Excavation in wetlands will take place after the soil is dry on the surface and able to support a person.

Disturbances from Removal Activities

iv. Vegetation Removal: Many areas within the Associated Wetlands of the Central Valley Floor are vegetated densely enough to restrict visibility, impede movement, create physical hazards, and potentially expose workers to serious safety risks from MEC. For these reasons, and to ensure the effective use of MEC detection equipment, vegetation clearance will be required prior to MEC removal actions. However, vegetation removal must be minimized. Where necessary, a

combination of mechanical and manual methods of vegetation removal may be used with the following stipulations:

Vegetation must NOT be removed to a level shorter than approximately six inches above ground surface.

- The maximum diameter of shrub/tree to be cut during brush cutting should be three inches.
- No mechanical method should be used within 15 feet of a pond or any surface water body to protect these resources and protect worker from potential unstable saturated soil conditions and stream banks.
- Insure all mechanized vegetation removal is completed by machinery with low-pressure treads. Ideally the tires/treads/tracks should operate with a pressure, measured in Pounds per Square Inch (PSI), comparable to that of a laborer using hand-cutting methods.
- Re-establishment of disturbed vegetation communities to minimize runoff and intrusion by invasive plants.
- When possible, clippings from the identified wetland area must be spread over the wetland area after remediation is complete to assist in preserving the seed bank.

v. MEC Removal: MEC removal activities should be limited to the smallest area possible to minimize unnecessary disturbance of the wetland. Existing roads must be used whenever possible, and use of vehicles within the wetland must be minimized to the greatest extent practicable. Excavation size and depth must be kept to a minimum, and in-situ detonation, if necessary, must be conducted in a manner to minimize soil disturbance.

vi. Excavated Soil Handling: All excavations for MEC are expected to be less than 14 inches deep. During MEC excavations, the topsoil layer (upper 8 inches of soil), which contains a large proportion of seed bank, bulbs, eggs and larvae of many invertebrates that inhabit these wetlands, and excavated first must be stockpiled separately from other deeper soil layers. Soil must be laid out on a ground cloth, boards, or other material to minimize disturbance of soils and vegetation in the soil storage area.

vii. In-situ Detonation: In some cases, due to safety concerns it may be necessary to detonate MEC in situ. In such situations, before detonation, to the greatest extent possible and within safety limits, topsoil and deeper soil layers must be removed from the affected area and stockpiled separately, as described above.

viii. Excavated Soil Replacement: After MEC removal activity or in-situ detonation is completed, the excavated area or the crater should be backfilled using the topsoil and other deeper soil layers that were set aside, simulating existing soil horizons as closely as possible. Each layer should be returned to its original position. During backfilling, the soil should be compacted at 6-inch intervals to help preserve the permeability of the disturbed soil. The final layer must be the topsoil.