DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS
441 G STREET, NW
WASHINGTON, DC 20314-1000

REPLY TO
ATTENTION OF

CEMP-CE

MEMORANDUM FOR US Army Engineer Division, North Atlantic (CENAE-PPM/ Ms.Sullivan), 696 Virginia Rd, Concord, MA 01742

SUBJECT: Approval of the Decision Document for Spring Valley Formerly Used Defense Site, Washington, D.C., DERP FUDS MMRP/CWM Project No. C03DC091801 and HTRW Project No. C03DC091802

1. Reference email dated 19 April from CENAD, subject "Spring Valley DD for NAD", copy enclosed.

2. The subject Decision Document dated June 2017 has been reviewed by Office of Counsel and Public Affairs.

3. This document presents a selected remedy with a total present worth cost estimate of $19,224,200.00 consisting of the following remedies:

- Contaminated Soil – Excavation and Off-Site Disposal. Excavation of contaminated soils from identified areas, and backfilling the areas with clean soil.
- Explosive Hazards – DGM of Accessible Areas, Investigate Detected Anomalies, and Remove Munitions, Implementation of a 3Rs Explosive Safety Education Program.

4. This Decision Document is approved and forwarded to you, pursuant to USACE Interim Guidance Document on FUDS Decision Documents dated 9 February 2017, and to Engineer Regulation 200-3-1, FUDS Program Policy, dated 10 May 2004.

5. Please ensure that this document is filed in accordance with Records Management procedures, in both the Administrative Record and the Permanent Project File. Also, please ensure that the FUDS Management Information System is updated with this approval in the Property Information, Record of Decision/Decision Document screen.

6. Point of contact for this action is Mr. Mark Seebeck, CEMP-CED, 202-761-1863.

Encls
Decision Document Packet

KAREN J. BAKER
Chief Environmental Division
Directorate of Military Programs

FINAL
DECISION DOCUMENT

Spring Valley Formerly Used Defense Site (SVFUDS)
Washington, D.C.

DERP FUDS MMRP/CWM Project No. C03DC091801 and
HTRW Project No. C03DC091802

U.S. Army Corps of Engineers
Baltimore District

June 15, 2017

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FINAL
DECISION DOCUMENT

Spring Valley Formerly Used Defense Site (SVFUDS)
Washington, D.C.

Contract W912DR-09-D-0061, Delivery Order 0011
DERP FUDS MMRP/CWM Project No. C03DC091801 and
HTRW Project No. C03DC091802

Prepared for:
U.S. Army Corps of Engineers
Baltimore District

Prepared by:
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09/30/16

Thomas Bachovchin, PG — Date
Project Manager

07/06/16

Jennifer Harlan, PMP — Date
Program Manager

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COMPLETION OF SENIOR TECHNICAL REVIEW

This document has been produced within the framework of the ERT, Inc. (ERT) quality management system. As such, a senior technical review has been conducted. This included review of all elements addressed within the document, proposed or utilized technologies and alternatives and their applications with respect to project objectives and framework of U.S. Army Corps of Engineers regulatory constraints under the current project, within which this work has been completed.

07/06/16

Jennifer Harlan, PMP Date
Senior Technical Reviewer

COMPLETION OF INDEPENDENT TECHNICAL REVIEW

This document has been produced within the framework of ERT's quality management system. As such, an independent technical review, appropriate to the level of risk and complexity inherent in the project, has been conducted. This included a review of assumptions; alternatives evaluated; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the project objectives. Comments and concerns resulting from review of the document have been addressed and corrected as necessary.

07/05/16

Michelle Chesnut Date
Independent Technical Reviewer

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ACRONYMS and ABBREVIATIONS

AC	advanced classification
AOI	Area of Interest
ARARs	Applicable or Relevant and Appropriate Requirements
AU	American University
AUES	American University Experiment Station
bgs	below ground surface
CENAB	U.S. Army Corps of Engineers, Baltimore District
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Chemical of Concern
COPC	Chemical of Potential Concern
CSM	Conceptual Site Model
CWM	Chemical Warfare Materiel
DCMR	D.C. Municipal Regulations
DCRA	D.C. Department of Consumer and Regulatory Affairs
DDOE	District of Columbia Department of the Environment
DERP	Defense Environmental Restoration Program
DGM	digital geophysical mapping
DMM	Discarded Military Munitions
DoD	Department of Defense
DOEE	District of Columbia Department of Energy and Environment
EE/CA	Engineering Evaluation/Cost Analysis
EU	Exposure Unit
FS	Feasibility Study
FUDS	Formerly Used Defense Site
HHRA	Human Health Risk Assessment
HI	Hazard Index
LUCs	Land Use Controls
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MEC HA	MEC Hazard Assessment
MMRP	Military Munitions Response Program
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NTCRA	Non-time Critical Removal Action
OSR FUDS	Operation Safe Removal FUDS
OU	Operable Unit
PAHs	Polycyclic aromatic hydrocarbons
PSB	Public Safety Building
POI	Point of Interest
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study

RSL	Regional Screening Level
SARA	Superfund Amendments and Reauthorization Act
SCRA	Spaulding-Captain Rankin Area
SVFUDS	Spring Valley Formerly Used Defense Site
TBC	To Be Considered
TCRA	Time Critical Removal Action
USACE	U.S. Army Corps of Engineers
USC	United States Code
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded Ordnance

1.0 THE DECLARATION

1.1 Site Name and Location

This Decision Document addresses the Spring Valley Formerly Used Defense Site (SVFUDS), which comprises 661 acres in northwest Washington, D.C. This is a largely residential area with local shops and restaurants. It is surrounded by a cluster of dense apartment buildings, townhouses and single-family homes. Land use in and around the SVFUDS is primarily low-density residential, with smaller portions zoned for commercial use. The campus of American University (AU) occupies a large portion of the SVFUDS.

1.2 Statement of Basis and Purpose

This Decision Document presents the selected remedial actions for the Spring Valley FUDS. The United States (U.S.) Army is the lead Federal agency under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for the Formerly Used Defense Site (FUDS) Program. The U.S. Army Corps of Engineers (USACE) executes the FUDS Program on behalf of the Army, including drafting Decision Documents and implementing selected remedial actions. The signature authority for the SVFUDS Decision Document includes the Deputy Assistant Secretary of the Army for Environment, Safety and Occupational Health and the Deputy Commanding General for Military & International Operations, U.S. Army Corps of Engineers.

The SVFUDS was part of the American University Experiment Station (AUES), which the U.S. Government established to research the testing, production, development and effects of noxious gases, Chemical Warfare Materiel (CWM) (i.e., chemical munitions and chemical agent in other than a munitions' configuration), antidotes and protective masks, during World War I.

The Army selected the remedial actions (also referred to as the selected remedy) for the SVFUDS in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) [42 U.S.C. § 9601 et seq.], the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) [40 Code of Federal Regulations (CFR) Part 300], and the Defense Environmental Restoration Program (DERP) [10 U.S.C. § 2701 et seq.]. The Army based its decision on the Administrative Record for the SVFUDS.

The District of Columbia Department of Energy & Environment (DOEE) and Region III of the U.S. Environmental Protection Agency (USEPA) concur with the selected remedy.

1.3 Assessment of the Site

The Remedial Investigation (RI) Report (USACE, 2015) determined the nature and extent of contamination and bounded the military munitions present. As a result, it identified two levels of risk or hazard to be mitigated at the SVFUDS:

- Unacceptable risks posed by soil contamination, and
- Unacceptable explosive hazards posed by military munitions that may, upon recovery and evaluation by qualified personnel, be determined to be Munitions and Explosives of Concern (MEC), specifically unexploded ordnance (UXO) and discarded military munitions (DMM) that potentially remain within the SVFUDS.

The remedial actions selected are necessary to protect public health and the environment from actual or threatened releases of hazardous substances, and explosive hazards from past Department of Defense (DoD) operations and activities.

1.4 Description of Selected Remedy

The RI results were used to develop the Feasibility Study (FS) (USACE, 2016a). The FS identified the remedial action objectives and goals required to protect human health and the environment for the SVFUDS. The Army used the FS' recommendations to select remedies addressing both unacceptable risks posed by soil contamination and unacceptable explosive hazards posed by the possible presence of MEC. The preferred alternatives were presented to the public in the Proposed Plan that was finalized in June 2016 (USACE, 2016b). The total estimated cost of these alternatives is $19,224,200.00. The Proposed Plan provided the public an opportunity for comment (13 June through 28 July 2016). The Army subsequently extended this period from 29 August through 28 September, 2016 in response to a public comment. The public comments received were considered prior to selecting the final remedy.

1.4.1 Contaminated Soil Remedy

The selected remedy for the unacceptable risks posed by soil contamination is **Contaminated Soil Alternative 4, Excavation and Off-site Disposal**. This remedy, which has been successfully conducted many times throughout the SVFUDS, will:

- Meet the Remedial Action Objectives (RAOs) in the shortest time with the fewest unknowns
- Allow for unlimited use and unrestricted exposure (UU/UE).
- Address the contaminants of concern under every site-specific condition.

The major components of the selected remedy to address the unacceptable risks posed by soil contamination include:

- Excavation of contaminated soils in the areas identified;
- Backfilling the excavated areas with clean soil;
- Characterizing (sampling) and transporting the excavated soil to an appropriate off-site disposal facility.

1.4.2 Explosive Hazards Remedy

The selected remedy for unacceptable risk posed by military munitions that may remain present and upon recovery and evaluation by qualified personnel are determined to be MEC, specifically unexploded ordnance (UXO) and discarded military munitions (DMM), is **Explosive Hazards Alternative 6, Digital Geophysical Mapping (DGM) of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions; Implementation of 3Rs Explosives Safety Education.** This remedy is protective of human health and the environment and will meet the RAOs in the shortest time period. However, it will not achieve UU/UE conditions. As such, periodic reviews (commonly referred to as "5-year reviews") will be required.

As part of the remedy, the Army will implement a 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program (3Rs Program) within the SVFUDS. A 3Rs Program is a conservative measure to ensure the entire community is informed of the actions to take should a munition be encountered. The frequency during which the Army will conduct 3Rs Program efforts

or distribute 3Rs educational material will be evaluated and established in a SVFUDS Land Use Control Implementation Plan.

The major components of the selected remedy to address unacceptable risk posed by the explosive hazards associated with MEC that may remain present include:

- Conducting DGM on a property, with a DGM coverage standard of 'accessible areas;'
- Investigating geophysical anomalies and removing munitions encountered, with a removal quantity standard of 'selected anomalies.'
- Conducting continuing 3Rs Program initiatives (e.g., mailing 3Rs educational material, informing the community of the 3Rs website (3Rs.mil)) to remind community members that they reside within a FUDS where they may encounter a munition and inform them of what to do should they encounter one.

1.5 Statutory Determinations

The selected remedial actions are protective of human health and the environment. These actions:

- Comply with Federal and State requirements that are applicable or relevant and appropriate given the hazardous substances that are the subject of this response action;
- Are cost effective;
- Use permanent solutions to the maximum extent possible.

The statutory preference to permanently and significantly reduce contaminants through treatment is not met by the contaminated soil remedy in that the soil contaminants are transferred to a landfill rather than treated. This statutory preference is met for the explosive hazards remedy in that military munitions, including munitions determined to be MEC, are destroyed; therefore no longer pose an explosive hazard.

However, as the explosive hazards remedy does not achieve UU/UE, the Army will implement 5-year reviews within five years after initiation of remedial action to ensure that the remedy remains protective of human health and the environment.

1.6 Data Certification Checklist

The following information is included in this Decision Document's Summary section:

- Risk and/or hazard associated with AUES-related material present within the SVFUDS; with the exception of material/contaminants located at 4825 Glenbrook Road and with contaminants possibly remaining in surface water or groundwater. 4825 Glenbrook Road is covered by a separate Decision Document signed in 2012, and surface water and groundwater will be covered by a future decision document.
- Remediation (cleanup) levels established for the SVFUDS and the basis for these levels;
- Current and reasonable future land use assumptions used in the Human Health Risk Assessment and this Decision Document;
- Estimated capital, annual operation and maintenance (O&M), and total costs, discount rate, and the number of years over which the remedy-cost estimates are projected; and

1.7 Authorizing Signature

This Decision Document has been coordinated with and concurred on by the Deputy Assistant Secretary of the Army for Environment, Safety, and Occupational Health.

for: MG, USA 6/15/2017
TODD T. SEMONITE Date
Lieutenant General, USA
Commanding
DCG

2.0 THE DECISION SUMMARY

2.1 Site Name, Location, and Description

The SVFUDS comprises 661 acres in northwest Washington, D.C. This is a largely residential area with local shops and restaurants. It is surrounded by a cluster of apartment buildings, townhouses and single-family homes. Land use in and around the SVFUDS is primarily low-density residential, with smaller portions zoned for commercial use. The American University (AU) campus comprises a portion of the SVFUDS. This is considered institutional use. The Dalecarlia Woods area, which is located on the western edge of the SVFUDS, is zoned as Federal or public use. (Figure 1 shows the SVFUDS boundary and Appendix A contains the figures referenced in this DD.) It should be noted that the property located at 4825 Glenbrook Road and the surface water and groundwater at the site are not a part of this decision. These areas will be addressed in separate decision documents.

2.2 Site History and Enforcement Activities

2.2.1 Site History

During World War I, the U.S. Government established the AUES to research the testing, production, development and effects of noxious gases, CWM, antidotes, and protective masks. Mustard and lewisite agents, adamsite, irritants, and smokes were among the chemicals researched and tested. The SVFUDS includes property occupied by the former AUES from 1917 to 1920. AUES was located on the grounds of the present AU and used portions of the adjoining properties.

2.2.2 Previous Investigations

The SVFUDS is an extremely complex site involving several ongoing and concurrent response (cleanup) activities over many years. These activities focused on the investigation and removal (cleanup) of different potential hazards at various locations. To manage and track activities at SVFUDS and present them in a cohesive manner, the Army has organized the activities it conducted at SVFUDS in this DD as: initial investigation and characterization; follow-on investigation and characterization; geophysical investigations; and removal actions. The Army's activities at the SVFUDS fall under one (or more) of these activity types.

2.2.2.1 Initial Investigation and Characterization

In January 1993, the Army initiated an emergency response upon discovery of a munitions burial trench in the 52nd Court area of Spring Valley. This emergency response, which was known as Operation Safe Removal (OSR) FUDS, was essentially the start of the RI phase at the SVFUDS. Using historical documentation (e.g., reports, maps and photos) USACE established Points of Interest (POIs) and performed geophysical investigations at those POIs considered to be potential munitions burial sites. USACE subsequently conducted sampling of environmental media at 17 POIs. These POIs and USACE's findings were documented in the 1995 Operation Safe Removal (OSR) FUDS RI Report (USACE, 1995). With the exception of a POI designated the Spaulding and Captain Rankin Area, this report recommended 'no further action' for the SVFUDS. The Spaulding and Captain Rankin Area POI was a single property that contained former shell pits or bunkers associated with AUES activities. The RI report resulted in a No Further Action Record of Decision in June 1995.

In June 1994, USACE conducted an Engineering Evaluation/Cost Analysis (EE/CA) for the Spaulding and Captain Rankin Areas. This EE/CA identified a risk associated with soil within the former shell pits. Based on these findings, USACE conducted a Non-Time-Critical Removal Action (NTCRA) to remove the soil debris found within the structures and prepared a separate RI report for the Spaulding and Captain Rankin Area. This RI recommended no further action for this area (USACE, 1996).

In 1999, USEPA Region 3 prepared a human health risk assessment (HHRA) for the SVFUDS (USEPA, 1999). During this assessment, USEPA analyzed soil sampling data collected between 1993 and 1995 at 16 locations throughout Spring Valley and the AU campus. It also took splits of the USACE OSR FUDS RI samples. Section 2.7.1.1 discusses how these results were used.

2.2.2.2 Follow-on Investigation and Characterization

The D.C. Department of Consumer and Regulatory Affairs (DCRA) prepared a report in 1996 based on USACE's work at the SVFUDS. DCRA recommended site-wide comprehensive geophysical investigations, soil sampling and a health study (the current DOEE was formerly part of the DCRA). Following its review of DCRA's recommendations, USACE conducted field investigations in the Glenbrook Road area that was designated as operable unit (OU) 3. USEPA also collected soil samples in this area to supplement its HHRA. In 2000, on the HHRA's results, USEPA and USACE determined that the area of investigation should be expanded beyond OU-3. This expanded area of investigation was designated as OU-4.

In response to significant community and regulator concerns regarding possible soil contamination, USACE, in consultation with USEPA Region 3 and the District of Columbia Department of the Environment (DDOE [now called the DOEE]), developed a comprehensive plan. This plan addressed the conduct of both soil sampling on every property within the SVFUDS for arsenic and additional geophysical investigations to identify potential burial pits and individual subsurface munitions. The expanded area of investigation, some 577 acres, was designated as OU-5.

Under an EE/CA (USACE, 2003), USACE characterized the soils of both OU-4 and OU-5 for arsenic. Additionally, USACE sampled some areas for selected chemical agents (CA) and CA breakdown products that would be associated with AUES activities. The Spring Valley Partners (i.e., the Army, USEPA, and DDOE) established by consensus a 20 mg/kg arsenic removal goal for this EE/CA. An independent Scientific Advisory Panel, that the Army established to assist the community in understanding technical issues affecting the SVFUDS, supported this EE/CA goal.

In addition, in 2000, USEPA completed an HHRA specific to the southern portion of the AU campus. This HHRA evaluated the potential risk to human health from exposures to metals in the soil at AU. Section 2.7.1.1 discusses how these results were used.

2.2.2.3 Geophysical Investigations

In some areas, USACE only conducted geophysical surveys. USACE conducted geophysical investigations at 99 residential properties within the SVFUDS between 1998 and 2011. Properties were prioritized for investigation using a complex classification scheme. USACE conducted these investigations in two phases. In phase one, USACE conducted non-intrusive surveys to identify buried metallic anomalies. In phase two, an Anomaly Review

Board analyzed the geophysical survey's results to identify anomalies with munitions characteristics for investigation. Using the same approach, USACE conducted a number of geophysical surveys and investigations on the AU campus, and on approximately 60 acres of D.C. and Federal property located on SVFUDS's western edge just east of the Dalecarlia Reservoir.

2.2.2.4 Removal Actions

USACE determined that removal actions were warranted for some properties. USACE completed these as Time Critical Removal Actions (TCRAs) or NTCRAs. For the SVFUDS, these removals were primarily excavations of arsenic-contaminated soil. (In the early stages of the investigations at SVFUDS, USACE, in coordination with the Spring Valley Partners, determined that arsenic in soil was the primary wide-spread contaminant. As such, a decision was made to address this contamination with removal actions.

USACE conducted TCRAs on portions of the AU campus and several residential properties. USACE conducted NTCRAs on 100 properties and 9 lots during the period of 2004 to 2012. For selected properties, USACE also used phytoremediation (in this case, ferns that naturally remove contaminants) to remove arsenic from soil. USACE used this process to address 21 residential properties and one lot on the Washington Aqueduct property

The determination of the nature and extent of contamination for the SVFUDS, as discussed in Section 2.5.3, is based on the findings of each of these four primary types of activities conducted at the SVFUDS.

2.3 Community Participation

USACE provides information regarding the cleanup of the SVFUDS to the public, community residents and workers through a dedicated community outreach staff working side-by-side with project personnel. Collectively, the USACE Spring Valley project team responds to community inquiries daily and through a 24-hour telephone answering service. It also meets with concerned and affected residents on a regular basis. The team emails monthly project updates, mails quarterly newsletters to addresses within the project area and the interested public at large and, when warranted, sends unscheduled updates, newsletters, and press releases to a diverse list of stakeholders.

Since 2001, the project team has supported the Spring Valley Restoration Advisory Board (RAB), conducted small group briefings and attended public meetings to discuss significant milestones and issues of concern. The USACE Public Affairs Office advertises these meetings in local papers, on local electronic community bulletin boards and by mailing newsletters and postcards. The Administrative Record for the site, the USACE website, and a local Information Repository at the neighborhood library provide easy access to historical and current documents on the project's progress. Using these outreach mechanisms, USACE encourages public input to ensure that the remedy selected for the SVFUDS considers community concerns in addition to being an effective technical solution.

USACE established a public comment period from June 13 to July 28, 2016, and held a public meeting on July 14, 2016 to obtain input and feedback from the public on the selected remedies, as presented in the Proposed Plan. In coordination with DOEE and the USEPA, USACE evaluated comments received from the public during this period. In addition, there was an extension of the comment period that ran from August 28 to September 28, 2016.

Appendix C provides a Responsiveness Summary that contains significant comments and questions about the Proposed Plan that the public submitted and USACE's responses to those comments. It also provides a transcript of the July 14 meeting. This Decision Document, which was coordinated fully with the Department of the Army and signed by USACE, is USACE's official record of the final remedy selection for the SVFUDS.

2.4 Scope and Role of Response Action

The RI Report identified two levels of risk to be mitigated (as discussed in more detail in Section 2.7):

- Unacceptable risks posed by soil contamination, and
- Unacceptable explosive hazards posed by the possible presence of MEC.

The FS addressed these two issues separately. The FS evaluated various remedial action alternatives to mitigate soil contamination and address MEC that may remain present.

The scope of the remedial action to address:

- Soil contamination is to return the identified areas of contamination (see Section 2.7) to a condition that eliminates unacceptable risk to the human health and the environment;
- Potential explosive hazards associated with MEC that may remain present is to reduce the potential for encountering MEC at properties within the identified areas of focus (see Section 2.7) and return them to a condition that eliminates unacceptable explosive hazards to people living and working in this area;
- Potential explosive hazards associated with MEC that may remain present for properties within and outside the identified areas of focus is to reduce the probability that people (e.g., residents, workers, visitors) who encounter a munitions will approach, disturb move or handle it. USACE will accomplished this by implementing a 3Rs explosives safety education program within the SVFUDS.

2.5 Site Characteristics

2.5.1 Environmental Setting

The SVFUDS comprises 661 acres in northwest Washington, D.C. Washington, D.C. is in the humid subtropical climate zone and exhibits four distinct seasons. Its climate is typical of Mid-Atlantic U.S. areas removed from bodies of water and is classified as modified continental. Located within the Little Falls Watershed, surface water in the vicinity of Spring Valley consists of intermittent streams that flow generally to the west. The District of Columbia's water supply comes from the Potomac River with intakes located at Great Falls and Little Falls. The Dalecarlia Reservoir, which supplies the Dalecarlia plant and provides drinking water to more than 600,000 residents, lies just outside the western SVFUDS boundary.

Four geological formations and four separate soil associations are present within the SVFUDS. Typically the soils have been greatly disturbed by construction and landscaping activities. In many areas of the District, several feet of miscellaneous artificial fill have been placed over streams, swamps, flood plains, and tidal marshes. These areas are now mostly covered with roads, buildings, or other structures.

There are various groundwater aquifer systems within the area. These include terrace gravels and fracture system aquifers associated with the Piedmont formations and saprolite and fill systems. Groundwater may be found in these aquifers, but the majority of the groundwater would be expected to be found in the underlying bedrock that comprises the fracture system aquifer. Groundwater is not used as a public water supply in the SVFUDS or surrounding areas. Municipal water is provided to these areas.

USACE is currently conducting a SVFUDS groundwater investigation. According to the separate groundwater-focused RI, soil is not significantly contributing to groundwater contamination. As such, groundwater is discussed in separate RI and FS Reports.

2.5.2 Conceptual Site Model (CSM)

USACE developed CSMs to describe the current state of knowledge and assumptions about risks at the SVFUDS. The CSM presents an exposure pathway analysis by integrating information on a contaminant's source, potential receptors and receptor interaction. It identifies complete, potentially complete or incomplete pathways for both current and reasonably anticipated future land uses for a site. Each pathway must include a source, a receptor, and interaction between them (access and activity).

2.5.2.1 Contaminated Soil CSM

The sources of contaminated soil within the SVFUDS are the activities associated with the former AUES operations, including open-air testing and disposal or burial of materials. Open air testing included chemical releases from live-fire testing and other activities (e.g., spraying vegetation for persistency testing of various chemicals). In addition, for some of the AUES laboratory buildings, spills and leakage may have resulted in releases.

Current potential receptors were evaluated using an exposure interval of 0 to 2 feet below ground surface (bgs) to represent routine landscaping, gardening and outdoor recreational activities. The soil exposure interval for future potential receptors includes mixed soils from 0 to 10 feet bgs, which includes the 0 to 2 foot bgs interval to which current receptors could be exposed. Soil exposure pathways include incidental soil ingestion, dermal contact, inhalation outdoors, inhalation of vapors indoors and ingestion of home-grown vegetables. Current and future receptors include residents (adult and child), outdoor workers and construction workers.

The CSM indicates that, for example, a complete pathway exists for a resident to interact through dermal contact with contaminants released by AUES activities to surface soil. The quantitative HHRA, analyzed this pathway and others on an individual receptor basis to determine whether risk remains.

2.5.2.2 MEC CSM

The primary release mechanisms that can result in the potential presence of MEC are related to the type of military munition-related activities that occurred within the SVFUDS. Munitions that may be determined to be MEC can result from the improper functioning of a munition during live-fire testing or the loss or burial of unused munitions. Incomplete combustion, the failure of a munition to function properly or the deterioration of subsurface munitions can result in the presence of explosive or chemical agent residues.

The MEC CSM for the SVFUDS is based on the historical AUES activities,

where munitions were ballistically and statically fired. The SVFUDS Range Fan was developed based on live-fire testing activities of 3-inch and 4-inch Stokes Mortars and Livens projectiles. Static firing, the remote firing of fixed or stationary munitions, primarily using 75 millimeter (mm) munitions, was also conducted. For the SVFUDS, the investigations of the sources of munitions were based on munitions-related activities that could result in the presence of MEC. These include:

- Ballistic live-fire testing (e.g., Range Fan);
- Static live-fire testing; and
- Disposal areas or burial pits.

Ballistic live-fire testing can result in a munition landing in impact areas or a buffer zone around these areas, while static live-fire testing can produce a kick-out. These munitions-related activities can result in the presence of MEC on the surface or in the subsurface.

The interaction of receptor and source is a function of whether the source can be accessed and whether an activity is intrusive or non-intrusive. The MEC CSM indicates, for example, that a complete pathway exists for a resident to encounter a munition in the subsurface during intrusive activities in an impact area, a potential disposal area or burial pit.

2.5.3 Nature and Extent

The determination of the nature and extent of contamination or the presence of munitions for the SVFUDS is based on the findings of each of the primary types of response activities conducted at the SVFUDS (e.g., investigation, characterization, geophysical surveys, and removals), as discussed in Section 2.2.2.

The nature of the contamination is unacceptable risks posed by soil contamination, and unacceptable explosive hazards posed by the possible presence of MEC, as previously discussed. The specific types and areas of contamination and areas where munitions may be present are presented in more detail in Section 2.7.

2.6 Current and Potential Future Land Use

The SVFUDS lies wholly with Washington, D.C.'s Ward 3. This is a largely residential area located in the upper northwest quadrant of the city. Some of these neighborhoods developed because of the Connecticut Avenue streetcar line that connected D.C. with Chevy Chase in suburban Maryland. Many of Ward 3's neighborhoods follow a similar pattern of a commercial core with local shops and restaurants, surrounded by a cluster of dense apartment buildings, townhouses, and single-family homes. Spring Valley, which straddles Massachusetts Avenue, follows a similar but more single-family home-oriented, pattern. Much of the remainder of the Ward consists of single-family homes set among tall trees and parks. Some are modest in size, while others are quite large and home to some of the wealthiest DC residents and a large number of foreign ambassadorial residences. The character of these areas is more suburban in nature, with a high concentration of cul-de-sacs.

Land use in and around the SVFUDS is primarily low-density residential (three to four dwellings per acre). Smaller portions are zoned for commercial use. AU's campus is considered institutional use. Zoning is also predominantly for single-family detached housing except for AU's Campus that is zoned for apartments. The Dalecarlia Woods area on the western edge of the SVFUDS is zoned as Federal or public use. Changes in land use that would affect the discussions in this Decision Document are not projected (D.C. Planning, 2013).

2.7 Site Risks

This discussion summarizes the conclusions of the RI Report with regard to unacceptable risks posed by soil contamination and MEC that may remain present within the SVFUDS.

2.7.1 Human Health Risks

2.7.1.1 Risk Screening

USACE conducted a comprehensive risk screening process to review previous HHRAs to assess whether they remained protective relative to updated comparison or toxicological standards. As part of this process, USACE conducted supplemental soil sampling to address data gaps and identified specific areas where a further quantitative risk assessment was warranted. To do this, three separate efforts were conducted, each building off the findings of the previous one.

The first effort completed a work plan (USACE, 2012) presenting the methodology to review five older HHRAs. This review determined whether the chemicals of potential concern (COPCs) identified, the exposure pathways considered, and the toxicity evaluations would still be appropriate when considering updated USEPA guidance and site-specific background concentrations. It also identified exposure units (EUs) that require additional risk screening and risk assessment.

The second effort conducted and provided the results of the review (USACE, 2013a) of the five older HHRAs where re-screening of soil data from SVFUDS was done using updated risk-based screening levels and background data. This effort was conducted to ensure that potential risks associated with soils still in place were evaluated.

The third effort presented the results (USACE, 2013b) of the completion of the recommended activities identified in the HHRA Review report (USACE, 2013a).

These three efforts concluded with the identification of EUs that, based on the COPCs identified and the risks calculated, required full quantitative HHRAs. These EUs, which are shown in Figure 2, include:

- The Area of Interest (AOI) 9 EU;
- The Spaulding-Rankin EU; and
- The Southern AU EU.

USACE reviewed the sample results for each EU to ensure that the identified EUs were not so large that they diluted higher concentrations of a chemical over the larger area (that is, small areas of higher concentrations were not eliminated from further consideration).

This review evaluated whether maximum concentrations of each chemical were more than 10 times higher than the average of the remaining concentrations of that chemical (that is, it identified whether the maximum concentration was an outlier). Where an outlier was determined, that sample location was removed from the data set and the EU was separately evaluated in the HHRA using the remaining samples. Outlier locations were then individually assessed for human health risks. USACE completed the '10 times' procedure at the screening level and conducted more formal statistical testing, such as Rosner tests, as needed.

2.7.1.2 Quantitative HHRA

A quantitative HHRA estimates the "baseline risk," which is an estimate of the likelihood of health problems occurring if no cleanup action is taken at a site. USACE completed quantitative HHRAs for the three SVFUDS EUs. The RI Report presents the HHRAs in detail. To conduct the HHRAs for the three EUs, USACE used data previously collected during site investigation activities to identify and screen COPCs at each EU. For the receptors present at each EU, the HHRA estimated the magnitude of exposure to COPCs, identified potential exposure pathways, and quantified exposure. USACE used this information and toxicity data for the COPCs to estimate quantitatively the risk posed to human receptors associated with exposure to the COPCs in soil at each of the three EUs.

The quantitative HHRAs determined which COPCs were actual chemicals of concern (COCs) in soil at each of the three EUs.

2.7.1.3 Receptors and Exposure Pathways

The AOI 9 EU comprises multiple residential properties and defines an area with common receptors and exposure pathways. The EU contains multiple POIs, with portions of it falling within the downrange impact areas of the Range Fan.

The Spaulding-Rankin EU is limited to a single residential property previously known as the Spaulding-Captain Rankin area (SCRA), where the Range Fan firing point and concrete shell pits were located. The EU includes multiple POIs.

Current potential exposures to surface soil evaluated in the HHRA for these two residential EUs, included outdoor workers (e.g., landscapers), and adult and child residents. Future exposures to mixed surface and subsurface soil were evaluated for outdoor workers, construction workers, and adult and child residents.

The Southern AU EU is an active university campus with no full-time permanent residents. The EU boundary defines an area with common receptors and exposure pathways. Current potential exposures to surface soil evaluated in the HHRA for this EU included outdoor workers and student recreational users (associated with a 4-year student). USACE evaluated future exposures to mixed surface and subsurface soil for outdoor workers, construction workers, student recreational users, and adult and child residents.

2.7.1.4 Summary of Human Health Risks

A response action is generally warranted if the cumulative excess carcinogenic risk to an individual exceeds 10^{-4} (1 in 10,000) with a discretionary range of 10^{-6} to 10^{-4}, or the non-carcinogenic hazard index (HI) value is greater than the USEPA benchmark of 1. For:

- AOI 9 EU, no COCs, and therefore no unacceptable risks to human health, were identified.
- Spaulding-Rankin EU, cobalt, posing a non-carcinogenic risk in soil, was the only COC identified.
- Southern AU EU, the COCs are cobalt, mercury, and vanadium posing non-carcinogenic risks in soil.

This means that because non-carcinogenic risks in soil due to mercury and vanadium in the identified areas at the Southern AU EU exceed the benchmark HI of 1 response actions are required to address them. However, with regard to cobalt, USACE recommended that an HI value of 2 was more appropriate than the benchmark of 1. USACE based its recommendation on the level of uncertainty associated with the provisional toxicity data used to estimate the cobalt non-cancer hazards. USEPA's confidence in these toxicity data is low to medium, and the practical implication is that it exaggerates risks due to cobalt. USEPA accepted USACE's recommendation Therefore, non-carcinogenic risks in soil due to cobalt in the identified areas at the Spaulding-Rankin and Southern AU EUs are based on HI values exceeding 2. Response actions are required to address areas that exceed HI values of 2.

Figure 3 shows the areas of potential non-carcinogenic and carcinogenic risks at the Spaulding-Ranking and Southern AU EUs. Table 2.1 presents a summary of the human health risks determined for the EUs.

Table 2.1: Summary of Human Health Risks

EXPOSURE UNIT	RISK	COC
SCRA	Non-carcinogenic	Cobalt
SCRA Outliers	Non-carcinogenic	Cobalt
Southern AU	Non-carcinogenic	Cobalt
Southern AU Outliers	Non-carcinogenic	Cobalt, Mercury, Vanadium

2.7.2 Ecological Risks

The potential for ecological risk was also assessed as part of the RI. A Screening Level Ecological Risk Assessment (SLERA) is the "environment and ecology" equivalent of the human health risk assessment. The SLERA evaluated whether unacceptable adverse risks are posed to ecological receptors as a result of hazardous substance releases. The SVFUDS area was characterized with respect to physical, chemical and ecological characteristics, and the current and anticipated future land uses. The SLERA concluded that ecological risks are negligible and that no further action on the basis of ecological risks was warranted.

2.7.3 Explosive Hazards

The SVFUDS geophysical surveys, anomaly investigations and removal process has provided high quality geophysical data of key areas based on historical review of past practices and the likelihood of munitions being present. However, individual munitions or munitions debris may remain present in the SVFUDS.

A Munitions Response Site (MRS) is a discrete location that is known to require a munitions response. The RI Report describes the SVFUDS, MRS-01 in detail. MRS-01 is an area where field-testing to determine the effectiveness of toxic chemicals and substances, incendiaries, and smoke mixtures is thought to have occurred. It is also an area where there may be associated disposal areas and burial pits. This MRS is delineated by historical documentation, the findings of geophysical surveys, and anomaly investigations that have occurred.

2.7.3.1 MEC Hazard Assessment

As the RI Report describe in more detail, the potential explosive hazards associated with MEC that may remain present was partly determined using the MEC Hazard Assessment (HA) methodology. The MEC HA evaluates potential explosive hazards, given current conditions and under various cleanup scenarios. At the SVFUDS, the MEC HA was organized around those activities that would most likely resulted in munitions being present within the SVFUDS. These activities include ballistic live-fire testing, static live-fire testing, and disposal or burial activities. Table 2.2 summarizes the MEC HA scoring for these activities.

Table 2.2: Summary of MEC HA Scoring

AREA or ACTIVITY	HAZARD LEVEL CATEGORY	EXPLOSIVE HAZARD CONDITION
Safety Buffer for Livens Projectiles	4	Low
Impact Area for Stokes Mortars	3	Moderate
Impact Area for Livens Projectiles	3	Moderate
Generic Disposal Area or Burial Pit	3	Moderate

Based on ballistic live-fire testing activities, the Safety Buffer zone for the Livens Projectile scored a 4 (low potential explosive hazard conditions). This indicates that only a few munitions would be expected to be encountered within the buffer zone. The Impact Areas for both the Livens and the Stokes mortars scored a 3 (moderate potential explosive hazard conditions). This indicates that response actions to mitigate unacceptable explosive hazards may be required within the impact areas.

Static live-fire test areas would typically have been monitored to assess the results of the test. As such, munitions are not likely to be present. However, munitions burial pits may be present near these testing locations or within the safety buffer zones. Given this possibility, response actions to mitigate the unacceptable explosive hazards associated with munitions burial pits may be required.

To address possible disposal areas or burial pits, USACE completed a generic MEC HA that conservatively assumed a worst case disposal area or burial pit scenario. The resulting score was a 3. The unknowns associated with possible disposal areas and burial pits (e.g., type, quantity and state of buried munitions) suggests a need for response actions to mitigate unacceptable explosive hazards that may be present these areas.

The AU Public Safety Building (PSB), which is being used, is considered a disposal area that may contain munitions. As long as the building remains in place, it effectively acts as a barrier that prevents an encounter with munitions that may be present. If the PSB is demolished within the next three years, USACE will apply the selected explosive hazards remedy to address MEC, AUES-related debris, or soil contamination that may be present from past Army activity.

USACE will also apply the Contaminated Soil Risk RAOs (see Section 2.8) including over-excavation of soil, should sampling indicate unacceptable risks. Should USACE

encounter other potential COCs during the conduct of response actions, USACE will address them after discussion with the Spring Valley Partners and establishment of a clean-up goal. If the PSB is demolished after three years from the date this Decision Document is signed, USACE may re-evaluate risk posed and either apply the selected explosive hazards remedy or select an alternative remedy in accordance with CERCLA and the NCP.

With regard to unacceptable risk from MEC that may be present, the MEC pathway is considered complete for those properties within the identified focus areas because there is a potential source, potential receptors, and a potential for interaction between them.

Figure 4 indicates the focus areas of potential unacceptable risk from MEC that may be present. Figure 4 also shows SVFUDS MRS-01, which is a compilation of several test areas and burial pits. As previously indicated, MRS-01 consists of the areas where live-fire field testing is thought to have occurred and disposal areas or burial pits may exist. The focus or response action areas are shown relative to the MRS-01 boundary.

2.7.4 Summary of Site Risks/Hazards

Based on the HHRA, unacceptable risks are posed by soil contamination at the identified areas of the Spaulding-Rankin and Southern AU EUs. Response actions are required to mitigate these risks. (Note: Arsenic-based soil removal actions have previously been completed within these area.)

Based on the MEC HA scores and the historical knowledge of past munitions-related activities that occurred, unacceptable risk is potentially posed from MEC that may remain within the SVFUDS. Response actions are required to mitigate these risks.

The response actions selected in this Decision Document are necessary to protect public health and the environment from actual or threatened releases of hazardous substances or the explosive hazards associated with MEC that may remain present from past Department of Defense (DOD) operations and activities.

2.8 Remedial Action Objectives (RAOs)

RAOs describe the expected outcome from completion of the proposed site cleanup. The RAOs specify the contaminants and media of concern, the types of munitions potentially present; and the receptors, exposure pathways and remediation goals that permit a range of remedial alternatives to be developed.

2.8.1 Site-Specific RAOs

For the SVFUDS, USACE developed remedial alternatives for the two identified levels of risk. These were the unacceptable risks posed by soil contamination and the unacceptable risk associated with MEC that may remain present.

2.8.1.1 Contaminated Soil Risk RAOs

For unacceptable risks posed by soil contamination, based on the quantitative HHRA in the RI Report, the COCs in soil are cobalt, mercury, and vanadium. Taking into account the COCs, the affected media, the exposure pathways and the project goals, the SVFUDS RAOs for contaminated soil are:

- Prevent direct contact with mercury or vanadium-contaminated soil having a non-carcinogenic HI exceeding 1. This HI value will be

obtained by achieving an average concentration (95% upper confidence limit on the mean) across the EU of 1.3 mg/kg for mercury, and 390 mg/kg for vanadium.

- Prevent direct contact with cobalt-contaminated soil having a non-carcinogenic HI exceeding 2. This HI will be obtained by achieving an average concentration (95% UCL of the mean) across the EU of 43 mg/kg for cobalt.

Table 2.3: Summary of Contaminated Soil RAO Cleanup Goals

RISK	COC	Cleanup Goal
Non-carcinogenic	Cobalt	HI $\leq$ 2, 95% UCL of Mean* = 43 mg/kg
Non-carcinogenic	Mercury	HI $\leq$ 1, 95% UCL of Mean* = 1.3 mg/kg
Non-carcinogenic	Vanadium	HI $\leq$ 1, 95% UCL of Mean* = 390 mg/kg

* 95% UCL of the mean of the EU.

2.8.1.2 Explosive Hazards RAOs

Unacceptable explosive hazards are posed by MEC potentially remaining within the SVFUDS. Combining the affected media, the exposure pathways and the project goals, the SVFUDS RAOs for explosive hazards are:

- Reduce the potential for encountering a munition in identified focus areas where MEC may remain present by investigating detected anomalies that are determined to most likely be munitions and removing munitions and munitions debris to the depth of detection.

Reduce the probability that people (e.g., residents, workers, visitors) who encounter a munition within the SVFUDS MRS-01 will approach, disturb, move or handle it. USACE will accomplished this by implementing a 3Rs explosives safety education program within the SVFUDS. A 3Rs Program is a conservative measure to ensure the entire community is informed of the actions to take should a munition be encountered.

2.8.2 Applicable or Relevant and Appropriate Requirements

Applicable or Relevant and Appropriate Requirements (ARARs) are Federal or State standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate to a CERCLA site or action.

Action-specific ARARs were identified during the development of remedial alternatives in the FS Report. These are the *U.S. Chemical and Biological Warfare Program, 50 United States Code (USC) 1518*, regarding disposal of such material, and *DCMR, 20 DCMR § 605.1*, regarding control of fugitive dust during remediation. No chemical or location-specific ARARs were identified for the SVFUDS. Pursuant to CERCLA/NCP, compliance with ARARs is a threshold requirement that a remedial alternative must meet in order to be eligible for selection.

In addition to ARARs, advisories, criteria, or guidance may be identified as "to be considered" (TBC) information for a particular scenario. Chemical-specific TBCs include USEPA

Regional Screening Levels (RSLs) and USEPA Toxicity values for selected COCs (Cancer Slope Factors and Reference Doses).

2.9 Description of Alternatives

This section presents a summary of the remedial alternatives developed separately to meet the RAOs for each of the two identified levels of risk for the SVFUDS. The alternatives were evaluated against the short- and long-term aspects of three broad criteria: effectiveness, implementability and cost.

The effectiveness criterion evaluates effectiveness in protecting human health and the environment, and providing reduction in toxicity, mobility and volume. Short-term (construction and implementation period) and long-term effectiveness (effective period after the remedial action is complete) was also evaluated.

The implementability criterion evaluates both the technical and administrative feasibility of constructing, operating and maintaining a remedial alternative. Technical feasibility is the ability to construct, reliably operate and maintain an alternative, while administrative feasibility refers to the ability to obtain approvals from agencies, and the availability of required goods and services.

The cost of each alternative was also evaluated. Prior estimates, sound engineering judgment, and real-world (actual) costs based on previous implementation of some of the remedial alternatives within the SVFUDS were used to evaluate one alternative against another.

2.9.1 Contaminated Soil Remedial Alternatives

Four remedial alternatives were identified to mitigate the unacceptable risks posed by soil contamination resulting from the identified COCs.

2.9.1.1 Contaminated Soil Alternative 1: No Further Action

The No Further Action alternative involves leaving the contaminated area (i.e., the identified area of risk) in its current condition. Under this alternative, no remedial action would be taken and identified contaminants are left "as is" without the implementation of containment, removal, treatment or other protective actions. This alternative failed key elements of the effectiveness and implementability criteria. As such, it did not undergo a more detailed analysis.

2.9.1.2 Contaminated Soil Alternative 2: Land Use Controls (LUCs)

The Land Use Controls (LUCs) alternative would include limiting access to all or portions of the identified area of risk. It would call for environmental covenants (e.g., prohibition of routine landscaping activities, legally binding the current and future property owner to the appropriate access and use restrictions). Implementation of this alternative would require the cooperation of the regulators, the government and the current and future property owners. Options for limiting access include fencing specific areas (e.g., areas known to contain soil contamination), covering the areas with concrete or brick (e.g., restricting the area’s use to a parking area or patio) or planting the areas with groundcover plants that do not require routine maintenance. This alternative failed key elements of the effectiveness and implementability criteria. As such, it did not undergo a more detailed analysis.

2.9.1.3 Contaminated Soil Alternative 3: Phytoremediation

Phytoremediation uses plants to remove contaminants from the environment. Alternative 3 entails installing selected plants in contaminated-soil areas, based on treatability studies conducted to determine the appropriateness of this alternative to site-specific conditions. The plants would be periodically harvested and disposed of per applicable laws and regulations.

The duration of this effort would be site-specific and vary depending on the COC, growth rate of the plantings, depth of contamination and climatic conditions. Phytoremediation has generally been shown to be effective in removing some SVFUDS-specific COCs from soils, but a treatability study would be required to determine the true effectiveness for each COC at a given location. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.9.1.4 Contaminated Soil Alternative 4: Excavation and Off-site Disposal

This alternative entails excavation of contaminated soils from identified areas, and backfilling the areas with clean soil. USACE would subsequently conduct additional soil sampling. USACE would use data from this sampling to recalculate the human health risks for the location sampled. Excavation would be considered complete when the recalculated EU mean concentration was less than or equal to the cleanup standard. Excavated soil would be characterized and transported to an off-site disposal facility. Based on previous experience at SVFUDS, this would likely be a sanitary landfill. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.9.2 Explosive Hazards Remedial Alternatives

The primary response action to mitigate potential explosive hazards associated with the potential presence of MEC at the SVFUDS has been digital geophysical mapping (DGM), investigation of anomalies, and recovery of munitions and munitions-debris encountered. USACE has used and continues to use an electromagnetic instrument (the EM61) and a magnetic instrument (the G-858), in combination. USACE classifies detected anomalies based on factors (e.g., anomaly size, geophysical signatures) placing them into one of the below four categories

- Category A - most likely to represent a buried munition at shallow depth, high certainty.
- Category B – most likely to represent a buried munition at greater depth, low to moderate certainty
- Category C – possible munition buried at depth, but exhibits few characteristics of a munition, cannot be ruled out
- Category D – most likely to not represent a buried munition, high certainty

Advanced geophysical classification (AGC) is a new approach to improve DGM's efficiency. AGC uses advanced electromagnetic induction sensors and geophysical data processing software to better estimate the depth, size, wall thickness and shape of a buried item. AGC technology allows for a more informed decision as to whether a detected anomaly is a

potential munition, which should be investigated, or metal clutter, which can be left in the ground. Six remedial alternatives were identified to mitigate the potential unacceptable explosive hazards.

2.9.2.1 Explosive Hazards Alternative 1: No Further Action

The No Further Action alternative would leave munitions that may present in place, without further investigation or removal. This alternative does not provide for removal of munitions that may upon recovery and evaluation by qualified personnel be determined to be MEC. As such, it does not provide for either active or passive land use controls that would reduce the potential for personnel to encounter and interact with a munition. Consequently, this alternative is not protective of human health or the environment and failed key elements of the effectiveness and implementability criteria. As such, it did not undergo a more detailed analysis.

2.9.2.2 Explosive Hazards Alternative 2: LUCs

The LUCs alternative would not reduce toxicity or volume of munitions potentially present. The property owner's acceptance and the government's ability to commit future property owners to compliance with land use restrictions is limited, and could entail significant legal effort and potential financial claims. Consequently, this alternative failed key elements of the effectiveness and implementability criteria. As such, it did not undergo a more detailed analysis.

2.9.2.3 Explosive Hazards Alternative 3: Full DGM Coverage, Investigate Anomalies and Removal of Munitions, Implementation of 3Rs Explosives Safety Education

This alternative entails conducting DGM, investigating all anomalies and removing munitions and other material per specified criteria (e.g., percent of a property to be subjected to DGM, signature of anomalies to be investigated).

The DGM coverage standard is 'full' coverage. Full coverage, recognizing practical considerations for residential properties, is defined as using geophysical instruments to survey the entire property, with the exception of beneath buildings or trees approximately 100 years of age. Trees of that age would have existed at the time of AUES activities. As such, it is unlikely that munitions would be present beneath them. Full coverage would include DGM of areas covered by driveways, sidewalks or patios. It would also include gardens, landscaped areas and small trees or ornamental plants. Fences would be temporarily removed to survey the ground without interference to the DGM.

The anomaly investigation and removal criteria for this alternative is that detected geophysical anomalies be investigated and removed. Given this approach, USACE would use an EM61 plus the G-858. Because USACE would not use AGC or equivalent technologies and methods the discrimination of detected anomalies is not necessary.

For the properties that have previously undergone DGM, anomaly investigation and removal work, the remaining anomalies, even though previously assessed to be innocuous metal debris, would be removed under this alternative.

Finally, due to the nature of the site as a formerly used defense site, continuing the 3Rs Program (e.g., distribution of 3Rs explosives safety information via the 3Rs website {3Rs.mil}, mailing) would be conducted periodically to remind community members that munitions may be encountered anywhere and inform them of the actions to take should they

encounter one. Periodically, implementation of the 3Rs Program would be re-evaluated for its effectiveness and continued need. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.9.2.4 Explosive Hazards Alternative 4: Full DGM Coverage, Investigation of Selected Anomalies and Removal of Munitions; Implementation of 3Rs Explosives Safety Education

This alternative entails conducting DGM, investigating selected anomalies and removing munitions and other material within the entire property per specified criteria, as described for Explosive Hazard Alternative 3 above.

Removing selected anomalies means that only those anomalies recommended for investigation through the AGC methodology would be removed. Consequently, the DGM method associated with this alternative is the use of the EM61 plus the G-858, as supplemented by the AGC instrumentation or equivalent technologies and methods that achieve the alternative objective.

For the properties that have previously undergone DGM, the remaining anomalies would be re-acquired using the AGC methodology. This would help determine whether the selected anomaly should be excavated. The Army acknowledges that for these properties, new anomalies may be detected and previously detected anomalies may no longer be present.

Finally, given this is a FUDS, USACE would continue to implement the 3Rs Program to remind community members that munitions may be encountered anywhere and inform them of the actions to take should they encounter one. Periodically, implementation of the 3Rs Program would be re-evaluated for its effectiveness and continued need. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.9.2.5 Explosive Hazards Alternative 5: DGM of Accessible Areas, Investigate Anomalies and Removal of Munitions, Implementation of 3Rs Explosives Safety Education

This alternative entails conducting DGM, investigating anomalies, removal of munitions and other material for a given property per specific criteria (i.e., DGM coverage of "accessible areas," investigation of anomalies and removal of detected munitions and other material.

The DGM coverage standard of "accessible areas" excludes those areas not surveyed under the full coverage standard described for Alternatives 3 and 4 above, and areas covered by rare or valuable plants, large ornamental trees (regardless of age), and areas under fences. However, it includes DGM of driveways, sidewalks, patios and gardens and small trees or plants.

The accessible areas DGM coverage standard is further defined by property owner input during the remedial design phase, where Work Plan development will consider individual concerns about property disturbance to the extent practicable. USACE acknowledges that property owner input could result in a reduction of the accessible area for DGM coverage on an individual property.

The anomaly investigation and removal standard is that detected anomalies would be investigated and removed, as described in Alternative 3 above.

Finally, given this is a FUDS, USACE would continue to implement the 3Rs Program to remind community members that munitions may be encountered anywhere and inform them of the actions to take should they encounter one. Periodically, implementation of the 3Rs Program would be re-evaluated for its effectiveness and continued need. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.9.2.6 Explosive Hazards Alternative 6: DGM of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions; Implementation of 3Rs Explosives Safety Education

This alternative entails conducting DGM, investigating selected anomalies and removing munitions and other material on a given property. This alternative specifies a DGM coverage standard of "accessible areas" and an anomaly investigation and removal quantity standard of selected geophysical anomalies. The DGM coverage standard of accessible areas is as described in Alterative 5 above, and the anomaly investigation and removal standard of selected anomalies is as described in Alternative 4 above.

Finally, given this is a FUDS, USACE would continue to implement the 3Rs Program to remind community members that munitions may be encountered anywhere and inform them of the actions to take should they encounter one. Periodically, implementation of the 3Rs Program would be re-evaluated for its effectiveness and continued need. This alternative met key elements of the effectiveness and implementability criteria. As such, USACE included it in the more detailed comparative analysis.

2.10 Summary of Comparative Analysis of Potential Remedial Alternatives

The broad screen eliminated several remedial alternatives. The ones retained for the detailed analysis are summarized in Table 2.4.

Table 2.4: Summary of Remedial Alternatives Retained

RISK or HAZARD	REMEDIAL ALTERNATIVE RETAINED
Soil Contamination Risks	3. Phytoremediation
	4. Excavation and Off-site Disposal
Explosive Hazards	3. Full DGM Coverage, Investigate Detected Anomalies and Remove Munitions
	4. Full DGM Coverage, Investigate Selected Anomalies and Remove Munitions
	5. DGM of Accessible Areas, Investigate Detected Anomalies and Remove Munitions
	6. DGM of Accessible Areas, Investigate Selected Anomalies and Remove Munitions

In the detailed analysis, each alternative is assessed against nine evaluation criteria (Exhibit 1) that have been developed by the USEPA to address CERCLA requirements and technical and policy considerations that have proven to be important for selecting among remedial alternatives. The nine criteria are divided into three categories: threshold, balancing and modifying. The nine criteria are used to evaluate the remedial alternative individually, and then against one another, in order to select a preferred alternative. The evaluation focuses on whether the alternative is favorable, moderately favorable, or not favorable, relative to the criterion.

EXHIBIT 1
NINE EVALUATION CRITERIA

Threshold Criteria:
1) Overall Protectiveness of Human Health and the Environment- alternative shall be protective of human health and the environment.

2) Compliance with ARARs- alternative must meet cleanup standards, standards of control, or other requirements that pertain to the contaminants, remedial action, or the remedial location that are found in Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or a waiver must be justified.

Balancing Criteria:
3) Long-term Effectiveness and Permanence- considers the ability of an alternative to maintain protection of human health and the environment over time.

4) Reduction in Toxicity, Mobility, or Volume through Treatment- evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.

5) Short-Term Effectiveness- considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.

6) Implementability- considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.

7) Cost- includes the estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within +50 to -30 percent of the actual project costs.

Modifying Criteria:
8) State/Support Agency Acceptance- considers the acceptance of the State or support agency of the preferred alternative.

9) Community Acceptance- considers the acceptance of the community of the preferred alternative.

2.10.1 Individual Analysis of Contaminated Soil Remedial Alternatives

Each of the remaining contaminated soil alternatives were evaluated individually against the nine criteria.

2.10.1.1 Overall Protection of Human Health and the Environment

This is a threshold criterion in that it must be met. Contaminated Soil Alternative 3, Phytoremediation, is protective of public health and the environment. Based on the

results of previous phytoremediation efforts in the SVFUDS, and the general success with metals in soil, the primary COCs to be addressed, this criterion is ranked as favorable.

Contaminated Soil Alternative 4, Excavation and Off-site Disposal, provides protection of public health and the environment by excavating site soils and achieving the RAOs for contaminated soil. Under this alternative, areas of contaminated soil would be delineated through additional sampling, and excavated. This criterion is ranked as favorable for Alternative 4.

2.10.1.2 Compliance with ARARs

This is a threshold criterion in that it must be met. Contaminated Soil Alternative 3 is expected to achieve each ARARs. This alternative will comply with CERCLA criteria for soil by remediating subject soils to the RAOs; therefore, it is ranked as favorable.

Contaminated Soil Alternative 4 is also expected to achieve each ARAR, meeting CERCLA criteria for soil by removing the contaminated soils and leaving in-place soil that meets the RAOs; therefore, it is also ranked as favorable.

2.10.1.3 Long-Term Effectiveness and Permanence

Contaminated Soil Alternative 3 is moderately favorable for the long-term effectiveness criterion due to the potential need to have different types of plants targeting different COCs. The differing plant growth needs, such as water, nutrients, and sunlight, may have the overall effect of reducing long-term effectiveness in a small area where multiple plants are competing.

Contaminated Soil Alternative 4 is favorable regarding this criterion, as the contaminated soils will be removed from the site, eliminating residual risk.

2.10.1.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Both Contaminated Soil Alternatives 3 and 4 were ranked as not favorable in reducing toxicity, mobility and volume of contaminants, in that contaminants, either soil or harvested plants, are transferred (e.g., a landfill), rather than reduced through treatment.

2.10.1.5 Short-Term Effectiveness

Contaminated Soil Alternative 3 is not favorable in meeting the short-term effectiveness criterion because the plants have a growing and harvesting cycle that requires sufficient time.

Contaminated Soil Alternative 4 is favorable in meeting this criterion because the time required to meet the RAOs is minimal, and even though contaminants are initially disturbed by digging, the engineering controls to do this work safely and effectively have been well established for this type of operation in the SVFUDS.

2.10.1.6 Implementability

Contaminated Soil Alternative 3 is moderately favorable overall in meeting the implementability criterion. While phytoremediation has worked previously within the SVFUDS for metals in soil, it has not yet been demonstrated each site-specific COCs and implementation would be delayed pending completion of a treatability study. While materials and

services are generally available, site-specific plant needs would impact implementation of this alternative.

Contaminated Soil Alternative 4 is favorable overall in meeting the implementability criterion: construction and operational considerations and the reliability of the alternative are well established and materials and equipment required to perform the excavations are readily available.

2.10.1.7 Cost

Detailed cost estimates for each alternatives were developed as part of the FS. These costs are provided in Tables B-1 (Contaminated Soil Alternatives) and B-2 (Explosive Hazards Alternatives) of Appendix B.

The cost to implement Contaminated Soil Alternative 3 is moderate. The total estimated cost is approximately $15,000 (rounded down from $15,391) per grid of contaminated soil. A grid is 20 feet by 20 feet by 4 feet deep. Using an estimated 12 total grids, the total cost would be $184,700. These costs include planting a variety of selected species, maintenance, harvesting and disposal. The cost will vary for different discrete areas of contaminated soil, based on various factors including the type of plants required, climate factors (e.g., amount of irrigation needed), nutrient requirements, the number of harvesting and replanting cycles required, and disposal requirements.

The cost to implement Contaminated Soil Alternative 4 is moderate to high. The total estimated cost is approximately $30,000 (rounded up from $29,933) per grid of contaminated soil. A grid is 20 feet by 20 feet by 4 feet deep. Using an estimated 12 total grids, the total cost would be $359,200. These costs include delineation and confirmation sampling, excavation and disposal, backfilling with clean soil, and restoration of the land. Costs will vary at site-specific locations based on factors such as volume of soil removed and disposal requirements.

The costs for both alternatives are approximate, and in actual implementation, it is anticipated that an economy of scale would reduce per-grid costs considerably.

2.10.1.8 State/Support Agency Acceptance

DOEE and USEPA Region 3 have expressed support for the selected contaminated soil alternative, **Contaminated Soil Alternative 4, Excavation and Off-site Disposal,** as described in Section 2.12.

2.10.1.9 Community Acceptance

During the public comment period, the community generally supported the selected contaminated soil alternative described in Section 2.12, with no substantive objections raised. A Responsiveness Summary, providing the significant comments and questions about the selected remedy, submitted during the public comment period on the Proposed Plan, and the USACE responses to those comments, is presented as Appendix C.

2.10.2 Comparative Analysis of Contaminated Soil Remedial Alternatives

Each of the remaining contaminated soil alternatives were compared against each other.

Both contaminated soil alternatives were considered protective of human health and the environment. However, Contaminated Soil Alternative 4 was considered to have fewer performance unknowns than Alternative 3. Both alternatives were compliant with ARARs.

Alternative 3 was only moderately effective in the long-term due to the need to potentially have different types of plants targeting different COCs, and the phytoremediation process could take a substantial length of time to reach RAOs, based on plant growth cycles.

Alternative 4 was the most effective in the long-term. It is a permanent remedy that leaves no unacceptable risk at the site.

Both alternatives were ranked as not favorable with regard to reducing toxicity, mobility, and volume of contaminants because they transfer contaminants to a landfill, rather than reducing them through treatment.

Alternative 3 was not favorable in meeting the short-term effectiveness criterion because the plants have a growing and harvesting cycle that requires sufficient time. Alternative 4 was favorable in meeting this criterion because the time required to meet the RAOs is minimal.

Alternative 3 was only moderately favorable overall for the implementability criteria because it has not been successfully demonstrated for the site-specific COCs. However, Alternative 4 was favorable overall for the implementability criteria because construction and operational considerations and the reliability of excavation and disposal to address the contaminants are well established.

Costs generally are a function of time required to achieve the RAOs and volume of soil to be addressed, with Alternative 3 impacted more by time and Alternative 4 impacted more by volume of soil. On a per grid basis, phytoremediation is less expensive than excavation and disposal. However, phytoremediation contains more unknowns because treatability studies are needed. Therefore, while Alternative 3 is less costly than Alternative 4, based on much experience with both alternatives within the SVFUDS, the unknowns associated with phytoremediation costs are considered to be significant enough that the lower phytoremediation costs ranked only slightly more favorable than the higher excavation and disposal costs.

Both of the remaining contaminated soil alternatives achieve UU/UE conditions. Table 2.5 summarizes the detailed comparative analysis.

2.10.3 Individual Analysis of Explosive Hazards Remedial Alternatives

Each of the remaining explosive hazards alternatives were evaluated individually against the nine criteria.

2.10.3.1 Overall Protection of Human Health and the Environment

The four Explosive Hazard Alternatives (3, 4, 5, and 6) are protective of public health and the environment based on the investigation of detected anomalies and removal of munitions and other material that could pose an unacceptable explosive hazard. Under these alternatives, each detected anomaly is investigated or only selected anomalies that are determined to be munitions or munitions debris (MD) or cannot be discriminated are investigated. Recovered munitions and MD would be evaluated by qualified personnel to determine its explosive safety status. Munitions determined to be MEC and MD determined to pose an explosive hazard and other recovered material would be disposed of per applicable policy and regulations.

2.10.3.2 Compliance with ARARs

The four Explosive Hazard Alternatives are compliant with ARARs.

2.10.3.3 Long-Term Effectiveness and Permanence

Explosive Hazards Alternative 3 is favorable for the long-term effectiveness criterion because it addresses the magnitude of remaining hazard by employing the standard of full DGM coverage, investigation of detected anomalies and removal of munitions and other material. Alternatives 4, 5, and 6 were moderately favorable because they either employ full DGM coverage, but either they:

- Do not result in the investigation of each detected anomaly and the subsequent removal of munitions and other material; or
- Result in the investigation of detected anomalies and removal of munitions and other material, but they have a slightly lower DGM coverage standard.

2.10.3.4 Reduction of Toxicity, Mobility, or Volume through Treatment

Alternative 3 is favorable in reducing the quantity of munitions potentially present by employing a standard of full DGM coverage, investigation of detected anomalies and removal of munitions and other material. Under this alternative, the quantity of munitions potentially present that could, upon recovery, be determined to pose an explosive hazards is reduced significantly. Alternatives 4, 5, and 6 were moderately favorable because they do not result in either the investigation of each detected anomalies or removal of munitions and other debris or they do not provide full DGM coverage of the area.

2.10.3.5 Short-Term Effectiveness

Alternatives 3 and 4 are moderately favorable in meeting the short-term effectiveness criterion because although the engineering controls used are proven, the higher DGM coverage standard increases the time required to meet the RAOs. However, Alternatives 5 and 6 are favorable in meeting the short-term effectiveness criterion because the DGM coverage standard of accessible areas allows the RAOs to be achieved sooner.

2.10.3.6 Implementability

Alternatives 3 and 4 are moderately favorable in meeting the implementability criterion. The technical feasibility sub-criterion is only moderately favorable in that the higher DGM coverage standard may involve removal and restoration of more areas, potentially presenting challenges. The administrative feasibility sub-criterion is moderately favorable in that it would require significant coordination with the property owner to implement the extensive restoration activities that could be required. However, Alternatives 5 and 6 are favorable in meeting this criterion because operational considerations are well established and fewer landscaped areas or trees would need to be removed under the accessible areas DGM standard. Less extensive coordination with the property owner will be required as fewer areas of landscaped vegetation or trees would need to be removed.

2.10.3.7 Cost

The cost to implement Alternative 3 is moderate to high. The total estimated cost is approximately $230,000 per property. This includes the assumptions under the

full DGM coverage standard and all anomalies removed standard, that a certain level of disturbance to the property would require restoration. The cost to implement Alternative 4 is also moderate to high, approximately $225,000 per property. This is slightly less that Alternative 3 based on investigating only selected, anomalies and impacting slightly less of each property.

The cost to implement Alternative 5 is also moderate to high, approximately $197,500 per property. Under the accessible areas DGM coverage standard, fewer areas would be disturbed and consequently fewer areas would require restoration. The cost to implement Alternative 6 is also moderate to high, approximately $192,500 per property. Under the accessible areas DGM coverage and investigation of selected anomalies standards, even fewer areas would be disturbed that require restoration.

With regard to costing, each property presents a different level of effort (e.g., number of anomalies to investigate, amount of vegetation to remove, varying impacts to cultural or hardscape features). Therefore, while the costs for each alternative would be applied to each of the 98 properties, the formal costing analysis in the FS was based on an individual generic representative property. However, to present total costs, each 'per property' cost can be multiplied by 98 with the following resulting total costs:

- Alternative 3: $22,540,000
- Alternative 4: $22,050,000
- Alternative 5: $19,355,000
- Alternative 6: $18,865,000

In actual implementation, however, an economy of scale would reduce the 'per property' cost considerably. For example, a single Work Plan that addresses all 98 properties would be prepared rather than 98 separate Work Plans.

Costs for the explosive hazards alternatives would also include the continuation of a 3Rs Program and 5-year review costs, as described in Appendix B-2.

2.10.3.8 State/Support Agency Acceptance

DOEE and USEPA Region 3 have expressed support for the selected explosive hazards alternative, **DGM of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions; Implementation of 3Rs Explosives Safety Education,** as described in Section 2.12.

Table 2.5: Summary of Detailed Analysis of Remaining Contaminated Soil Remedial Alternatives

	Screening Criterion	Alternative 3: Phytoremediation	Alternative 4: Excavation and Off-site Disposal
Threshold	Overall Protection of Human Health and Environment	●	●
	Compliance with ARARs	●	●
Balancing	Long-Term Effectiveness	◑	●
	Reduction of Toxicity, Mobility and Volume Through Treatment\1	○	○
	Short-Term Effectiveness	○	●
	Implementability	◑	●
	Technical Feasibility	◑	●
	Administrative Feasibility	◑	●
	Availability of Materials and Services	◑	●
	Cost\2	**$15,000 per grid\3**	**$30,000 per grid\3**
Modifying\4	State Acceptance	●	●
	Community Acceptance	●	●

● Favorable ('YES' for threshold criteria)

◑ Moderately Favorable

○ Not Favorable ('NO' for threshold criteria)

\1 – While both alternatives reduce toxicity, mobility, and volume at the property, the statutory preference is permanent reduction through treatment; therefore, assuming landfill disposal, this criterion is not assessed as 'Favorable'.
\2 – Costs are detailed in Appendix B.
\3 – Based on one 20 ft. by 20 ft. by 4 ft. deep grid of contaminated soil. Total costs are based on 12 grids.
\4 – The Modifying criteria of State and Community acceptance are considered 'Favorable' following review and input from these parties.

2.10.3.9 *Community Acceptance*

During the public comment period, the community generally supported the selected explosive hazards alternative described in Section 2.12, with no substantive objections raised. A Responsiveness Summary that provides the significant comments and questions about the selected remedy that the public submitted on the Proposed Plan during the public comment period and the USACE responses to those comments is presented as Appendix C.

2.10.4 Comparative Analysis of Explosive Hazards Remedial Alternatives

Each of the four remaining explosive hazards alternatives were considered protective of human health and the environment. However, Alternatives 3 and 5, which result in the investigation of detected anomalies, had fewer unknowns than the other alternatives. Each of the four alternatives were compliant with ARARs.

Only Alternative 3 was favorable in the long-term due to the higher DGM coverage and anomaly investigation and removal quantity standards. The other three alternatives were moderately favorable because relative to Alternative 3, either they had less DGM coverage, or investigated fewer detected anomalies. Similarly, only Alternative 3 was ranked favorable with regard to reducing volume of munitions because more acreage would be covered and more removal actions would be conducted.

For short-term effectiveness, the higher DGM coverage standard of Alternatives 3 and 4, and the resulting additional time and logistics involved in cutting more areas of vegetation, ranked those alternatives as moderately favorable while Alternatives 5 and 6 were favorable for this criterion.

Alternatives 3 and 4 were ranked as moderately favorable overall for the implementability criteria primarily because the higher DGM coverage standard could present challenges to both the technical feasibility and administrative feasibility sub-criteria. These criteria would require significant coordination with the property owner for the implementation of extensive restoration activities that could be required. However, Alternatives 5 and 6 were ranked as favorable overall for the implementability criteria because fewer areas of landscaped vegetation or trees would be removed and less coordination with the property owner would be required under the accessible areas DGM standard.

Costs for the four explosive hazards remedial alternatives were primarily a function of amount of DGM coverage and the assumptions of how much additional work was involved in cutting and restoring landscaped areas of vegetation or trees. The full DGM coverage standard for Alternatives 3 and 4 was more costly than the accessible areas DGM coverage standard of Alternatives 5 and 6.

Secondarily, costs were a function of the anomaly investigation and removal quantity standard. Investigating all detected anomalies was more costly than investigating selected anomalies, but this was not a significant difference. This is because on an individual property basis, where a large number of anomalies would not be expected, the additional cost of the AGC technology activities intended to reduce the number of anomalies to be investigated. This tended to balance out the savings effected by not having to investigate all detected anomalies. Accordingly, the least costly alternative was Alternative 6, where less DGM would be conducted and fewer anomalies would be investigated.

None of the alternatives achieve UU/UE conditions. As this is the case, all four of the remaining alternatives do include amounts to cover the cost of ongoing education and awareness initiatives. Table 2.6 summarizes the analysis.

Table 2.6: Summary of Detailed Analysis of Remaining Explosive Hazards Remedial Alternatives (Note that all four alternatives also contain the Continuing Education/Awareness Initiatives element as previously described)

	Screening Criterion	Alternative 3: Full DGM Coverage, Remove All Anomalies	Alternative 4: Full DGM Coverage, Remove Selected Anomalies	Alternative 5: DGM of Accessible Areas, Remove All Anomalies	Alternative 6: DGM of Accessible Areas, Remove Selected Anomalies
Threshold	Overall Protection of Human Health and Environment	●	●	●	●
	Compliance with ARARs	●	●	●	●
Balancing	Long-Term Effectiveness	●	◑	◑	◑
	Reduction of Toxicity, Mobility and Volume Through Treatment\1	●	◑	◑	◑
	Short-Term Effectiveness	◑	◑	●	●
	Implementability	◑	◑	●	●
	Technical Feasibility	◑	◑	●	●
	Administrative Feasibility	◑	◑	●	●
	Availability of Materials and Services	●	●	●	●
	Cost\2	**$230,000 / property**	**$225,000 / property**	**$197,500 / property**	**$192,500 / property**
Modifying\3	State Acceptance	●	●	●	●
	Community Acceptance	●	●	●	●

● Favorable ('YES' for threshold criteria)

◑ Moderately Favorable

◯ Not Favorable ('NO' for threshold criteria)

\1 – For munitions, this criterion addresses volume of munitions that may be present. The through treatment preference is met for anomalies investigated and munitions and other material removed in that they are disposed of per applicable policy.
\2 – Costs are based on a generic individual property at which DGM was not previously conducted. To be multiplied by 98 for Total Cost (Appendix B).
\3 – The Modifying criteria of State and Community acceptance are considered 'Favorable' following review and input from these parties.

2.11 Principal Threat Waste

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site whenever practicable. The "principal threat" concept is applied to the characterization of "source materials" at a Superfund site in accordance with EPA guidance. A "source material" is material that includes or contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to ground water, surface water or air, or acts as a source for direct exposure. "Source materials" are further categorized as either "principal threat" or "low level" wastes. Principal threat wastes (PTW) are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur. Low Level wastes are those source materials that generally can be reliably contained and would present a low risk in the event of a release. With regard to this action, the designation of PTW will not be a significant factor as treatment has already been agreed to and planned for.

There is a possibility that military munitions will be encountered at the site and that upon evaluation by DoD explosive ordnance disposal personnel or similarly qualified personnel some will be determined to be MEC. If such munitions are encountered at the site during the course of implementing this DD, USACE will apply the selected remedy and treat it onsite in accordance with the remedy's previously agreed upon procedures (as per Action Memorandum, Disposal of Discarded Military Munitions (DMM), including Recovered Chemical Warfare Materiel (RCWM), Conventional DMM, and Material Documented as an Explosive Hazard (MDEH), February 2010), thereby satisfying the NCP's preference for treatment. Since treatment is the predetermined course of action a separate determination of whether MEC is a principal threat waste is moot and would delay action. USACE will take all necessary steps to ensure protectiveness of human health and the environment to address the unacceptable risks posed by the MEC at this site.

With regard to contaminated soil, the identified areas are considered to be low toxicity source materials (soil and subsurface soil concentrations not greatly above reference dose levels or that present an excess cancer risk near the acceptable risk range were exposure to occur).

2.12 Selected Remedial Alternative

Two levels of risk have been identified at the SVFUDS:

- Unacceptable risks posed by soil contamination, and
- Unacceptable risk posed by explosive hazards associated with MEC that may be remain present.

Contaminated Soil Alternative 4, Excavation and Off-site Disposal, is the selected remedial alternative to achieve the RAOs for unacceptable risks posed by contaminated soil.

Explosive Hazards Alternative 6, DGM of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions, Implementation of a 3Rs Explosives Safety Education, is the selected remedial alternative to achieve the explosive hazards RAOs for unacceptable explosive hazards posed by the possible presence of MEC.

2.12.1 Summary of the Rationale for the Selected Remedy

2.12.1.1 Contaminated Soil Remedy

Alternative 4, Excavation and Off-site Disposal was selected to address soil contamination because it is protective of human health and the environment and has fewer performance unknowns than the other alternatives. It is compliant with ARARs. This is the most effective alternative in the long-term because it is a permanent remedy. As such, it does not leave an unacceptable risk from soil contamination at the site. It is also most effective in the short-term as the time required to meet the RAOs is minimal.

This alternative is favorable overall in terms of implementability because construction, operational considerations and the reliability of excavation and disposal to address soil contaminants are well established. Although this alternative's cost is considered moderate to high, the known reliability and few performance unknowns support its selection. This alternative will achieve UU/UE conditions.

2.12.1.2 Explosive Hazards Remedy

DGM of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions, Implementation of a 3Rs Explosives Safety Education was selected because it is protective of human health and is compliant with ARARs. This alternative is most favorable for short-term effectiveness because of the lesser amount of time and logistics involved in cutting fewer areas of vegetation. This alternative is favorable overall in terms of implementability because fewer areas of landscaped vegetation or trees would be removed and less coordination with the property owner would be required.

This alternative is less costly than the others because fewer areas require vegetation removal; therefore, less restoration of landscaped areas would be required (i.e., investigating selected anomalies results in less property impact and lower costs per property). However, this alternative will not achieve UU/UE conditions.

2.12.2 Description of the Selected Remedy

2.12.2.1 Contaminated Soil Remedy

The selected remedy entails excavation of contaminated soils in the areas identified and backfilling the areas with clean soil. USACE would conduct additional soil sampling and use the sampling results to recalculate the human health risks for each location sampled. Once the RAOs are met, as determined by the recalculated non-carcinogenic risks, the limits of soil contamination would be established. USACE would consider the excavation complete when the recalculated EU's mean concentration for a particular COC is less than or equal to the cleanup standard.

USACE would characterize and transport excavated soil to an appropriate off-site disposal facility. USACE would use the disposal facility's requirements for its characterization of the soil. Previous SVFUDS experience has shown that the vast majority of the soil is likely to be characterized as non-hazardous; therefore, it could be transported to a sanitary landfill for proper disposal.

The COCs in soil are cobalt, mercury, and vanadium, and the SVFUDS RAOs for excavation are:

- Prevent direct contact with mercury- or vanadium-contaminated soil having a non-carcinogenic HI exceeding 1. This HI value will be obtained by achieving an average concentration (95% upper confidence limit on the mean) across the EU of 1.3 mg/kg for mercury, and 390 mg/kg for vanadium.
- Prevent direct contact with cobalt-contaminated soil having a non-carcinogenic HI exceeding 2. This HI will be obtained by achieving an average concentration (95% UCL of the mean) across the EU of 43 mg/kg for cobalt.

2.12.2.2 Explosive Hazards Remedy

The selected remedy entails conducting DGM, investigating selected anomalies, removal of munitions and other material on a subject property. USACE would apply a DGM coverage standard of 'accessible areas' and an anomaly investigation of selected geophysical anomalies.

The DGM coverage standard of "accessible areas" excludes those areas not surveyed under the full coverage standard described for Alternatives 3 and 4 above, and areas covered by rare or valuable plants, large ornamental trees (regardless of age), and areas under fences. However, it includes DGM of driveways, sidewalks, patios and gardens and small trees or plants.

The accessible areas DGM coverage standard is further defined by input during the remedial design phase, where Work Plan development will consider individual concerns about property disturbance to the extent practicable. USACE acknowledges that property owner input could result in a reduction of the accessible area for DGM coverage on an individual property.

Removing selected anomalies means that only those anomalies recommended for investigation through the AGC methodology will be removed. Consequently, the DGM method associated with this alternative is the use of the EM61 plus the G-858, as supplemented by the AGC instrumentation or other equivalent technologies and methods that achieve the alternative objective. For the properties that have previously undergone DGM, anomaly investigation and removal actions remaining anomalies would be re-acquired using the AGC methodology. This would help determine whether the selected anomaly should be excavated. The Army acknowledges that for these properties, new anomalies may be detected and previously detected anomalies may no longer be present.

The SVFUDS RAOs for the selected remedy to mitigate unacceptable explosive hazards posed by MEC potentially remaining within the SVFUDS are:

- Reduce the potential for encountering MEC in the identified focus areas of potential explosive hazards by investigating and removing subsurface anomalies that are most likely military munitions to the depth of detection of the technology and procedures used.
- Reduce the probability that people (e.g., residents, workers, visitors) who encounter a munition within the SVFUDS will approach, disturb

move or handle it. USACE will accomplish this by implementing a 3Rs explosives safety education program within the SVFUDS.

A 3Rs Program is a conservative measure to ensure the entire community is informed of the actions to take should a munition be encountered.

However, as the explosive hazards remedy does not achieve UU/UE, 5-year reviews would also be required. These reviews generally are required by CERCLA when hazardous substances remain on site above levels which permit UU/UE. These reviews will provide the opportunity for USACE to evaluate new information and ensure that the community remains aware of the potential for munitions to be encountered within the SVFUDS.

2.12.3 Summary of the Estimated Remedial Costs

Detailed cost estimates for all alternatives were developed as part of the FS. These costs are provided in Tables B-1 (Contaminated Soil Alternatives) and B-2 (Explosive Hazards Alternatives) of Appendix B.

- The estimated contaminated soil remedy cost is approximately $30,000 per grid (20 feet by 20 feet by 4 feet deep) of contaminated soil.
- The total estimated explosive hazards remedy cost is approximately $192,500 per property.

These cost estimates are based on prior estimates, sound engineering judgment, and real-world (actual) costs from previous implementation of these remedial alternatives within the SVFUDS. Changes in the cost elements may occur as a result of new information and data collected during the engineering design of the remedial alternative. These are order-of-magnitude engineering cost estimates that are expected to be within +50 to -30 percent of the actual project costs.

2.12.4 Expected Outcomes of the Selected Remedy

Based on the information available at this time, the selected remedy for the contaminated soil risks will be protective of human health and the environment, comply with ARARs, and be cost-effective. Upon this remedy's implementation, changes in the land's use associated with these areas are not anticipated.

Based on the information available at this time, the selected remedy for explosive hazards will be protective of human health, comply with ARARs and be cost-effective. Upon implementation of this remedy, there will be no anticipated change in the use of the land associated with these areas.

Potential explosive hazards associated with MEC that may remain present for properties within and outside the identified areas of focus is to reduce the probability that people (e.g., residents, workers, visitors) who encounter a munition will approach, disturb, move or handle it. USACE will accomplish this by implementing a 3Rs explosives safety education program within the SVFUDS.

2.13 Statutory Determinations

To meet the statutory requirements of Section 121 of CERCLA, remedial actions must:

- Achieve protection of human health and the environment;

- Comply with ARARs of both Federal and State laws and regulations;
- Be cost effective; and
- Use, to the maximum extent practicable, permanent solutions and alternative treatment or resource recovery technologies.

The following discussions summarize those statutory requirements and how they are met by each selected remedy.

2.13.1 Contaminated Soil Remedy

Excavation and off-site disposal provides protection of human health and the environment by excavating site soils and achieving the RAOs for contaminated soil. Under this remedy, USACE will remove chemical contaminants that pose an unacceptable risk from site soils eliminating their mobility and reducing the toxicity and volume of contaminated soil at the site. Areas of contaminated soil would be delineated through additional sampling, and excavated. USACE will conduct confirmation sampling and use the results to recalculate the human health risks for each location sampled to ensure the RAOs are met.

This remedy attains action-specific ARARs and chemical-specific TBCs. Additionally, it will comply with action-specific ARARs (e.g., controlling fugitive dust that may be inhaled by workers). Chemical-specific TBCs for soil that focus on health-protective cleanup standards will be attained.

This remedy's costs include delineation and confirmation soil sampling, excavation and disposal, backfilling with clean soil and restoration of the land. The remedy is cost effective, with costs proportional to its overall effectiveness, as determined by achieving long-term effectiveness and permanence within a reasonable timeframe. Although the other evaluated remedy was less costly on a per grid basis, it also contained associated unknowns; therefore, excavation and off-site disposal was considered to be more cost-effective.

The selected remedy for contaminated soil within the SVFUDS represents the maximum extent to which permanent solutions can be used in a cost effective manner. This remedy affords the best balance of tradeoffs compared to the other evaluated alternative. Alternative treatment technologies (e.g., phytoremediation) were found to be both less effective and implementable overall.

CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity and mobility of hazardous waste as the principal element. Although the selected remedy removes chemical contaminants from site soils from the site, USACE recognizes that unless treated, the mobility, toxicity or volume of contaminated soil is not reduced, but transferred to another site (i.e., a permitted landfill).

The selected remedy achieves UU/UE conditions.

2.13.2 Explosive Hazards Remedy

DGM of Accessible Areas, Investigation of Selected Anomalies and Removal of Munitions, Implementation of a 3Rs Program provides protection of human health and the environment by investigating detected anomalies and removing munitions that could pose an unacceptable explosive hazard. Under this remedy, recovered munitions and MD would be evaluated by qualified personnel to determine its explosive safety status. Munitions determined

to be MEC and MD determined to pose an explosive hazard and other recovered material would be disposed of per applicable policy and regulations. Anomalies identified as innocuous metallic debris may be left in the ground. This remedy will comply with action-specific ARARs that involved disposal or destruction of CWM.

The costs to implement this remedy include personnel to conduct the DGM survey and analyze DGM results. These costs also include the UXO-qualified personnel required to investigate anomalies, remove and evaluate the explosives safety status of munitions, munitions debris and other debris. The costing assumptions include cutting of vegetation and generally restoring property to its original conditions. The remedy is cost effective, with costs proportional to its overall effectiveness, as determined by achieving long-term effectiveness and permanence within a reasonable timeframe. This remedy is less costly than the others evaluated. This alternative is less costly than the others because fewer areas require vegetation removal; therefore, less restoration of landscaped areas would be required (i.e., investigating selected anomalies results in less property impact and lower costs per property). However, this alternative will not achieve UU/UE conditions.

The selected remedy represents the maximum extent to which permanent solutions and treatment technologies can be used in a cost effective and practicable manner to address the explosive hazards associated with munitions that may remain present within the SVFUDS. This remedy affords the best balance of tradeoffs as compared to all other evaluated alternatives.

For the munitions determined to be MEC and material determined to pose an explosive hazard that are removed, this alternative also meets the CERCLA preference to permanently and significantly reduce contaminants through treatment, because MEC and other munitions-related explosive hazards are destroyed on site. As such, these munitions no longer pose an explosive hazard.

The explosive hazards selected remedy does not achieve UU/UE. Therefore 5-year reviews will be required.

2.14 Documentation of Significant Changes

A public comment period was established from 13 June to 28 July 2016. On 14 July 2016, USACE held a public meeting to obtain input and feedback from the public on the selected remedies that the Proposed Plan presented. The Army subsequently extended this period from 29 August through 28 September 2016 in response to a public comment. The public comments received were considered prior to selecting the final remedy. USACE, in coordination with the Spring Valley Partners, evaluated comments received from the public during this period.

Appendix C provides a Responsiveness Summary that contains significant comments and questions about the Proposed Plan that the public submitted and USACE's responses to those comments. It also provides a transcript of the July 14 meeting. This Decision Document, which is signed by the Department of the Army, is USACE's official record of the final remedy selection for the SVFUDS.

The description of Alternatives 3 through 6 were modified to add "Implementation of 3Rs Explosives Safety Education." USACE based this addition on a comment received from within the Army. This addition was intended to clarify that a 3Rs program is considered a necessary attribute of each of the "active" alternatives to address the possible presence of MEC. USACE made this modification to clarify its original intent, which was that it always considered

implementation of a 3Rs program to be part of each of the four alternatives.

The USEPA released a revised assessment of the toxicity of carcinogenic PAHs in January of 2017 on its Integrated Risk Information System website (https://www.epa.gov/iris). This reassessment concluded that carcinogenic PAHs were less toxic than previously assumed which resulted in toxicity values going down for the carcinogenic assessment of all receptor groups exposed or possibly exposed to this constituent at Spring Valley by nearly seven times. When the Southern AU exposure unit was re-evaluated using these new carcinogenic PAH toxicity values the risk from PAHs fell into an acceptable range that no longer required taking an action.

USACE and its Spring Valley Partners, reviewed written and verbal comments submitted during the public comment period. They determined that significant changes to the remedy, as originally identified in the Proposed Plan, were neither necessary nor appropriate.

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Appendix A:
Site Figures

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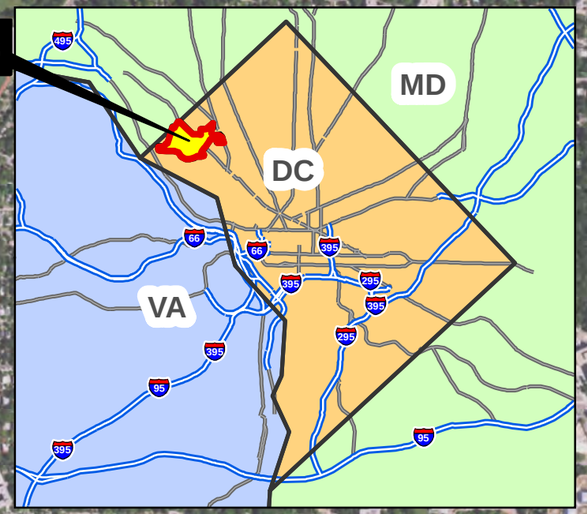
Spring Valley FUDS



Albemarle Street
Warren Place
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Warren Street
50th Street
Massachusetts Avenue
48th Place
Van Ness Street
46th Street
45th Street
Alton Place
Yuma Street
Windom Place
Warren Street
Verplanck Place
44th Street
43rd Street
42nd Street
Van Ness Street
Wisconsin Avenue
Dalecarlia Parkway
51st Street
Upton Street
49th Street
48th Street
Tilden Street
47th Street
45th Street
Springdale Street
Tindall Street
44th Street
Nebraska Avenue
52nd Street
52nd Street
Fordham Road
Rodman Street
Corey Place
University Avenue
Quebec Street
Little Falls Road
Rockwood Parkway
Overlook Road
Hillbrook Lane
Woodway Lane
Glenbrook Road
Loughboro Road
Indian Lane
Nebraska Avenue
Newark Street
Macomb Street
Foxhall Road

Figure 1
SVFUDS Location

Spring Valley FUDS
Washington, DC

Legend

SVFUDS

N
W E
S

Inset Map

SVFUDS
District of Columbia (DC) Boundary
Maryland Boundary
Virginia Boundary
Major Highways
Major Roads

US Army Corps of Engineers
BUILDING STRONG

ERT

0 500 1,000
Feet

June 2016

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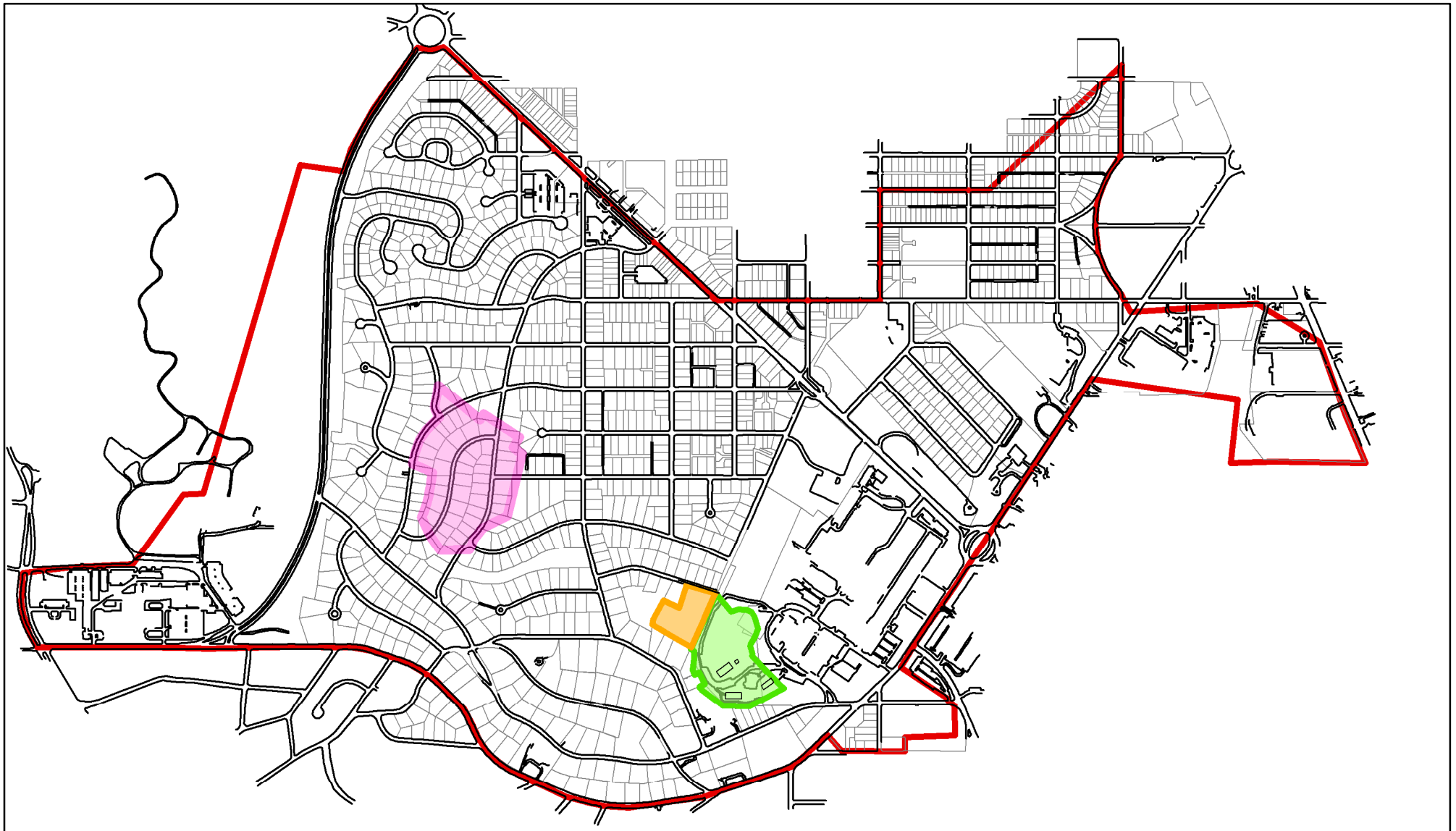

Legend

- Spaulding-Rankin EU
- Southern AU EU
- AOI 9 EU
- SVFUDS Boundary
- Parcels
- Roads

N
W E
S

0 500 1,000 Feet

July 2016

Figure 2
Human Health Risk Assessment
Exposure Units

Spring Valley FUDS
Washington, DC

US Army Corps of Engineers
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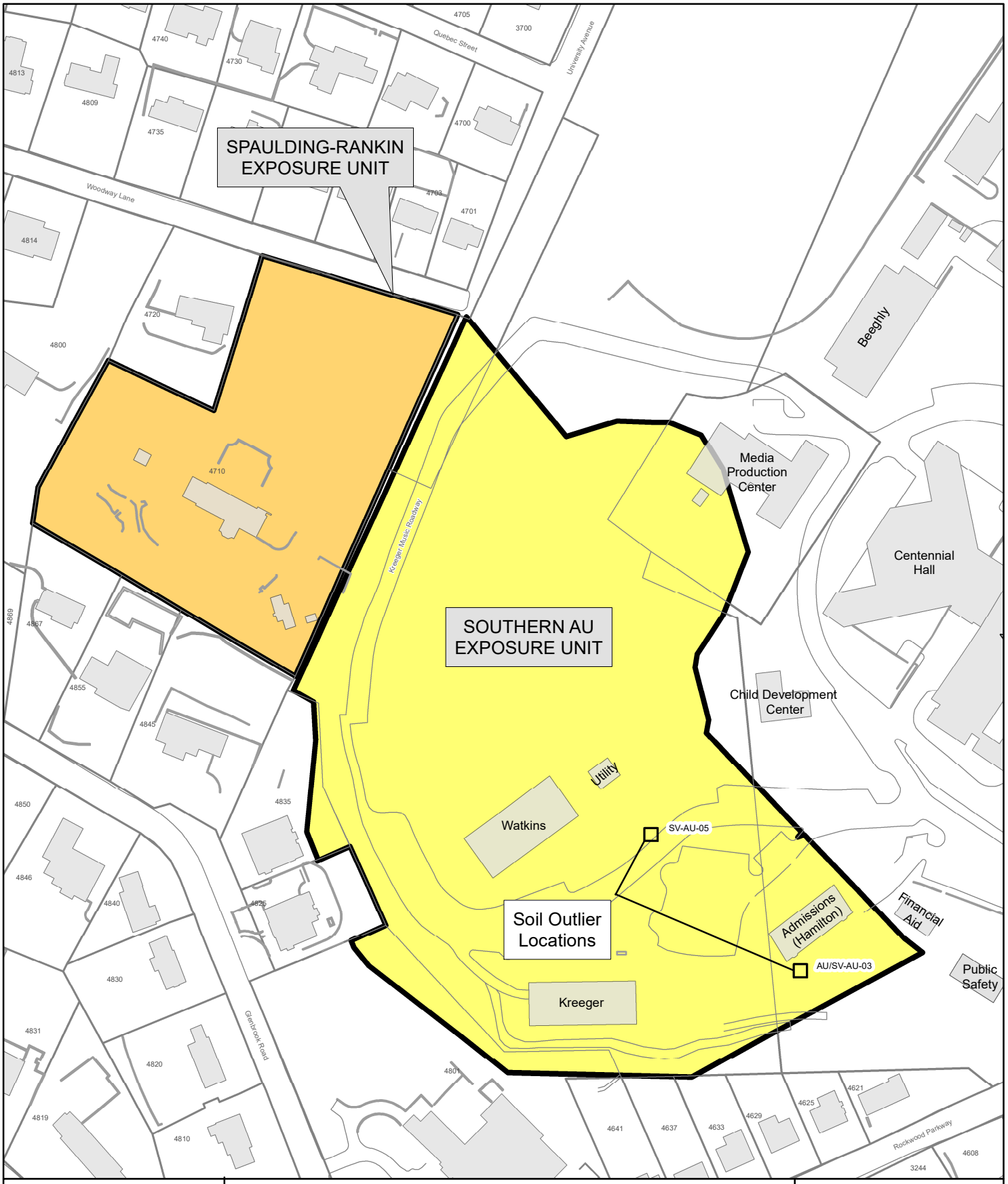

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June 2017

Legend

- Spaulding-Rankin Areas of Potential Non-Carcinogenic Risk
- Southern AU Areas of Potential Non-Carcinogenic Risk
- Parcels

N
W E
S

0 75 150 Feet

Figure 3
Areas of Non-Carcinogenic Risk in Soil

Spring Valley FUDS
Washington, DC

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Figure 4
Response Action Areas

Spring Valley FUDS
Washington, DC

Legend

- MRS-01 Boundary (120.1 Acres)
- Areas for Education and Awareness Initiatives*
- Areas of Focus for Active Response and Education and Awareness Initiatives (40.4 Acres)

*As a practical consideration, the education and awareness initiatives will also be applied to all areas of the SVFUDS (outside the MRS-01 boundary) to address the possibility that MEC could be relocated to, or less likely, found there. This serves as a conservative measure to ensure the entire community is educated about munitions issues even though the USACE does not propose active responses beyond the MRS-01 boundary.

- Buffer Zone (150 FT) of Statically Fired Testing Areas
- Range Fan
- FUDS Boundary
- Function Test Range/Impact Area (Stokes and Livens)
- Area of Interest (AOI)
- Point of Interest (POI)

Items

- Livens Projectile (MEC)
- Stokes Mortar (MEC)
- 75 mm Projectile (MEC)
- Thermite Grenade (MEC)
- Pipe with Explosives (MEC)
- Disposal Area (MEC/CWM)
- 75 mm MD
- Livens MD
- Stokes Mortar MD
- MD (miscellaneous)
- Non-AUES MD

N W E S

0 250 500 Feet

August 2016

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Function Test Range/Impact Area (Stokes and Livens)

Static Test Fire Area Buffer Zones

AOI 13
Possible Disposal Area

Public Safety Building
Possible Disposal Area

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Appendix B:
Costing Tables

Table B-1: Contaminated Soil Remedial Alternatives

Table B-2: Explosive Hazard Remedial Alternatives

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TABLE B-1
SITE-WIDE SVFUDS COSTS for
CONTAMINATED SOIL REMEDIAL ALTERNATIVES
(From FEASIBILITY STUDY)

	TOTAL COST SUMMARY		
	Task	**Total per Task**	
Alternative #3 - Phytoremediation	A. PLANNING	$	60,000
	B. ADMINISTRATION	$	5,000
	C. IMPLEMENTATION	$	87,000
	D. DISPOSAL	$	500
	E. SITE RESTORATION	$	4,700
	F. REPORTING	$	27,500
	TOTAL Alternative #3	**$**	**184,700**
	At an estimated 12 grids of contamination:		**$15,000/grid**

	TOTAL COST SUMMARY		
	Task	**Total per Task**	
Alternative #4 - Excavation and Off-site Disposal	A. PLANNING	$	60,000
	B. ADMINISTRATION	$	5,000
	C. IMPLEMENTATION	$	123,200
	D. MATERIAL TRANSPORT/DISPOSAL	$	64,800
	E. SITE RESTORATION	$	36,200
	F. REPORTING	$	70,000
	TOTAL Alternative #4	**$**	**359,200**
	At an estimated 12 grids of contamination:		**$30,000/grid**

Contaminated Soil Remedial Alternative #3 - Phytoremediation

Cost Item					Costs		
Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	-Plans						
	-Remedial Action Work Plan	Plans	1	LS	$ 25,000	$ 25,000	$ 25,000
	-Treatability Study	Study	1	LS	$ 5,000	$ 5,000	$ 5,000
		CENAB Review	2	WK	$ 15,000	$ 30,000	$ 30,000
		SUBTOTAL A				**$ 60,000**	**$ 60,000**
B	**ADMINISTRATION**						
	- Miscellaneous		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL B				**$ 5,000**	**$ 5,000**
C	**IMPLEMENTATION**						
	- Mob/Demob		1	LS	$ 2,000	$ 2,000	$ 2,000
	- Surveying		2	DAY	$ 1,500	$ 3,000	$ 3,000
	- Protective Fencing	Fence	1000	LF	$ 2.0	$ 2,000	$ 2,000
	- Sample Soil for COCs	Characterization	60	EA	$ 100	$ 6,000	$ 6,000
		Pre-confirmation	60	EA	$ 100	$ 6,000	$ 6,000
		Post-composite	60	EA	$ 100	$ 6,000	$ 6,000
	- Planting						
	Materials		1	LS	$ 5,000	$ 5,000	$ 5,000
	12 grids or hotspots	$5000/day includes 3 person team	6	DAY	$ 4,000	$ 24,000	$ 24,000
	- CENAB Oversight	plus per diem and equipment	1	WK	$ 5,000	$ 5,000	$ 5,000
	- Maintenance						
	Of plants and fencing	2 visits by 2 staff	2	DAY	$ 2,000	$ 4,000	$ 4,000
	- Harvesting						
	12 grids or hotspots		6	DAY	$ 4,000	$ 24,000	$ 24,000
		SUBTOTAL C				**$ 87,000**	**$ 87,000**
D	**DISPOSAL**						
	- Non-Hazardous Refuse	$20/ton disp and $30/ton transp	10	tons	$ 50	$ 500	$ 500
		SUBTOTAL D				**$ 500**	**$ 500**
E	**SITE RESTORATION**						
	- Backfill Material	Minor misc backfill	50	CY	$ 14	$ 700	$ 700
	- Labor (fence removal, general restoration)		2	DAY	$ 2,000	$ 4,000	$ 4,000
		SUBTOTAL E				**$ 4,700**	**$ 4,700**

Contaminated Soil Remedial Alternative #3 - Phytoremediation

Cost Item					Costs		
Task/Subtask		Item	Quantity	Units	Unit Cost	Subtotal	Total
F	**REPORTING**						
	-Closure Report	Report	1	LS	$ 20,000	$ 20,000	$ 20,000
		CENAB Review	1.5	WK	$ 5,000	$ 7,500	$ 7,500
		SUBTOTAL F				**$ 27,500**	**$ 27,500**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 60,000
B. ADMINISTRATION	$ 5,000
C. IMPLEMENTATION	$ 87,000
D. DISPOSAL	$ 500
E. SITE RESTORATION	$ 4,700
F. REPORTING	$ 27,500
TOTAL	**$ 184,700**

or $15,000/grid assuming 12 contaminated grids

ASSUMPTIONS		
A.	**PLANNING**	-The Work Plan is a single document covering all areas requiring a response action
B.	**ADMINISTRATION**	-Miscellaneous administrative costs.
C.	**IMPLEMENTATION**	-Single mobilization of team/equipment for all hotspots/grids -All low probability work; costs for work done under high probability protocols not included **-12 total hotspots (or grids), 6 on Spaulding-Rankin, 6 on AU** -Day rate is for 3 person team (3 planters). $2500 for 10 hr day, $1000 per diem, $500 equipment. -6 days to plant all grids, 6 days to harvest all grids -2 additional days for 2 staff for maintenance between planting and harvesting -Estimate 5 samples per hotspot/grid for characterization, pre-confirmation, post confirmation
D.	**DISPOSAL**	-Disposal of harvested plant materials
E.	**SITE RESTORATION**	-Remove any protective fencing, general maintenance of site to original conditions
F.	**POST REMEDIATION REPORT**	-Basic closure report that describes the activities conducted.

Abbreviations:

LS = lump sum
WK = week
EA = each
CY = cubic yard
CENAB = Baltimore District USACE
LF = linear foot
COC = Chemicals of Concern

Contaminated Soil Remedial Alternative #4 - Excavation and Off-site Disposal

Cost Item					Costs		
Task/Subtask		Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	-Plans	Plans	1	LS	$ 30,000	$ 30,000	$ 30,000
	Plans include Remedial Design/ Remedial Action Work Plan to address all site activities	CENAB Review	2	WK	$ 15,000	$ 30,000	$ 30,000
		SUBTOTAL A				**$ 60,000**	**$ 60,000**
B	**ADMINISTRATION**						
	- Miscellaneous		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL B				**$ 5,000**	**$ 5,000**
C	**IMPLEMENTATION**						
	- Construction team Mob/Demob		1	LS	$ 5,000	$ 5,000	$ 5,000
	- Surveying		2	DAY	$ 1,500	$ 3,000	$ 3,000
	- Erosion/Sediment Control	Silt Fence	1000	LF	$ 1.0	$ 1,000	$ 1,000
		Hay Bales	400	LF	$ 8.0	$ 3,200	$ 3,200
	- Sample Soil	Analytical Costs - TCLP	20	EA	$ 250	$ 5,000	$ 5,000
		Analytical Costs - COCs	50	EA	$ 100	$ 5,000	$ 5,000
	- Miscellaneous Equipment Contingencies		1	LS	$ 5,000	$ 5,000	$ 5,000
	LOW PROBABILITY **- Soil Excavation** 12 grids or hotspots = 720 CY 60 CY/day (six 10 CY trucks/day)	$5000/day includes 4 man team plus per diem plus $1000/day equipment	12	DAY	$ 5,500	$ 66,000	$ 66,000
	- Contractor Management		3	WK	$ 5,000	$ 15,000	$ 15,000
	- CENAB Management	This includes time for mob/demob	3	WK	$ 5,000	$ 15,000	$ 15,000
		SUBTOTAL C				**$ 123,200**	**$ 123,200**
D	**MATERIAL TRANSPORT and DISPOSAL**						
	- Non-Hazardous Soil to Landfill (648 CY)	$20/ton disp and $30/ton transp	972	tons	$ 50	$ 48,600	$ 48,600
	- Hazardous Soil to Landfill (72 CY)	$90/ton disp and $60/ton transp	108	tons	$ 150	$ 16,200	$ 16,200
		SUBTOTAL D				**$ 64,800**	**$ 64,800**
E	**SITE RESTORATION**						
	- Backfill Material	Material Only (720 CY + ~10%)	800	CY	$ 14	$ 11,200	$ 11,200
	- Labor (assumes 140 CY/day)	2-1/2 CY Loader w/ Operator	5	DAY	$ 5,000	$ 25,000	$ 25,000
		SUBTOTAL E				**$ 36,200**	**$ 36,200**

Contaminated Soil Remedial Alternative #4 - Excavation and Off-site Disposal

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
F	**REPORTING**						
	-Closure Report	Report	1	LS	$ 30,000	$ 30,000	$ 30,000
		CENAB Review	4	WK	$ 5,000	$ 20,000	$ 20,000
		CEHNC Review	4	WK	$ 5,000	$ 20,000	$ 20,000
		SUBTOTAL F				**$ 70,000**	**$ 70,000**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 60,000
B. ADMINISTRATION	$ 5,000
C. IMPLEMENTATION	$ 123,200
D. MATERIAL TRANSPORT/DISPOSAL	$ 64,800
E. SITE RESTORATION	$ 36,200
F. REPORTING	$ 70,000
TOTAL	**$ 359,200**

or $30,000/grid assuming 12 contaminated grids

ASSUMPTIONS		
A.	**PLANNING**	-The Work Plan is a single document covering all areas requiring a response action
B.	**ADMINISTRATION**	-Miscellaneous administrative costs.
C.	**IMPLEMENTATION**	-Single mobilization of construction team/equipment for all excavation required -All low probability excavation; costs for work done under high probability protocols not included **-12 total hotspots (or grids), 6 on Spaulding-Rankin, 6 on AU** -Each hotspot or grid is conservatively sized at 20ft x 20ft x 4ft deep. This is 1600 cu ft or approx 60 CY (90 tons). -Assumes a 1.5 factor for the soil conversion of CY to Ton -Hole does not extend deep enough to require elaborate shoring -Day rate is for 4 man team (3 diggers and one safety). $3000 for 10 hr day, $1500 per diem, $1000 equipment/gas. -60 CY of soil (one hot spot) removed per day -20 TCLP samples at $250/sample, and 50 samples for COC metals or PAHs at $100/sample
D.	**MATERIAL TRANSPORT / DISPOSAL**	-90% of soil will be nonhazardous soil and 10% will be hazardous -Assumes trucks rather than roll-offs
E.	**SITE RESTORATION**	-10% more soil required for backfill to allow for compaction. Assume 140 CY/day.
F.	**POST REMEDIATION REPORT**	-Basic closure report that describes the activities conducted

Abbreviations:

LS = lump sum
WK = week
EA = each
CY = cubic yard
CENAB = Baltimore District USACE
LF = linear foot
COC = Chemicals of Concern
TCLP = Toxicity Characteristic Leaching Procedure

TABLE B-2
SITE-WIDE SVFUDS FEASIBILITY STUDY COSTS for
EXPLOSIVE HAZARD REMEDIAL ALTERNATIVES
(From FEASIBILITY STUDY)

	TOTAL COST SUMMARY	
	Task	**Total per Task**
Alternative #3 - Full DGM Coverage, Remove <u>All</u> Anomalies	A. PLANNING	$ 50,000
	B. DGM FIELD ACTIVITIES	$ 13,000
	C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 37,000
	D. SITE RESTORATION	$ 60,000
	E. REPORTING	$ 70,000
	TOTAL Alternative #3	**$ 230,000**
	For 98 separate properties (no economy of scale):	**$22,540,000**

	TOTAL COST SUMMARY	
	Task	**Total per Task**
Alternative #4 - Full DGM Coverage, Remove <u>Selected</u> Anomalies	A. PLANNING	$ 50,000
	B. DGM FIELD ACTIVITIES	$ 23,500
	C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 26,500
	D. SITE RESTORATION	$ 55,000
	E. REPORTING	$ 70,000
	TOTAL Alternative #4	**$ 225,000**
	For 98 separate properties (no economy of scale):	**$22,050,000**

	TOTAL COST SUMMARY	
	Task	**Total per Task**
Alternative #5 - DGM of Accessible Areas, Remove <u>All</u> Anomalies	A. PLANNING	$ 50,000
	B. DGM FIELD ACTIVITIES	$ 10,500
	C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 37,000
	D. SITE RESTORATION	$ 35,000
	E. REPORTING	$ 65,000
	TOTAL Alternative #5	**$ 197,500**
	For 98 separate properties (no economy of scale):	**$19,355,000**

	TOTAL COST SUMMARY	
	Task	**Total per Task**
Alternative #6 - DGM of Accessible Areas, Remove <u>Selected</u> Anomalies	A. PLANNING	$ 50,000
	B. DGM FIELD ACTIVITIES	$ 21,000
	C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 26,500
	D. SITE RESTORATION	$ 30,000
	E. REPORTING	$ 65,000
	TOTAL Alternative #6	**$ 192,500**
	For 98 separate properties (no economy of scale):	**$18,865,000**

Explosive Hazard Remedial Alternative #3 - Full DGM Coverage, Remove All Anomalies

Cost Item					Costs		
Task/Subtask		Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	- DGM Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	- Anomaly Removal Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL A				**$ 50,000**	**$ 50,000**
B	**DGM FIELD ACTIVITIES**						
	- Surveying		1	LS	$ 2,000	$ 2,000	$ 2,000
	- Vegetation Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- Fence Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- DGM team Mob/Demob		1	LS	$ 3,000	$ 3,000	$ 3,000
	- DGM Surveying (EM61+G-858)		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0	DAY	$ 3,000	$ -	$ -
	- AC team Mob/Demob		0	LS	$ 6,000	$ -	$ -
	- AC Survey		0	DAY	$ 3,000	$ -	$ -
		SUBTOTAL B				**$ 13,000**	**$ 13,000**
C	**ANOMALY REMOVAL FIELD ACTIVITIES**						
	- Dig team mob/demob		1	LS	$ 16,000	$ 16,000	$ 16,000
	- Dig team daily rate		1	DAY	$ 8,000	$ 8,000	$ 8,000
	- Anomaly re-acquisition		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- USACE oversight (all field activities)		1	WK	$ 5,000	$ 5,000	$ 5,000
	- Contingencies		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL C				**$ 37,000**	**$ 37,000**
D	**SITE RESTORATION**						
	- Replace driveway		0.5	LS	$ 30,000	$ 15,000	$ 15,000
	- Replace vegetation		2	LS	$ 20,000	$ 40,000	$ 40,000
	- Replace fence		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL D				**$ 60,000**	**$ 60,000**

Explosive Hazard Remedial Alternative #3 - Full DGM Coverage, Remove All Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
E	**REPORTING**						
	-DGM Report (EM61, G-858)	Report	1	LS	$ 25,000	$ 25,000	$ 25,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Report	Report	1	LS	$ 15,000	$ 15,000	$ 15,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL E				**$ 70,000**	**$ 70,000**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 50,000
B. DGM FIELD ACTIVITIES	$ 13,000
C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 37,000
D. SITE RESTORATION	$ 60,000
E. REPORTING	$ 70,000
TOTAL	**$ 230,000**

For 98 separate properties: $22,540,000*

***no economy of scale included**

ASSUMPTIONS		
	GENERAL	-All costs are for an individual property. Not every property will require the same effort; some will cost more, some less. -Property has not previously been geophysically surveyed or intrusively investigated for anoms.
A.	**PLANNING**	-A programmatic work plan costs the same across all alternatives. These costs are for brief property-specific plans. -5 yr reviews (plans, site visit, and report, for $35,000) were added at the DD stage and were not included above.
B.	**DGM FIELD ACTIVITIES**	-One day to survey a property -2 discrete areas of vegetation removal -Small section of fence to be temp removed
C.	**ANOMALY REMOVAL FIELD ACTIVITIES**	-Full UXO team of 7 staff -One day to dig all anomalies (max of 100)
D.	**SITE RESTORATION**	-On average, half of driveway needs to be replaced -2 discrete areas of vegetation replanting -Small section of fence replaced
E.	**REPORTING**	-Anomaly Removal Report includes all anomalies (max of 100)

Abbreviations:

LS = lump sum
WK = week
EA = each
DGM = Digital Geophysical Mapping
CENAB = Baltimore District USACE
LF = linear foot
AC = Advanced Classification
UXO = Unexploded Ordnance

Explosive Hazard Remedial Alternative #4 - Full DGM Coverage, Remove Selected Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	-DGM Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL A				**$ 50,000**	**$ 50,000**
B	**DGM FIELD ACTIVITIES**						
	- Surveying		1	LS	$ 2,000	$ 2,000	$ 2,000
	- Vegetation Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- Fence Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- DGM team Mob/Demob		1	LS	$ 3,000	$ 3,000	$ 3,000
	- DGM Surveying (EM61+G-858)		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0.5	DAY	$ 3,000	$ 1,500	$ 1,500
	- AC team Mob/Demob		1	LS	$ 6,000	$ 6,000	$ 6,000
	- AC Survey		1	DAY	$ 3,000	$ 3,000	$ 3,000
		SUBTOTAL B				**$ 23,500**	**$ 23,500**
C	**ANOMALY REMOVAL FIELD ACTIVITIES**						
	- Dig team mob/demob		1	LS	$ 12,000	$ 12,000	$ 12,000
	- Dig team daily rate		0.5	DAY	$ 6,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0.5	DAY	$ 3,000	$ 1,500	$ 1,500
	- USACE oversight (all field activities)		1	WK	$ 5,000	$ 5,000	$ 5,000
	- Contingencies		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL C				**$ 26,500**	**$ 26,500**
D	**SITE RESTORATION**						
	- Replace driveway		0.3	LS	$ 30,000	$ 10,000	$ 10,000
	- Replace vegetation		2.0	LS	$ 20,000	$ 40,000	$ 40,000
	- Replace fence		1.0	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL D				**$ 55,000**	**$ 55,000**

Explosive Hazard Remedial Alternative #4 - Full DGM Coverage, Remove Selected Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
E	**REPORTING**						
	-DGM Report (EM61, G-858, AC)	Report	1	LS	$ 30,000	$ 30,000	$ 30,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Report	Report	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL E				**$ 70,000**	**$ 70,000**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 50,000
B. DGM FIELD ACTIVITIES	$ 23,500
C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 26,500
D. SITE RESTORATION	$ 55,000
E. REPORTING	$ 70,000
TOTAL	**$ 225,000**

For 98 separate properties: $22,050,000*

***no economy of scale included**

ASSUMPTIONS		
	GENERAL	-All costs are for an individual property. Not every property will require the same effort; some will cost more, some less -Property has not previously been geophysically surveyed or intrusively investigated for anoms.
A.	**PLANNING**	-A programmatic work plan costs the same across all alternatives. These costs are for brief property-specific plans. -5 yr reviews (plans, site visit, and report, for $35,000) were added at the DD stage and were not included above.
B.	**DGM FIELD ACTIVITIES**	-One day to survey a property -2 discrete areas of vegetation removal -Small section of fence to be temp removed, then replaced
C.	**ANOMALY REMOVAL FIELD ACTIVITIES**	-Smaller UXO team (5 staff) than for digging all anoms -Half a day to dig all anomalies (max of 25)
D.	**SITE RESTORATION**	-On average, AC results in only 1 of 3 driveways needing to be replaced -2 discrete areas of vegetation replanting -Small section of fence replaced
E.	**REPORTING**	Anomaly Removal Report includes fewer anomalies (max of 25) and all AC discussions

Abbreviations:

LS = lump sum
WK = week
EA = each
DGM = Digital Geophysical Mapping
CENAB = Baltimore District USACE
LF = linear foot
AC = Advanced Classification
UXO = Unexploded Ordnance

Explosive Hazard Remedial Alternative #5 - DGM of Accessible Areas, Remove All Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	-DGM Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL A				**$ 50,000**	**$ 50,000**
B	**DGM FIELD ACTIVITIES**						
	- Surveying		1	LS	$ 2,000	$ 2,000	$ 2,000
	- Vegetation Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- Fence Removal		0	DAY	$ 2,500	$ -	$ -
	- DGM team Mob/Demob		1	LS	$ 3,000	$ 3,000	$ 3,000
	- DGM Surveying (EM61+G-858)		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0	DAY	$ 3,000	$ -	$ -
	- AC team Mob/Demob		0	LS	$ 6,000	$ -	$ -
	- AC Survey		0	DAY	$ 3,000	$ -	$ -
		SUBTOTAL B				**$ 10,500**	**$ 10,500**
C	**ANOMALY REMOVAL FIELD ACTIVITIES**						
	- Dig team mob/demob		1	LS	$ 16,000	$ 16,000	$ 16,000
	- Dig team daily rate		1	DAY	$ 8,000	$ 8,000	$ 8,000
	- Anomaly re-acquisition		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- USACE oversight (all field activities)		1	WK	$ 5,000	$ 5,000	$ 5,000
	- Contingencies		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL C				**$ 37,000**	**$ 37,000**
D	**SITE RESTORATION**						
	- Replace driveway		0.5	LS	$ 30,000	$ 15,000	$ 15,000
	- Replace vegetation		1	LS	$ 20,000	$ 20,000	$ 20,000
	- Replace fence		0	LS	$ 5,000	$ -	$ -
		SUBTOTAL D				**$ 35,000**	**$ 35,000**

Explosive Hazard Remedial Alternative #5 - DGM of Accessible Areas, Remove All Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
E	**REPORTING**						
	-DGM Report (EM61, G-858, AC)	Report	1	LS	$ 20,000	$ 20,000	$ 20,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Report	Report	1	LS	$ 15,000	$ 15,000	$ 15,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL E				**$ 65,000**	**$ 65,000**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 50,000
B. DGM FIELD ACTIVITIES	$ 10,500
C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 37,000
D. SITE RESTORATION	$ 35,000
E. REPORTING	$ 65,000
TOTAL	**$ 197,500**

For 98 separate properties: $19,355,000*

***no economy of scale included**

ASSUMPTIONS		
	GENERAL	-All costs are for an individual property. Not every property will require the same effort; some will cost more, some less. -Property has not previously been geophysically surveyed or intrusively investigated for anoms.
A.	**PLANNING**	-A programmatic work plan costs the same across all alternatives. These costs are for brief property-specific plans. -5 yr reviews (plans, site visit, and report, for $35,000) were added at the DD stage and were not included above.
B.	**DGM FIELD ACTIVITIES**	-One day to survey a property -1 discrete area of vegetation removal
C.	**ANOMALY REMOVAL FIELD ACTIVITIES**	-Full UXO team of 7 staff -One day to dig all anomalies (max of 100)
D.	**SITE RESTORATION**	-On average, half of driveway needs to be replaced -1 discrete area of vegetation replanting
E.	**REPORTING**	-Anomaly Removal Report includes all anomalies (max of 100)

Abbreviations:

LS = lump sum
WK = week
EA = each
DGM = Digital Geophysical Mapping
CENAB = Baltimore District USACE
LF = linear foot
AC = Advanced Classification
UXO = Unexploded Ordnance

Explosive Hazard Remedial Alternative #6 - DGM of Accessible Areas, Remove Selected Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
A	**PLANNING**						
	-DGM Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Work Plan	Plans	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL A				**$ 50,000**	**$ 50,000**
B	**DGM FIELD ACTIVITIES**						
	- Surveying		1	LS	$ 2,000	$ 2,000	$ 2,000
	- Vegetation Removal	Labor, not replacement	1	DAY	$ 2,500	$ 2,500	$ 2,500
	- Fence Removal		0	DAY	$ 2,500	$ -	$ -
	- DGM team Mob/Demob		1	LS	$ 3,000	$ 3,000	$ 3,000
	- DGM Surveying (EM61+G-858)		1	DAY	$ 3,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0.5	DAY	$ 3,000	$ 1,500	$ 1,500
	- AC team Mob/Demob		1	LS	$ 6,000	$ 6,000	$ 6,000
	- AC Survey		1	DAY	$ 3,000	$ 3,000	$ 3,000
		SUBTOTAL B				**$ 21,000**	**$ 21,000**
C	**ANOMALY REMOVAL FIELD ACTIVITIES**						
	- Dig team mob/demob		1	LS	$ 12,000	$ 12,000	$ 12,000
	- Dig team daily rate		0.5	DAY	$ 6,000	$ 3,000	$ 3,000
	- Anomaly re-acquisition		0.5	DAY	$ 3,000	$ 1,500	$ 1,500
	- USACE oversight (all field activities)		1	WK	$ 5,000	$ 5,000	$ 5,000
	- Contingencies		1	LS	$ 5,000	$ 5,000	$ 5,000
		SUBTOTAL C				**$ 26,500**	**$ 26,500**
D	**SITE RESTORATION**						
	- Replace driveway		0.3	LS	$ 30,000	$ 10,000	$ 10,000
	- Replace vegetation		1.0	LS	$ 20,000	$ 20,000	$ 20,000
	- Replace fence		0.0	LS	$ 5,000	$ -	$ -
		SUBTOTAL D				**$ 30,000**	**$ 30,000**

Explosive Hazard Remedial Alternative #6 - DGM of Accessible Areas, Remove Selected Anomalies

Cost Item					Costs		
	Task/Subtask	Item	Quantity	Units	Unit Cost	Subtotal	Total
E	**REPORTING**						
	-DGM Report (EM61, G-858, AC)	Report	1	LS	$ 25,000	$ 25,000	$ 25,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
	-Anomaly Removal Report	Report	1	LS	$ 10,000	$ 10,000	$ 10,000
		USACE Review	1	WK	$ 15,000	$ 15,000	$ 15,000
		SUBTOTAL E				**$ 65,000**	**$ 65,000**

TOTAL COST SUMMARY	
Task	**Total per Task**
A. PLANNING	$ 50,000
B. DGM FIELD ACTIVITIES	$ 21,000
C. ANOMALY REMOVAL FIELD ACTIVITIES	$ 26,500
D. SITE RESTORATION	$ 30,000
E. REPORTING	$ 65,000
TOTAL	**$ 192,500**

For 98 separate properties: $18,865,000*

***no economy of scale included**

ASSUMPTIONS		
	GENERAL	-All costs are for an individual property. Not every property will require the same effort; some will cost more, some less. -Property has not previously been geophysically surveyed or intrusively investigated for anoms.
A.	**PLANNING**	-A programmatic work plan costs the same across all alternatives. These costs are for brief property-specific plans. -5 yr reviews (plans, site visit, and report, for $35,000) were added at the DD stage and were not included above.
B.	**DGM FIELD ACTIVITIES**	-One day to survey a property -2 discrete areas of vegetation removal
C.	**ANOMALY REMOVAL FIELD ACTIVITIES**	-Smaller UXO team (5 staff) than for digging all anoms -Half a day to dig all anomalies (max of 25)
D.	**SITE RESTORATION**	-On average, AC results in only 1 of 3 driveways needing to be replaced -2 discrete areas of vegetation replanting
E.	**REPORTING**	Anomaly Removal Report includes fewer anomalies (max of 25) and all AC discussions

Abbreviations:

LS = lump sum
WK = week
EA = each
DGM = Digital Geophysical Mapping
CENAB = Baltimore District USACE
LF = linear foot
AC = Advanced Classification
UXO = Unexploded Ordnance

Appendix C:
Response Summary

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Appendix C-1:
Summary of Public Comments Received

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Appendix C-1: Summary of Public Comments Received

Ten (10) separate sets of comments were received via e-mail. Two of the 8 commenters also mailed letters (with both physical letters being duplicates of the e-mailed comments). Some commenters addressed more than one issue in their comments.

Five comments addressed landscaping and plant/vegetation removal or disturbance issues and USACE's replacement and reimbursement plans.

Two comments asked how the prioritization of the properties for remediation would be determined and requested inclusion in the first group.

One comment suggested their property should not be included on the list of active response actions based on their interpretation of the buffer zone added to the static testing areas.

Three comments (two received separately from the same person) questioned whether the 4835 Glenbrook Road property had been thoroughly investigated.

One comment questioned that, as currently stated in the Proposed Plan, the Public Safety Building on the American University campus poses no explosive threat so long as the building remains in place.

Additional emails were received from property owners that had no comments other than specific requests to be included in the first group of remediation properties. Including those listed above, the total number of properties requesting to be included in the first group was 15.

Appendix C-2 presents the full transcript of the public meeting.

My name is Martha L. Cochran. I live at 3800 Fordham Rd., N.W. Washington DC 20016
It is impossible to fully evaluate and comment upon your proposal, without knowing exactly how it would impact my individual property.

For example, I have very mature boxwoods on my grounds. I recently purchased boxwoods 1/3 the size of the older ones, and I paid over $300 each. Would your plan allow for leaving the mature boxwoods, or replacing them with boxwoods of similar size, or fully reimbursing me?* I believe the cost of replacement would be enormous.

In every case where a shrub is removed, will the reimbursement be for 100% of the cost of a similarly mature/size shrub?*

I have extensive hardscape around my property. And a large number of mature trees. And many mature shrubs. The actual open space is relatively small. I need to understand exactly how you would treat each and every element of the landscape and hardscape in order to fully understand the impact of your work. At minimum, can you provide reassurance to the public that you would provide full replacements of any disturbed landscape and hardscape and/or full reimbursement for their value?*

Moreover, establishing a garden requires more than simply installing plants in the ground. Newly planted shrubs and grasses must be watered and tended. Watering a new garden is costly. Managing it also is costly for some who is not resident for months at a time, which is my situation. How do you propose addressing those costs?*

If neighbors do not all participate, and/or if large amounts of the landscaping in various properties is left untouched, because of large trees and shrubs, what kind of assurances will we have that the neighborhood is safe?* Briefly, what is the point?

Thank you for considering my comments.
Martha Cochran

USACE RESPONSE:

The questions asterisked above (*) are answered individually below.

The overall response to the vegetation issues is that USACE is extremely sensitive to landscaping issues and will consult with property homeowners on an individual basis, addressing the unique aspects of their landscaping before any work is undertaken. The general process is summarized as follows:

USACE will use certified arborists to complete landscape surveys to document all existing landscaping and vegetation. The flora at each property will be assessed, and appraised values will be provided to use as a baseline in the event that damage is caused by the remediation.

USACE will coordinate with individual property owners, through the Community Outreach Team, as to when these contractors would come to assess their property. We will ensure that the arborist appraisal is completed prior to the site visit to assess the geophysical instrument accessible areas, so that issues such as tree size/age are properly considered by the team determining the accessible areas. USACE will communicate the results of these assessments and ensure the property owner is satisfied that the assessment appropriately reflects their concerns.

USACE's goal is to complete as thorough an investigation as possible, while acknowledging, and being considerate of, the practical aspects of disturbance to both the property and the property owners.

*Would your plan allow for leaving the mature boxwoods, or replacing them with boxwoods of similar size, or fully reimbursing me?
USACE RESPONSE: Based on the arborist evaluation, potentially any of those options would be available to you. USACE will confer with you on the most appropriate option.

*In every case where a shrub is removed, will the reimbursement be for 100% of the cost of a similarly mature/size shrub?
USACE RESPONSE: Yes, assuming a similarly sized replacement is available. Otherwise, USACE will confer with you using the arborist's recommendations as guidance.

*At minimum, can you provide reassurance to the public that you would provide full replacements of any disturbed landscape and hardscape and/or full reimbursement for their value?
USACE RESPONSE: As stated above, that is our plan for restoration of properties that we impact.

*Moreover, establishing a garden requires more than simply installing plants in the ground. Newly planted shrubs and grasses must be watered and tended. Watering a new garden is costly. Managing it also is costly for some who is not resident for months at a time, which is my situation. How do you propose addressing those? costs?
USACE RESPONSE: Watering and establishing a new plant or re-establishing a transplanted plant will be part of the USACE restoration process.

*If neighbors do not all participate, and/or if large amounts of the landscaping in various properties is left untouched, because of large trees and shrubs, what kind of assurances will we have that the neighborhood is safe?
USACE RESPONSE: As discussed at the public meeting (and other meetings), closure letters/reports that are approved by the regulators will document the level of safety for the properties where USACE was allowed to conduct remediation activities.

July 20, 2016

Dear Sir:

I am writing to express concern about one aspect of Alternative 6, specifically, the possible inclusion of irreplaceable shrubs in the definition of “accessible areas” set forth in Alternative 5.

Alternative 5 indicates that the term "accessible areas" includes "DGM of hardscape features such as driveways, sidewalks, or patios, as well as gardens and small trees or plants.” On the other hand, the term excludes “rare or valuable plants, large ornamental trees (regardless of age), and areas under fences . . . .” My home at 3822 Fordham Road (corner of Fordham Road and Sedgwick Street) contains a number of shrubs and trees that are 30 years old or older and that are virtually irreplaceable or that would be extremely expensive to replace. They include:

English boxwoods. My home has a double row of English boxwoods lining my front walk. English boxwoods are very slow growing; my boxwoods were planted shortly after we moved in in 1980 and are now four feet or higher. They were planted by my late wife and her father and, as she is no longer with us, have a sentimental value to me, not to mention that the Army Corps would have difficulty locating replacements anywhere and, if any were available, they might cost as much as $1,000 each. Beyond this, the DGM technology can examine the ground beneath the branches of the boxwoods and obtain meaningful readings.

Japanese maple trees. One of my Japanese maples was planted long before we moved in in 1980. It is unlikely that it can be replaced. Moreover, it isn’t necessary to remove it, as virtually all the ground beneath is available for the DGM process. The trunk is quite small. The other Japanese maple is about ten years old. Japanese maples are generally considered ornamental and should be excluded from “accessible areas.”

Arbor vita and photinia. Along my boundaries are stretches of arbor vita and photinia bushes that are up to 25 feet or so tall and provide an effective screen from my next door neighbors. The row of arbor vita in my back yard along Sedgwick Street is essential for my privacy. These are 20 feet or higher. Another row along my Fordham Road neighbor’s property line was planted by my father-in-law in the early 80’s. It is equivalent to a fence between the two properties.

Dogwood tree. One of my dogwoods is nothing special and can be replaced, but another one, in the back yard, is quite tall and has a slender base that should not inhibit the DGM process.

Azaleas. Some of my azaleas are only a few years old and are expendable, but several others were planted shortly after we moved in in 1980 and are enormous. They can be trimmed somewhat to allow access underneath, but they can’t be replicated.

In summary, while I have numerous shrubs and a garden that can be replaced, other shrubs are simply too large and not readily available in the market. I believe the Army Corps can make a reasonably thorough survey of my property — the second such survey by the Army Corps —

without damaging them and that they should fall within the exception to "accessible areas" as explained in Alternative 5.

Kindly acknowledge receipt of this comment letter.

Ernest C. Barrett, III
3822 Fordham Road
Washington, D.C. 20016
tel. 202-363-8045

USACE RESPONSE:

USACE notes that the accessible areas DGM coverage standard in Alternatives 5 and 6 is further defined by property owner input during the remedial design phase, where Work Plan development will consider individual concerns about property disturbance to the extent practicable. It is acknowledged that such property owner input could result in a reduction of the accessible area for DGM coverage on any individual property.

USACE is extremely sensitive to issues of landscaping and will consult with property homeowners on an individual basis, addressing the unique aspects of their landscaping before any work is undertaken. The general process is summarized as follows:

USACE will use certified arborists to complete landscape surveys to document all existing landscaping and vegetation. The flora at each property will be assessed, and appraised values will be provided to use as a baseline in the event that damage is caused by the remediation.

USACE will coordinate with individual property owners, through the Community Outreach Team, as to when these contractors would come to assess their property. We will ensure that the arborist appraisal is completed prior to the site visit to assess the geophysical instrument accessible areas, so that issues such as tree size/age are properly considered by the team determining the accessible areas. USACE will communicate the results of these assessments and ensure the property owner is satisfied that the assessment appropriately reflects their concerns.

USACE's goal is to complete as thorough an investigation as possible, while acknowledging, and being considerate of, the practical aspects of disturbance to both the property and the property owners.

From: Robert Liberatore [mailto:rgliberatore@aol.com]

Sent: Monday, June 20, 2016 6:28 PM
To: Noble, Dan G NAB <Dan.G.Noble@usace.army.mil>
Subject: [EXTERNAL] Comment on Proposed Plan

Dan,

I will be out of town for the next public meeting to discuss the MEC project in Spring Valley. Therefore, I am sending this comment to you for your consideration.

Two meetings ago I raised a question about the order or sequencing of the 100 properties. I noted that I have been in my house for 26 years, my wife died of breast cancer four years ago in this house, and it is time for me to move on. But because of the cloud hanging over the properties until we get a clean bill of health from USACE, it is impossible for me to sell at anything like market value of my home. At that meeting you said you thought some system might be devised to inspect those properties first where there is a strong desire to sell.

At the last meeting, when I asked if such a system was being devised you said that it was not in the works, and a long impassioned discussion followed. As I understood it, you were going to come back to the community with the framework of such a plan.

I would like to suggest that one criteria would be the length of time someone has been resident at their property. The longer they have been there the more likely that selling might be a priority.

I am quite certain that there are no unexploded ordinances on my property. It is built on fill and raised above the street. The back yard has a large pool installed 15 years ago, at which time all the power lines were buried around the entire perimeter of the back yard. Two enormous houses are being built on 52nd St. in a line between my house and AU. They found no munitions and they excavated at least 10-15 feet to put in basements on the acre lot which was subdivided to put two 7,000 plus square foot homes on it.

If it were feasible I would happily pay to have extra technicians hired to accelerate the work on my property.

Could you send me an outline of what you plan to propose on the question of ordering the inspection/remediation among the 100 homes? This is really important to me, and I appreciate any effort you can make to create an order of inspection/remediation which is sensitive to those wanting to sell now.

Best regards,

Rob Liberatore
4054 52nd Terrace, NW

Washington, DC 20016
H) 202-966-8194
M) 202-361-8099

USACE RESPONSE:

USACE is extremely sensitive to issues of landscaping and will consult with property homeowners on an individual basis, addressing the unique aspects of their landscaping before any work is undertaken. The general process is summarized as follows:

USACE will use certified arborists to complete landscape surveys to document all existing landscaping and vegetation. The flora at each property will be assessed, and appraised values will be provided to use as a baseline in the event that damage is caused by the remediation.

USACE will coordinate with individual property owners, through the Community Outreach Team, as to when these contractors would come to assess their property. We will ensure that the arborist appraisal is completed prior to the site visit to assess the geophysical instrument accessible areas, so that issues such as tree size/age are properly considered by the team determining the accessible areas. USACE will communicate the results of these assessments and ensure the property owner is satisfied that the assessment appropriately reflects their concerns.

USACE's goal is to complete as thorough an investigation as possible, while acknowledging, and being considerate of, the practical aspects of disturbance to both the property and the property owners.

With regard to prioritization of the properties for remediation, USACE will do everything it can to work with homeowners to address and honor concerns and preferences as the work proceeds. However, please note that USACE's ability to respond to specific requests will be affected by the total number of requests received.

Dear Mr. Gardner,

Please find attached an advance copy of the letter we are mailing to you for your attention.

We request that our property be examined in the first group of thirty properties.

Sincerely yours,

David and Rosalie Berk
5040 Sedgwick

USACE note: a formal letter was received requesting that this property be included in the first group of thirty properties.

USACE RESPONSE:

With regard to prioritization of the properties for remediation, USACE will do everything it can to work with homeowners to address and honor concerns and preferences as the work proceeds. However, please note that USACE's ability to respond to specific requests will be affected by the total number of requests received.

Dear Mr. Gardner:

We wish to express our concern with the amount of plant removal and disruption to our yard which could be involved to study further and access "accessible areas" when the Army Corps begins the planned final clean-up remedy next year. We were pleased to co-operate in the first phase of the investigation in 2009-10 and were even more pleased to learn that there was no evidence of toxic or dangerous materials after the anomaly removal on our property. Even though we apparently are in the general area of Spring Valley where there was some contamination, we hope to avoid having to deal with this issue again absent some meaningful new evidence there is a risk or danger to be addressed.

Kindly acknowledge receipt of our comments and keep us advised as and when appropriate.

Thank you,
Peter and Claudia Sherman
5123 Tilden

USACE RESPONSE:

Per figure 4 of the Proposed Plan, your property is within the response action area of focus for potential unacceptable explosive hazards and is therefore included in those properties to be remediated. The rationale for inclusion of a property as requiring a response action is described in detail in the Proposed Plan.

USACE notes that the accessible areas DGM coverage standard in Alternatives 5 and 6 is further defined by property owner input during the remedial design phase, where Work Plan development will consider individual concerns about property disturbance to the extent practicable. It is acknowledged that such property owner input could result in a reduction of the accessible area for DGM coverage on any individual property.

With regard to plant removal, USACE is extremely sensitive to issues of landscaping and will consult with property homeowners on an individual basis, addressing the unique aspects of their landscaping before any work is undertaken. The general process is summarized as follows:

USACE will use certified arborists to complete landscape surveys to document all existing landscaping and vegetation. The flora at each property will be assessed, and appraised values will be provided to use as a baseline in the event that damage is caused by the remediation.

USACE will coordinate with individual property owners, through the Community Outreach Team, as to when these contractors would come to assess their property. We will ensure that the arborist appraisal is completed prior to the site visit to assess the geophysical instrument accessible areas, so that issues such as tree size/age are properly considered by the team determining the accessible areas. USACE will communicate the results of these assessments and ensure the property owner is satisfied that the assessment appropriately reflects their concerns.

USACE's goal is to complete as thorough an investigation as possible, while acknowledging, and being considerate of, the practical aspects of disturbance to both the property and the property owners.

Mr. Gardener,

Attached are the comments of William N. Hall in regard to 5148 Tilden Street, NW. Please note that I inadvertently forgot to include Appendix F (which follows the first sentence, third paragraph on page 3) to the comments I sent by Federal Express which will arrive tomorrow.

I thank your consideration.

John A. Terrell
Legal Administrative Assistant to Christopher L Boone,

Amy R. Mudge, Shahin O. Rothermel and Randal M. Shaheen
Venable LLP
t 202.344.4862 | f 202.344.8300
575 7th Street, NW, Washington, DC 20004

USACE Note: a formal letter containing Attachments A through F was received by USACE. The primary comment from the letter is excerpted below. The attachments were figures taken from the USACE Remedial Investigation Report (RI Report) as finalized June 30, 2015. The figures were marked up by the property owner per the comment below.

5148 TILDEN STREET AND OTHER TILDEN STREET PROPERTIES SHOULD NOT BE PART OF THE "AREAS OF EVALUATION IN THE FS"

The Final RI Report (June 30, 2015) and the Final Feasibility Study (Jan. 22, 2016) devote a substantial assessment of the Munitions and Explosives of Concern –Hazardous Assessment (MEC-HA) to determine whether additional steps should be taken at particular properties to avoid these concerns. The Final Site-Wide Proposed Plan recommends that "Explosive Hazards Alternative 6, DGM of Accessible Areas, Remove Selected Anomalies" be adopted as the preferred alternative. However, as explained below, we strongly believe that 5148 Tilden Street and other Tilden Street properties should not be included as part of the "Areas of Evaluation under the FS." This is because, after studying the Spring Valley FUD for nearly 25 years, there is no compelling reason to expand concern about Point of Interest 1 (POI 1) on Sedgwick Street to these properties on Tilden Street.

In particular, the Final RI Report states that the static test fire areas like POI 1 (Sedgwick Trench) do not represent MEC concerns because the testing process would have monitored and controlled any munition item not properly firing at the Site (Final RI Report at 215). As a result, "none of the [munition] items would be left behind (i.e., still existing at the Site)" and "therefore, no MEC HA scoring was required" (Id.).

In evaluating POI 1, there are at least four Figures showing that the concerns about POI 1 on Sedgwick Street do not extend to 5148 Tilden Street and the other Tilden Street properties. These are: (1) Figure 1-5 showing the "POI" where POI 1 is within a circle on Sedgwick Street and does not extend to the Tilden Street properties (Appendix B); (2) Figure 1-7 showing "POIs, Areas of Interest (AOIs) and Range Fan" where POI 1 is within a circle on Sedgwick Street and does not

extend to the Tilden Street properties (Appendix C); (3) Figure 7-8 showing the "Known and Potential Disposal Areas (MEC HA)" where POI 1 is within the circle on Sedgwick Street, but does not extend to the Tilden Street properties (Appendix D); and (4) Figure 5-6 showing the "Geophysical and Survey Extent (post 1995) and Munition Finds" where POI 1 is confined to Sedgwick Street and yet again does not extend to the Tilden Street properties (Appendix E). So far these Figures are correct because they do not improperly extend POI 1 to include 5148 Tilden Street.

Unfortunately, however, in the "Areas of Evaluation for the FS," a large buffer zone is included around POI 1, which includes more than half of 5148 Tilden Street (my house), a small portion of 5142 Tilden Street, all of 5154, 5160, 5164 of Tilden Street, and half of 5170 Tilden Street (Appendix F). The only rationale stated is that the static testing activity; (1) "may" suggest the presence of munition burial pits near the testing pits; and (2) a "possible" further geophysical investigation includes this area, Then, without justification, ACE arbitrarily and capriciously chooses a distance of 150 ft. as representing a "practical" distance workers may have walked to bury DMM. However, by using this contrived distance from presumably the center of POI 1, the homes on Tilden Street, including 5148 Tilden Street, are now swept into the new "Areas for Evaluation."

However, in the Final RI and FS Reports, after 25 years of study, the only reference to a "possible pit associated with POI 1 — Sedgwick Trenches" is POI 2," (Final RI Report at 211) POI 2 is near Fordham Street and therefore, in relation to POI 1, is in the opposite direction of Tilden Street. Thus, there is no reason to believe that any "potential" or "speculative" disposal area from POI 1 would extend to Tilden Street, instead of extending to POI 2 and Fordham Street where there is evidence of such a pit.

Unfortunately, the MEC HA scoresheets and MRSPP scoresheets and appendices are not included in the materials that can be printed out from the ACE website for the Spring Valley's FUDS. Thus I am not in a position to evaluate whether there is any credible information to include 5148 Tilden St. in the "Areas of Evaluation for the FS." I request that the rulemaking record remain open until two weeks after the ACE provides me with the MEC HA and MRSPP scoresheets and appendices.

For the above reasons, I request that ACE in its final decision eliminate 5148 Tilden Street and the other Tilden Properties from the "Areas of Evaluation for the FS." If this action is not taken, we request that ACE give immediate priority to address the MEC issue for homes in the Tilden Street Area because there is no credible evidence that burial areas for statically fired testings occurred in that area. I also would like to meet with you and your staff to discuss our concerns. I look forward to hearing from you.

USACE RESPONSE:

USACE acknowledges that your property is included based on the buffer zone for the Sedgwick Trench Static Test Fire Area. However, USACE notes that there is professional judgment involved in these types of determinations, and that regulators, safety professionals, and explosive ordnance disposal professionals were consulted to help establish these buffer zones. USACE will be happy to meet with you to discuss in greater detail our methodology and decisions.

The MEC HA and MRSPP appendices (Appendix F to the RI Report) were available to the public during the entire review period. Downloadable versions of Appendix F can be accessed at the web site below. However, as accurately summarized in your letter above, no MEC HA score was completed for static test fire areas for the reasons described; thus no MEC HA scoring was used to include your property in the buffer zone.

Additionally, the Information Repository is located at the Tenley-Friendship Branch Library, 4450 Wisconsin Ave. N.W., Washington, D.C. Hard copies and digital records of key project documents can be found upstairs in the Reference Section. Check with the reference librarian to direct you to our shelves of materials. Also, please visit:

http://springvalley.ertcorp.com/home/site-wide-remedial-investigation-report

While these items are and have been available for review, USACE grants the request to further extend the comment period. As announced on August 29, 2016, the comment period has been extended from August 29 to September 28, 2016.

In summary, USACE notes that your property and those of your neighbors are private property and USACE can only access your property to the extent that you and your neighbors grant us permission to access them. Whether or not you will face other regulatory action from EPA and the District of Columbia due to your decision is something you need to judge.

Dear Chris,

For the most part, I agree wholeheartedly with the cleanup strategy outlined in the long overdue 6/7/16 Site-Wide Proposed Plan for the Spring Valley Formerly Used Defense Site. After investigating and conducting a series of "Time Critical Removal Actions" across this 661-acre site since January 1993, it's about time the U.S. Army Corps of Engineers addressed the remaining threats to the environment from World War I-era chemical contamination, as well as hazards due to munitions and explosives of concern. However, I strongly disagree with USACE's conclusion that no further remedial action is needed under the house at 4835 Glenbrook Road and its inexplicable decision to postpone the inevitable cleanup of the widely acknowledged disposal area beneath the Public Safety Building on American University's campus. In addition to lingering explosive hazards at each location, both areas are up-gradient of the entire Spring Valley community and undoubtedly contribute to site-wide groundwater contamination all the way from the ridge along the FUDS eastern boundary at Nebraska Avenue downrange to the western boundary at Dalecarlia Reservoir next to Sibley Hospital.

Public Safety Building:

On page 8 of the Proposed Plan, the Public Safety Building is identified as a "possible" disposal area, even though substantial quantities of debris from the AU Experiment Station have been removed by USACE on either side of the building and most likely extending underneath it (on January 4, 2010, the cleanup team unearthed a closed-cavity 75 mm artillery shell under a concrete slab at the building's lower entrance). The Proposed Plan equivocates on the inevitable required cleanup by claiming that "the PSB is an active building on the AU campus [and], so long as it remains in place, it effectively acts as a cap or control to contain any potential explosive hazard." On pages 7 - 8 of the 11/3/15 Partnering Meeting minutes the University explained that the building will "no longer [be] used for Public Safety operations once the new development on the East Campus is completed" — now expected to occur some time between March - September of 2017. Since the remedies outlined in the Proposed Plan are set to be implemented between 2017 - 2020, it's makes no sense to postpone a decision on a remedy for the PSB cleanup until some unspecified future date. In fact, at the most recent July 12 Restoration Advisory Board meeting, project manager Dan Noble publicly stated:

"We have indications from American University that the removal of that building is probably going to happen sooner rather than later. So we are planning within our budgetary cycle to have the funds available to implement that portion of the remedy."

By agreeing to apply "the preferred explosive hazards mitigation alternative" for this identified disposal area and properly address any munitions burial pits only "when the PSB is removed," the Proposed Plan is trifling with American University, Spring Valley stakeholders and the general public. A more appropriate and responsible course of action would be to outline a remedy in the current Site-Wide Proposed Plan, instead of postponing a decision until some indefinite time in the future.

4835 Glenbrook Road:

Still more appalling is the fact that USACE remains in complete denial about the presence of MEC underneath the AU President's house at 4835 Glenbrook Road. At the September 7, 2011, community meeting with ANC-3D (which is not documented at either USACE website*) project manager Brenda Barber was asked by Commissioner Kent Slowinski whether the Corps had talked to the construction workers at 4825 and 4835 Glenbrook Road who, in several videotaped interviews, identified precisely where munitions and chemical-filled bottles were buried during construction of both those buildings. At that time project manager Brenda Barber replied [33:55]:

"Yes, we have copies of the transcripts from those videotapes and our legal counsel is actually engaged in trying to find out the names of those employees so that we can do additional interviews with them."

For the next five years USACE tried in vain to find those eye-witnesses to the historic Glenbrook Road coverup, but three of the missing construction workers unexpectedly showed up at the May 10, 2016, RAB meeting to repeat their claims yet again. In a Northwest Current interview after the meeting one of them reported that the "worst" contamination was still under the house at 4835 Glenbrook Road, claiming: "There's all kinds of stuff under it, stuff that could explode under you" [Workers recount Glenbrook Road hazards, 5/18/16, pg. 3]. Whether or not USACE believes these reports are credible, it's indisputable that the Site-Wide Proposed Plan was drafted and passed on for review by the Partners, well before the workers' most recent testimony. If USACE has sincerely been searching for the workers since 2011, now that they've actually been located, it behooves the Army to at least consider their reports somewhere in the Proposed Plan. Project manager Dan Noble has admitted on numerous occasions that the only intrusive investigation ever conducted beneath the perimeter of that house was a single boring in the center of the basement.

PRP Investigation:

Finally, it should be noted that since the Army has launched a "Potentially Responsible Party" investigation to identify the developers of 4835 Glenbrook Road and the PSB in order to recoup added cleanup costs, it's logical for USACE to finish remediating these two sites to ascertain precisely what those total costs will entail.

Sincerely,
Allen Hengst

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* The 9/7/11 USACE community meeting with ANC-3D is documented on my blog at Blockedhttp://wmdindc.blogspot.com/2011/09/corps-has-video-transcript-will-try-to.html. A 38-minute audio recording of the meeting is posted at Blockedhttps://soundcloud.com/redressor/army-corps-meeting-9-7-11.

USACE RESPONSE:

Public Safety Building – The area directly beneath the AU Public Safety Building (PSB) is considered a 'possible' disposal area in that no AUES-related debris has definitively been found

under the building. As USACE describes in the Final RI Report, if it is a disposal area, there is no interaction between source and receptor so long as the building remains in place, effectively acting as a cap or control to contain any potential explosive hazard.

With regard to remediation of the area beneath the PSB, USACE will follow the law at the time the building is removed, in coordination with the USEPA and the Washington DC Department of Energy & Environment (DOEE).

4835 Glenbrook Road – USACE has high confidence in the work performed at 4835 Glenbrook Road, and the only indications that further investigation is warranted are from the workers' May 2016 statements. USACE takes all such statements seriously but has concluded that these allegations do not warrant additional investigation.

A very comprehensive investigation was carried out on the property and on adjacent properties at 4825 and 4845 Glenbrook Road. The investigation at 4835 Glenbrook Road lasted several months, including digging 76 test pits on a grid pattern approved by regulators, collecting numerous soil samples, and advancing soil borings in locations agreed to by regulators. During this investigation, USACE recovered a small number of items from the AUES (small fragments of glass, one intact container, one piece of munitions debris, and some miscellaneous other pieces of laboratory material); in contrast to several tons of items at 4825 Glenbrook Road to include thousands of cubic yards of chemical agent contaminated soil, over 500 munition items, and hundreds of pounds of laboratory glassware and other materials. The USACE and the regulatory agencies came to a shared conclusion that while 4825 Glenbrook Road represented a disposal area, 4835 Glenbrook Road did not. This information was compiled and evaluated in a complete investigation report on the property. Then all the data gathered was run through a USEPA approved human health risk assessment that was reviewed and accepted by the USEPA, the DOEE, the Restoration Advisory Board TAPP consultant, and the property owner. This Human Health Risk Assessment is available to the public in the Administrative Record. A large scale removal of arsenic contaminated soil was carried out at 4835 Glenbrook Road (similar to other properties in the neighborhood), and during this removal no further debris or munitions from the AUES were encountered.

Since 2012, USACE has been performing a remedial action at the neighboring property, 4825 Glenbrook Road. As part of the remedial action at this property, built at the same time and by the same workers as 4835 Glenbrook Road, USACE has removed the house at 4825 and thereby gained more information about its construction. Beneath the house itself no debris from the AUES was found (while as stated previously, significant amounts of AUES debris was found around the house, i.e. outside the footprint of the foundation of the structure), further calling into question whether these statements at the RAB concerning debris under 4835 Glenbrook Road are accurate recollections from observations made almost 25 years ago. Given the results of past investigations, at this time USACE has decided, with regulator support, that no further action at 4835 Glenbrook Road is warranted.

Dear Chris,

Re comments on the proposed plan for Spring Valley...
I am out of town on family business so my comments are brief:

Re:4835 Glenbrook Road NW
This property needs to be examined and tested thoroughly under its OWN footprint, which has NOT been done.

The workers who worked on the two homes 4825 and 4835 Glenbrook Road in 1991 and 1992 have said, in person at a RAB meeting in May, 2016, and in several transcripts of conversations in recent years sent to the 3 Partners and to AU, that 4835 Glenbrook Road needs to be examined under its OWN footprint. They refer to boring under the back porch area into the cement in the crawl space under 4835.

They also refer to boring into the floor of the garage.

At the May 2916 RAB meeting they specifically referred to these two locations under the house. They personally drove from West Virginia to attend the May, 2016 RAB to communicate with ATSDR and with USACE. Yet they were not named or identified in the May 2016 draft minutes when they spoke. Thus they have been drafted out Of existence!!

In addition, their comment or question asking how deep the USACE did its one test boring under the house was omitted from the draft of the May 2016 RAB minutes.

The USACE investigation and Final Report on 4835 was done before the workers concern about 4835 specifically came to light but the report did not include any information about what is under the house because they had not adequately tested there. BUT, Shortly thereafter the specific information from workers who worked on the house about what lies under the house came to the USACE and Partners' attention. Yet years later the Report on 4835 remains as is, and says that the 4835 investigation is complete - with NOFA.

4835 Glenbrook Road sits on a hill overlooking other Spring Valley homes and properties as well as a creek running downhill.

How can other property owners be assured of no soil contamination running down onto their own properties in Spring Valley unless more work is done on 4835?

What more can be done in all conscience for public officials to act?

Thank you for your consideration.

Regards,
Ginny Durrin
Spring Valley resident

USACE RESPONSE:

4835 Glenbrook Road – With regard to the 4835 Glenbrook Road property, USACE re-states that a very comprehensive investigation was carried out on the property that lasted several months, including digging 76 test pits on a grid pattern approved by regulators, collected numerous soil samples, advanced soil borings in locations agreed to by regulators, and that all information was compiled and evaluated in a complete investigation report on the property. USACE feels the testimony of the witnesses was considered in these investigations. Then all the data gathered was run through a USEPA approved human health risk assessment that was reviewed and accepted by the USEPA, the DOEE, the Restoration Advisory Board TAPP consultant, and the property owner. A large scale removal of arsenic contaminated soil was carried out, and during this removal no further debris or munitions from the AUES were encountered; at this time USACE has decided, with regulator support, that no further actions are warranted.

From: Ginny Durrin [mailto:gdurrin@durrinproductions.com]
Sent: Wednesday, September 28, 2016
To: Gardner, Christopher P NAB <Christopher.P.Gardner@usace.army.mil>
Subject: Comments on Proposed Plan

Re 4835 Glenbrook Road NW:
1) Please pursue a thorough physical investigation under the footprint of the house.
2) Please pursue contacting the workers for their comments beyond tonight's deadline, if they have not responded, to talk and better still, hopefully arrange for a walk through of the property with them. Do not give up!
3) I suggest that Dan Nobel with Brenda Barber be the primary contacts with the workers, not Carrie Johnston.
4) The workers have a credible history of saying where things were buried thus far in transcripts forwarded to the Partners since 1993.

As for the most recent days...the West Virginia workers wouldn't be proactive and 1) call the USACE and give their contact info, or 2) ring the doorbell of 4835 to warn the owners (American University) of the house, or 3) drive from West Virginia to attend a RAB/ATSDR in meeting in May, 2016 all for nothing. They are genuinely concerned about what is under 4835.

You have not investigated under the footprint of the house. I realize that you want further evidence. But please look at the transcripts again with fresh eyes....the men who participated on the crew are trying to tell you something...4825 and 4835 Glenbrook Road might be similar styles and layouts but that does not mean that the burials are in the same places or that the original topography of each house is the same.

Please also correct the May 2016 RAB meeting minutes. As it stands now, any reference regarding the construction of 4835 Glenbrook Road by the worker in attendance has been deleted! This is censorship and blatantly wrong. The case on 4835 is simply not closed.

Thank you.
Ginny
Durrin
Resident and Filmmaker

USACE RESPONSE:

1. Please see above response to your initial comments.
2. USACE has sought input from the builders of the property and has since been in contact with the workers.
3. USACE will ensure that appropriate personnel are involved in all attempts to contact/communicate with the workers.
4. Information provided to USACE in transcripts has been taken into consideration when work plans for investigations or remedial actions were developed. Any and all additional information is analyzed and acted upon as the USACE receives it.

Additionally it is noted that the Restoration Advisory Board meeting minutes go through a fairly extensive drafting and review process before approval and finalization. The May meeting minutes have been reviewed again by the USACE, and the agency is comfortable with their completeness and accuracy.

From: John Katkish <john.katkish@gmail.com>
To: "Gardner, Christopher P NAB" <Christopher.P.Gardner@usace.army.mil>
Date: Mon, 29 Aug 2016
Subject: Spring Valley, Washington, DC

Thank you for extending the comment period. I am the owner of 5010 Sedgwick St, Washington, DC. I have many mature trees and shrubs including a valuable collection of English boxwoods.

I am very concerned about how the corps will address possible disturbance of such plant life. Please advise.

John Katkish

USACE RESPONSE:

USACE is extremely sensitive to issues of landscaping/vegetation and will consult with property homeowners on an individual basis, addressing the unique aspects of their landscaping before any work is undertaken. The general process is summarized as follows:

USACE will use certified arborists to complete landscape surveys to document all existing landscaping and vegetation. The flora at each property will be assessed, and appraised values will be provided to use as a baseline in the event that damage is caused by the remediation.

USACE will coordinate with individual property owners, through the Community Outreach Team, as to when these contractors would come to assess their property. We will ensure that the arborist appraisal is completed prior to the site visit to assess the geophysical instrument accessible areas, so that issues such as tree size/age are properly considered by the team determining the accessible areas. USACE will communicate the results of these assessments and ensure the property owner is satisfied that the assessment appropriately reflects their concerns.

The plan may allow for leaving the mature boxwoods, or replacing them with boxwoods of similar size, or fully reimbursing you. Any of those options would be available to you based on the arborist evaluation. USACE will confer with you on the most appropriate option.

USACE's goal is to complete as thorough an investigation as possible, while acknowledging, and being considerate of, the practical aspects of disturbance to both the property and the property owners.

Appendix C-2:
Public Meeting Transcript

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U.S. Army Corps of Engineers
Spring Valley Formerly Used Defense Site
Butler Board Room on the 6th Floor of the Bender Arena at American University
Transcript of the July 14, 2016 Public Meeting for the Proposed Plan

ATTENDING PROJECT PERSONNEL	
Dan Noble	Military Co-Chair/USACE, Spring Valley MMRP Manager
Todd Beckwith	USACE, Spring Valley Project Manager
Alex Zahl	USACE, Spring Valley Technical Manager
Cliff Opdyke	USACE, Risk Assessor
Eleanor Gordon	USACE
Brenda Barber	USACE, Spring Valley Project Manager
Chris Gardner	USACE, Corporate Communications Office
Steve Hirsh	Environmental Protection Agency (EPA) Region III
James Sweeney	Agency Representative – District Department of Energy and Environment (DOEE)
Thomas Bachovchin	ERT, Project Manager
Maya Werner	ERT
Rebecca Yahiel	Spring Valley Community Outreach Program
Carrie Johnston	Spring Valley Community Outreach Program
Holly Hostetler	ERT

HANDOUTS FROM THE MEETING

I. Army Corps of Engineers Presentation
II. Spring Valley Project Timeline
III. CERCLA Remedial Action Timetable
IV. Site-Wide Proposed Plan Community Meeting Agenda
V. April *Corps'pondent*
VI. Spring Valley June 2016 Monthly Project Summary
VII. Spring Valley Project website URL.
VIII. Site-Wide Proposed Plan Summary of the Preferred Alternative to Mitigate Potential Unacceptable Explosive Hazards
IX. Site-Wide Proposed Plan Summary of the Preferred Alternative to Mitigate Potential Unacceptable Risks Posed by Soil Contamination
X. Map of Site-Wide Proposed Plan Areas Identified in the Remedial Action Objectives
XI. Summary of Remedial Action Objectives
XII. Analysis of Remaining Explosive Hazards Remedial Alternatives
XIII. Analysis of Remaining Contaminated Soil Remedial Alternatives
XIV. Summary of Preferred Remedial Alternatives 4 and 6

Note: This meeting was transcribed by Ms. Holly Hostetler of ERT.

AGENDA

Starting Time: The July 14, 2016 Community meeting began at 7:17 PM.

I. Welcome and Introductions

A. Welcome

Colonel Edward Chamberlayne, Commander, Baltimore District, U.S. Army Corps of Engineers (USACE): On behalf of USACE, and on behalf of the Baltimore District, I would like to welcome you tonight. I am Colonel Ed Chamberlayne; the USACE Baltimore District Commander. Many of you have met a series of commanders from our district, we rotate every three years. I have been in the command for about a year. We will give you an update and answer any of your questions of what we are doing. I can give you an assurance that in my one year time here in the District, this project has received a lot of attention; not just from me, but my leadership within USACE, and the USACE staff. There is a lot of attention to this project for us to be as conscientious as we can, to be as detailed as we can, and to give great outreach to the public and answer any questions so there are no surprises.

I will tell you, as a little personal history of myself, that I grew up in Alexandria, VA and I was very familiar with this project back in 1993. I then went on to have a career in the Army, and did not realize I would come right back here. I am very proud to be associated with this project. Our team that is associated with this project are some of the best project managers and associated team in our District. We have a lot of responsibilities in our district; a lot of other environmental projects, military construction, and navigation projects all over the country. We put our very best team on this. I will be here all night, answering questions. We hope that we answer and address any of the concerns that you have. I introduce Dan Noble, Spring Valley Project Manager and Military Co-Chair.

Dan Noble, USACE: Thank you, sir. My name is Dan Noble; I am the Project Manager for the Spring Valley Formerly Used Defense Site (FUDS) Project. I want to thank you all for coming this evening. Like Col. Chamberlayne said, we will stay as long as you would like. I have a presentation I am going to give. There is a lot of information on the slides, and we do have handouts of the slides. I will not say every word that is on a slide, but if there is something you see that I am not talking about and you would like me to, please go ahead and interrupt me and let me know. I am going to try to move through fairly efficiently, because I want to take questions and hear what is on your minds and focus on what you are concerned about.

B. Introductions

D. Noble, USACE: Let me introduce some of the folks that are here tonight so you realize who is in the room with you. Jim Sweeney, District Department of the Environment (DDOE), is the District's representative on the project. Steve Hirsh, United States Environmental Protection Agency (USEPA), Region III, keeps track of our project for the Environmental Protection Agency. Editor's Note: [D. Noble introduced all project personnel in attendance for USACE and from ERT, Inc. All USACE and contractor personnel are listed in the above table.]

II. USACE Presentation

D. Noble, USACE: This evening's presentation is about the Site-Wide Proposed Plan (PP). When we present here tonight as USACE, we want to assure you that it is not just USACE that is collecting this data, looking at this data, and making these decisions. The process involves a lot of other agencies and stakeholders, including the community. USACE focuses a lot on community involvement as Colonel Chamberlayne mentioned, so we have a Restoration Advisory Board (RAB) that is made up of community members. The RAB meets 6 times a year, every other month. The meetings are open to the public if you would like to come to those meetings. We have the information on our website about the dates and times of those meetings. USACE reaches out in many ways to residents, American University (AU), and to elected

officials. USACE tries to communicate and be as transparent as we can about the project; what we are doing, the decisions we are making, and why we are making them. As I mentioned, USACE works very closely with District Department of Energy and Environment (DOEE) and EPA Region III. When we have major decisions that need to be made on the project, we make them in a consensus manner. We need to have all three agencies in agreement that we are making the right decision before we proceed. So again, it is not just USACE making the important decisions on the project.

A. The CERCLA Process

D. Noble, USACE: The process we are in is a process that is laid out by a federal regulation called the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), sometimes referred to as 'Superfund.' This is not a 'Superfund' site, but USACE follows the 'Superfund' process to clean up the site. We are in the Site-Wide PP phase. We have completed the investigation phase and have written a Site-Wide Remedial Investigation Report (RI). USACE wrote a Site-Wide Feasibility Study (FS) and then a Site-Wide Proposed Plan (PP). It was in the Site-Wide RI that USACE identified the issues that needed to be addressed in order to close out the project. The Site-Wide FS looked at several alternatives that could address those issues, and then the Site-Wide PP is the spot in the process where USACE formally states to the community what was chosen as the preferred alternative to deal with each of the issues that were identified in the Site-Wide RI report.

By the CERCLA regulation, USACE must have a public comment period on that Site-Wide PP document. We are in the middle of the public comment period right now. As part of that public comment period, it is recommended in the guidance that a public meeting such as this be held if there is interest in the project, and if the meeting will help the community. That is what we are doing tonight. Once the Site-Wide PP public comment period ends on July 28, 2016, USACE will move forward with writing a Decision Document (DD).

USACE will modify the preferred alternative if necessary based on the comments received. The DD will be signed by the appropriate authority within the Department of Defense (DoD), funds will be authorized and made available to carry out the preferred alternative, and the project will move into the Remedial Design and then Remedial Action phase. The Remedial Action phase is typically the 'shovels in the ground' phase. That is usually when people notice that USACE is out in the community.

B. Site Overview

D. Noble, USACE: The Spring Valley project started in 1993 with the discovery of a munitions disposal pit at 52nd Court when a home was being built there. We put this summary slide up to try to emphasize that the Remedial Investigation report was a challenging report to write because it had to cover all of the project's history and try to make sense of all of this, talk about what we have learned and what we have done along the way, and then hopefully point out those issues that still need to be dealt with to bring the project to an end.

D. Noble, USACE: In addition to the investigation, USACE has been doing some remediation work as well, because there were issues that USACE felt needed to be addressed right away. USACE understands that the process can and does take years, as I am sure you are all well aware. If there is an issue that is identified going through the process that needs to be addressed sooner rather than later, USACE goes ahead and does that. There is a mechanism in the law and in the process to allow USACE to take early action if that is needed. For example, USACE did arsenic testing of all the properties in Spring Valley. If arsenic was elevated at a property, then USACE performed arsenic removal actions. Those removal actions began around 2003 and were completed in 2012. Out of the 1600 properties and lots that were tested, about 170 of them did have elevated arsenic that needed to be addressed, so that has been accomplished. You can tell from that timeline it took us 9 years and that was an action that we felt needed to be done sooner rather than later, and it still took 9 years. There are times when addressing these issues can be very time consuming.

USACE is doing a groundwater investigation. The groundwater investigation is not part of the current Site-Wide PP. USACE is treating groundwater as a separate unit, going through the CERCLA process itself as its own topic of concern. USACE is close to releasing a Groundwater RI report. USACE will do a Groundwater FS, write a Groundwater PP, and will write a DD about groundwater as well. There will be another public meeting; you can come hear about groundwater if you are interested.

During the site-wide investigations, if USACE came across a disposal of munitions or a single munition they were not left in place. For safety reasons, if USACE finds munitions, then USACE is required to clean them up right away. There has been a lot of work that has been done over the years to clean up munitions that have been left behind by the Army in Spring Valley. The large project at 4825 Glenbrook Road that has been going on for several years is an example of that.

D. Noble, USACE: The Site-Wide PP summarizes the issues that were identified in the Site-Wide RI as needing to be addressed. The Site-Wide PP discusses the alternatives that were evaluated in the Site-Wide FS to sort through those alternatives and then, most importantly, formally identifies the preferred remedial alternative.

There were two major issues that were identified in the Site-Wide RI. There were areas of the site that did have unacceptable risk posed by chemical contamination that had been left behind in the soil by Army activity. There were two areas USACE felt where there were still these risks; one was the Spaulding and Captain Rankin Area (SCRA) and the other area was a southern portion of the AU campus.

There were also certain focus areas within the site where the Army conducted activities with munitions back in World War I (WWI), and USACE feels there is a chance there is an unacceptable munition hazard that remains with respect to the chance that the Army may have left behind a munition in these areas. USACE wants to do something about looking at those areas and if possible, find those potential munitions and gather them up if they are out there.

D. Noble, USACE: When USACE identifies an issue and alternatives to address the issue, how does USACE evaluate those alternatives? What is the evaluation process? The evaluation process is laid out in the CERCLA regulation that I mentioned earlier. The regulation instructs USACE that there are 9 criteria that we evaluate all remedial alternatives against. There are 'threshold criteria' that have to be met, 'balancing criteria' that begin to give a priority ranking of which alternatives might be better than others, and then there are 'modifying criteria;' both regulator acceptance and comment on the alternatives, and also community acceptance and comment on the alternatives as a way to address the issue. Those are modifying criteria that could modify the actual cleanup that ends up being performed. Another thing we do is formally establish what we call our Remedial Action Objectives (RAOs) in the Site-Wide PP; or what will actually be achieved if this preferred alternative is undertaken. The RAOs describe what the cleanup will be, and the extent of the cleanup.

D. Noble, USACE: We will first discuss the unacceptable risks posed by soil contamination. When I say 'unacceptable,' it probably means something a little bit different to me than it might to most people. The regulation instructs USACE to look at things in a very conservative manner. So when I call an issue unacceptable, it is arguable that there could be someone that could hear the same issue and say, 'Well, that does not sound so bad to me, why do you need to do anything?' I am just trying to say do not be alarmed by the term unacceptable. If it was not unacceptable, then there would be no action to take, everything would be acceptable, USACE would have nothing to do, and we would all go home. The only way that we reach the process of taking a cleanup and improving the community is we have to declare that something is unacceptable and must be addressed. These are the RAOs with respect to soil contamination that has been left behind in those two specific areas in the site mentioned previously. There are four compounds that USACE is concerned about: mercury, vanadium, cobalt, and then a class of compounds that are referred to as PAHs, which stands for polycyclic aromatic hydrocarbons.

D. Noble, USACE: The four cleanup alternatives that were examined in the Site-Wide FS to address the soil contamination issues include:

1. No Further Action – USACE is required by regulation to always look at no further action.

2. Land Use Controls – for example, putting up a fence with a sign on the fence that says "keep out." That would be a land use control; you are controlling the use of the land.

3. Phytoremediation –certain plants that can extract the contamination out of the soil as they grow.

4. Excavation and Offsite Disposal – contaminated soil is dug up and disposed of at a proper facility, then the contaminated soil is replaced with clean soil.

D. Noble, USACE: You will notice that Alternatives 1 and 2 did not meet the threshold criteria. If the alternatives do not meet the threshold criteria, they do not move forward to the in-depth evaluation with the balancing criteria and decide whether or not the alternatives meet those criteria. If you look at the legend at the bottom of the alternatives' analysis chart, you see that a checkmark means USACE felt the alternative favorably met the balancing criteria. The circle is moderately favorable, which would not necessarily cause the alternative to be rejected, but is not as good as the checkmark. The 'x' means that USACE felt that the alternative did not meet the criteria. Just because an alternative does not meet a balancing criteria, that does not cause it to be rejected as a possible alternative. If there were an 'x' in the threshold criteria, then the alternative would have to be rejected. In this case, you will see these two alternatives met the threshold criteria and so then USACE evaluated them against the balancing criteria.

D. Noble, USACE: USACE chose Alternative 4, which is Excavation and Offsite Disposal of the contaminated soil. The cost of this alternative is projected to be about $500,000. The reason for the relatively low price tag is that the two areas are not heavily contaminated; they are contaminated in a couple spots. For instance, on the southern part of AU campus, the four contaminants that USACE is concerned about are elevated at three discreet locations. USACE is proposing to go to those three locations, dig the contaminated soil up, and then send it off for offsite disposal.

The second area where USACE has concerns is the SCRA exposure unit. The area has three locations that happen to be in the backyard of this particular property. There will be three locations there that will also be excavated and disposed of.

Allen Hengst, Community Member: Do you know how many grids you will be looking at and what are the dimensions of the grid?

D. Noble, USACE: USACE assumes that there are 2 grids at each location that will need to be disposed of, at 20 feet by 20 feet. But again, those are just assumptions for the purpose of coming up with metrics on what the alternative would cost. There could be a little more than that, there could be a little bit less than those 2 grids, but the assumption is that these are fairly discreet locations and 2 grids will cover it.

D. Noble, USACE: Let us move on to the other issue that the Site-Wide RI report identified as needing to be addressed, and that is the issue of unacceptable explosive hazard that might be present from the fact that munitions may have been left behind by the Army while it conducted its activities here. The term that is used frequently is Munitions and Explosives of Concern (MEC). I will just use 'munitions' this evening, but you will see the acronym MEC appears in our Remedial Action Objectives (RAOs). The RAO for MEC is to do our best to try to find and remove them. The second RAO addresses the fact that a munition is not very big, and we have a fair amount of acreage that we are concerned about. As we go out to try to find those munitions, there are going to be things in our way that make it more difficult. What we have to acknowledge is that no matter what alternative we chose in order to look for munitions, and no matter how long we look for them, and how thorough we try to be, there is always going to be a chance that a munition is going to be left behind by us. We will not be able to guarantee 'yes, we found them all.' If there is a chance that a munition will be left behind, then some of the hazard will also be left behind. So, how do you address that residual hazard? What would be the appropriate steps to take to address that residual hazard?

This second RAO speaks to that, it discusses the need to address what is going to be a residual hazard that will be here because this is a FUDS and that status will not change.

D. Noble, USACE: What were the alternatives evaluated for potential explosive hazards? First, let me describe a little bit about the location of these focus areas. There are 4 focus areas; 2 were static test fire facilities back in WWI. A static test fire facility is a facility where you would take a munition; you would not fire it through a weapon, but lay the munition out on the test range, maybe put it on a wooden stand, hook up electrical wires to the munition, back off, and then detonate the munition by use of those electrical wires. Here at the American University Experiment Station (AUES), they were interested in developing the munition; they were not interested in firing the munition so much. They used already existing standard weapons and adapted them to be used as deliverers of chemical agent. They were interested in how they can adapt these munitions to become chemical weapons. They had 2 static test fire facilities that we identified as areas where potential munitions could have been left behind. There was a mortar firing range here, so even though they were not necessarily interested in the ballistics of these weapons, they did fire them, and we know they tested them by firing them.

There is what we call a range fan, and basically the highlighted area is where we feel is the most likely area that represents the impact zone of that range fan. There were target areas in the middle of the range fan, and then you draw a buffer around those targets and establish the area that could be the impact zone. Back by the firing point, there was an area just off what is now part of the campus in the neighborhood where they had a storage area for munitions components. There were things that were referred to as detonator shacks, fuze storage shacks, and explosive storage shacks; so we feel that this storage area for munitions from WWI could be an area where a munition may have been left behind when the Army left the facility.

C. Potential Munition Hazards

D. Noble, USACE: The six cleanup alternatives evaluated for the potentially remaining munition hazards:

1. No Further Action
2. Land Use Controls
3. Full Digital Geophysical Mapping (DGM) Coverage, Remove All Anomalies
4. Full DGM Coverage, Remove Selected Anomalies
5. DGM of Accessible Areas, Remove All Anomalies
6. DGM of Accessible Areas, Remove Selected Anomalies

D. Noble, USACE: The last four alternatives are really different mixing and matching of the same alternative. I want to spend just a little bit of time attempting to describe what it is we are talking about here. Basically it consists of two components; which is to perform what we call Digital Geophysical Mapping (DGM) and then to remove what that mapping finds. Anomalies are what are identified when you do the mapping, and then you have to make the decision, 'ok, I have identified a metallic anomaly in the ground. Do I want to dig it up or not?' Basically that is what we are proposing in all four of these alternatives, we are going to do this DGM, and then we are going to remove the anomalies that we find. We have to make decisions about how much of that mapping we need to do, based on what we feel the hazard level is at any particular property, in order to achieve an appropriate cleanup that will be protective of public safety. We defined these two terms, where we would do full coverage or we would get coverage of what we call accessible areas.

D. Full Coverage

D. Noble, USACE: What would full coverage be? For full coverage, if we came to your property, we would not look under your house, detached garage, guest house, or swimming pool; but pretty much everything else we are saying we have to look at. So if there is a driveway, and we cannot see through the driveway with our instruments, then we would have to remove the driveway and then look at the area of land

underneath the driveway. If you have walkways that we cannot see through, we have to remove the walkways and then look. If there are large trees that have very large trunks, and we cannot get underneath the tree, we would cut the tree and take the tree out of the way so we could look at the ground underneath the tree. If you have a tennis court, and we could not see through your tennis court, we would remove the tennis court so we could look under the tennis court. It would be a very complete, thorough, and probably destructive process, because we would be removing a lot of things in your yard to get them out of our way so we could use our mapping instruments to look at the ground.

E. Accessible Areas

D. Noble, USACE: As we come to your property, what we are really concerned about are those areas that are still accessible to you; where you might be digging in the ground and where you could encounter a munition item if you were digging. The definition of accessible area is not as all-encompassing as the full coverage, because in this case, if we cannot see under the driveway, we are not going to worry about it because we assume you are not going to dig through your driveway every day. The driveway would be in place, and you would not be going under your driveway. Same thing if you have a tennis court. If you have placed a tennis court there, you are playing tennis on top of it. You are not going to then try to dig and plant a plant in the middle of your tennis court. We would look at those areas that are accessible to us and where our instruments will work, on the theory that those are the areas most likely where you would be digging into the soil on your own property.

Now, if you, say, have a mature vegetable garden, and we would say to ourselves, 'well, that is an accessible area, we can get to that area.' Yes, unfortunately we would have to move the vegetable garden out of the way, which means we would have to cut it all down. But then we can run our instruments over that ground and we can check it out. So by our definition, that area is accessible. You might disagree with us. You might say, 'no, that is not an accessible area. I have been digging in it for years, I have never found anything, I have never had any problem, and you are not touching my vegetable garden.' That is fine; you can identify inaccessible areas for us. I can tell you, 'I can get in there, I can do it.' You can say, 'yes, but you are not going to.' And that is ok. We are just going to have to judge at the end when we are done. We wanted to achieve a certain amount of coverage, we know that we are capable of getting a certain amount of coverage at your property, but you chose to keep us out of certain areas. What does that add up to? In the end, do we think that our effort was good enough or was it not good enough. So if we achieve 90% of what we thought we could do when we first showed up, that is probably pretty good. But if we only achieved 50% of what we thought we could do because you had a lot of areas that you wanted to keep us out of, that might not be good. We might have to have more discussion about what to do.

F. All Anomalies vs. Selected Anomalies

D. Noble, USACE: 'All anomalies' is pretty obvious; any anomaly we find we dig it up. So if we find an anomaly in the middle of the driveway, we put a hole in the driveway and go see what the anomaly is. The best way, of course, to determine what an anomaly is, is to get it out of the ground and look at it, actually see what it is. There is a lot of very recent technology that is performing very well that allows us to look at an anomaly in the ground. If we can see it with the instrument, the instrument is able to tell us whether it is potentially a munition item or not. If we look at an anomaly in the driveway, and the instrument tells us in all likelihood there is something metal buried here, but it is not a munition, in that case we would not dig it up. If the instrument tells us there is a metal item buried in the ground here and it kind of looks like a munition, we would dig it up. So that is where the 'selected anomaly' term comes from. When the instrument tells us that most likely the anomaly is due to the presence of a munition item, then we would select that anomaly to be dug up. These are just a different ordering of the different mapping coverages and then the decision points on whether to bring an anomaly out of the ground or not.

D. Noble, USACE: We put these Alternatives through the same evaluation. Alternatives 1 and 2 fall out again because we do not feel they meet the threshold criteria. Each alternative was scored based on the balancing criteria. We have regulator input already; we are still waiting for your input. USACE is proposing

to do Alternative 6 to address the explosive hazards that we feel could remain at the site; which is we would come to your property and do the DGM of accessible areas, and then we would remove those selected anomalies that the instruments tell us are most likely caused by the presence of munition items. We have in these 4 focus areas 96 private properties that we have to get to, plus a portion of city owned property along Dalecarlia Parkway. Our estimate of the cost of performing this at 96 homes is approximately $20 million.

A. Hengst, Community Member: The rectangle in the right bottom corner, Area of Interest 13, possible disposal pit…

D. Noble, USACE: Possible disposal area.

A. Hengst, Community Member: Ok. If someone wanted to find out more about the background, I suspect it is not going to be on the PP. But there should be an Area of Interest Task Force report on Area of Interest 13, right?

D. Noble, USACE: Yes.

A. Hengst, Community Member: Is there any place other than the Area of Interest Task Force where someone could find out more about what is in that area or why the Army believes it is a possible disposal area? Were there any other reports generated other than the Area of Interest task force report?

D. Noble, USACE: Well, there is the Site-Wide RI report.

A. Hengst, Community Member: There is more detail in that on Area of Interest 13?

D. Noble, USACE: In that this was investigated as part of the Site-Wide RI and what was found that is not summarized in the Area of Interest report, but is summarized in the Site-Wide RI. The Area of Interest report was written before the area was investigated. The Site-Wide RI report was written after the area was investigated.

A. Hengst, Community Member: So that was last summer?

D. Noble, USACE: Yes, July 2015 for the Site-Wide RI report. Tom, is there another source for Area of Interest information?

Tom Bachovchin, ERT: Everything should be in the Site-Wide RI report, it is pretty thorough.

G. Tentative Schedule

D. Noble, USACE: The only thing that is not tentative is that our Site-Wide PP will be final on July 28, 2016. That is when the public comment period will end, and once that public comment period is over, the Site-Wide PP phase is over. The alternatives as I have laid them out for you here might need to be modified, based on input we received from the public comment period. If there are modifications that need to be done to the alternatives, they will be written up and described in the Decision Document (DD). We hope by fall of this year that we will be done with the DD and have it signed. We will then have an approved project, and we can acquire a contractor to carry out the project for us.

By late fall or winter of this year at the latest, we will begin the Remedial Design work that we have to do to design the remedy. We hope to begin to conduct the Remedial Action as early as we can in 2017. We put down that the remedial action will take about 3 years to perform. That is of course just an estimate that is based on what I mentioned for the Site-Wide RI. This process of doing DGM at a property and then digging up some selected anomalies to see what they are; that is exactly what we did during the Site-Wide RI phase to determine if we had a problem or not. In a sense, the remedy is very similar to the methods used in the investigation. We looked at about 90 properties in the investigation in various areas of the site. As we were working our way through these 90 properties in our busy, highly productive years, we were getting to about 30 properties in a year to conduct the investigation. With 96 properties that we are

suggesting that we would visit during the remedy, and being able to do about 30 a year, that led us to the 3 year estimate.

D. Noble, USACE: We hope you will participate in the public comment period. We have a formal 45-day public comment period underway. It began on June 13, 2016 and will end on July 28, 2016. You can submit to us comments in many ways. You can write them down and put them in the box here this evening and we will take your comment. You can speak to Holly after the meeting if you would just like to give an oral comment, and she will record it for you, and we will put it into the record. You can send us a letter with your comments, and this would be the mailing address that you would send that to. Chris Gardner, USACE, will receive your comments through the mail, or if you would like to e-mail Chris and give him your comments. We would just ask that you have your letter postmarked by 28 July, or you hit the 'send' button on the e-mail before midnight on 28 July. And then as I mentioned, turn in written or oral comments here this evening. You can find the Site-Wide PP at www.nab.usace.army.mil/Home/Spring-Valley/Proposed-Plan/, it is up online, and you can download it and look at it, or read it online. There is a physical copy of it at the Tenley-Friendship Branch Library if you would like to go and actually read a hard copy of it.

Community Member 1: Dan, is this presentation also on the website?

D. Noble, USACE: It will be placed on the website, yes, and we also have handouts of it this evening if you would like to take a paper copy home with you.

III. Community Questions

D. Noble, USACE: Alright, so I think I have spoken enough and I thank you for your attention. Can I answer questions, or do you have questions?

Community Member 2: We are in a situation where we will be replacing our driveway at some point. Because of subsidence, I suspect they will need to have a deeper base or foundation to make it work; so we will not just be replacing what we have, but going lower. What would the construction company need to do in that situation? And indeed, I am curious about how this works before the remediation occurs, because behind us there is a tear-down, and two houses are being built where one existed, so they are digging in new places all the time. Do they come to you for a consultation, and should I come to you for a consultation even before you have reached my property?

D. Noble, USACE: It is not required, but if you would like to, you certainly can. In that case, that developer did. We met with them and we went over a lot of this information with them. We spoke to their builder as well. We gave them our contact information and said, 'as you dig, if you find something that you think is unusual or interesting, we are here in the neighborhood every day, so call us and we will be over there in a few minutes to look at it.'

Community Member 2: But you did not do any of your testing. They did not ask you to?

D. Noble, USACE: No. Did they ask us to? They might have. I think we had to explain to them that we must go through this process. If you want to wait for us to do that you can, but you better put your project on hold. Of course they were not interested in that. We gave them some information about what we found and where we found it. We tried to put the idea of what the unacceptable hazard is in perspective for them. We have done that with other projects in the neighborhood as well when people reach out to us. But it is not required. Certainly if the hazard was at such a level that we thought it should be required, we would be working with DOEE to make that a requirement. We have not done that over the 20 some years of the project. There was a time when for a while we advertised to 'call us before you dig,' but we do not do that anymore. We were doing it at the time because we had just finished all of the testing for the arsenic and we had not started on cleaning it up yet. We knew where the 170 houses were. We felt with all of the arsenic contaminated soil out in the neighborhood, before people dug into it, if they would speak with us we could

lay it out for them at their project site whether or not there was an issue with arsenic in the soil. The arsenic has been addressed and removed, so we stopped the 'call us before you dig' recommendation.

Community Member 2: Are there any precautions that the construction company or crew should have available to them or anything they should undertake to reduce the risk further or what do you advise them?

D. Noble, USACE: Well, the interesting thing, or maybe not so interesting, is that this is not just a problem in Spring Valley. There are many sites across the country where there have been munitions left behind by military activity. People have moved into those areas and are moving into those areas and developing them, so USACE has a program that we call the 3 Rs, Recognize, Retreat, and Report. Certainly you could make your contractor aware that the project is taking place in a Formerly Used Defense Site (FUDS). If they see anything unusual, we literally are in the neighborhood every day and I could have someone over at your house very quickly to look at something if there is a concern. If they see something strange or unusual and they think it looks like a munition, go ahead and retreat, call us, and we will be there very quickly. We will not hold you up, we can tell you if it is something to worry about or not.

Community Member 2: Then they may want to charge me more.

D. Noble, USACE: The contractor?

Community Member 2: Yeah, because it is not a normal site.

D. Noble, USACE: There are hazards to digging everywhere. There is always a possibility and people who dig and excavate for a living, they know this. I think if they know it ahead of time, I do not know that it is really going to drive the cost all that much. It is what it is. It is a FUDS.

Community Member 3: Two questions. One is, have you determined whether there have been actual health problems created by any of this stuff, and if so, what are they? What should we be doing about those? My second question is, when you are finished with all of this stuff, including the groundwater and anything else that is in the planning stage that I may not know about; where do you hope to be, and where will we homeowners who live here expect to be? Will this all be remedied?

D. Noble, USACE: With respect to the groundwater?

Community Member 3: With respect to any of these problems that will have been created by what was going on here during the First World War.

D. Noble, USACE: Let me address the first question first, and I might ask you to remind me about the second question again. My answer to your first question is going to sound a little bureaucratic; but USACE is not a public health agency. So no, USACE does not attempt to try to determine if there have been health outcomes, if there have been health impacts that have already occurred. USACE does not do that. There are other agencies that do that. They have come to Spring Valley and they have looked at different aspects of the project and have written different reports. The Agency for Toxic Substances and Disease Registry (ATSDR) has written several reports about Spring Valley. DOEE has hired the Johns Hopkins Bloomberg School of Public Health (JHSPH) to perform 2 investigations, and they wrote 2 reports about their investigations and what they thought health impacts and health outcomes might be. I would refer you to those reports and documents because they are written by people who know what they are doing. We have linked to them through our website, so if you go to our website you can get to all of the health consultations and all the health reports that have been written.

Community Member 3: I understand that you are not a health agency, but I presume that given what you are doing, that you have looked at these reports and have some sense as to what they might say. I will not hold you to vouching for what they have said. But can you give us a brief summary of what they have concluded?

D. Noble, USACE: I might ask Steve Hirsh, EPA Region III to help me with this. My sense is the way they approached the problem is they tried to gather health statistics about the Spring Valley community,

they compared those to national averages, and then they compared those to the similar statistics that they saw in what they felt was a comparable nearby community. In this case they chose the community of Chevy Chase, so they compared the health of the people in Spring Valley to the health of the people in Chevy Chase, and tried to see what the differences were. I think the basic conclusions of the report were that the health of the Spring Valley community is very good; it is certainly well above national averages. It also compares very favorably when compared against Chevy Chase. I would say that was the strategy that JHSPH took when they did their reports for DOEE. When ATSDR has come and done reports, they have oftentimes looked at more specific issues and problems. For instance, there was a concern for the children who attended the Child Development Center (CDC) here at AU back in the early 2000s. They specifically looked at that cohort of people, the children who were students at CDC on campus. I think they actually did different types of direct medical testing of the children and they did not see an impact. That was driven by a concern of elevated arsenic that was found in the ground at the playground of the facility. I think generally when people have looked at it, they have come to the conclusion that health is very good; but there are always a few numbers and statistics that turn up, that to me seem to say, 'we are not sure if there is a problem, but this is a little different than when we look at a comparison community,' or, 'this might be a little bit higher than we would have expected.' Steve, are there any other points you can give about health?

Steve Hirsh, EPA Region III: I think Dan just gave a good summary. There were specific things that were looked at, like the kids at the CDC. They took hair and urine samples to make sure, because you can, that you can do. There was the DOEE health study that JHSPH did; they generally confirmed what other people had said, that in general the health was good. There were a couple things like Dan was mentioning. Part of the issue with these sorts of questions is that some diseases are seen 1 in 100,000. Well, if there is 1 here, and there is not 100,000 people, depending on how you look at it, you could say it looks like we have more than we would have expected. We expected none and we saw 1, or we expected 1 and we saw 2. They raised those exponential issues and sometimes had suggestions for how you might tease that data out.

What Dan did not mention is the last study that was done by ATSDR, which is part of the Centers for Disease Control and Prevention, which looked very specifically at 4825 Glenbrook Road. In that case they did determine that some health impacts probably happened to the people that lived in that house and the people that constructed that house. That is sort of what has been done with respect to health. Again, all this has been done by health organizations. What we do and what USACE does is we look at risk: What happens if we leave this stuff here? What is likely to happen in the future? It is health people, medical doctors, public health specialists that look at health records and they talk to people and they talk to doctors. They gather information about individual people. The way we do this is we look at the population and the contamination and say, 'how much do we have to take away to prevent something from happening?' An 'unacceptable' level, which Dan talked about earlier.

Community Member 3: Which leads me to my second question?

D. Noble, USACE: Right. The standard that we have to meet with our cleanup remedy and our cleanup alternatives are that at the end of the day, with respect to risk, we have to clean up to a level such that there are no unacceptable risks to human health or the environment. So our remedies have to protect human health, and they have to protect the environment, to the extent that we can determine it. We gather data, we look at the data, we try to calculate a risk that we think the data is telling us, and then we reduce that risk to an acceptable level. There is a lot of modeling; there is a lot of risk calculations that are done, so it is done to the best of our knowledge and the best of our ability. We are making a lot of assumptions and decisions along the way that you cannot directly measure. The regulations instruct us to be very conservative, because you have to do modeling, and you have to make assumptions. And so we do that. At the end of the day, our remedies have to meet those two very broad criteria. Steve Hirsh, EPA Region III and Jim Sweeney, DOEE are here to oversee us and make sure they agree. So my answer is yes, when we are done there will be no unacceptable risk in the community to the extent that we can determine it, and there will be no unacceptable hazards left behind by munitions to the extent that we can assure that.

Community Member 3: So this has been an iterative process, it seems to me from the beginning, because we have lived in Spring Valley since before the first discovery of this stuff occurred. It has felt like an iterative process, that there has been a lot of learning along the way, and a lot of discovery of new things, and expanded and contracted geographic areas of concern. Is it your expectation when you are completed with what you are working on now, including the groundwater stuff, that there will be no further discoveries, no further iterative processes you will have to go through?

D. Noble, USACE: Well, again, like I say we actually have a Remedial Action Objective that discusses the residual hazard that might be left behind. There is always this caveat that is written into the regulation that says, when you come to the end of the process you are done, unless new information comes to light or an opinion changes on something. So if for instance, we decide that arsenic is actually much more dangerous than we thought it was, and it really needs to be cleaned up to a much lower level than what we did, then all those 170 arsenic cleanups that I mentioned, we might have to look at them and say, 'are they still protective of human health and the environment?' And if we feel the answer is no, then we are coming back and knocking on everyone's door again. We are very conservative up front and so hope never to have to do that, but for that reason USACE will continue to pay attention to the Spring Valley FUDS, and so will EPA and DOEE.

Colonel E. Chamberlayne, USACE: I would like to add one thing, and I know you have probably heard this before, and appreciate your patience of 23 years of the project. The other thing is that for USACE and EPA and DOEE, we are not walking away from this area. We have lots of things that we do in the region that we are responsible for, but we are responsible for this area. So if there is something that is found, or a concern that is redefined for instance, we will be here to respond. The Army created this problem; right, wrong, or indifferent. So we will address it, if there is a problem in the future, even when we think we are done. We are not walking away from the area. I just want to assure you of that.

Community Member 4: I have a property in the MEC area. You have helped me get to the practical a little bit, but I know between 2017 and 2020 something is going to happen. You said you are going to be selective; you are not going to dig up my driveway. Can you go a little bit further beyond that, will I have 1 months warning or will you tell me a year out we are planning to hit you then. When you arrive, what is it going to be like? You said you are going to level a vegetable patch, do you need to level the garden in order to investigate it, or is it just like an oversized metal detector? Are you going to leave just little mole hills where you have dug, or are you going to be digging the whole thing up? How long is it going to take? What happens at the back end of it? Can you paint that picture out a little bit, please?

D. Noble, USACE: Throughout the process we will be staying in touch with you and giving you updates as to how we are doing and what our progress is. I would hope we would give you somewhere around 2 to 3 months advance notice that we are getting ready to come to your property, and can begin the upfront administrative work with you to make it happen. You can imagine when the government comes on your property and causes some damage and then owes you money for that damage, there is a lot of paperwork involved with that. So we have to go through the paperwork with you on that.

Community Member 5: What does that involve?

D. Noble, USACE: What we would do first is we would come to your property and assess the value of your entire landscape, because we are not sure what might get damaged, and what might not. We would present the value of the landscape to you, so you could go through it and agree or disagree with us. We will reach agreement finally on what is the proper value of something. Then we would bring the folks who are actually going to collect the data for us, and they would walk around the property and identify the things that they would like to have moved out of the way. So we will identify that plant, that trampoline, things like that. We will bring this all to you and say, 'this is what we would like to do.' Then you can look at what we are proposing to do and you can agree, or you can say, 'well, not that. I am not letting you do that.'

At that point we would need you to sign a Right of Entry (ROE). You give the government formal permission to come onto the property and do this work. We present the documents to you, you would have to sign them, we counter-sign them, and then the ROE is in effect. We would have the landscape crews come and remove any landscape, equipment, or trampolines that need to be moved out of the way. We would ask you not to park your car on the driveway or out on the street that day, because anything metal is detected by our instruments. We do not want a big piece of metal sitting at the street because that will interfere with the data we collect in the front yard.

I do not think collecting the data will take more than two or three days to go over the property and collect the data. We would then go away for a period of time to look at the data and determine where there are anomalies in the ground. The technology then requires us to return to each spot on the ground where there is an anomaly, collect more data to see if it is a munition item or not, and then based on the results of what we see as we go around to each of these locations, come up with a dig list. We would give you a date when we would come to essentially dig everything up and see what it is. Again, that will not take long, only a day or two, to dig up what we need to dig up. We will see what the items are, we will remove them, and then it will become a process of putting your property back together. We feel we are under a responsibility to return your property to the condition it was when we first set foot on it. If there is a patched hole in the driveway now, we will replace the driveway for you. If there are plants that are missing, we will replant them or we will give you the value of those plants, whichever you prefer. Generally what we try to do when we do this restoration is we try to do ourselves things that relate to security or access on your property. We do not want you to have trouble with security or access at your property, so if we had to take a fence down we would want to replace the fence for you immediately. We would have contractors lined up to replace the fence. If we had to damage your driveway, we would have the contractor standing by to replace the driveway right away so you do not have issues with access to your property. Generally what we find is that for things like shrubs or grass, oftentimes people prefer simply to receive a check and manage that portion of the job themselves. We can do it for you, but if you have the funds then you can work directly with the people that you prefer to work with on landscaping and get what you want. That is generally how it has gone, but it does not have to be. We will replant everything for you if that is what you want.

Community Member 5: What about, say, shrubs that are 20 or 30 feet high, like arborvitae trees?

D. Noble, USACE: The size of the shrub is a part of its value calculation. The shrub in place might be worth several hundred dollars and what we can go out to buy to replace it only cost $30.00. In that case we would give value of the shrub in place as it is, as we cut it; acknowledging that we cannot replace it.

Community Member 5: You think you can go out and buy a 30 foot arborvitae?

D. Noble, USACE: No. It would be valued, and I would give you a check for that, and say this is something that I cannot replace so I am going to pay you for it.

Community Member 5: Are you willing to accept a homeowner's objection to removing his arborvitae trees?

D. Noble, USACE: Yes, absolutely. If we define it as an accessible area, you hold the final trump card. We then simply have to take into consideration how much of your property that we would have liked to have gotten, and how much did we actually get when we do the work. Is it 90% coverage? Okay. Is it 50%? Maybe we try to talk more.

Community Member 5: What about 70% for example?

D. Noble, USACE: Then I start talking with Steve Hirsh, EPA Region III and Jim Sweeney, DOEE and start asking what they think.

S. Hirsh, EPA Region III: These decisions are going to be site specific. We know a lot about the properties, we know what is to your right, to your left, and to your rear. We would look at that and we would do some mental math and think about how likely is it that there is something there. There is some

qualitative stuff. We have these discussions a lot, because people do not want to lose a mature tree. We have been through this and in almost every case we have been able to come out with an acceptable solution.

Community Member 5: As you know, a lot of property lines have very tall shrubs. In fact my next door neighbor has 30 to 35 foot trees lining the fence on his property. If you are proposing to cut down all of those trees, that is likely to be unacceptable to him. Maybe he would be willing to let you do what you want to do elsewhere on his property, up to a point. I gather you are willing to negotiate to some extent on allowing unusual pieces of shrubbery to remain?

D. Noble, USACE: Absolutely. If there is a particular reason, even knowing that we could replace it, it does not matter because that individual specimen is what is important to me.

Community Member 4: When you say remove the landscape, is the starting point an expectation that all trees go, or is it more like we think there might be something under that particular shrub, therefore that particular shrub we would like to remove. Broadly, your garden is going to look like it did. What is your starting point?

D. Noble, USACE: The general determination is going to be things need to go if they are in the way. We do not know if there is anything under them or not. We will not be able to tell until we can run the instruments over that specific spot.

Community Member 4: You would like to have a totally cleared space to run an instrument back and forth over the entire landscape.

D. Noble, USACE: Right, that would be ideal. We are out in the middle of the desert and it is just all open, we could run the instruments everywhere we want. That would be great.

Community Member 4: What is your interaction with the city on large trees?

D. Noble, USACE: Well, this time we are proposing accessible areas. The area under a large tree is not an accessible area. We are not proposing to cut down large trees, but we had to do that during the arsenic removal. A lot of large trees were cut down. When they were city trees, we had an agreement with the city that we would replace the trees by trunk inch. So if it was a 30-inch diameter tree, and we could buy 3-inch diameter trees, we would replace it with 10 3-inch diameter trees and the city told us where they would like them to be planted. That is how we worked that out. So we did not give money to the city, we replaced the trees by trunk inch.

Community Member 4: Thank you.

Community Member 6: For properties that were looked at relatively late in the process that are still considered within the 90 plus properties, is there the expectation that if they were looked at rather later that they might not need to be looked at again?

D. Noble, USACE: We are proposing to return to all properties in these areas because the first time that we went through and looked at properties during the investigative phase, we gathered enough information that we thought we needed to be able to make decisions like this. So if we did come up against a whole back of the property which is planted with arborvitae that formed a privacy screen and we could not get in there, we decided that was okay, we are not going to get that area, so we got the area in front of it. Now what we are saying during the cleanup phase is, now we are interested in the area where those trees are. So yes, we would propose to cut the shrubs this time and incur that cost because we believe it is worth it. Then we will try to get that area covered underneath the shrubs.

Just about every property during the investigation we did not get the 100% accessible area coverage that we are trying to propose we would collect now. We did not have the technology at the time that could give you an opinion on whether or not that buried anomaly might be a munition item. We had an algorithm process we went through where if we identified 100 anomalies on a property; we would dig up 50 of them, just to get an idea of what was there. We chose what we thought maybe were the 50 most likely objects

that could be a munition item, but we did not have a sophisticated manner of choosing which one of those. We did the best we could, but we were limited by the technology. On just about every property there were a lot of anomalies left behind. Now we feel like we have this technology where we can go and relocate the anomaly, gather this new data on it, and see if maybe it is worth digging it up or not now. So very few properties did we dig up all the anomalies that we found, and on very few properties did we cover the area as to the extent that we are proposing we would cover them now, if the homeowner allows us to.

Community Member 6: Is the driveway considered an accessible area or no?

D. Noble, USACE: If we can see through it, yes. If we cannot see through it, then it is not an accessible area. Some driveways are concrete driveways with a lot of steel rebar in them, and that just masks the signal. Other driveways are just asphalt on top of maybe a gravel pad, and so we can usually see through that. So if there was a metallic anomaly buried under a driveway like that we could see it, and so we could make a determination as to whether we want to dig it up or not.

Community Member 1: At the end of the process, you identify some anomalies, and the homeowner agrees and goes along with your digging and doing whatever you have to do. What is the end game in terms of a closure letter, and conversely, if they agree to 1, 3, and 5, but not 2, 4, and 6, do they get any kind of letter?

D. Noble, USACE: If we can, to a high degree, achieve what we want to achieve on the property, we will give a closure letter at that time as soon as the work is done, so that not everybody has to wait until 2020. If we come to your house in 2017, we would like you to have a letter then that says you have been through the process and it is over. If it comes down to there is a lot of area that we were not able to get to because the homeowner did not want us to, I am of the mind that we might have to wait until closer to the end. We are worried about these focus areas as geographical units that were used by the Army in WWI. That they have been carved up into individual properties now was not important to soldiers in WWI, they used the area. If we step back at the end of what we do on any one of these focus areas, and we say you know, there was this one homeowner that did not let us do much, but everywhere else we pretty much got what we wanted, we really covered this area pretty darn well. Everybody is off the hook. So you might have to wait until the end where we can make that determination.

Community Member 1: In that latter case though, the owner that did not let you look at much, might also get a closure letter?

D. Noble, USACE: Well, no, because there would be a closure report that says we set out to achieve this and we achieved it. So everyone can go throw out their closure letter, because I have this report that says everything is okay. This is really the better document that you can show people. You can say, look, I was in this area, but here is the report from the Army that says they came into the area and they did what they needed to do, and everything is okay now; so I am covered. But of course if I give you an individual closure letter I do not expect you to throw it away, you can hold on to it if you want. So that person might not get a closer letter, but in the end he might be able to hold up this report and say, 'oh look, this report says everything is okay.'

Community Member 1: How do you plan to deal with patios? Are those things you can see through?

D. Noble, USACE: Some we can, some we cannot. That would be the same way as driveways**.** If we can see through it, it is an accessible area, if we cannot see through it, it is not. Patios are like sidewalks and driveways.

Community Member 1: Let us say you cannot see through it, you then want to dig it up?

D. Noble, USACE: No.

Community Member 1: Let us say you do see through it, do you want to dig it up?

D. Noble, USACE: We would dig it up if our instruments tell us there is most likely a munition item buried under it. So then we would dig right there in that spot and see if indeed that was a munition item. Then we would repair the damage for you or replace the patio for you if that is what it took to return it to its pre-investigation condition.

Community Member 1: Well, that raises the driveway question I had coming in here, which is: I have an old asphalt driveway, probably not a deep foundation. Do I just wait and find out whether you are going to find a serious anomaly underneath, rather than taking any action in the immediate future, because you may just tear up what I do myself?

D. Noble, USACE: I would say the likelihood of us finding a hazardous munition on any individual property is pretty low. I think in these four areas, we will find a few hazardous items during the cleanup action, but again, I feel it is going to be a handful of items. So my response would be no, do not wait for us, because the chance that there is something hazardous under your driveway right now is extremely low. So I would say move ahead on your schedule and do what you want to do. When we get to your driveway, we will see if we can see through it or not, and if we can, we are only going to damage it if we think there is a really good reason to damage it. Then we will replace it exactly the way you had originally built it.

Community Member 1: What you are saying, I am finding hard to accept, given that I am at ground zero, as far as the function test range. It sounds like it would all be concentrated there.

D. Noble, USACE: We did not really find that when we went to the function test range. I do not know if that is because they did not do a lot of ballistic firing, or when they did do the ballistic firing, because it was an experiment and development station, they were very interested in the munitions; how they functioned, and what they looked like after they functioned as well. They went out and cleaned up everything as they went along so they could look at it, study it, and see if it functioned the way they wanted it to function. We think they did a lot of that. So no, all of the four areas in the Site-wide RI report that I mentioned received about the same hazard category ranking, so none of those four focus areas ranked higher than the others. It is not what we found. I will say we did find one hazardous item in each of the four areas during the investigation, and that drove a lot of our consideration of wanting to go back to these areas and look at them further. For the community meeting last year, we tried to pull the numbers together for the work that we did do in these areas; the number of houses that had been looked at during the investigative phase. I think we dug up about 2,700 anomalies. We found that about 60 or 70 of them were anomalies that were from the Army in WWI. As I mentioned, four of them were hazardous items. So those are the numbers that we are looking at. We looked at 2,700 things, and 4 of them were hazardous items left behind by the Army. It just so happened that there were 50 houses in the area that we looked at during the investigation. There are about 100 properties total in these areas, so we need to go to about 50 houses that we have never been to. Numbers would tell you that we are probably going to find about 3 or 4 more hazardous items from those properties as well. But that is just an average and averages can jump around.

Community Member 1: Do you have an idea of what order you will get to each of the four areas?

D. Noble, USACE: I do not. As I mentioned, none of the areas rank higher than the others. If there was one that ranked higher than the other, I would tell you that I probably would want to go to that one first, but that is not the case here. We discussed this at the last couple RAB meetings. I discussed this with a couple of folks before the meeting tonight. I really think as we get to the point where we are ready to begin work, I think we are going to ask everybody. We are going to send you all a letter and ask if you would like to be first. Respond in writing and tell us if you would. I will see how many responses I get. If 20 people care enough to sit down, send me a letter, and say 'I would like to be first,' then I will say, 'ok, all 20 of you are in the first group.' If 96 people write back to me and say I would like to be first, then I am sort of back to square one. At that point, it would probably a just be a lottery.

Community Member 1: But you are saying you are willing to do that?

D. Noble, USACE: Yes, we are going to do that, we are going to see. I predict that there are about 15 or 20 people that are concerned enough to write me a letter and say 'yes, I would like to be first,' and so they will go in the first group. I figure I can do about 30 properties per year. If I get 30 responses of homeowners who want to be first, at least I can get back to you and say you will go in the first year. If I get more than 30, then I do not know; I might have to start to say we have gone past the tipping point here and maybe we should just do a lottery. I will emphasize that I do not have any particular reason to go to anyone's individual property over anyone else's. It is that level of hazard. Again, as the regulations instruct us, it is a very conservative look at what the hazard is. That is how we came up with the 96 properties.

Community Member 4: I know one property owner who plans to do some major landscaping this fall. What is your advice to him? You want to be able to come in and dig up all these plants that he intends to plant this fall. Would you tell him not to do that?

D. Noble, USACE: I guess I would tell him if it is something you have been planning for a long time and you want to do it, and you are a little frustrated that you now might have to wait another 2 or 3 years, go ahead and do it. When I get to the property, the condition I find will be what I will restore the property to when I am done. I would imagine that if they do it, let us say this year, and I come in 2 or 3 years, that plant that they been planted is not going to reach the 30-foot size that we are talking about. It will still be a relatively small plant; I can take it out and replace it for that individual. Replace it with what they put in. I know it sounds inefficient, but when you consider that we are going through a process that I outlined here, and then we have to go through a planning process that is going to last several months, and I am not even sure what order I am going to go to the properties, I do not feel right telling somebody definitely wait until I come. I might not come for 3 or 4 years. If that person wants to do their project and enjoy the result of that project for 3 or 4 years while they wait for me, understand that I will do my very best when I get there to leave their property in the way I found it so that you can continue to enjoy it with that improvement.

D. Noble, USACE: If there are no further questions, I would like to say we will all hang around this evening and will be more than happy to talk to you individually. Again, thank you all for coming. If you do live in one of these areas, we will be in touch with you in the coming months and years. Please, if you have a comment you would like us to formally pay attention to, please submit it. I should mention that part of the DD is actually a listing of the comments that we receive, and then a written response from us to those individual comments. If you do turn in a comment to us, when we make the DD available you will see your comment and you will see our written response. Thank you very much.

IV. Closing Remarks

D. Noble, USACE: Thank you very much.

The meeting was adjourned at 8:32 PM.