FINAL

FIRST FIVE-YEAR REVIEW REPORT FOR SPRING VALLEY FORMERLY USED DEFENSE SITES Property Number C03DC0918 Project 01 and Project 02 WASHINGTON, D.C.

US Army Corps of Engineers ®

Prepared by

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4 APRIL 2024
Date

Table of Contents

LIST OF APPENDICES

LIST OF TABLES

LIST OF FIGURES

(Figures are in **Appendix F** unless noted)

LIST OF ABBREVIATIONS & ACRONYMS

AGC	Advanced Geophysical Classification
AOF	Area of Focus
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirement
AU	American University
AUES	American University Experiment Station
AUEU	American University Exposure Unit
Bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
Cm	centimeter
COC	Contaminant of concern
CWM	Chemical Warfare Materiel
DD	Decision Document
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munition
DOD	Department of Defense
DOEE	Department of Energy and Environment
EU	Exposure Unit
Ft	foot/feet
FUDS	Formerly Used Defense Sites
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
HI	Hazard Index
HTRW	Hazardous, Toxic, Radioactive Waste
ICs	Institutional Controls
IDW	Investigation Derived Waste
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MC	Munitions Constituent
MD	Munitions Debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
MPV	Man Portable Vector
MRS	Munition Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NMRD	Non-Munitions Related Debris
NPL	National Priorities List
NTCRA	Non-Time Critical Removal Action
O&M	Operation and Maintenance
OSR	Operation Safe Removal
OU	Operable Unit
PRP	Potentially Responsible Party
PSB	Public Safety Building
QC	Quality Control
RA	Remedial Action
RAB	Restoration Advisory Board
RAO	Remedial Action Objectives

RG	Remedial Goal
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SREU	Spaulding-Rankin Exposure Unit
SVFUDS	Spring Valley Formerly Used Defense Sites
TBC	To be considered
TCRA	Time Critical Removal Action
UCL	Upper Confidence Limit
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UU/UE	Unlimited Use/Unrestricted Exposure
UXO	Unexploded Ordnance
VI	Vapor Intrusion

1 INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Army Corps of Engineers (USACE), Baltimore District is preparing this five-year review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40 CFR Section 300.430(f)(4)(ii)), and considering U.S. Environmental Protection Agency (USEPA), DOD, and Formerly Used Defense Sites (FUDS) policy (ER 200-3-1) (USACE, 2020).

This is the first FYR for Spring Valley. The triggering action for this statutory review is the start of remedial action, which began on 6 June 2018. The FYR has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Spring Valley property consists of multiple projects but only two will be addressed in this FYR, Project 01 and Project 02. The June 2017 Decision Document (DD) selected the remedial actions for Munition Response Site (MRS) 01 and included the explosive hazard remedial action for Project 01 and the contaminated soil remedial action for Project 02, Site Wide HTRW. However, the remedial action selected in the DD to address contaminated soil under Project 02 was identified only for two areas within MRS 01: Spaulding-Rankin Exposure Unit (SREU) and the Southern American University Exposure Unit (AUEU). The other Spring Valley projects that are not included in this FYR are listed in Table 1. The remedial action areas for Project 01 and Project 02 are shown on Figure 1.

Table 1: Spring Valley Projects Not Included in FYR

Project	Name	Description
04	HTRW - ARSENIC TCRA COMPLETE - NDAI	Not included in FYR because project was executed as a Time-Critical Removal Action.
08	Battery Vermont	Battery Vermont. Separated from Project 01 because no known hazards were present, therefore, no FYR requirement.
09	4825 Glenbrook Road – CLOSED	Response complete in FY22 after remedial action, with no requirement for FYR.
11	Sitewide PRP/MMRP	PRP investigation is primarily focused on 4825 Glenbrook Road but may also include other areas of the site (sitewide). No FYR requirement.
13	Sitewide Groundwater	ROD has not been finalized, so there is no requirement for FYR.

The Spring Valley FYR was led by USACE project manager, Dan Noble. The data analysis and review were conducted by Marissa Lucento, USACE risk assessor. The review began on 19 May 2023.

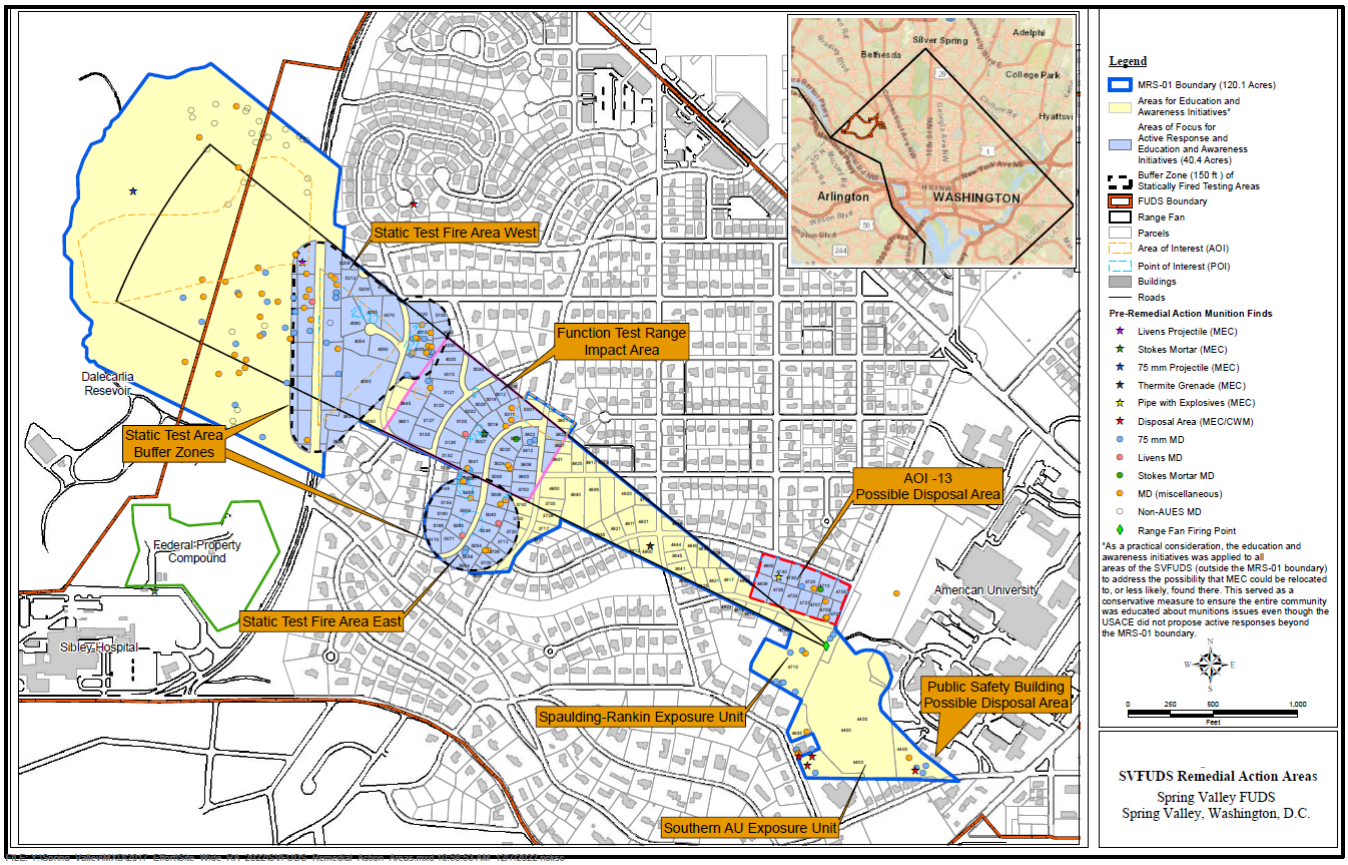

Figure 1 Spring Valley Project 1 and Project 2 Remedial Action Areas

1.1 Site Background

The Spring Valley property comprises 661 acres in northwest Washington, D.C. MRS 01 encompasses 120.10 acres of the total Spring Valley acreage, in the central-western portion of the Spring Valley property. The MRS 01 acreage also includes the acreage of the Southern AUEU (9.4 acres), and the SREU acreage (3.0 acres). The Spring Valley property is located in a largely residential area with local shops and restaurants. The majority of the MRS 01 area is located within residential areas. The American University (AU) campus comprises a portion of the Spring Valley property and includes the location of the former AU Public Safety Building (PSB), which is currently undergoing remedial action under both Project 01 and Project 02. The Dalecarlia Woods area, which is located on the western edge of the Spring Valley property, is zoned as Federal or public use, and the Range Fan extends into a portion of the Dalecarlia Woods.

During World War I (WWI), the U.S. Government established the American University Experiment Station (AUES) to research the testing, production, development and effects of noxious gases, chemical warfare materiel (CWM), antidotes, protective masks, and to provide medical and pharmacological research. Mustard and lewisite agents, adamsite, irritants, and smokes were among the chemicals researched and tested. Historical records suggest that Livens projectiles, and 3-inch and 4-inch Stokes mortars may have been fired from the firing point near AU and Woodway Lane (see Figure 1) and, in turn, may have impacted downrange locations to the northwest towards the Dalecarlia Woods. Buried military munitions were discovered in 1993 during utility trenching activities at a residential property.

The buried munitions are most likely resulting from the training activities conducted when Camp Leach was active. The Spring Valley property 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. The Spring Valley property also includes property adjacent to the AUES named Camp Leach, which was established and used for staging, training, and billeting troops during WWI. After the war, these activities were transferred to other locations, the AUES was demobilized, and the land was returned to the owners, American University. Land use in and around the Spring Valley property, including the Project 01 area, is primarily low-density residential, with smaller portions zoned for commercial use. Land use is not expected to change.

Project 01 is a compilation of several test areas and burial pits, and it consists of the areas where field testing is thought to have occurred, as well as associated burial pits and disposal areas. The areas included in Project 01 are the Burial Pits/Field Test Areas, which includes Area of Interest (AOI) 13, Static Test Fire Areas East and West, Static Test Fire Buffer Zones, Function Test Range Impact Area, SREU, Southern AUEU, and the former PSB on American University campus. It should be noted that the project boundary extends outside of the Spring Valley property boundary. The former Range Fan is a cone-shaped area defined by a firing point and potential impact areas downrange. Previous investigations determined the Range Fan extended beyond the Spring Valley property and munition items existed outside of the Spring Valley property boundary. The Spring Valley Project 02 included a soil and groundwater component due to munition constituent (MC) contamination. The Inventory Project Report Addendum for the Spring Valley property noted that the MC contamination (i.e., metals) in soil were to be addressed under Project 02. Contaminated soil encountered at the former PSB will be addressed during the explosive hazard remedial action, as the DD included a caveat that the contaminated soil RAOs will be applied with the explosive hazard RAO at the former PSB.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
FUDS Property Name: Spring Valley		
FUDS Property No.: C03DC0918		
Region: 3	**State:** DC	**City/County:** Washington
SITE STATUS		
NPL Status: Non-NPL		
Multiple Projects? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: USACE ***[If "Other Federal Agency", enter Agency name]*:**		
Author name (Federal or State Project Manager): Dan Noble		
Author affiliation: USACE		

Review period: 5/19/2023 - 12/29/2023
Date of site inspection: 6/26/2023
Type of review: Statutory
Review number: 1
Triggering action date: 6/6/2018
Due date *(five years after triggering action date)*: 6/6/2023

2 RESPONSE ACTION SUMMARY

2.1 Basis for Taking Action

The contaminants associated with Project 01 include munitions of explosive concern (MEC) (in the form of unexploded ordnance [UXO]); CWM and MC are the contaminants associated with Project 02. The Remedial Investigation (RI) completed in 2015 identified that MEC, CWM, and MC present at the MRS 01 pose an unacceptable risk to human receptors. Therefore, the 2017 DD selected remedies to treat the contamination present within MRS 01, and the former PSB which is located outside of the MRS 01 boundary.

Unacceptable risk is described as the cumulative excess carcinogenic risk to an individual exceeding 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. However, with regard to cobalt, the 2017 DD stated that USACE recommended an HI value of 2 was more appropriate than the benchmark of 1 at Spring Valley and this recommendation was approved by the USEPA and DOEE. Cobalt was identified as a COC in the SREU, as cobalt posed a non-carcinogenic risk (HI value greater than 2) to human health due to exposure to contaminated soil. In the Southern AUEU, the COCs are cobalt, mercury, and vanadium, which posed non-carcinogenic risks (HI value greater than 1 for vanadium and mercury, and HI value greater than 2 for cobalt) to human health through exposure to contaminated soil.

In addition, a response action is warranted if unacceptable explosive hazards are present. 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. Buried munitions, such as Livens projectiles, Stokes mortars, and 75-millimeter munitions, have been removed from within MRS 01 during the RI and various removal actions. Explosive hazards at MRS 01 were evaluated with a MEC Hazard Assessment (MEC HA) during the RI. The MEC HA evaluates potential explosive hazards, given conditions current at the time of assessment, and under various cleanup scenarios. At MRS 01, the MEC HA was organized around those activities that were most likely to result in munitions being present within the MRS 01. These activities include ballistic live-fire testing, static live-fire testing, and disposal or burial activities. Unacceptable MEC risk is considered to be present within MRS 01 based on the MEC HA scores from the 2015 RI and the historical knowledge of past munitions related activities that occurred. The MEC HA results are presented in Table 2.

Table 2: MEC HA Results from 2015 RI

Area or Activity	Hazard Level Category	Explosive Hazard Condition
Safety Buffer for Livens Projectiles (includes Static Test Fire Areas and Buffer Zones)	4	Low
Impact Area for Stokes Mortars (includes Function Test Range Impact Area)	3	Moderate
Impact Area for Livens Projectiles (includes Function Test Range Impact Area)	3	Moderate
Generic Disposal Area or Burial Pit (includes AOI-13)	3	Moderate

The receptors present that may interact with MEC and MC contaminated soil include residents (adult and child), visitors/trespassers, outdoor workers, student recreational users, and construction workers. For MC risks, receptors may be exposed to contaminated soil via ingestion, inhalation, and dermal exposure. The 2015 RI included ingestion of garden vegetables grown in contaminated soil as an exposure pathway. For MEC hazards, receptors may be exposed to MEC in the surface and subsurface soils.

2.2 Response Actions

The remedial action objectives (RAOs) were established in the June 2017 DD for Project 01 and Project 02 to address explosive hazards and contaminated soil risk, respectively. The RAOs for contaminated soil and explosive hazards are listed in Table 3. The DD included a caveat that the USACE will also apply the contaminated soil RAOs during the explosive hazard remedial action, should sampling indicate unacceptable risks are present in soil.

Table 3: Spring Valley MRS 01 Remedial Action Objectives

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

Explosive Hazards RAO	1. Reduce the potential for encountering a munition in identified focus areas where MEC[1] 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.
	2. Reduce the probability that people (e.g., residents, workers, visitors) who encounter a munition within the Spring Valley MRS 01 will approach, disturb, move or handle it.

To achieve the RAOs, the following remedial actions were selected in the DD, signed June 2017:

- Project 01: The remedy components that address unacceptable risk posed by military munitions that may remain present and upon recovery and evaluation by qualified personnel are determined to be MEC, specifically 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.

- Project 02: The remedy components that address the unacceptable risks posed by soil contamination is Contaminated Soil Excavation and Off-site Disposal, which includes: Excavation of contaminated soils in the areas, identify and backfilling the areas with clean soil, characterize and transport excavated soil to an appropriate off-site disposal facility.

The explosive hazard remedy component will not achieve UU/UE since all of the potential MEC items were not accessible for removal. The explosive safety remedy component will comply with action-specific applicable or relevant and appropriate requirements (ARARs) that involved disposal or destruction of CWM.

2.3 Status of Implementation

This FYR includes a review of relevant documents including investigation reports, the DD, workplans, and remedial action reports. The list of documents reviewed in preparation of this FYR is included in **Appendix A**. The RAOs and cleanup levels were obtained from the 2017 DD. However, the former PSB on AU campus is still undergoing remedial action for both contaminated soil and explosive hazards. The former PSB is technically outside of the MRS 01 boundary (see Figure 1), but the explosive hazard and contaminated soil RAOs apply to the former PSB.

Contaminated Soil Remedial Action

The remedial action selected for the contaminated soil posed by high concentrations of cobalt, vanadium, and mercury, which presented an unacceptable risk to human health, achieved the RAOs at SREU and Southern AUEU. Results from pre-excavation direct-push technology (DPT) sampling showed that mercury and vanadium concentrations in soil did not exceed the cleanup goals at SREU, and cobalt was the only remaining COC at the SREU. Therefore, a total volume of 44 cy of cobalt contaminated soil was

[1] Focus Areas include the MRS 01 areas shown on Figure 1.

removed from the SREU over six selected excavation areas. The excavated material was transported from the SREU to the USACE command operations for storage until all excavations were completed. The excavations were immediately backfilled using clean, certified topsoil and the backfill compacted to the project specifications. The backfill soil was analyzed for metals, and the cobalt concentration of the backfill soil from a composite sample was 11 mg/kg. The section of the *Draft-Final Site-Wide Remedial Action Report* discussing the demonstration of completeness for the contaminated soil remedial action performed at the SREU stated that the final post-excavation HI was 1.9 (at a 95% UCL of the mean cobalt concentration) based on data with designated remediation points removed and replaced with the clean backfill soil, which is below the HI goal of 2.0. No soil removal action was implemented at the Southern AUEU in response to mercury or vanadium concentrations in soil, as pre-excavation DPT sampling confirmed that mercury and vanadium concentrations did not exceed the cleanup goals. A total volume of 10.2 cy of cobalt-contaminated soil was removed from Southern AUEU at two remedial areas (SAU-RA1 and SAU-RA2). The excavated material was handled in the same manner as described for the SREU contaminated soil excavation. A post-excavation risk evaluation was conducted using the background data sets for the Southern AUEU. The section of the *Draft-Final Site-Wide Remedial Action Report* discussing the demonstration of completeness for the contaminated soil remedial action performed at the Southern AUEU stated that the Southern AUEU had an HI of 1.5 for cobalt in soil (at a 95% UCL of the mean cobalt concentration), based on data with the excavated soil removed and replaced with the cobalt background concentrations. Therefore, it was reported that the RAOs had been achieved for the contaminated soil remedial action that was required at the Southern AUEU and SREU.

Explosive Hazard Remedial Action

The remedial action selected for explosive hazards posed by the potential presence of explosive hazards at the residential properties and federal/city lots achieved the RAOs at MRS 01. A total of 91 private property owners of the 92 within the MRS 01 (including AOI-13, Static Test Fire Area East and West, and Function Test Range Impact Area) chose to participate in the remedial action, resulting in a 98.9% homeowner participation rate. The geophysical survey that was performed as part of the remedial action collected data over 93.7% of AOI-13, 94.6% of Static Test Fire Area East, 94.3% of Static Test Fire Area West (east of the Dalecarlia Reservoir security fence), and 94.3% of the Function Test Range Impact Area. The dynamic data were collected throughout the accessible portions of the selected remedial action areas with a G-858 Magnetometer and Man Portable Vector (MPV). The dynamic MPV data were used to identify individual metallic subsurface anomalies to a depth of 0.99 meters (3.24 feet [ft]), and the G858 Magnetometer data were used to identify potential burial pits or caches of munitions at depths of up to 8- to 10-ft below ground surface (bgs). Geophysical coverage was not achieved over 100% of these areas due to accessibility issues either due to vegetation or structures blocking coverage. The geophysical survey identified over 28,000 subsurface metallic anomalies and selected 3,155 anomalies for intrusive investigation. The UXO dig team hand dug all individual anomalies selected for intrusive investigation in 5-inch lifts, investigating within a 25-centimeter (cm) radius of the target location, until the source anomaly and/or predicted depth was reached. If multiple sources were identified, the depth and result of each was recorded. If no source was identified or the identified source did not align with Advanced Geophysical Classification (AGC) predictions, the excavation parameters were expanded to a 40-cm radius from the target location and 15 cm beyond the predicted depth. Intrusive investigation of targets identified through the AGC process resulted in the removal of approximately 1,513 pounds of non-munitions-related debris (NMRD), 341 quality control (QC) blind seeds, 196 quality assurance (QA) blind seeds, 99 pieces of munitions debris (MD), and the removal of three MEC items. Accessible areas were also surveyed with the G858 Magnetometer and data processed to identify potential munitions burial pits below the depth of detection of the MPV. Analog investigation of remedial action areas resulted in removal of approximately 2,751 pounds NMRD, 146 QC blind seeds, 5 QA blind seeds, and 36 pieces of MD. A total of nine potential burial pits were identified for intrusive investigation. In the nine potential burial pits investigated, no munitions-related items were recovered; all detections were determined to be

cultural features, which were left in place, or non-munitions-related debris. All NMRD recovered were sorted into recycling and general refuse categories, and disposed of through the Washington, D.C. recycling and waste programs, respectively. MD was certified as material documented as safe (MDAS) and secured pending final disposition.

As mentioned above, three MEC items were identified during the remedial action fieldwork: A 3-inch Stokes mortar and a Livens projectile, were recovered from the AOI-13 and Function Test Range Impact Area, respectively. These MEC items were considered to be related to activities at the former AUES and were removed from residential properties, reducing the likelihood of interaction with explosive hazards at the residential properties and federal/city lots. Additionally, one 3-inch smoothbore cannonball was also recovered from the Static Test Fire Area East and confirmed to pose an explosive hazard; however, the Civil War-era item was not related to the activities at the former AUES because the installation did not exist at the time of the Civil War. No soil staining or leaking munitions were observed from the recovered MEC items, a composite soil sample was collected beneath the 3-inch Livens projectile MEC items removed from AOI-13. Additionally, all MD items underwent headspace analysis for mustard and lewisite agents, and breakdown products, as a precaution. Soil samples were shipped to Chemical Biological Application and Risk Reduction Environmental Monitoring Laboratory, and headspace samples were transferred to Combat Capabilities Development Command for analytical analysis. Neither the soil samples nor the headspace samples showed detections for mustard or lewisite. Soil samples were also non-detect for arsenic, cobalt, lead, mercury, vanadium, explosives, 1,4-thioxane, and 1,4-dithiane. Arsenic is a degradation product of lewisite, and 1,4-thioxane and 1,4-dithiane are degradation products of mustard. As the results were non-detect, the results demonstrated the successful completion of the MEC remedial action and achievement of the RAO set forth in the Final DD of reducing the potential of encountering MEC within MRS 01 to the depth of detection of the technology and procedures used.

Former Public Safety Building

The former PSB, which was demolished in 2017 by AU, has undergone MEC removal, soil remediation, and AUES debris removal under the remaining concrete slab foundation, in accordance with the Final DD. The remedial action was initially implemented between April 2018 and June 2021. During the initial implementation of the remedial action under the former PSB foundation, a layer of AUES debris that extended north, east, and west of the former foundation slab was observed. This layer of contamination may include MEC, munitions debris, laboratory glassware, and/or HTRW. The PSB on AU's campus will undergo additional remedial action for additional MEC or MC contamination that may be present. Remedial action has begun at the former PSB but is still on-going. During the remedial action conducted between 2018 and 2021, contaminated soil was removed from underneath the foundation of the former PSB. A total of 566 cy of soil and debris was excavated and removed from the 30-ft-by-60-ft foundation slab area of the former PSB down to undisturbed soil or the top of bedrock saprolite. Laboratory analysis of the excavated soil showed metals in exceedance of the cleanup goals, and contaminated soil was removed from underneath the former PSB. The post-excavation soil sampling confirmed that no COCs remain in exceedance of cleanup levels. The post-excavation risk summary tables from the *Final Soil Remediation Property Report. Public Safety Building, Under Foundation* are located in **Appendix H**. However, during the soil excavation, additional AUES-related debris was identified along the excavation sidewall in a layer of dark soil extending to the north of the PSB foundation and in lesser amounts to the west and east of the PSB.

AUES glassware (264 pounds of broken laboratory glass) and over 194 pounds of MD were removed from the 566 cy of soil that were excavated and screened, but no CWM and only one MEC item (a test tube with a substance identified as TNT) was recovered. Additional AUES-related debris was identified along the excavation sidewall in a layer of dark soil extending to the north of the PSB foundation and in lesser amounts to the west and east of the PSB. This 1- to 3-ft-thick dark soil layer with abundant AUES-

related debris corresponds with the estimated 1918 ground surface elevation (approximately 347 to 350 feet above mean sea level) in the area and appears to be darkened due to fire, as evidenced by the abundant black cinders observed in the soil layer. Therefore, additional remedial action for soil and AUES-related debris removal is currently on-going. Progress has been made to achieve the RAOs but is not expected to be achieved until the additional removal is completed.

Additional remediation work is planned for the hillside above the former AU PSB to address MEC, AUES debris, and MC contaminated soil. Interim physical controls are in place around the former PSB area to restrict access to the area until the remedial action is completed. The former PSB is located on the AU campus, and access is restricted with a fence and a locked gate.

Site Wide Land Use Controls

A low level of risk associated with residual explosive hazards within Project 01 area will remain. This risk was and will continue to be addressed through implementation of Land Use Controls (LUCs), including the 3Rs Explosive Safety Education program. The purpose of the Land Use Controls Implementation Plan (LUCIP) is to detail the approach for providing LUCs for the Spring Valley property. Table 4 summarizes the LUC objectives for the Spring Valley property.

Table 4: Summary of Planned and/or Implemented ICs

Media	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil	Yes	Yes	MRS 01	Modify human behavior to avoid potential MEC items remaining within the MRS.	*Final LAND USE CONTROLS IMPLEMENTATION PLAN MILITARY MUNITIONS RESPONSE PROGRAM (MMRP) SITE-WIDE REMEDIAL ACTION SPRING VALLEY FORMERLY USED DEFENSE SITE (SVFUDS) WASHINGTON, D.C.*

The LUCs implemented by this remedial action at the Spring Valley property help spread the message of the 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program. The 3Rs Program consists of the following:

- **Recognize** – When you may have encountered a munition and that munitions are dangerous.
- **Retreat** – Do not touch, move, or disturb it, but carefully leave the area. Leave the area following the same path used to enter the area where the suspect munitions was found.
- **Report** – Notify local law enforcement: call 911. Advise the police of what and where the suspect munition was found.

Per the LUCIP, the components of the LUCs for the Spring Valley property are presented in Table 5.

Table 5: LUCIP Actions to Implement and Maintain LUCs at Spring Valley

LUC Component and Actions	Frequency
Coordinate with the participating institutions	Annually
Distribute information packages to public officials and SVFUDS property owners	Annually
3Rs Internet website	As needed
Recurring Reviews	Every five years

The LUCs have been implemented at the Spring Valley property, specifically annual fact sheets and information on the 3Rs Program were mailed out to the property owners within MRS 01. Institutional partners in the area, including AU, are also informed of the potential MEC risks and project updates through similar mailings and a video. The information packets were last sent in mid-September 2023, and the next annual mailing of information packets is scheduled to be completed in September 2024.

3 PROGRESS SINCE THE LAST REVIEW

This is the first five-year review of the remedy for Spring Valley Project 01 and Project 02.

4 FIVE-YEAR REVIEW PROCESS

4.1 Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting on 19 July 2023 in the Washington Post and was published to the Spring Valley property website for the Restoration Advisory Board (RAB) (https://www.nab.usace.army.mil/Home/Spring-Valley/), stating that there was a five-year review and inviting the public to submit any comments to USACE. A copy of the public notice is included in **Appendix D**. The results of the review and the report will be made available at the Site information repository located at the Spring Valley RAB website listed above.

During the FYR process, interviews were conducted to document any perceived problems or successes with the remedy that has been implemented to date**.** The results of these interviews are summarized below. Interview Questionnaires are located in **Appendix C**.

Representatives from AU were interviewed via a Microsoft Teams call on 12 June 2023. The interviewees, which included the Vice President of Compliance, Risk, and Safety and the Senior Associate General Counsel, had an overall positive impression of the remedial action that has been performed at Spring Valley, and felt well-informed on the project status and updates. The AU representatives did not have any additional comments regarding the project and did not have any concerns regarding the project. The interview questionnaire in **Appendix C** only includes answers provided by the AU Senior Associate General Counsel (Bethany Bridgham), as they were more familiar with MRS 01.

Regulators from the USEPA - Region III, and Department of Energy and Environment (DOEE) in Washington, D.C. were interviewed for their impressions on the Spring Valley remedial action. The USEPA Regulator was interviewed via Microsoft Teams on 28 June 2023. The USEPA Regulator stated that the Spring Valley remedial action has been thorough, and there are no concerns regarding the protectiveness of the remedy from the USEPA. The USEPA Regulator commented that more communication amongst the community stakeholder may be beneficial, but that the current communication processes have been adequate. The DOEE Regulator was interviewed via email and stated that the project has been well-managed and properly communicated with the public and regulators. The DOEE Regulator did not have any additional comments or concerns regarding the remedial action or the protectiveness of the remedy.

The nine members of the RAB were also emailed the FYR interview questionnaire, and two RAB members responded. The RAB members had an overall positive impression of the project and had no additional comments or concerns. The RAB interviewees also responded that the 3Rs Program information is received annually.

4.2 Data Review

The data review portion of the FYR assesses how the RAOs listed in the 2017 DD are being met at the Spring Valley property, for Project 01 and Project 02. Additionally, any operations and maintenance activities that have been conducted within the MRS is documented below. The remedial action has not yet achieved construction complete, as there is additional remedial action on-going for the PSB.

Explosive Hazard RAO

As mentioned in Section 2.3 of this report, ninety-one (91) out of ninety-two (92) residential property owners within the Project 01 MRS 01 remedial action area granted right-of-entry (ROE) to allow USACE to implement the remedial action. One residential property (4055 52nd Terrace) did not grant USACE ROE to implement the remedial action on the property. USACE attempted to obtain ROE from this property multiple times, in accordance with the FUDS Handbook. When ROE was not granted, USACE sent a letter to the USEPA and DOEE requesting that the regulatory agencies attempt to obtain ROE. The regulatory agencies did not pursue further ROE attempts at this property, and ROE was never granted for this property. The copies of the letters sent to the USEPA and DOEE, and the final close-out letter sent to the property owners at 4055 52nd Terrace are included in **Appendix I**. As ROE was not granted at this one property, the analysis of how the RAOs were achieved within the MRS is located in **Appendix I**.

Due to the RI delineating nature and extent at the 4055 52nd Terrace property, the remedial action results at the surrounding properties, and the coverage achieved during the remedial action, the RAOs, which included reducing the potential for encountering a munition in identified focus areas where MEC may remain present by investigating detected anomalies and reducing the probability that people (e.g., residents, workers, visitors) who encounter a munition within the Spring Valley MRS 01 will approach, disturb, move or handle it, are considered achieved. In addition, the regulatory agencies were involved in the process of designing the remedial action and reviewing the implementation of the remedial action, and the USEPA and DOEE have agreed that the RAO has been achieved within MRS 01 for Project 01 through their concurrence of the *Draft-Final Site-Wide Remedial Action Report*.

A low level of risk associated with residual explosive hazards within MRS 01 remains in areas inaccessible to geophysical survey equipment, beyond the depth of detection of the equipment used, and beneath structures assumed to be permanent. In accordance with the LUCIP, USACE initially mailed informational packets, including a letter to the residents, a site map, and a 3Rs brochure, to 1,271 residential addresses within the Spring Valley property in June 2019. The objective of the LUC is to inform residents of the possible explosive hazard that may still exist within the Project 01 area. A copy of the informational packet is provided in **Appendix E**. Separate informational packets were distributed in April 2021 to the seven institutions identified in the LUCIP along with a munitions safety video aimed at informing excavation contractors working within the Spring Valley property boundary. In accordance with the LUCIP, the informational packets are mailed out annually.

In addition, the regulatory agencies were involved in the process of designing the remedial action and implementing the remedial action, and the USEPA and DOEE have agreed that the RAO has been achieved within MRS 01 for Project 01 through their concurrence of the *Draft-Final Site-Wide Remedial Action Report*.

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Contaminated Soil RAO

Additional calculations were performed during this FYR to confirm the results of demonstration of completeness for the contaminated soil remedial action performed at the Southern AUEU and SREU. As stated in Section 2.3, the *Draft-Final Site-Wide Remedial Action Report* stated that the post-excavation HI for cobalt in soil at the SREU was 1.9, based on a cobalt concentration of 45.1 mg/kg, based on the 95% UCL of mean. However, the remedial action reports for SREU and Southern AUEU did not provide any supporting documentation that confirmed that the RAO was achieved. Therefore, during the preparation of this FYR, the methodology prescribed in the workplan for the contaminated soil remediation, and recorded in the remedial action reports for each EU, was followed to produce supporting information that the RAO was achieved. The methodology presented in the workplan and remediation reports was agreed upon by the USACE, USEPA, and DOEE as an acceptable approach for soil remediation. **Appendix G** provides all of the data tables and ProUCL 5.2 inputs and outputs that were utilized to demonstrate that the RAO was achieved at SREU and Southern AUEU. The areas selected for excavation were based on contamination previously identified during the RI, and the pre-excavation sampling methodology implemented at the SREU and Southern AUEU were designed to characterize the lateral and vertical extent of contamination. The methodology of demonstrating that RAOs were achieved at the EUs included the following steps:

1. Cobalt-contaminated soil was identified within EUs at concentrations that exceeded the HI of 2. The cobalt-contaminated soil areas were identified through data sets from the RI, and the excavation area was confirmed using DPT to collect soil borings. The DPT soil borings were used to delineate the excavation area.
2. The selected areas were excavated and backfilled will clean soil. The backfill soil was sampled to ensure the cobalt concentrations naturally-occurring in the backfill source were at or below the remedial goal concentration and USEPA RSL for residential soil. The cobalt concentration in the backfill soil was 11 mg/kg (from a composite sample of the backfill soil source). The maximum cobalt concentration from a discrete sample of the backfill soil source was 10.4 mg/kg. The backfill soil source concentration for cobalt that was used in the analysis was 11 mg/kg.
3. The pre-excavation EU soil sample results for cobalt concentrations that exceeded an HI of 2 was selected for removal. These concentrations were replaced with the cobalt concentration in the backfill soil (11 mg/kg) to reflect the post-remediation cobalt concentration.
4. After replacing concentrations with backfill soil cobalt concentration, the cobalt concentrations from all sample locations in the EU were inputted into the ProUCL 5.2 application to identify the 95% UCL of cobalt concentration in soil, post-excavation.
5. The calculated 95% UCL of the post-excavation cobalt concentration within the EU was used to determine if the RAO of obtaining an HI of 2 was achieved.

The post-excavation 95% Student's t UCL (as suggested by the ProUCL 5.2 software for use) of cobalt for the SREU was calculated to be 36.15 mg/kg. This 95% UCL cobalt concentration results in a HI of 1.54 (for non-cancer risks to child receptors), which is below the goal HI of 2, as stated by the RAO. The 95% UCL of the post-excavation cobalt concentration for the SREU was determined to be below the remedial goal (RG) identified in the DD (43 mg/kg) and is also below the USEPA RSL for residential soil (46.8 mg/kg at a THQ = 2). The RSL calculator determined that the HI was below the RAO of achieving an HI of 2; therefore, the RAO was achieved at SREU. The post-excavation 95% Student's t UCL (as suggested by the ProUCL 5.2 software for use) of cobalt for the Southern AUEU was calculated to be

12.7 mg/kg. This 95% UCL cobalt concentration results in a HI of 0.5 (for non-cancer risks to child receptors), which is below the goal HI of 2, as stated by the RAO. The 95% UCL of the post-excavation cobalt concentration for the Southern AUEU was determined to be below the RG identified in the DD (43 mg/kg) and is also below the USEPA RSL for residential soil (46.8 mg/kg at a THQ = 2). The RSL calculator determined that the HI was below the RAO; therefore, the RAO was achieved at the Southern AUEU. Furthermore, the regulatory agencies were involved in the process of designing the remedial action and reviewing the implementation the remedial action, and the USEPA and DOEE have agreed that the RAO has been achieved within MRS 01 for Project 02, through their concurrence of the *Draft-Final Site-Wide Remedial Action Report*.

Public Safety Building
The remedial action for the former PSB is still on-going to address MEC, AUES debris, and MC contaminated soil. The Contaminated Soil RAOs and the Explosive Hazard RAOs apply to the remedial action conducted at the former PSB.

4.3 Site Visit

The site visit to the MRS 01 was conducted on 26 June 2023. In attendance were Dan Noble, USACE project manager, Kim Berg, USACE environmental engineer, and Marissa Lucento, USACE risk assessor. The purpose of the site visit was to assess the protectiveness and effectiveness of the remedy. A copy of the trip report from the site visit, including site photos, is included as **Appendix B**.

The site visit encompassed all of the subareas included in MRS 01. The residential properties that underwent remedial action for explosive hazards and contaminated soil between 2018 and 2021 appeared unchanged since site restoration following remedial action. Renovations were observed at various residences within the MRS 01 community. The remedial action areas on American University campus were visited, and no changes were observed to the land use and no residential land use has been established on American University campus The future remedial action area at the former PSB was overgrown with grass, but the remedial action area was easily observed. The interim control measures discussed in Section 2.3 were in place around the former PSB area. As the majority of MRS 01 is located in a residential area, a site walk was not performed at the residential properties that underwent remedial actions for MEC and MC. No signs of munitions were observed while driving through the neighborhoods, and no signs of munitions were observed during the site walk through American University campus. No observations were made during the site visit that would suggest a protectiveness issue is present.

The USACE command operations is located in a secured area on federally owned property adjacent to AU campus. USACE command operations includes trailers for workers, investigation-derived waste (IDW) holding areas, and a separate secured area for suspect CWM items. No IDW is currently being stored at command operations but will be used for any IDW that is created during the upcoming remedial action at the former PSB on campus.

5 TECHNICAL ASSESSMENT

5.1 QUESTION A: Is the remedy functioning as intended by the decision document?

Question A Summary:
Yes, the remedy is functioning as intended by the DD. The remedial action selected in the 2017 DD for unacceptable risks posed by soil contamination is excavation of contaminated soil and off-site disposal, and the remedial action selected for unacceptable risk posed by military munitions that may remain is

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

The remedial action for Project 01 and Project 02 commenced in June 2018 and encompassed all of the areas within MRS 01 that were identified in the DD as requiring remedial action (AOI-13, Static Test Fire Areas East and West and Buffer Zones, and the Function Test Range Impact Area, Spaulding-Rankin Exposure Unit, Southern AU Exposure Unit), and under the foundation of the PSB. The results of the remedial action implemented for both Project 01 and Project 02 is expected to achieve the RAOs for both explosive hazards and contaminated soil once the remedial action is complete at all areas. One residence within the Static Fire Test Area West did not grant permission for USACE to conduct the remedial action on their property. However, this residence was investigated during the RI and the nature and extent of explosive hazards potentially present at the 4055 52nd Terrace property was fully delineated. Therefore, due to the remedial action results at the surrounding properties, and the coverage achieved during the RI and remedial action, the remedy functioned as intended to treat explosive hazards within MRS 01. In addition, the regulatory agencies were involved in the process of designing the remedial action and reviewing the implementation of the remedial action, and the USEPA and DOEE have agreed that the 4055 52nd Terrace property was adequately investigated during the RI. The landowner that denied ROE has been made aware of potential MC risks and MEC hazards and has been furnished with directions on how to safely respond to a MEC encounter.

The remedial goals for soil removal were all attained and verified throughout the excavation areas. The excavated soils were transported safely to a permitted offsite facility for disposal, as shown by transport manifests and certificates of disposal can be found in Appendices B through D of the *Draft-Final Site-Wide Remedial Action Report,* and Appendix J of the *Final Soil Remediation Property Report. Public Safety Building, Under Foundation.* Metallic items were intrusively investigated as they were detected with the G-858 Magnetometer and Man Portable Vector (MPV), achieving the RAOs for the explosive hazard remedy. NMRD were sorted into recycling and general refuse categories, and disposed of through the Washington, D.C. recycling and waste programs, respectively.

As a component of the selected remedy, annual fact sheets and information on the 3Rs Program were mailed out to the residences. Institutional partners in the area, including AU, are also informed of the potential MEC risks and project updates. The information packets that were mailed to the Spring Valley property community members are included in **Appendix E**. The project files contain no incidents involving MEC items found by the general public during the FYR period.

As stated in previous sections, the remedial action is not complete at the PSB. The PSB is currently undergoing further remedial action to remove contaminated soil and possibly MEC items that may remain. It is expected that the RAOs for contaminated soil and explosive hazards will be achieved after the remedial action is complete at the PSB.

5.2 QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:
Yes, the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid.

Changes in Standards and TBCs

Standards identified as ARARs for the MRS 01 remedial action have not changed since the DD was signed. The action-specific ARARs identified during the development of remedial alternatives in the FS Report 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 MRS 01. However, chemical-specific To-Be-Considereds (TBCs) include USEPA Regional Screening Levels (RSL) for residential soil and USEPA Toxicity values for selected COCs (Cancer Slope Factors and Reference Doses). The RSLs have not changed for the COCs since the DD was signed in 2017.

Changes in Toxicity and Other Contaminant Characteristics

There have not been any changes to the toxicity or other contaminant characteristics since the finalization of the 2017 DD.

Changes in Risk Assessment Methods

A MEC hazard assessment (HA) was performed during the RI to assess explosive safety risks to the public at MRS 01. Current guidance for evaluating explosive risk to receptors from interaction with MEC replaced MEC HA with Risk Management Methodology. While there may have been updates to the risk assessment methodology for munitions and explosives of concern, these updates do not fundamentally change the risk determination or affect the protectiveness of the explosive hazard remedial action. There have been no changes to the risk assessment methodologies or guidance for MC risks that could affect the protectiveness of the contaminated soil remedy.

Changes in Exposure Pathways

There are no known changes to the exposure pathways since the DD was signed in 2017. One of the COCs in soil within MRS 01 is mercury, which exhibits sufficient volatility in its elemental form to potentially pose an inhalation risk from vapor intrusion (VI). The potential risk from VI was assessed during the 2015 RI using the Johnson and Ettinger model, and no unacceptable risks from VI were estimated. The residential RSL for mercury in indoor air has not changed since the RI was conducted in 2015. Therefore, there is no reason to consider any changes to exposure pathway or toxicity characteristics for mercury since the 2015 RI. The exposure pathways, which were identified in the RI as posing unacceptable risks to receptors, included incidental ingestion of soil or consumption of home-grown fruits and vegetables. The RAOs were developed to be protective of receptors in the event of direct contact exposures to mercury in soil to achieve an HI of one. There are no changes to exposure pathways or land use for MEC and CWM and no new human routes of exposure identified. There are no site conditions that would impact the RAO and remedy protectiveness. There are no anticipated changes to land use within the MRS. No new contaminants have been identified in soil within the MRS, and no new contaminant byproducts present in soil that could impact human health or ecological risk.

Expected Progress Towards Meeting RAOs

The RAOs have been achieved at the residential properties as a result of the remedial actions that have occurred for contaminated soil and explosives hazards. The results from the remedial action for contaminated soil implemented at the Southern AUEU and SREU did not exceed the cleanup goals identified in the DD, and achieved the RAO of achieving a target HI for the COCs in soil. Additionally, results from the remedial action for contaminated soil from both the Southern AUEU and SREU confirmed that the 95% UCL of the COCs remaining in soil did not exceed the USEPA RSLs for residential soil. The RAOs have been achieved at the remedial action locations on AU campus, except for the remaining remedial action that is required at the former PSB. The remedial action scheduled at the former PSB is expected to achieve RAOs upon completion.

5.3 QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other information has come to light that could call into question the protectiveness of the remedy.

6 ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Project 01 and Project 02.

6.1 OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and may accelerate site close-out and improve management of LUCs, but do not affect current and/or future protectiveness:

- Prior to the next annual mailing, update the 3Rs materials to be in accordance with U.S. Army's Explosive Safety Education Program.
    - The 3Rs brochure and mailing sheet will need to be updated to match the standardized 3Rs Explosives Safety Education message and logo located at https://3Rs.mil.
- The 2017 DD should be modified, most likely in the form of an Explanation of Significant Differences (ESD). The DD modification would be written to state that the property which refused ROE during the remedial action (4055 52nd Terrace) was adequately investigated and characterized during the RI, and the findings from the RI resulted in sufficient information to determine that this property did not require remedial action. Alternatively, if future review of the investigations performed at the 4055 52nd Terrace property determines that previous investigations were not adequate, then the DD would be modified to separate the 4055 52nd Terrace property from the rest of MRS 01. The property would remain open as a remedial action area under Project 01 until USACE is able to obtain ROE and perform the remedial action. The USACE will continue to contact the property owners every five years to attempt ROE as part of the Interim Risk Management process. Additionally, the DD should also be modified to restate the source of RGs for contaminated soil under Project 02.

7 PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Project No.: Project 01 and Project 02	*Protectiveness Determination:* Will be Protective	*Planned Addendum Completion Date:* NA
Protectiveness Statement: The remedy at Project 01 and Project 02 is expected to be protective of human health and the		

environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

8 NEXT REVIEW

The next five-year review report for the Spring Valley property is required five years from the completion date of this review.

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APPENDIX A – LIST OF DOCUMENTS REVIEWED

U.S. Army Corps of Engineers (USACE), 2009. *Final Geophysical Report – 4055 52nd Terrace.* Spring Valley Formerly Used Defense Site, Washington, D.C. October.

USACE, 2011. *Site-Specific Anomaly Investigation Report for 4055 52nd Terrace.* Spring Valley Formerly Used Defense Site, Washington, D.C. September.

USACE, 2015. *Final Site-Wide Remedial Investigation Report.* Spring Valley Formerly Used Defense Site, Washington, D.C. June.

USACE, 2016. *Final Feasibility Study.* Spring Valley Formerly Used Defense Site, Washington, D.C. January.

USACE, 2017. *Final Decision Document.* Spring Valley Formerly Used Defense Site, Washington, D.C. June.

USACE, 2018. *Final Advanced Geophysical Classification Quality Assurance Project Plan.* Spring Valley Formerly Used Defense Site, Washington, D.C. June.

USACE, 2018. *Final Land Use Control Implementation Plan.* Spring Valley Formerly Used Defense Site, Washington, D.C. October.

USACE, 2018. *Final Workplan/Uniform Federal Policy Quality Assurance Project Plan, Site-Wide Remedial Action - Spaulding-Rankin Exposure Unit, Southern American University Exposure Unit, and Public Safety Building.* Spring Valley Formerly Used Defense Site, Washington, D.C. November.

USACE, 2019. *Final Soil Remediation Property Report. Spaulding-Rankin Exposure Unit.* Spring Valley Formerly Used Defense Site, Washington, D.C. October.

USACE, 2021. *Final Soil Remediation Property Report. Southern American University Exposure Unit.* Spring Valley Formerly Used Defense Site, Washington, D.C. April.

USACE, 2022. *Draft-Final Site-Wide Remedial Action Report*. Spring Valley Formerly Used Defense Site, Washington, D.C. December.

USACE, 2022. *Final Soil Remediation Property Report. Public Safety Building, Under Foundation.* Spring Valley Formerly Used Defense Site, Washington, D.C. December.

USACE, 2023. *Final Workplan/Uniform Federal Policy-Quality Assurance Project Plan. Public Safety Building Hillside Remediation.* Spring Valley Formerly Used Defense Site, Washington, D.C. August

*Final document versions were reviewed for this report, as available.

APPENDIX B – SITE VISIT CHECKLIST, REPORT AND PHOTO LOG

OSWER No. 9355.7-03B-P

Five-Year Review Site Inspection Checklist

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: Spring Valley	**Date of inspection: 26 June 2023**
Location and Region: Spring Valley, Washington, D.C.	**FUDS Property ID: C03DC0918**
Agency, office, or company leading the five-year review: USACE	**Weather/temperature: Sunny, warm**

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☐ Access controls
X Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
X Other___ Contaminated soil removal; geophysical survey and explosive hazard removal
☐ Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _EPA_____
Contact Joseph Vitello_____ Remedial Project Manager ____28 June 2023_____
Name Title Date Phone no.
Problems; suggestions; X Report attached _____
_____

Agency __DOEE_____
Contact __Kelsey Tharp_____Remedial Project Manager___5 July 2023_____
Name Title Date Phone no.
Problems; suggestions; X Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) X Report attached.

Interviewed Fitzroy Smith and Bethany Bridgham with American University.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ As-built drawings ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Maintenance logs ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Effluent discharge ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Other permits_____ ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

9. **Discharge Compliance Records**
   - ☐ Air ☐ Readily available ☐ Up to date ☐ N/A
   - ☐ Water (effluent) ☐ Readily available ☐ Up to date ☐ N/A

   Remarks_____

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☐ N/A

    Remarks_____

IV. O&M COSTS

1. **O&M Organization**
   ☐ State in-house ☐ Contractor for State
   ☐ PRP in-house ☐ Contractor for PRP
   ☐ Federal Facility in-house ☐ Contractor for Federal Facility
   ☐ Other_____
   _____

2. **O&M Cost Records**
   ☐ Readily available ☐ Up to date
   ☐ Funding mechanism/agreement in place
   Original O&M cost estimate_____ ☐ Breakdown attached

   Total annual cost by year for review period if available

   From_____ To_____ _____ ☐ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ ☐ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ ☐ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ ☐ Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ ☐ Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: _____
   _____
   _____
   _____
   _____
   _____

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map X Gates secured ☐ N/A
   Remarks__Area around former PSB is fenced and secured with a locked gate to ensure that no one enters the construction area. _____
   _____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
   Remarks_____LUCs in place for Spring Valley property. Residents and institutional partners receive annual fact sheets on potential explosive hazard risks.
   _____
   _____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes X No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes X No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _Five Year Review
_____
Frequency _every five years
_____
Responsible party/agency _USACE
_____
Contact _Dan Noble_____ _PM_____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date X Yes ☐ No ☐ N/A
Reports are verified by the lead agency X Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met X Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes X No ☐ N/A
Other problems or suggestions: X Report attached
_____
_____
_____
_____

2. **Adequacy** X ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks_____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map X No vandalism evident
Remarks_____
_____

2. **Land use changes on site** X N/A
Remarks_____
_____

3. **Land use changes off site** X N/A
Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map X Roads adequate ☐ N/A
Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____
_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____
_____

B. Benches ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____
   _____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____
   _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____
   _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____
   _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____
   _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____
   _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable X N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____
   _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable X N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
☐ Good condition☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
Remarks_____
_____
_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition☐ Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
Remarks_____
_____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Collection Structures, Pumps, and Electrical**
☐ Good condition☐ Needs Maintenance
Remarks_____
_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
☐ Good condition☐ Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment**
☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
Remarks_____
_____

C. Treatment System ☐ Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____
   _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____
   _____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

5. **Treatment Building(s)**
   ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____
   _____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

D. Monitoring Data

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

_No obvious issues were observed during the site inspection. Please see the FYR report for more detail on the implementation of the remedy.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

_N/A

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. __N/A_____ __

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. ___N/A_____ __

CENAB-ENE-R 27 June 2023

MEMORANDUM FOR: CENAB-ENE-C

SUBJECT: Spring Valley FUDS MRS-01 Five Year Review Site Visit

1. Introduction. The USACE team arrived in Spring Valley, Washington, D.C., on 26 June 2023 and conducted the site visit to the Spring Valley Formerly Used Defense Site, MRS-01. Team members included Marissa Lucento (regulatory specialist/risk assessor), Kim Berg (environmental engineer), Dan Noble (project manager), and Todd Steelman (ordnance and explosive safety specialist). As part of the Five Year Review (FYR) process, the purpose of the site visit was to assess the protectiveness of the remedial action that has been performed at the MRS.

2. Activities and Observations – 26 June 2023. The USACE Team met at the USACE command operations trailer on American University campus. Dan Noble provided background and history of the MRS, and the remedial and removal actions that have taken place at the MRS. Todd Steelman provided examples of the types of munitions and munitions debris found within the MRS. Dan Noble, Kim Berg, and Marissa Lucento left the trailers and drove to the residential areas that have undergone remedial actions. All of the residential properties that underwent remedial activities, including soil removals between 2018 and 2021, have been restored. There are no signs of any changes to land use. No concerns regarding the protectiveness of the remedy at these residential properties were observed.

   From the residential area, the USACE team returned to the American University to visit the remedial action areas on campus. There are no signs of any changes to the land use in the remedial action areas on campus, nor any concerns regarding the protectiveness of the remedy. However, the remedial action is still on-going on the American University Campus. The next phase of remedial action on will occur at the former Public Safety Building campus is removal of contaminated soil and any MEC items that may be identified during soil removal. The next phase of remedial action at the former Public Safety Building on campus is scheduled to begin in mid-August 2023.

3. Action Items: Finalize the FYR report and conduct interviews of the regulators and RAB members.

Marissa Lucento
CENAB-ENE-R
443-619-1657

Attachment:

- Site Visit Photos:
  1. Spring Valley FUDS project history
  2. Munitions Debris found during previous investigations at Spring Valley FUDS
  3. Solid Investigation-Derived Waste (IDW) holding area at USACE command ops
  4. Liquid IDW holding area at USACE command ops
  5. Damaged monitoring well (MW) at USACE command ops, near liquid IDW holding area
  6. Overview of liquid IDW area and damaged MW
  7. Secure containment area for suspect chemical warfare materiel (CWM) within USACE command ops
  8. CWM containment area (white building) and attached carbon filter (right of white building)
  9. Flat spot in residential area of former trench
  10. Residential house under renovation – former target area was remediated during remedial action (RA)
  11. Fenced area for former Public Safety Building that is pending further remedial action
  12. PSB area for upcoming remedial action
  13. PSB remedial action area setting

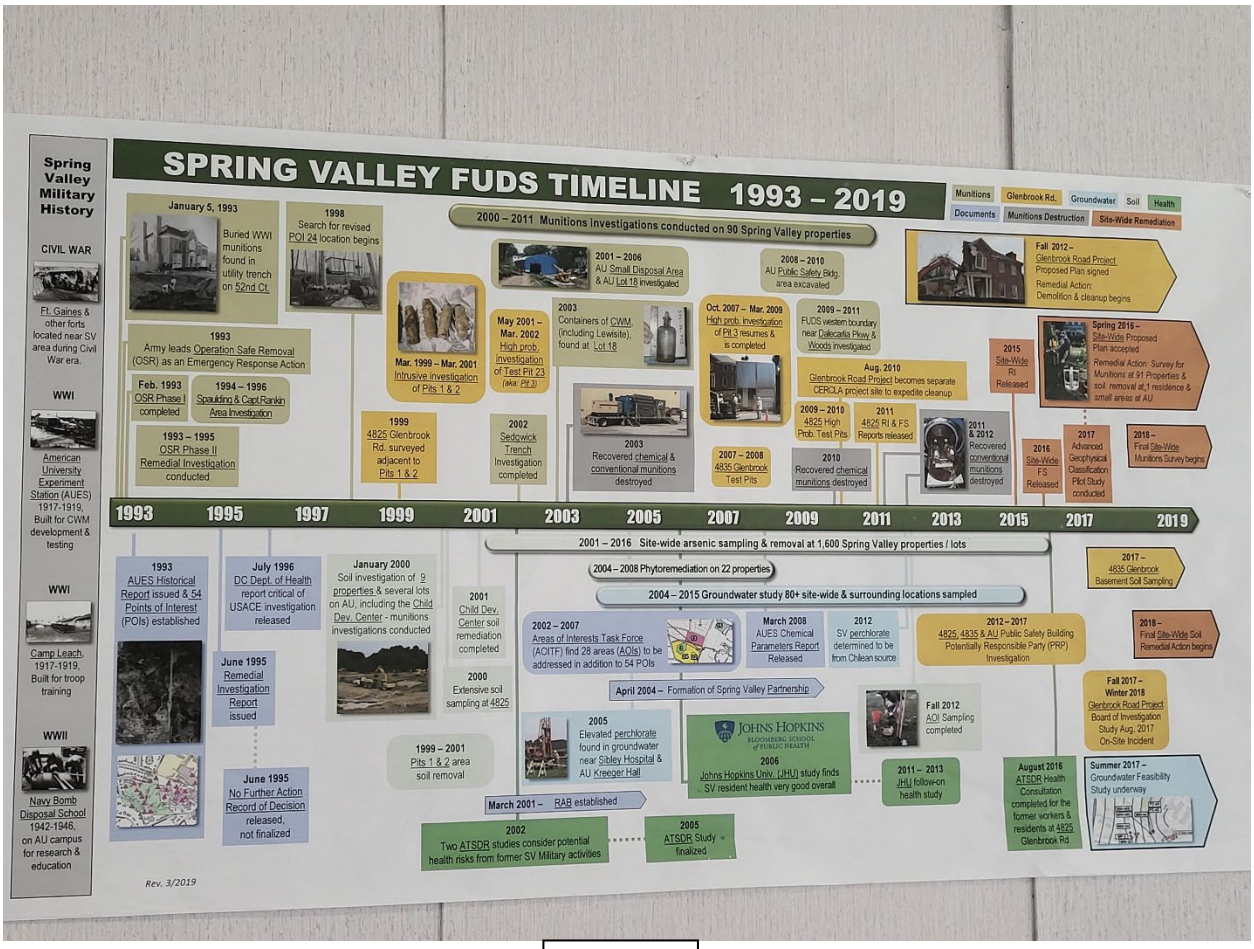
SPRING VALLEY FUDS TIMELINE 1993 – 2019
Spring Valley Military History
CIVIL WAR
Ft. Gaines & other forts located near SV area during Civil War era.
WWI
American University Experiment Station (AUES) 1917-1919, Built for CWM development & testing
WWI
Camp Leach, 1917-1919, Built for troop training
WWII
Navy Bomb Disposal School 1942-1946, on AU campus for research & education
Munitions
Glenbrook Rd.
Groundwater
Soil
Health
Documents
Munitions Destruction
Site-Wide Remediation
January 5, 1993
Buried WWI munitions found in utility trench on 52nd Ct.
1998
Search for revised POI 24 location begins
2000 – 2011 Munitions investigations conducted on 90 Spring Valley properties
2001 – 2006
AU Small Disposal Area & AU Lot 18 investigated
2008 – 2010
AU Public Safety Bldg. area excavated
Fall 2012 –
Glenbrook Road Project
Proposed Plan signed
Remedial Action: Demolition & cleanup begins
1993
Army leads Operation Safe Removal (OSR) as an Emergency Response Action
Feb. 1993
OSR Phase I completed
1994 – 1996
Spaulding & Capt Rankin Area Investigation
1993 – 1995
OSR Phase II Remedial Investigation conducted
Mar. 1999 – Mar. 2001
Intrusive investigation of Pits 1 & 2
May 2001 – Mar. 2002
High prob. investigation of Test Pit 23 (aka: Pit 3)
2003
Containers of CWM (including Lewisite), found at Lot 18
Oct. 2007 – Mar. 2009
High prob. investigation of Pit 3 resumes & is completed
2009 – 2011
FUDS western boundary near Dalecarlia Plow & Woods investigated
Aug. 2010
Glenbrook Road Project becomes separate CERCLA project site to expedite cleanup
2015
Site-Wide RI Released
Spring 2016 –
Site-Wide Proposed Plan accepted
Remedial Action: Survey for Munitions at 91 Properties & soil removal at 1 residence & small areas at AU
1999
4825 Glenbrook Rd. surveyed adjacent to Pits 1 & 2
2002
Sedgwick Trench Investigation completed
2003
Recovered chemical & conventional munitions destroyed
2007 – 2008
4835 Glenbrook Test Pits
2009 – 2010
4825 High Prob. Test Pits
2011
4825 RI & FS Reports released
2010
Recovered chemical munitions destroyed
2011 & 2012
Recovered conventional munitions destroyed
2016
Site-Wide FS Released
2017
Advanced Geophysical Classification Pilot Study conducted
2018 –
Final Site-Wide Munitions Survey begins
1993
1995
1997
1999
2001
2003
2005
2007
2009
2011
2013
2015
2017
2019
2001 – 2016 Site-wide arsenic sampling & removal at 1,600 Spring Valley properties / lots
2004 – 2008 Phytoremediation on 22 properties
2004 – 2015 Groundwater study 80+ site-wide & surrounding locations sampled
2017 –
4835 Glenbrook Basement Soil Sampling
1993
AUES Historical Report issued & 54 Points of Interest (POIs) established
July 1996
DC Dept. of Health report critical of USACE investigation released
January 2000
Soil investigation of 9 properties & several lots on AU, including the Child Dev. Center - munitions investigations conducted
2001
Child Dev. Center soil remediation completed
2000
Extensive soil sampling at 4825
2002 – 2007
Areas of Interests Task Force (AOITF) find 28 areas (AOIs) to be addressed in addition to 54 POIs
March 2008
AUES Chemical Parameters Report Released
2012
SV perchlorate determined to be from Chilean source
2012 – 2017
4825, 4835 & AU Public Safety Building Potentially Responsible Party (PRP) Investigation
2018 –
Final Site-Wide Soil Remedial Action begins
April 2004 – Formation of Spring Valley Partnership
Fall 2012
AOI Sampling completed
Fall 2017 – Winter 2018
Glenbrook Road Project Board of Investigation Study Aug. 2017 On-Site Incident
June 1995
Remedial Investigation Report issued
June 1995
No Further Action Record of Decision released, not finalized
1999 – 2001
Pits 1 & 2 area soil removal
2005
Elevated perchlorate found in groundwater near Sibley Hospital & AU Kreeger Hall
JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH
2006
Johns Hopkins Univ. (JHU) study finds SV resident health very good overall
2011 – 2013
JHU follow-on health study
August 2016
ATSDR Health Consultation completed for the former workers & residents at 4825 Glenbrook Rd.
Summer 2017 –
Groundwater Feasibility Study underway
March 2001 – RAB established
2002
Two ATSDR studies consider potential health risks from former SV Military activities
2005
ATSDR Study finalized
Rev. 3/2019

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

Photo 7

Photo 8

Photo 9

Photo 10


NOTICE
TO REPORT EROSION, RUNOFF, OR STORMWATER POLLUTION FROM THIS CONSTRUCTION SITE:
4601 Rockwood Pkwy NW
Washington DC, 20016

Photo 11

Photo 12

Photo 13

APPENDIX C – INTERVIEWS

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name: Daniel Noble Date: 03 July 2023
Title: USACE PM
Phone number or email address (optional): 443-986-3450
What is your overall impression of the project? It has been long with many delays, but important goals and milestones have been achieved and the end is in sight. A lot of people and organizations have worked hard and cooperated to achieve what has been accomplished so far, but special notice should be given to the residents and community of Spring Valley as nothing would have been accomplished without their cooperation and willingness to grant access to private property.
What effects have site operations had on the property and/or surrounding community? The biggest is the damage and unease caused during munitions operations in residential areas. Damage to property can be fixed or compensated for, but it is hard to alleviate concerns of some residents if they are just uneasy about the nature of the work to begin with. Fortunately, at this point, munitions operations and cleanup on private residential parcels are over, and the last affected landowner is institutional (American University).
Are you aware of any community concerns regarding the Site or its operation and administration? The largest concern seems to be when owners and potential purchasers go to sell their properties via a real estate transaction. Many sellers want reassurance that all necessary action has been accomplished on their properties, and potential purchasers seek reassurances about specific properties and the environmental health of the larger neighborhood.
Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? There have been rare instances of trespassing at the Federal Property, but no damage or vandalism for several years now.
Do you feel well informed about the Site's activities and progress? Yes.
Do you have any comments, suggestions, or recommendations regarding the Site's management or operation? No.

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name: Kelsey Tharp Date: 7/5/2023
Title: Remedial Project Manager
Organization: District of Columbia Department of Energy & Environment (DOEE)
What is your overall impression of the project? The project is well managed with proper public outreach. The vast majority of the project is complete and requires minimal oversight.
Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please give purpose and results. Routine communications have been limited to Restoration Advisory Board Meetings and occasional informal updates from USACE. DOEE believes this level of communication is consistent with the Site's progress through the cleanup process. DOEE has not performed any inspections at the Site.
Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results of the responses. No complaints, violations, or other incidents related to the Site have been reported to DOEE.
Do you feel well informed about the Site's activities and progress? USACE has kept DOEE and the public well-informed about Site activities and progress.
Do you have any comments, suggestions, or recommendations regarding the Site's management or operation? DOEE has no additional comments, suggestions, or recommendations at this time.

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name: Joseph Vitello	Date: June 28, 2023
Title: Remedial Project Manager	
Organization: Superfund & Emergency Management Division, USEPA Region III	

What is your overall impression of the project?

Thorough. EPA participates in tech review of USACE sampling activities and the post-RA sampling has gone through thorough evaluation to be protective of human health. Comfortable with decisions that were made, and how conclusions have been made.

Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please give purpose and results.

Yes.

Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results of the responses.

Not with respect to the areas included in this FYR.

Do you feel well informed about the Site's activities and progress?

Yes. Kept informed annually and included in document reviews.

Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

No. The USACE has been transparent with information. Participate in RAB meetings, so at no time have felt like USACE should be doing something different. Perhaps increasing communications in between RAB meetings may be helpful to keep stakeholders informed. FYI tech support branch needs about 45 days for review.

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name:	Date: 12 June 2023
Title: Senior Associate General Counsel	
Organization: American University	

What is your overall impression of the project?

Overall, positive. But USACE is returning to LOT 18 to continue MEC removal. Understand the constraints that have slowed progress, but progress is being made.

Have there been routine communications or activities (site visits, inspections, reporting activities, etc.) conducted by your office regarding the Site? If so, please give purpose and results.

Within the last 5 years, Dan Nichols was in charge of day-today, but it was very localized for Glenbrook Road properties.

Have there been any complaints, violations, or other incidents related to the Site requiring a response by your office? If so, please give details of the events and results of the responses.

If so, please give details of the events and results of the responses. None that can be recalled.

Do you feel well informed about the Site's activities and progress?

Yes.

Do you have any comments, suggestions, or recommendations regarding the Site's management or operation?

No.

What effects have site operations had on the property and/or surrounding community? AU made an effort to allow USACE to stage on AU-owned property to limit impacts to community. Community may still complain about impacts.
Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? Cannot recall anything specific, but USACE worked with AU police for security procedures.

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name: RAB Member Date: June 27, 2023
Address (optional):
Phone number or email address (optional):
Do you feel well informed about the Site's activities and progress? Yes. The briefings and discussion at RAB meetings, the project website, and general community outreach have provided sufficient information.
Do you receive the annual 3Rs (Recognize, Retreat, Report) Program information and fact sheets? Yes
What is your overall impression of the project? Favorable
What effects have site operations had on the property and/or surrounding community? The clean-up has resolved environmental questions, enhanced values, and left properties as they were found apart from the major tear-downs.
Are you aware of any community concerns regarding the Site or its operation and administration? No
Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? No, other than the strange trespassing by an activist at the trailers several years ago.

Do you have any comments, suggestions, or recommendations regarding the Site's management or operation? No

Spring Valley FUDS

Five-Year Review Interview Questionnaire

Name: RAB member 2 Date: 6/28/2023
Address (optional):
Phone number or email address (optional):
Do you feel well informed about the Site's activities and progress? yes
Do you receive the annual 3Rs (Recognize, Retreat, Report) Program information and fact sheets? yes
What is your overall impression of the project? I think this was was necessary and conducted well. I can't say the same about the earlier removal actions through the Spring Valley / American University Park area.
What effects have site operations had on the property and/or surrounding community? I think negative effects have been avoided as much as possible.
Are you aware of any community concerns regarding the Site or its operation and administration? No
Are you aware of any events, incidents, or activities at the Site such as vandalism, trespassing, or emergency responses from local authorities? No

Do you have any comments, suggestions, or recommendations regarding the Site's management or operation? I think this part of the overall Spring Valley FUDS was well executed.

APPENDIX D – PUBLIC NOTICE

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THE WASHINGTON POST

By Nicole Morton-McFadden

Nicole Morton-McFadden
MANAGER, FINANCE

SPRING VALLEY FORMERLY USED DEFENSE SITE NOTIFICATION OF FIVE-YEAR REVIEW This Public Notice is to inform the community of the U.S. Army Corps of Engineers' (USACE) intent to conduct the 2023 Five-Year Review (FYR) for the Spring Valley Formerly Used Defense Site (SVFUDS), located in the northwest section of Washington, D.C. Specifically, the FYR will evaluate the Munitions Response Sites (MRS) Burial Pits/Field Test Areas. The American University (AU) campus comprises a portion of the MRS along with the Dalecarlia Woods area located on the western edge of the SVFUDS, which is zoned for Federal or public use. It should be noted that the property located at 4825 Glenbrook Road, as well as the surface water and groundwater at that site, are not a part of this FYR. The purpose of the FYR is to determine if the remedy selected in the Decision Document (DD) for the above listed MRS is, and will continue to be, protective of human health and the environment. The Army is required to evaluate the protectiveness of these remedies at least every five years in order to ensure selected remedies continue to meet acceptance standards for hazardous substances, pollutants or contaminants remaining in the soil. Work Previously Completed: The Remedial Investigation (RI) Report, prepared by USACE in 2015, determined that 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), potentially remain within the SVFUDS. Because of this potential risk, the DD, signed 15 June 2017, called for the Excavation and Off-site Disposal of contaminated soil to address unacceptable risk, which was completed in 2022. Additionally, to address the unacceptable MEC hazards, the selected remedy is Investigation and Removal of MEC and Institutional Control (IC) Implementation of 3Rs Explosives Safety Education. Soil is the only medium affected. The MEC removal work is on-going and the ICs remain in place. Contact Information: Scheduled date of completion of this 2023 SVFUDS Burial Pits/Field Test Areas FYR anticipated to be 31 December 2023. If you have any questions or comments about the FYR, please contact the U. S. Army Corps of Engineers, 2 Hopkins Plaza, Baltimore, MD 21201. USACE welcomes your comments and questions. The point of contact for further information is the USACE-Baltimore Public Affairs Office, nab-pao@usace.army.mil.

SPRING VALLEY
FORMERLY USED DEFENSE SITE
NOTIFICATION OF FIVE-YEAR REVIEW

US Army Corps of Engineers®

This Public Notice is to inform the community of the U. S. Army Corps of Engineers' (USACE) intent to conduct the 2023 Five-Year Review (FYR) for the Spring Valley Formerly Used Defense Site (SVFUDS). Specifically, the FYR will evaluate the Munitions Response Sites (MRS) Burial Pits/Field Test Areas. The American University (AU) campus comprises a portion of the MRS along with the Dalecarlia Woods area located on the western edge of the SVFUDS, which is zoned for Federal or public use. It should be noted that the property located at 4825 Glenbrook Road, as well as the surface water and groundwater at that site, are not a part of this Five-Year Review.

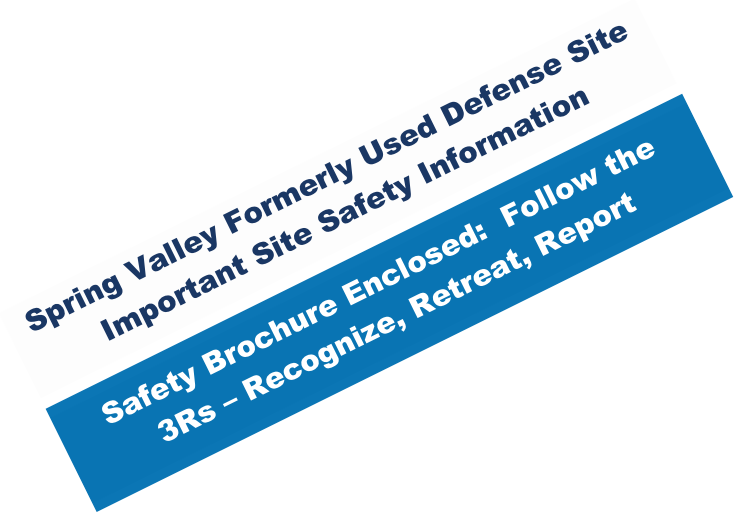
The purpose of the FYR is to determine if the remedy selected in the Decision Document (DD) for the above listed MRS is, and will continue to be, protective of human health and the environment. The Army is required to evaluate the protectiveness of these remedies at least every five years in order to ensure selected remedies continue to meet acceptance standards for hazardous substances, pollutants or contaminants remaining in the soil.

Work Previously Completed: The Remedial Investigation (RI) Report, prepared by USACE in 2015, determined that 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), potentially remain within the SVFUDS. Because of this potential risk, the DD, signed 15 June 2017, called for the Excavation and Off-site Disposal of contaminated soil to address unacceptable risk, which was completed in 2022. Additionally, to address the unacceptable MEC hazards, the selected remedy is Investigation and Removal of MEC and Institutional Control (IC) Implementation of 3Rs Explosives Safety Education. Soil is the only medium affected. The MEC removal work is on-going and the ICs remain in place.

Contact Information: Scheduled date of completion of this 2023 SVFUDS Burial Pits/Field Test Areas FYR anticipated to be 31 December 2023. If you have any questions or comments about the FYR, please contact the U. S. Army Corps of Engineers, 2 Hopkins Plaza, Baltimore, MD 21201. USACE welcomes your comments and questions. The point of contact for further information is the S CE-Baltimore Public ffairs ffice, nab-pao usace.arm .mil.

APPENDIX E – LUC INFORMATION PACKET

Department of the Army
U.S. Army Corps of Engineers, Baltimore District
ATTN: Corporate Communication Office, Suite 10-F
2 Hopkins Plaza
Baltimore, MD 21201



DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because your home is within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site (SVFUDS). During World War I (WWI) (1917-1921), the U.S. Army and the Bureau of Mines operated an experiment station at American University (AU) and in part of the Spring Valley (SV) neighborhood to research and test chemical agents, equipment and munitions. A map of the SVFUDS site is attached.

Decades later, in January 1993, a contractor doing utility work encountered buried WWI munitions. Since that time, the U.S. Army Corps of Engineers (USACE), Baltimore District has worked to determine the nature and extent of potential buried munitions and chemical contamination leftover from past WW I military use and carried out various cleanup activities. Considerable investigation and cleanup activities have already occurred at AU and in the SV neighborhood.

USACE has held regular public meetings and established a Restoration Advisory Board (RAB) to gather public input and disseminate information regarding SVFUDS activities. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

- The site has undergone numerous munition and contaminated soil investigations and removal actions, health studies, soil and groundwater sampling, and a pilot study to examine the most appropriate detection technology to use in SV.
- The completed investigation and remediation work, which occurred since 1993 includes:
  - 1993: Buried WWI munitions removed from utility trench on 52nd Court. Operation Safe Removal conducted. Historical investigation began.
  - 2000: Soil investigation and cleanup at AU.
  - 2000-2011: Munitions Investigation conducted at 90 properties.
  - 2001-2016: Site-wide arsenic sampling at 1,600 SV properties/lots. Cleanup of all 177 properties where elevated levels of arsenic were detected in the soil.
  - 2004-2015: Comprehensive Groundwater Study conducted.
  - 2005: Centers for Disease Control and Prevention finalized two health risk studies.
  - 2007: Johns Hopkins conducted heath study. (Follow on health study conducted in 2011-13). Both studies found SV residents' health very good overall.
  - 2012: 4825 Glenbrook Rd. cleanup resumed (completed in 2021).
  - 2017: Implementation of Site-Wide Remedial Action (RA) begins (completion expected in 2024).

A summary of the most significant work that USACE has done over this 30+ year period is available on the USACE Spring Valley website at: www.nab.usace.army.mil/Home/Spring-Valley.

This work resulted in a Site-Wide Decision Document (DD), approved by the regulatory partners (the Environmental Protection Agency (EPA), and the District Department of Energy and Environment (DOEE)) and signed in June 2017 by USACE Headquarters, which describes additional actions USACE will take at the SVFUDS.

- The 2017 DD identified four areas that should undergo clean up activity as part of a final RA. These areas are where the Army focused their WWI munitions experiments. The RA activities include using Advance Geophysical Classification instruments to survey for potentially buried munitions. All property owners involved in this effort within the four identified RA areas have been notified during the planning process.
- As previously mentioned, USACE completed cleanup actions at these four areas in late 2022. A map of the RA area is attached.

At this time, there are no known munitions hazards on any particular property, but we are actively addressing the areas where historical evidence indicates a higher potential of munitions hazards. However, there is a need to be aware about safety and proper response should you encounter a munition on your property. It is important to ensure residents are familiar with the history of the site and what actions to take in the event they were to come across a munitions item or some other unknown metallic item that could be a munitions item.

Action Requested

Although the cleanup has been as thorough as possible, USACE recognizes that, though unlikely, it may be conceivable that a WWI munition could be encountered. It is possible for a munition to remain on-site, for example, if it is under a driveway or patio, or entwined in tree roots.

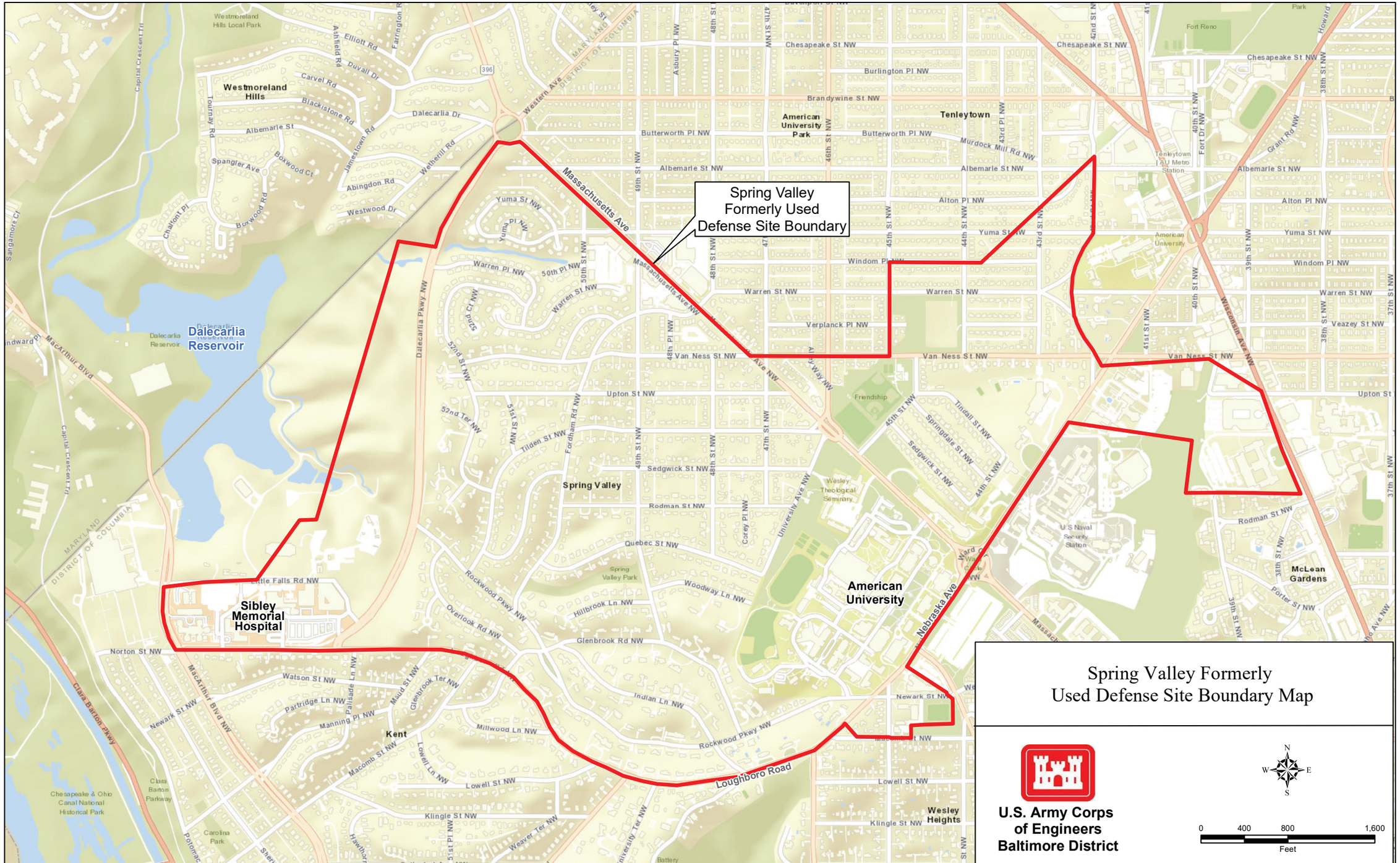
Therefore, with an abundance of caution and as part of our commitment to both public safety and transparency, we are distributing this notice and attachments to all residences within the SVFUDS.

- If you conduct any construction or landscaping project, including home additions/ improvements, swimming pool construction, extensive landscaping and/or tree-planting or removal, be sure to follow the **3Rs** of munitions safety - **R**ecognize, **R**etreat, and **R**eport.
- Enclosed is a site-related safety brochure titled ***3Rs Safety Guide*** with more information that will be useful to you and your contractors. Please review the brochure and keep it in an accessible location in your home for later reference.

If you are interested in learning more about the SVFUDS or in participating in our processes, we invite you to participate in our SVFUDS RAB meetings. The primary purpose of the RAB is to involve the local community in the decision making process. The RAB acts in an advisory capacity to assist the government agencies engaged in the investigation and cleanup of the SVFUDS. The RAB is comprised of Spring Valley community stakeholders as well as representatives from USACE, EPA and DOEE. Due to COVID-19, RAB meetings are temporarily being held virtually via Webex and are open to the public. This information is posted on the Spring Valley website if you are interested in attending.

USACE appreciates your time in learning about munitions safety and participating in the SVFUDS cleanup process. **If you have any questions,** please contact the Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.

Enclosures:
Attachment 1: SVFUDS Boundary Map
Attachment 2: *3Rs Safety Guide* Brochure


Spring Valley
Formerly Used
Defense Site Boundary
Spring Valley Formerly
Used Defense Site Boundary Map
U.S. Army Corps
of Engineers
Baltimore District
0 400 800 1,600
Feet
Dalecarlia
Reservoir
Sibley
Memorial
Hospital
American
University
Spring Valley
Kent
Wesley
Heights
Tenleytown
Westmoreland
Hills
Massachusetts Ave
Loughboro Road
Nebraska Ave
MacArthur Blvd
Dalecarlia Pkwy NW
Wisconsin Ave NW
Rockwood Pkwy NW
Little Falls Rd NW
Chesapeake & Ohio
Canal National
Historical Park
Clara
Barton
Parkway
McLean
Gardens

BACKGROUND

The **Spring Valley Formerly Used Defense Site** comprises 661 acres in northwest Washington, D.C. This is largely a residential area; however, Dalecarlia Woods is located on the western edge, and a large portion of the site is occupied by American University. During World War I, the U.S. Government established the American University Experiment Station to investigate the testing, production, and effects of noxious gases, antidotes and protective masks. These experimental activities were conducted on university property and in the open area which eventually became the Spring Valley neighborhood. For these reasons unexploded ordnance and/or chemical weapons may be encountered with in the Spring Valley neighborhood.

Since 1993, the **U.S. Army Corps of Engineers** has been conducting investigations, removal actions, health studies, soil sampling, a pilot study, and evaluations of long-term cleanup remedies. The final cleanup for the site began in 2018 and is expected to conclude in 2024.

Weathering may make munitions, which may be on the surface, buried, or whole or in parts, difficult to recognize. **Even old munitions can still kill.** Residents and others should never touch, move, or disturb anything encountered that may be a munition or part of one. All munitions should be considered dangerous, regardless of how long they have been in the environment or how frequently they have been handled.

Help **protect yourself, your family, and your community** by learning and following the 3Rs of Explosives Safety.

IF YOU ENCOUNTER A MUNITION CALL 911

LEARN MORE

For additional information regarding the Spring Valley Formerly Used Defense Site contact the U.S. Army Corps of Engineers, Baltimore District Public Affairs Office or visit our website.

410-962-2809

NAB-PAO@USACE.ARMY.MIL

https://www.nab.usace.army.mil/Spring-Valley/

US Army Corps of Engineers®
Baltimore District

Spring Valley

Formerly Used Defense Site

WASHINGTON, D.C.

3Rs SAFETY GUIDE

RECOGNIZE

RETREAT

REPORT

Help **protect yourself, your family, and your community** by learning and following the 3Rs of Explosives Safety.

Recognize when you may have encountered a munition

Do not touch, move or disturb it. Carefully leave the area.

Notify the local police. Call 911.

RECOGNIZE

Recognizing when you may have encountered a munition is the most important step in reducing the risk of injury or death. Munitions may be encountered during residential construction projects. Munitions may be easy or hard to identify. Many areas, surfaces and utensils easily attract germs and bacteria when they are not cleaned properly and regularly.

Top left: 75 mm Projectile
Bottom left: 3 in. Stokes Mortar
Right: Livens Projectile

Munitions come in many sizes, shapes and colors. Some may look like bullets or bombs while others look like pipes, small cans or even a car muffler. Whether whole or in parts, new or old, shiny or rusty, munitions can still explode. The easiest way to avoid injury or death is to follow the 3Rs.

RETREAT

Avoid death or injury by recognizing that you may have encountered a munition and promptly retreating from the area.

If you encounter what you believe is a munition, do not touch, move or disturb it. Instead, immediately
and carefully leave the area by retracing your steps—going out the way you entered.

Once safely away from the munition, mark the location or path (e.g., with a piece of clothing) so munitions response personnel can find the munition.

To avoid the risk of injury or death:

- Never move, touch or disturb a munition or suspect munition
- Be aware that munitions do not become safer with age, in fact they may become more dangerous
- Don't be tempted to take or keep a munition as a souvenir
- Notify contractors working in your yard that munitions may be encountered and share the 3Rs information

REPORT

Protect yourself, your family, friends, community, and workers/contractors by immediately reporting munitions or suspected munitions to the police.

Help us by providing as much information as possible about what you saw and where you saw it. This will help the police and military or civilian explosive ordnance disposal personnel find, evaluate and address the situation.

If you believe you may have encountered a munition, call the police and report:

- The area where you encountered it.
- Its general description
- do not approach it
- do not touch, move or disturb it.

When possible, provide:

- Its estimated size
- Its shape
- Any visible markings,
- including coloring

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **American University** is within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

Enclosed is a brochure entitled ***3Rs Safety Guide*** that highlights safety procedures for personnel within your institution. Additionally, we ask that you take the time to view the four-minute-long ***Spring Valley Munitions Safety Video***. The 3 Rs – Recognize, Retreat, and Report – encompass the actions to take if encountering an unknown item at your location. The video, as well electronic versions of the site boundaries map and the *3Rs Safety Guide* are available on our website. Any item found during construction projects could be a munition and/or contain a warfare agent. It is possible for a munition to remain on-site, for example, under a road or parking lot, or entwined in tree roots. Therefore, if the **District of Columbia** starts any construction projects that involves excavating, the enclosed safety information and video will be useful to you and your contractors. If you would like to distribute the 3Rs safety brochure, you may reproduce the PDF of the 3Rs safety brochure.

Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **District of Columbia Department of Energy and Environment** is a regulatory partner for the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

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Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **U.S. Environmental Protection Agency, Region III** is a regulatory partner for the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

Enclosed is a brochure entitled ***3Rs Safety Guide*** that highlights safety procedures for personnel within your institution. Additionally, we ask that you take the time to view the four-minute-long ***Spring Valley Munitions Safety Video***. The 3 Rs – Recognize, Retreat, and Report – encompass the actions to take if encountering an unknown item at your location. The video, as well electronic versions of the site boundaries map and the *3Rs Safety Guide* are available on our website. Any item found during construction projects could be a munition and/or contain a warfare agent. It is possible for a munition to remain on-site, for example, under a road or parking lot, or entwined in tree roots. Therefore, if the **District of Columbia** starts any construction projects that involves excavating, the enclosed safety information and video will be useful to you and your contractors. If you would like to distribute the 3Rs safety brochure, you may reproduce the PDF of the 3Rs safety brochure.

Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **National Park Service** manages property within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

Enclosed is a brochure entitled ***3Rs Safety Guide*** and a CD containing the four-minute-long ***Spring Valley Munitions Safety Video*** for your reference that highlights safety procedures for personnel within your institution. The 3 Rs – Recognize, Retreat, and Report – encompass the actions to take if encountering an unknown item at your location. Also included on the CD with the MPEG-4 format safety video file are electronic versions of the site boundaries map and the *3Rs Safety Guide*. Any item found during construction projects could be a munition and/or contain a warfare agent. It is possible for a munition to remain on-site, for example, under a road or parking lot, or entwined in tree roots. Therefore, if the **National Park Service** starts any construction projects and extensive landscaping that involves excavating, the enclosed safety information and video will be useful to you and your contractors. Please review the brochure and video and keep the CD in an accessible location in your office. If you would like to distribute the 3Rs safety brochure, you may reproduce the PDF of the 3Rs safety brochure provided on the enclosed CD. The safety video, along with other site-related information, is provided online at:
http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
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2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **Sibley Memorial Hospital** is within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

Enclosed is a brochure entitled ***3Rs Safety Guide*** that highlights safety procedures for personnel within your institution. Additionally, we ask that you take the time to view the four-minute-long ***Spring Valley Munitions Safety Video***. The 3 Rs – Recognize, Retreat, and Report – encompass the actions to take if encountering an unknown item at your location. The video, as well electronic versions of the site boundaries map and the *3Rs Safety Guide* are available on our website. Any item found during construction projects could be a munition and/or contain a warfare agent. It is possible for a munition to remain on-site, for example, under a road or parking lot, or entwined in tree roots. Therefore, if the **District of Columbia** starts any construction projects that involves excavating, the enclosed safety information and video will be useful to you and your contractors. If you would like to distribute the 3Rs safety brochure, you may reproduce the PDF of the 3Rs safety brochure.

Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2022

You are receiving this notice because the **Washington Aqueduct** is within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

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Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

DEPARTMENT OF THE ARMY
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2 Hopkins Plaza
BALTIMORE, MD 21201

Summer 2023

You are receiving this notice because the **Wesley Theological Seminary** is within the boundaries of what is referred to as the Spring Valley Formerly Used Defense Site. In the World War I timeframe, parts of the Spring Valley neighborhood and nearby institutions were temporarily used by the Army as part of the American University Experiment Station and as part of Camp Leach for research, training of troops, and testing of chemical agents, equipment, and munitions. An enclosed map shows the boundaries of the Spring Valley Formerly Used Defense Site. Since the discovery of buried munitions in January 1993 by a contractor doing utility work, the U.S. Army Corps of Engineers, Baltimore District has worked to determine the nature and extent of potentially buried munitions leftover from this past military use as well as chemical contamination and carried out various cleanup activities. This work has resulted in a site-wide decision document, signed in June 2017, which describes additional actions the U.S. Army Corps of Engineers, Baltimore District will take at four areas in the Spring Valley Formerly Used Defense Site.

The Army Corps is currently carrying out cleanup activities and complete cleanup actions are expected at these areas in 2024. We appreciate your interest, understanding, and participation through these years of munitions/environmental activities.

Enclosed is a brochure entitled ***3Rs Safety Guide*** that highlights safety procedures for personnel within your institution. Additionally, we ask that you take the time to view the four-minute-long ***Spring Valley Munitions Safety Video***. The 3 Rs – Recognize, Retreat, and Report – encompass the actions to take if encountering an unknown item at your location. The video, as well electronic versions of the site boundaries map and the *3Rs Safety Guide* are available on our website. Any item found during construction projects could be a munition and/or contain a warfare agent. It is possible for a munition to remain on-site, for example, under a road or parking lot, or entwined in tree roots. Therefore, if the **District of Columbia** starts any construction projects that involves excavating, the enclosed safety information and video will be useful to you and your contractors. If you would like to distribute the 3Rs safety brochure, you may reproduce the PDF of the 3Rs safety brochure.

Once again, the safety video, along with other site-related information, is provided online at http://www.nab.usace.army.mil/Home/Spring-Valley/.

The U.S. Army Corps of Engineers, Baltimore District appreciates your time in learning about munitions safety and participating in the Spring Valley Formerly Used Defense Site cleanup process. If you have any questions, please contact the **Baltimore District Public Affairs Office at NAB-PAO@usace.army.mil.**

Enclosures: *3Rs Safety Guide* brochure
Spring Valley Formerly Used Defense Site Boundary Map
Spring Valley Munitions Safety Video

APPENDIX F – FIGURES

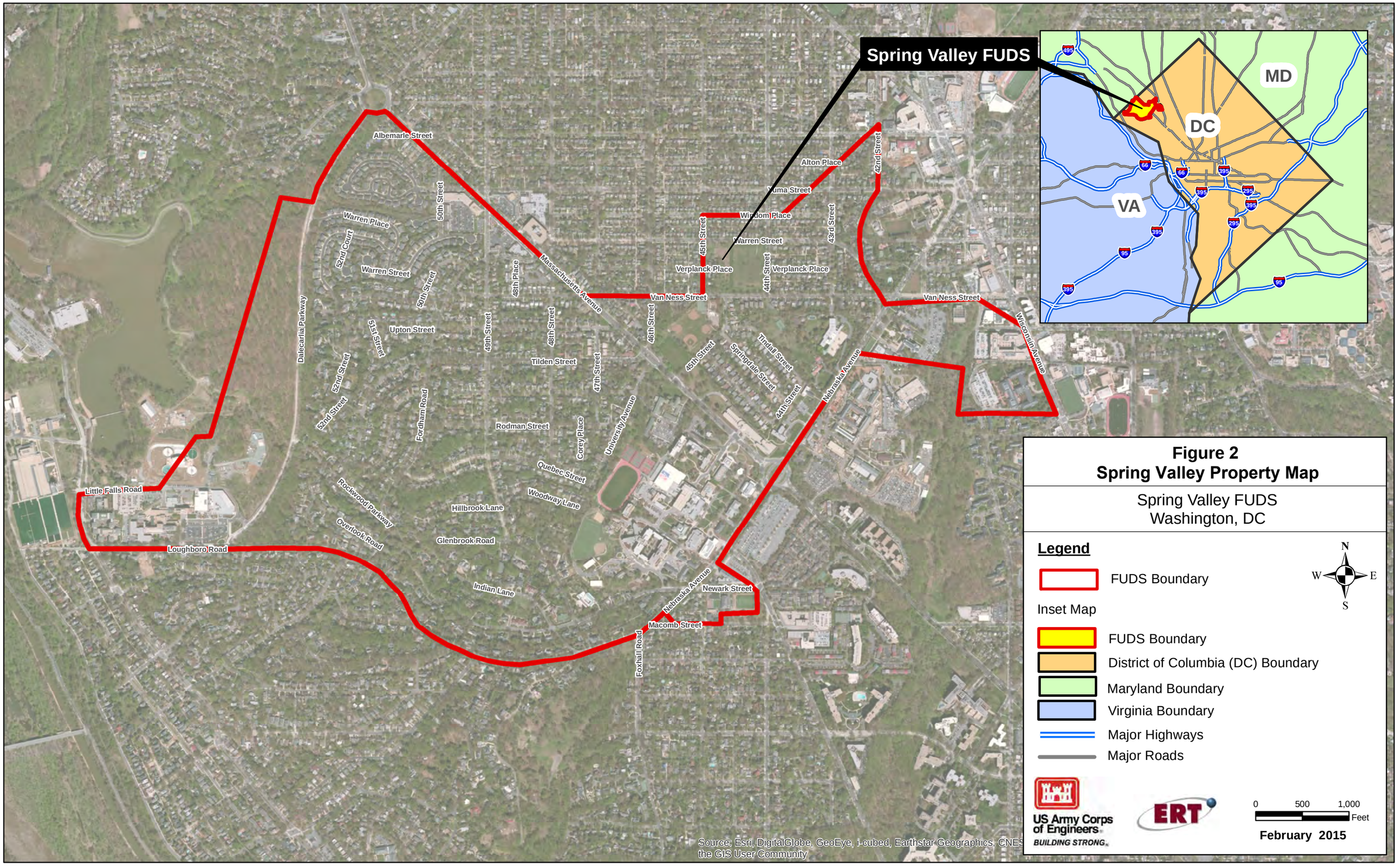


Figure 2
Spring Valley Property Map

Spring Valley FUDS
Washington, DC

Legend

FUDS Boundary

N
W E
S

Inset Map

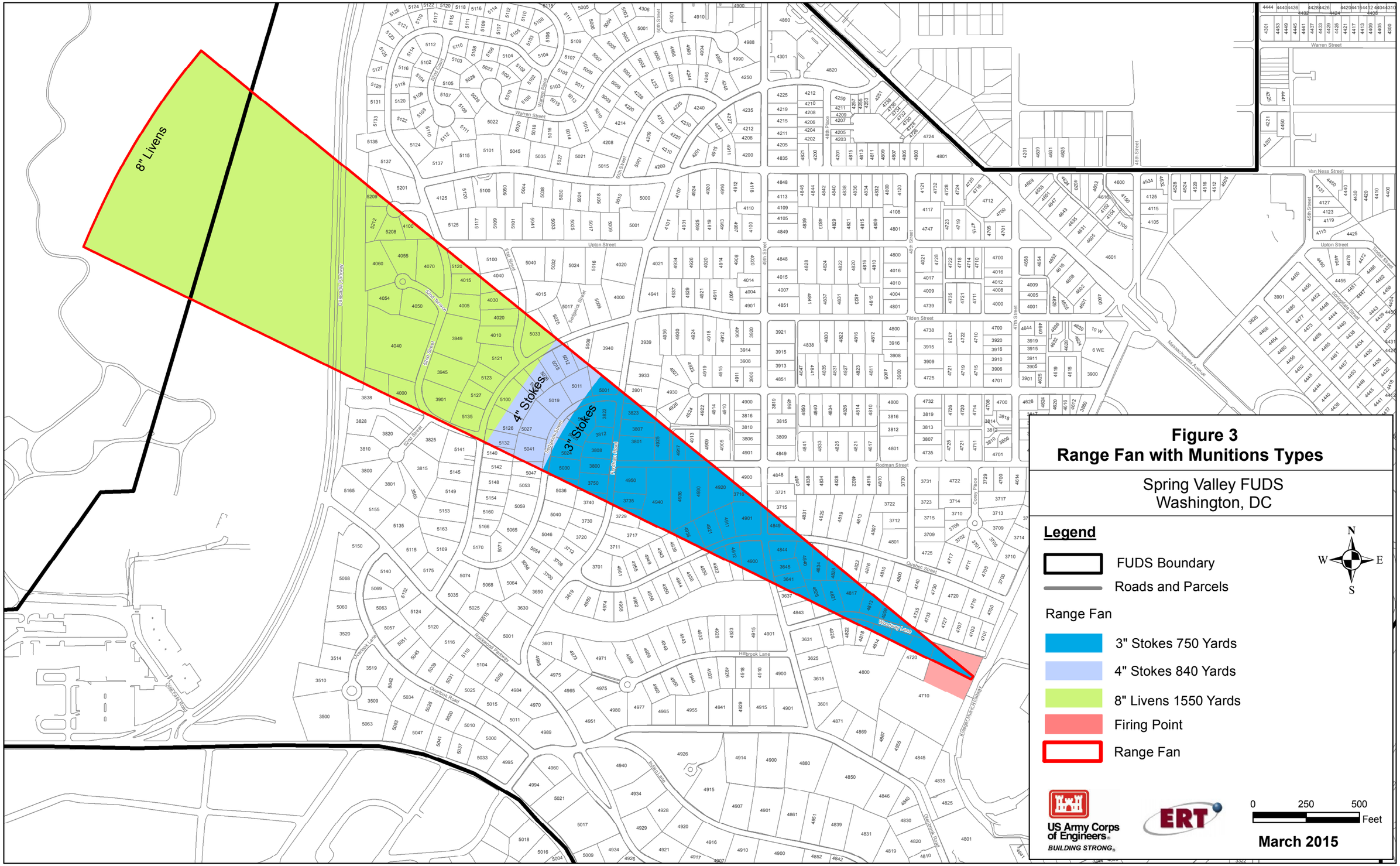
FUDS Boundary
District of Columbia (DC) Boundary
Maryland Boundary
Virginia Boundary
Major Highways
Major Roads

US Army Corps of Engineers
BUILDING STRONG

ERT

0 500 1,000
Feet

February 2015


8" Livens
4" Stokes
3" Stokes
Figure 3
Range Fan with Munitions Types
Spring Valley FUDS
Washington, DC
Legend
FUDS Boundary
Roads and Parcels
Range Fan
3" Stokes 750 Yards
4" Stokes 840 Yards
8" Livens 1550 Yards
Firing Point
Range Fan
N
W
E
S
US Army Corps of Engineers
BUILDING STRONG
ERT
0
250
500
Feet
March 2015

POI 1 - Circular (Sedgwick) Trenches
POI 2 - Possible Pit
POI 3 - Small Crater Scars
POI 4 - Possible Pit
POI 5 - Possible Pit
POI 6 - Possible Target or Test Site
POI 7 - Possible Test Area
POI 8 - Possible Target or Test Site
POI 9 - Possible Firing or Observation Stalls
POI 10 - Possible Target or Test Site
POI 11 - Scattered Ground Scars
POI 12 - Possible Graded Area
POI 13 - Circular Trenches
POI 14 - Disposal Pit
POI 15 - Ground Scar
POI 16 - Chemical Persistency Area
POI 17 - Possible Pit
POI 18 - Small Crater Scars
POI 19 - Old Mustard Field
POI 20 - Ground Scar
POI 21 - Capt. Burrell Bomb Pit
POI 22 - Shell Pit
POI 23 - Shell Pit
POI 24 - Probable Pit
POI 25 - Possible Trenches
POI 26 - Small Crater Scars
POI 27 - Probable Trench or Ditch
POI 28 - Probable Trench or Ditch
POI 29 - Ground Scar
POI 30 through 36 - Training Trenches
POI 37 - Mill Creek
POI 38 - Bradley Field / Major Tolman's Field
POI 39 - Static Test Fire Area
POI 40 - Ohio Hall
POI 41 - History Building
POI 42 - Physiological Laboratory
POI 43 - Gun Pit
POI 44 - Chemical Research Laboratory
POI 45 - Explosives Laboratory
POI 46 - Canister Laboratory
POI 47 - Research Laboratory
POI 48 - Dispersoid Laboratory
POI 49 - Pharmacological Laboratory
POI 50 - Gun Pit
POI 51 - Fire and Flame Laboratory
POI 52 - Electrolytic Laboratory
POI 53 - Baker Valley
POI AU - American University

Figure 4
Points of Interest (POIs)

Spring Valley FUDS
Washington, DC

Legend

- Point of Interest (POI)
- FUDS Boundary
- AUES and Camp Leach Buildings in 1918
- Roads and Parcels

(See List of POIs in Top Left Corner)

N
W E
S

US Army Corps of Engineers
BUILDING STRONG

ERT

0 500 1,000 Feet

March 2015

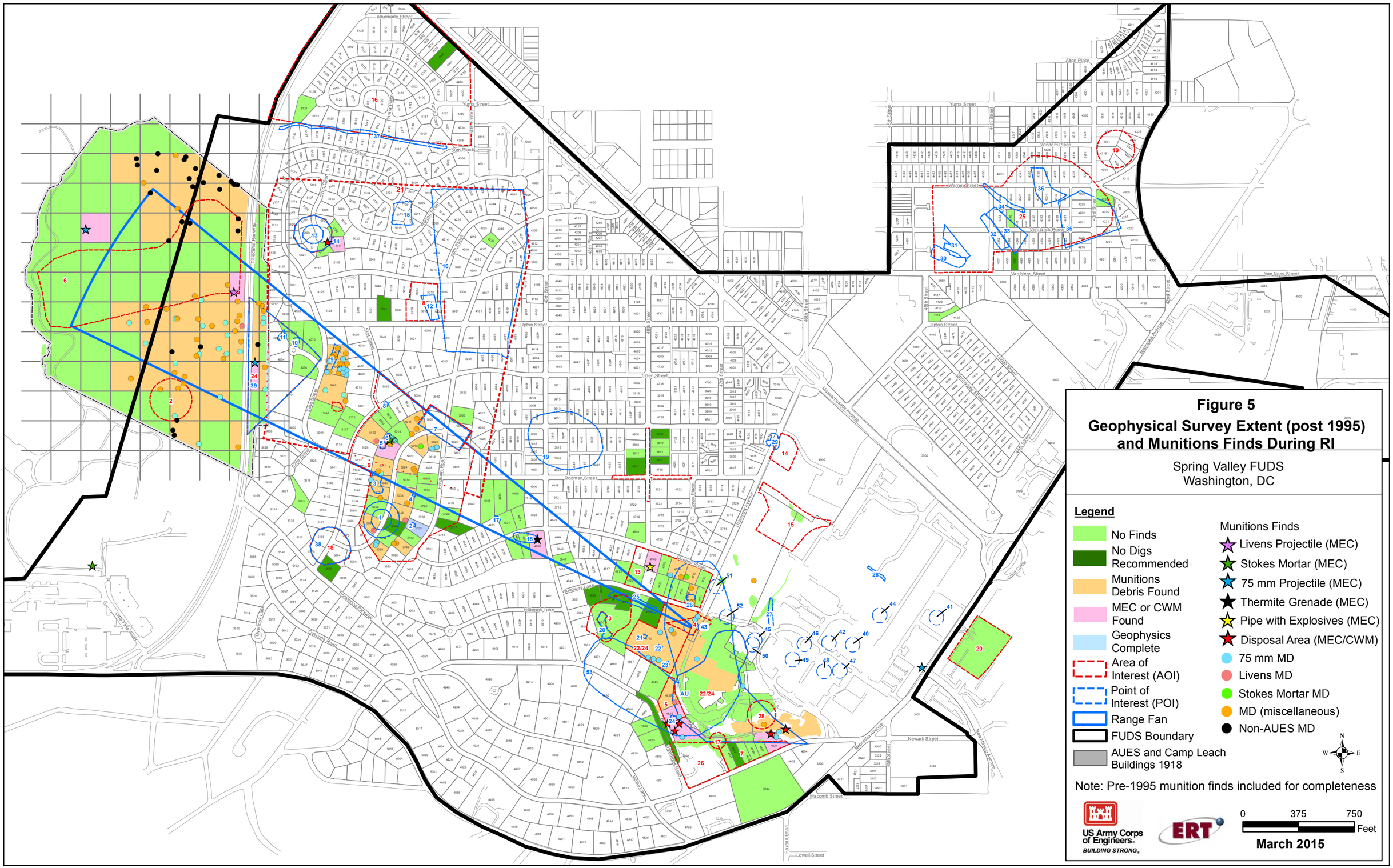


Figure 5
Geophysical Survey Extent (post 1995) and Munitions Finds During RI

Spring Valley FUDS
Washington, DC

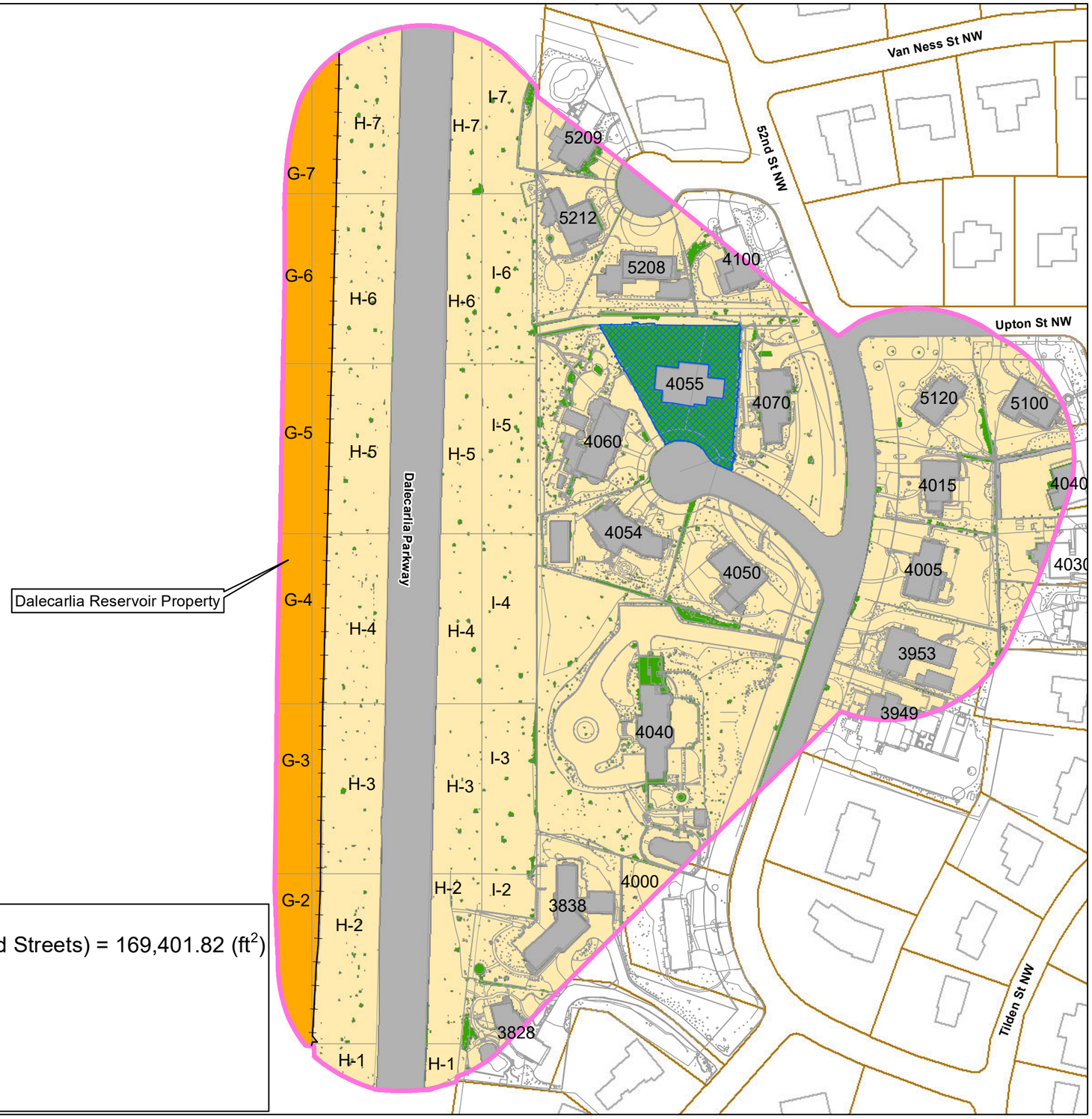
Figure 6
Static Test Fire Area West Accessible MPV and Analog Coverage during RA

Legend

- Static Test Fire Area West
- Parcels
- Refused ROE
- Full Coverage Mag and Dig
- Accessible/No Coverage
- Inaccessible Areas
- MPV Coverage
- Property Features
- Fence

0 65 130 260 Feet

N W E S



Static Test Fire Area Buffer Zone = 738,357.13 square feet (ft^2)
Inaccessible Areas (Includes Trees, Buildings, Saturation Buffer, and Streets) = 169,401.82 (ft^2)
Property - Inaccessible Area = 568,955.31 (ft^2)
Accessible/No Coverage = 28,973.48 (ft^2)
MPV Coverage Survey Area = 539,981.83 (ft^2)
MPV Coverage East of Dalecarlia Reservoir Fence = 94.3%
Analog Coverage Survey Area = 60,650.96 (ft^2)
Remedial Survey Coverage = 94.9%

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Figure 7
Static Test Fire Area West Intrusive Investigation Results During RA

Legend

- Static Test Fire Area West
- Parcels
- Property Features
- Fence

Current Remedial Action Munitions Finds

- 75mm (MD)
- Unidentifiable Fragmentation (MD)
- Fuze (MD)

0 65 130 260 Feet

N W E S

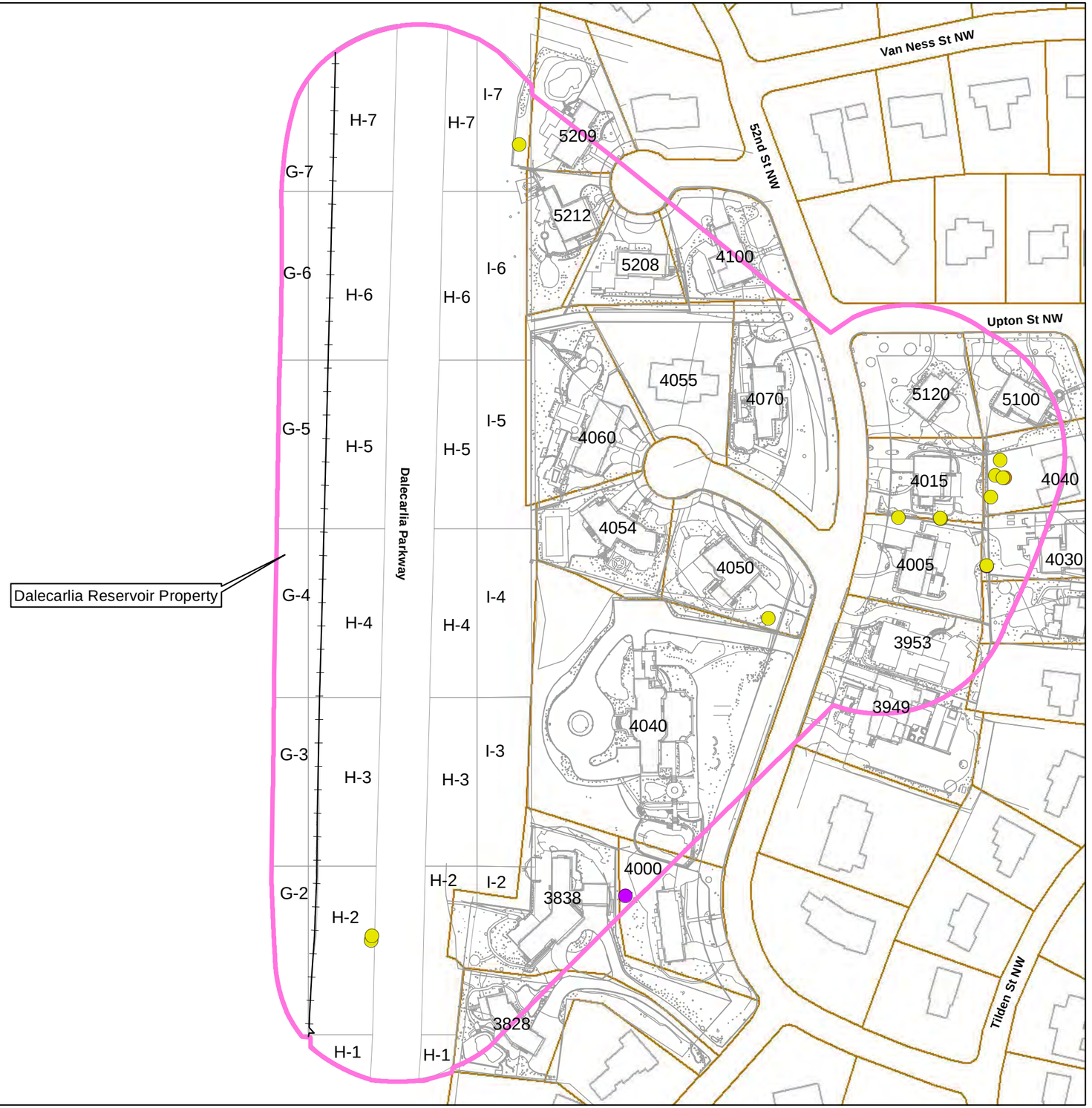

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Figure 8
Static Test Fire Area East
Accessible MPV Coverage
During RA

Legend

- Static Test Fire Area East
- Parcels
- Accessible/No Coverage
- Inaccessible Areas
- MPV Coverage
- Property Features

0 25 50 100 Feet

N W E S

Tilden St. NW

Sedgwick St. NW

Quebec St. NW

5047 5030 5148 5053 5036 5154 3740 5059 5160 5040 5166 5065 3730 5046 3720 5170 5071 3712 5054 3706 5058 5068 3700 5064 3650

Static Test Fire Area Buffer Zone = 240,240.41 square feet (ft^2)
Inaccessible Areas (Includes Trees, Buildings, Saturation Buffer, and Streets) = 64,326.99 (ft^2)
Property - Inaccessible Area = 175,913.42 (ft^2)
Accessible/No Coverage = 9,436.32 (ft^2)
MPV Coverage Survey Area = 166,477.1 (ft^2)
Coverage = 94.6%

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Figure 9

Static Test Fire Area East Intrusive Investigation Results

Legend

- Static Test Fire Area East
- Parcels
- Property Features

Current Remedial Action Munitions Finds

- Cannonball (MEC)
- Stokes (MD)
- 75mm (MD)
- Unidentifiable Fragmentation (MD)
- Livens Projectile (MD)
- Nose Pipe (MD)

0 25 50 100 Feet

N W E S

Tilden St. NW

Sedgwick St. NW

Quebec St. NW

5047 5030 5148 5053 5036 5154 3740 5059 5160 5040 3730 5166 5065 5046 3720 5170 5071 3712 5054 3706 5058 3700 5068 5064 3650

FILE: Y:\Spring_Valley\MXD\2017_Effort\Site_Wide_RA_2022\Static_Test_Fire_Area_East_Intrusive_Investigation.mxd 4:39:09 PM 10/7/2022 ricksc

Figure 10
Function Test Range Impact Area Accessible MPV Coverage During RA

Legend

- Function Test Range Impact Area
- Parcels
- Accessible/No Coverage
- Inaccessible Areas
- MPV Coverage
- Property Features

0 45 90 180 Feet

N W E S

52nd St. NW
51st St. NW
Fordham Rd. NW
Sedgwick St. NW
4030
4005
4020
3953
4010
5033
3949
5121
5012
5018
3945
5123
5026
5032
5001
5011
3901
5127
5100
5019
5135
5126
5027
3822
5010
3823
3807
5020
3812
5132
3801
5041
5024
3808
5140
5047
5030
3800
5036
3750
3740

Function Test Range/Impact Area = 523,794.18 square feet (ft^2)
Inaccessible Areas (Includes Trees, Buildings, Saturation Buffer, and Streets) = 153,094.26 (ft^2)
Property - Inaccessible Area = 370,699.92 (ft^2)
Accessible/No Coverage (Green) = 21,081.12 (ft^2)
MPV Coverage Survey Area = 349,618.8 (ft^2)
Coverage = 94.3%

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Figure 11
Function Test Range Impact Area Intrusive Investigation Results During RA

Legend

- Function Test Range Impact Area
- Parcels
- Property Features

Current Remedial Action Munitions Finds

- Liquid Filled Livens Projectile (MEC)
- Stokes (MD)
- 75mm (MD)
- Unidentifiable Fragmentation (MD)
- Livens Projectile (MD)

0 45 90 180 Feet

N W E S

52nd St. NW
51st St. NW
Fordham Rd. NW
Tilden St. NW
Sedgwick St. NW

4030 4005 4020 3953 4010 3949 5121 3945 5123 3901 5127 5135 5126 5132 5140 5041 5047 5100 5027 5033 5006 5012 5018 5026 5032 5001 5011 5019 3822 5010 3823 3807 5020 3812 5024 3808 3801 5030 3800 5036 3750 3740

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Figure 12
AOI-13 Accessible MPV Coverage During RA

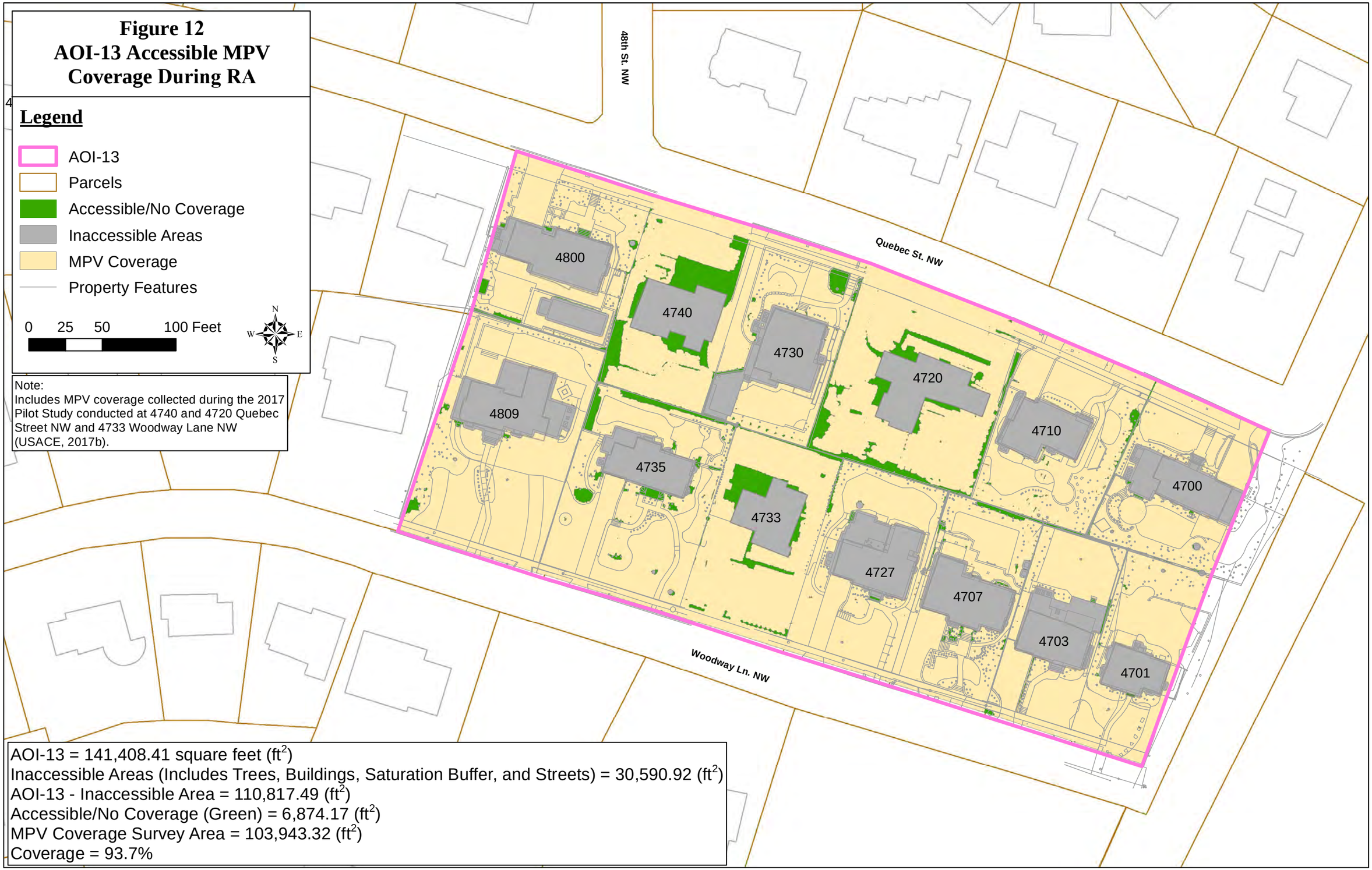
Legend

- AOI-13
- Parcels
- Accessible/No Coverage
- Inaccessible Areas
- MPV Coverage
- Property Features

0 25 50 100 Feet

N W E S

Note:
Includes MPV coverage collected during the 2017 Pilot Study conducted at 4740 and 4720 Quebec Street NW and 4733 Woodway Lane NW (USACE, 2017b).



AOI-13 = 141,408.41 square feet (ft^2)
Inaccessible Areas (Includes Trees, Buildings, Saturation Buffer, and Streets) = 30,590.92 (ft^2)
AOI-13 - Inaccessible Area = 110,817.49 (ft^2)
Accessible/No Coverage (Green) = 6,874.17 (ft^2)
MPV Coverage Survey Area = 103,943.32 (ft^2)
Coverage = 93.7%

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Figure 13
AOI-13 Intrusive Investigation During RA and Soil Sample Results

Legend

- AOI-13
- Parcels
- Property Features

Current Remedial Action Munitions Finds

- Stokes Mortar (MEC)
- Unidentifiable Fragmentation (MD)

2017 Pilot Study Munition Finds

- Stokes Mortar MD
- MD (miscellaneous)

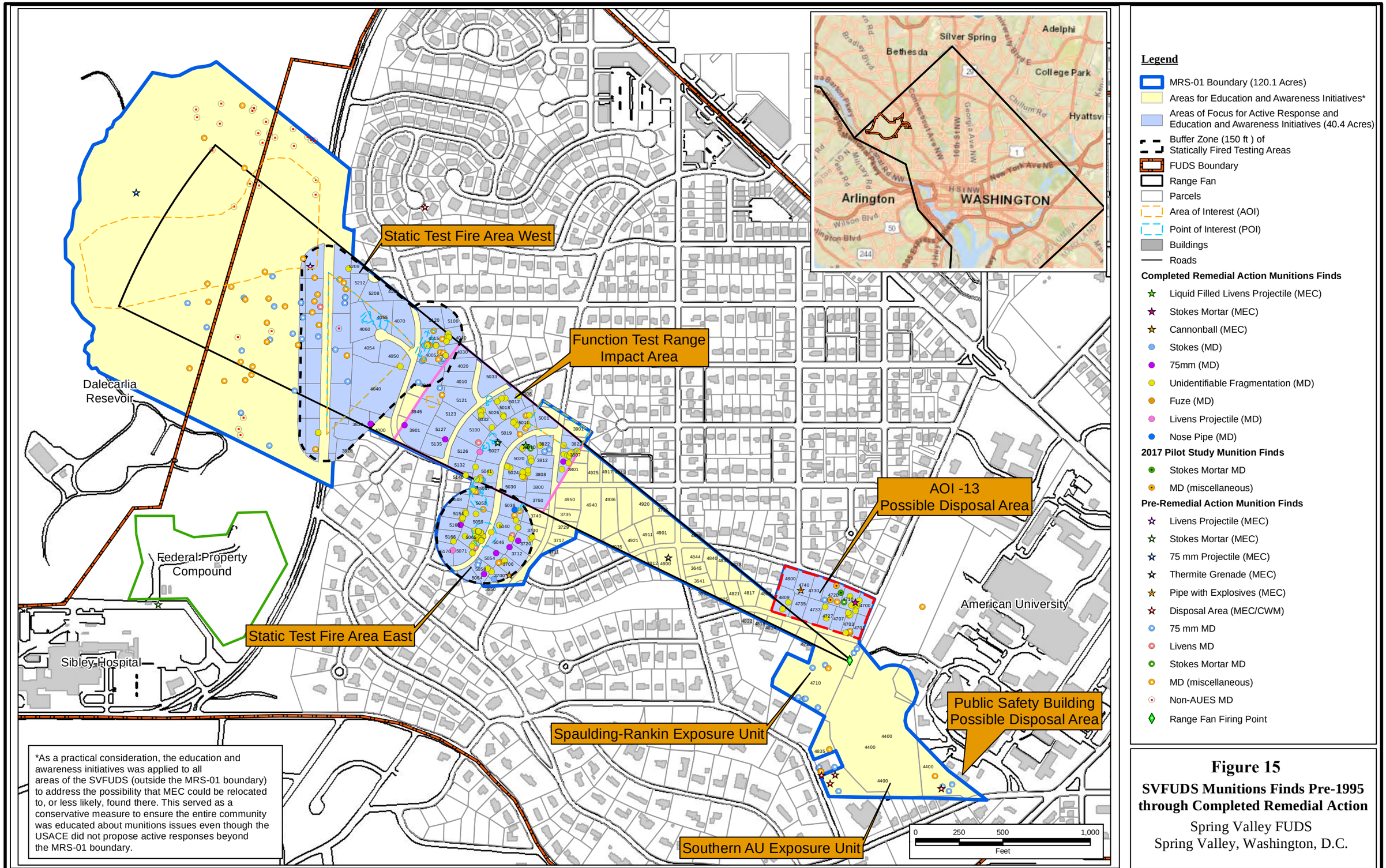
0 25 50 100 Feet

N W E S

Note:
Includes MD recovered during 2017 Pilot Study conducted at 4740 and 4720 Quebec Street NW and 4733 Woodway Lane NW (USACE, 2017b).

48th St. NW
Quebec St. NW
Woodway Ln. NW
4800
4740
4730
4720
4809
4735
4733
4710
4700
4727
4707
4703
4701

FILE: Y:\Spring_Valley\MXD\2017_Effort\Site_Wide_RA_2022\AOI13_Intrusive_Investigation.mxd 11:45:32 AM 12/7/2022 ricksc



*As a practical consideration, the education and awareness initiatives was 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 served as a conservative measure to ensure the entire community was educated about munitions issues even though the USACE did not propose active responses beyond the MRS-01 boundary.

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)
- Buffer Zone (150 ft) of Statically Fired Testing Areas
- FUDS Boundary
- Range Fan
- Parcels
- Area of Interest (AOI)
- Point of Interest (POI)
- Buildings
- Roads

Completed Remedial Action Munitions Finds

- Liquid Filled Livens Projectile (MEC)
- Stokes Mortar (MEC)
- Cannonball (MEC)
- Stokes (MD)
- 75mm (MD)
- Unidentifiable Fragmentation (MD)
- Fuze (MD)
- Livens Projectile (MD)
- Nose Pipe (MD)

2017 Pilot Study Munition Finds

- Stokes Mortar MD
- MD (miscellaneous)

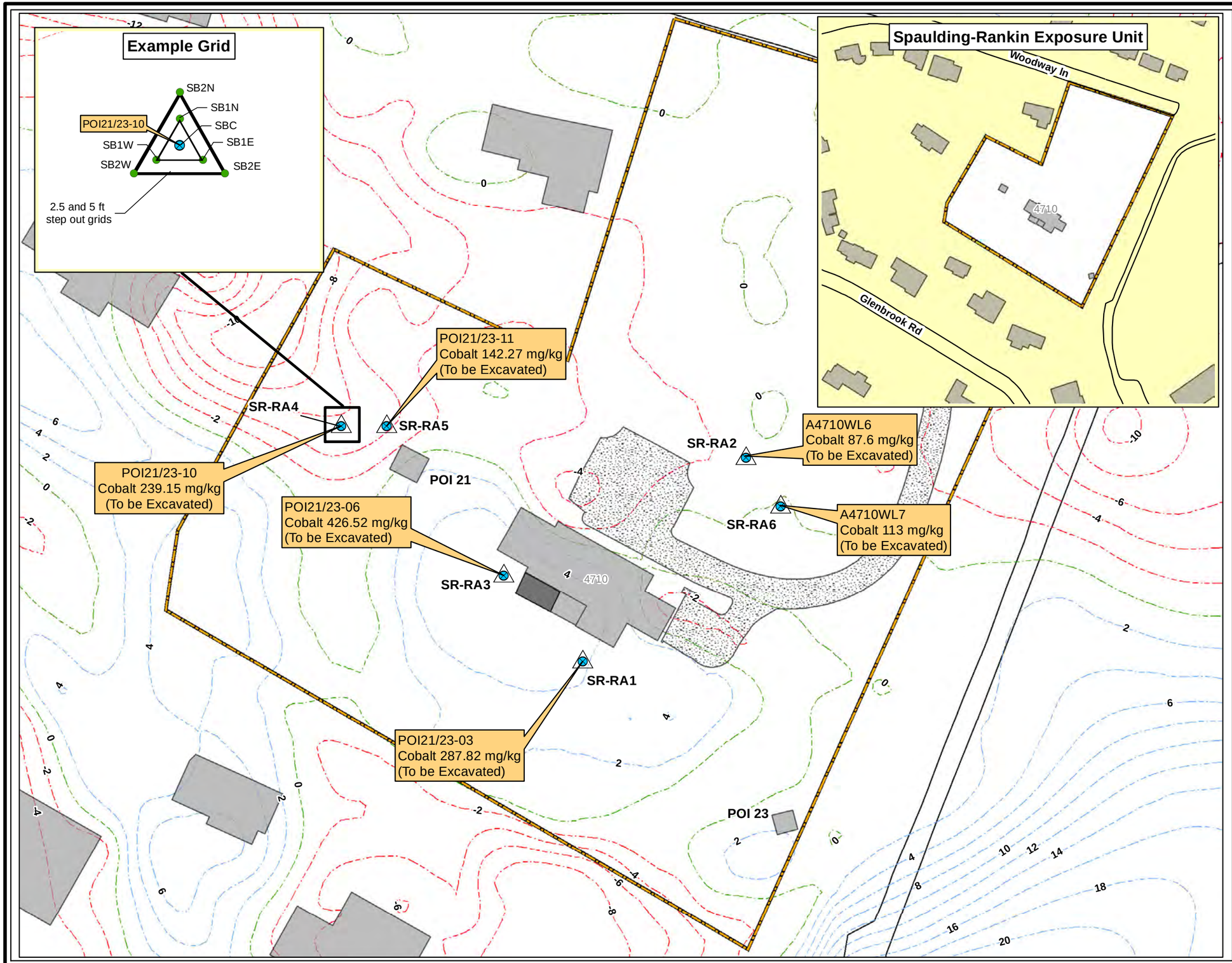
Pre-Remedial Action Munition Finds

- 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
- Range Fan Firing Point

Figure 15

SVFUDS Munitions Finds Pre-1995 through Completed Remedial Action

Spring Valley FUDS
Spring Valley, Washington, D.C.



Legend

- Enviromental Sample Locations
- Pre Characterization Soil Locations
- Spaulding-Rankin Exposure Unit
- Buildings
- Driveway
- Soil Fill Thickness (Feet)
- Soil Cut Thickness (Feet)
- No Fill or Cut Soil
- Roads

POI - Point of Interest
mg - milligram
kg - kilogram
C - Central
N - North
W - West
E - East
SB - Soil Boring
SR-RA - Site-Wide Remediation - Removal Action Excavation

POI21/23-10 Colbalt xxxd.xx mg/kg — Remediation Locations To be Excavated

Note:
* Cut and fill thicknesses were calculated using the 1918 and 2000 USGS topographic contours for the area.

N W E S

0 25 50 100
Feet

Figure 15

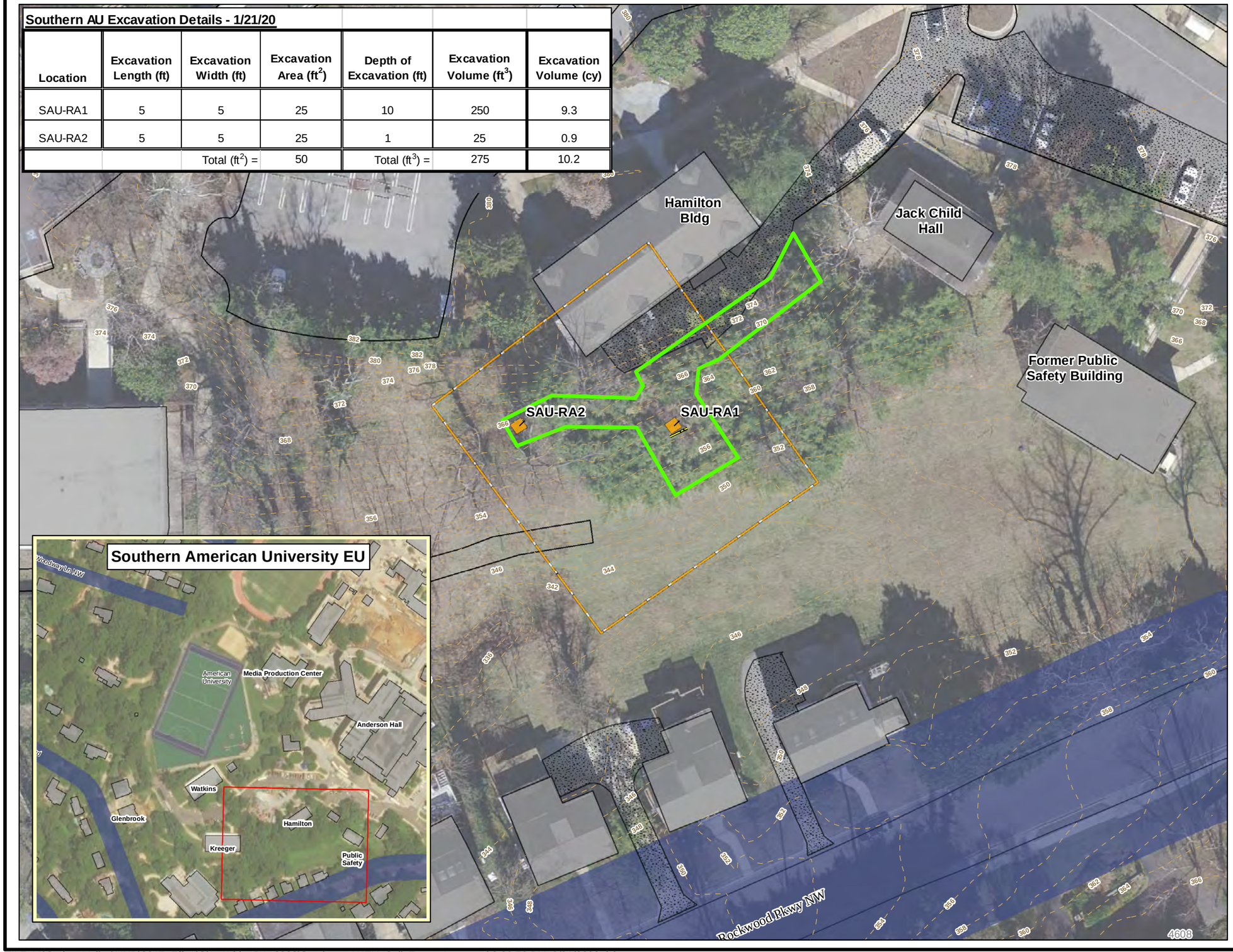
SREU Soil Boring Locations and Results

Spring Valley FUDS
Spring Valley, Washington, D.C.

FILE: Y:\Spring_Valley\MXD\2017_Effort\Site_Wide_RA_2022\SREU_SB_Locs.mxd 2:27:31 PM 9/21/2022 ricksc

Southern AU Excavation Details - 1/21/20

Location	Excavation Length (ft)	Excavation Width (ft)	Excavation Area (ft^2)	Depth of Excavation (ft)	Excavation Volume (ft^3)	Excavation Volume (cy)
SAU-RA1	5	5	25	10	250	9.3
SAU-RA2	5	5	25	1	25	0.9
		Total (ft^2) =	50	Total (ft^3) =	275	10.2



Legend

- Buildings
- Bamboo Clearing Area
- Driveway
- Street Right of Way
- Survey Area
- 5x5 ft Excavation Areas
- Roads
- Contour Elevation (ft)

Notes:
ft - foot
ft^2 - square foot
ft^3 - cubic foot
cy - cubic yard

Coordinate System:
WGS 1984 UTM Zone 18N, Feet

N
W E
S

0 20 40 80
Feet

Figure 16

Southern AUEU Soil Excavation Locations

Spring Valley FUDS
Spring Valley, Washington, D.C.

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American University Campus

Admissions (Hamilton)

Jack Child Hall

Geotechnical Test Soil Boring

PSB-GR32
PSB-GR21
PSB-GR11
PSB-GR12
PSB-GR22
PSB-GR13
PSB-GR23
PSB-GR33
PSB-GT01
PSB-GR31
PSB-GR41
PSB-GR42
PSB-GR43

Rockwood

MINICAMS Shed

Utility Box

Public Safety

88 Feet

Metal Grate

Fletcher Gate

Gate

Personnel Decontamination Station

Erosion Control Silt Fence

Rockwood Pkwy NW

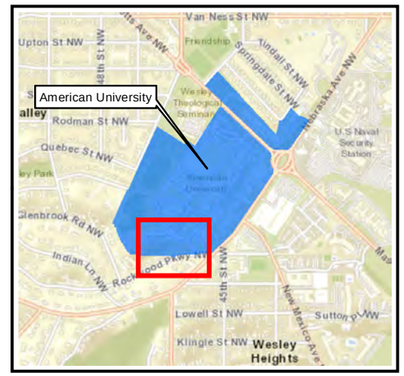
Rockwood Parkway

Nebraska Ave NW

Nebraska Ave

Legend

- American University
- Buildings
- Driveway
- Parcel Boundary
- Temporary Access Road (to be constructed)
- Temporary Security Fence with Fabric
- Roads
- Contour Elevation
- Pre-Remediation Characterization Soil Borings

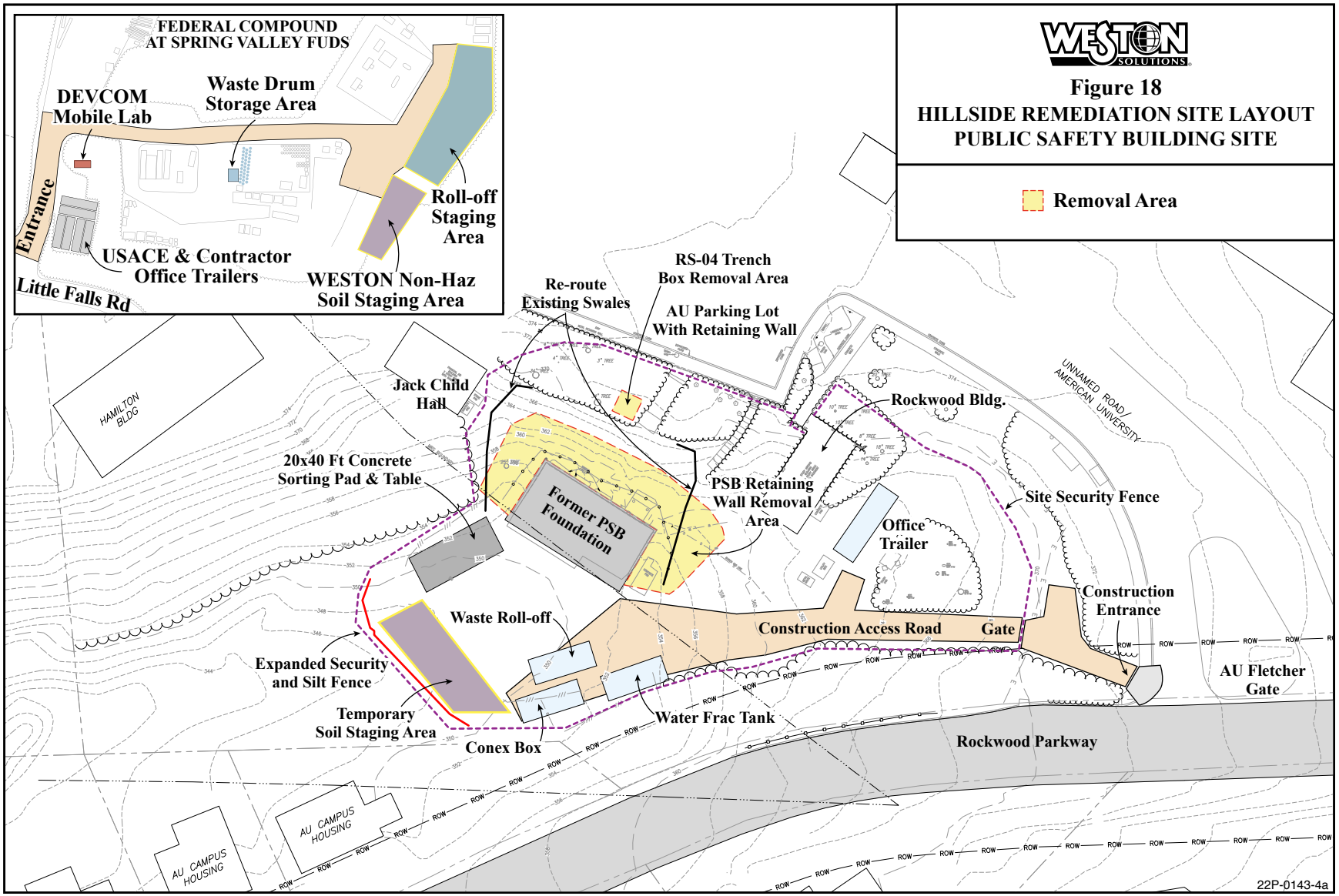


N
W E
S

0 40 80 160
Feet

Figure 17
Public Safety Building Foundation Pre-Characterization Sample Locations
Spring Valley FUDS
Spring Valley, Washington, D.C.

FILE: Y:\Spring_Valley\MXD\2017_Effort\PSB_Pre_Characterization.mxd 9:17:54 AM 5/23/2022 ricksc


FEDERAL COMPOUND
AT SPRING VALLEY FUDS
DEVCOM
Mobile Lab
Waste Drum
Storage Area
Roll-off
Staging
Area
Entrance
USACE & Contractor
Office Trailers
WESTON Non-Haz
Soil Staging Area
Little Falls Rd
WESTON SOLUTIONS
Figure 18
HILLSIDE REMEDIATION SITE LAYOUT
PUBLIC SAFETY BUILDING SITE
Removal Area
Re-route
Existing Swales
RS-04 Trench
Box Removal Area
AU Parking Lot
With Retaining Wall
HAMILTON
BLDG
Jack Child
Hall
Rockwood Bldg.
UNNAMED ROAD /
AMERICAN UNIVERSITY
20x40 Ft Concrete
Sorting Pad & Table
Former PSB
Foundation
PSB Retaining
Wall Removal
Area
Site Security Fence
Office
Trailer
Construction
Entrance
Waste Roll-off
Construction Access Road
Gate
AU Fletcher
Gate
Expanded Security
and Silt Fence
Temporary
Soil Staging Area
Conex Box
Water Frac Tank
Rockwood Parkway
AU CAMPUS
HOUSING
AU CAMPUS
HOUSING
22P-0143-4a

APPENDIX G – ProUCL AND HAZARD INDEX CALCULATIONS

Table G-1: Final Site-Wide Remedial Action Report Table
Geoprobe Soil Sampling Results for Cobalt at the Spaulding-Rankin Exposure Unit

Notes: This table was taken from the Final Soil Remediation Property Report for Spaulding-Rankin Exposure Unit (USACE, October 2019).

Location	Triangle Grid ID	Depth (ft bgs)	Sample ID	Result	Units	Recommended Action
POI21/23-03	Original Sample	4-5	POI21/23-03	287.8	mg/kg	Excavate 2-ft x 5-ft x 5-ft trench to remove old 287.8 mg/kg cobalt hit at 4-5 ft bgs.
SWR-SR-RA1	SBC	0-1	SWR-SR-RA1-SBC0001-00	37.2	mg/kg	
	SBC	1-2	SWR-SR-RA1-SBC0102-00	80.4	mg/kg	
	SBC	2-3	SWR-SR-RA1-SBC0203-00	52.8	mg/kg	
	SBC	3-4	SWR-SR-RA1-SBC0304-00	20.1	mg/kg	
	SBC	4-5	SWR-SR-RA1-SBC0405-00	24.9	mg/kg	
	SBC	5-6	SWR-SR-RA1-SBC0506-00	5.2	mg/kg	
	SBC	6-7	SWR-SR-RA1-SBC0607-00	18.0	mg/kg	
	SB1E	3-4	SWR-SR-RA1-SB1E0304-00	29.0	mg/kg	
	SB1N	3-5	SWR-SR-RA1-SB1N0305-00	38.6	mg/kg	
	SB1W	2-3	SWR-SR-RA1-SB1W0203-00	49.2	mg/kg	
	SB1W	2-3	SWR-SR-RA1-SB1W0203-01	43.8	mg/kg	
	SB2E	2-4	SWR-SR-RA1-SB2E0204-00	55.1	mg/kg	
	SB2N	3-5	SWR-SR-RA1-SB2N0305-00	47.0	mg/kg	
	SB2N	3-5	SWR-SR-RA1-SB2N0305-01	34.7	mg/kg	
	SB2W	2-3	SWR-SR-RA1-SB2W0203-00	44.8	mg/kg	
A4710WL6	Original Sample	5-7	A4710WL6	87.6	mg/kg	Excavate 2-ft x 5-ft x 7-ft trench to remove old 87.6 mg/kg cobalt hit at 5-7 ft bgs.
SWR-SR-RA2	SBC	0-1	SWR-SR-RA2-SBC0001-00	41.8	mg/kg	
	SBC	1-2	SWR-SR-RA2-SBC0102-00	110.0	mg/kg	
	SBC	2-3	SWR-SR-RA2-SBC0203-00	59.2	mg/kg	
	SBC	3-4	SWR-SR-RA2-SBC0304-00	62.6	mg/kg	
	SBC	3-4	SWR-SR-RA2-SBC0304-01	67.2	mg/kg	
	SBC	4-5	SWR-SR-RA2-SBC0405-00	74.1	mg/kg	
	SBC	5-6	SWR-SR-RA2-SBC0506-00	67.8	mg/kg	
	SBC	6-7	SWR-SR-RA2-SBC0607-00	403.0	mg/kg	
	SBC	7-8	SWR-SR-RA2-SBC0708-00	49.6	mg/kg	
	SBC	8-9	SWR-SR-RA2-SBC0809-00	29.5	mg/kg	
	SB1E	0-2	SWR-SR-RA2-SB1E0002-00	41.4	mg/kg	
	SB1N	0-2	SWR-SR-RA2-SB1N0002-00	47.0	mg/kg	
	SB1W	0-2	SWR-SR-RA2-SB1W0002-00	52.6	mg/kg	
	SB2E	0-2	SWR-SR-RA2-SB2E0002-00	47.6	mg/kg	
	SB2N	0-2	SWR-SR-RA2-SB2N0002-00	40.8	mg/kg	
	SB2W	0-2	SWR-SR-RA2-SB2W0002-00	47.9	mg/kg	
POI21/23-06	Original Sample	4-5	POI21/23-06	426.5	mg/kg	5-ft excavation (limited by the house to the north and the patio to the southeast) to remove old 426.5 mg/kg cobalt hit at 4-5 ft bgs.
SWR-SR-RA3	SBC	0-1	SWR-SR-RA3-SBC0001-00	20.1	mg/kg	
	SBC	0-1	SWR-SR-RA3-SBC0001-01	31.4	mg/kg	
	SBC	1-2	SWR-SR-RA3-SBC0102-00	110.0	mg/kg	
	SBC	2-3	SWR-SR-RA3-SBC0203-00	122.0	mg/kg	
	SBC	3-4	SWR-SR-RA3-SBC0304-00	31.4	mg/kg	
	SBC	4-5	SWR-SR-RA3-SBC0405-00	39.2	mg/kg	
	SB2E	3-5	SWR-SR-RA3-SB2E0305-00	105.0	mg/kg	
	SB2N	3-5	SWR-SR-RA3-SB2N0305-00	169.0	mg/kg	

Location	Triangle Grid ID	Depth (ft bgs)	Sample ID	Result	Units	Recommended Action
	SB1N	3-5	SWR-SR-RA3-SB1N0305-00	73.9	mg/kg	
	SB1N	3-5	SWR-SR-RA3-SB1N0305-01	118.0	mg/kg	
	SBC	5-6	SWR-SR-RA3-SBC0506-00	39.3	mg/kg	
	SBC	6-7	SWR-SR-RA3-SBC0607-00	134.0	mg/kg	
	SBC	7-8	SWR-SR-RA3-SBC0708-00	27.2	mg/kg	
	SBC	8-9	SWR-SR-RA3-SBC0809-00	150.0	mg/kg	Excavation meets HI goal of 2 - left in ground.
	SBC	9-10	SWR-SR-RA3-SBC0910-00	10.1	mg/kg	
	SB1E	3-5	SWR-SR-RA3-SB1E0303-00	29.4	mg/kg	
	SB1W	3-5	SWR-SR-RA3-SB1W0305-00	64.7	mg/kg	
	SB2W	3-5	SWR-SR-RA3-SB2W0305-00	76.0	mg/kg	
POI21/23-10	Original Sample	0-2	POI21/23-10	239.1	mg/kg	
SWR-SR-RA4	SBC	0-1	SWR-SR-RA4-SBC0001-00	53.2	mg/kg	
	SBC	1-2	SWR-SR-RA4-SBC0102-00	223.0	mg/kg	
	SBC	2-3	SWR-SR-RA4-SBC0203-00	31.5	mg/kg	
	SBC	3-4	SWR-SR-RA4-SBC0304-00	25.6	mg/kg	
	SBC	4-5	SWR-SR-RA4-SBC0405-00	149.0	mg/kg	Excavate 7-ft x 10-ft x 5-ft pit to remove old 239.1 mg/kg cobalt hit at 0-2 ft bgs.
	SB1E	0-2	SWR-SR-RA4-SB1E0002-00	115.0	mg/kg	
	SB1E	0-2	SWR-SR-RA4-SB1E0002-01	149.0	mg/kg	
	SB1N	0-2	SWR-SR-RA4-SB1N0002-00	83.5	mg/kg	
	SB1W	0-2	SWR-SR-RA4-SB1W0002-00	139.0	mg/kg	
	SB2E	0-2	SWR-SR-RA4-SB2E0002-00	115.0	mg/kg	
	SB2W	0-2	SWR-SR-RA4-SB2W0002-00	96.6	mg/kg	
	SBC	5-6	SWR-SR-RA4-SBC0506-00	56.0	mg/kg	
	SBC	6-7	SWR-SR-RA4-SBC0607-00	41.5	mg/kg	
	SBC	7-8	SWR-SR-RA4-SBC0708-00	72.8	mg/kg	
	SBC	8-9	SWR-SR-RA4-SBC0809-00	42.0	mg/kg	
	SBC	9-10	SWR-SR-RA4-SBC0910-00	22.0	mg/kg	
	SB2N	0-2	SWR-SR-RA4-SB2N0002-00	40.7	mg/kg	
	SB3E	0-2	SWR-SR-RA4-SB3E0002-00	36.2	mg/kg	
	SB3E	0-2	SWR-SR-RA4-SB3E0002-01	36.1	mg/kg	
	SB3W	0-2	SWR-SR-RA4-SB3W0002-00	66.9	mg/kg	
	SB4E	0-2	SWR-SR-RA4-SB4E0002-00	31.9	mg/kg	
	SB4W	0-2	SWR-SR-RA4-SB4W0002-00	47.0	mg/kg	
POI21/23-11	Original Sample	0-2	POI21/23-11	142.3	mg/kg	
SWR-SR-RA5	SBC	0-1	SWR-SR-RA5-SBC0001-00	61.9	mg/kg	
	SBC	0-1	SWR-SR-RA5-SBC0001-01	34.0	mg/kg	
	SBC	1-2	SWR-SR-RA5-SBC0102-00	15.9	mg/kg	
	SBC	2-3	SWR-SR-RA5-SBC0203-00	67.9	mg/kg	
	SBC	3-4	SWR-SR-RA5-SBC0304-00	79.2	mg/kg	Excavate 2-ft x 5-ft x 8-ft pit to remove old 142.3 mg/kg cobalt hit at 0-2 ft bgs.
	SBC	4-5	SWR-SR-RA5-SBC0405-00	41.8	mg/kg	
	SBC	5-6	SWR-SR-RA5-SBC0506-00	104.0	mg/kg	
	SBC	6-7	SWR-SR-RA5-SBC0607-00	51.9	mg/kg	
	SBC	7-8	SWR-SR-RA5-SBC0708-00	473.0	mg/kg	
	SBC	8-9	SWR-SR-RA5-SBC0809-00	50.4	mg/kg	
	SBC	9-10	SWR-SR-RA5-SBC0910-00	136.0	mg/kg	
	SB1E	0-2	SWR-SR-RA5-SB1E0002-00	46.4	mg/kg	
	SB1N	0-2	SWR-SR-RA5-SB1N0002-00	38.6	mg/kg	Excavation meets HI goal of 2 - left in ground.
	SB1N	0-2	SWR-SR-RA5-SB1N0002-01	26.8	mg/kg	
	SB1W	0-2	SWR-SR-RA5-SB1W0002-00	57.5	mg/kg	
	SB2E	0-2	SWR-SR-RA5-SB2E0002-00	37.5	mg/kg	

Location	Triangle Grid ID	Depth (ft bgs)	Sample ID	Result	Units	Recommended Action
	SB2N	0-2	SWR-SR-RA5-SB2N0002-00	48.0	mg/kg	
	SB2W	0-2	SWR-SR-RA5-SB2W0002-00	25.0	mg/kg	
A4710WL7	Original Sample	5-7	A4710WL7	113.0	mg/kg	Excavate 2-ft x 2-ft x 7-ft trench to remove old 113 mg/kg cobalt hit at 5-7 ft bgs.
SWR-SR-RA6	SBC	0-1	SWR-SR-RA6-SBC0001-00	50.3	mg/kg	
	SBC	1-2	SWR-SR-RA6-SBC0102-00	55.7	mg/kg	
	SBC	2-3	SWR-SR-RA6-SBC0203-00	48.9	mg/kg	
	SBC	3-4	SWR-SR-RA6-SBC0304-00	58.2	mg/kg	
	SBC	4-5	SWR-SR-RA6-SBC0405-00	51.9	mg/kg	
	SBC	5-6	SWR-SR-RA6-SBC0506-00	41.1	mg/kg	
	SBC	6-7	SWR-SR-RA6-SBC0607-00	50.5	mg/kg	
	SBC	6-7	SWR-SR-RA6-SBC0607-01	79.4	mg/kg	
	SBC	7-8	SWR-SR-RA6-SBC0708-00	56.2	mg/kg	
	SBC	8-9	SWR-SR-RA6-SBC0809-00	50.2	mg/kg	
	SBC	9-10	SWR-SR-RA6-SBC0910-00	41.5	mg/kg	
	SB1E	0-2	SWR-SR-RA6-SB1E0002-00	67.6	mg/kg	
	SB1E	0-2	SWR-SR-RA6-SB1E0002-01	50.3	mg/kg	
	SB1N	0-2	SWR-SR-RA6-SB1N0002-00	54.0	mg/kg	
	SB1W	0-2	SWR-SR-RA6-SB1W0002-00	51.8	mg/kg	
	SB2E	0-2	SWR-SR-RA6-SB2E0002-00	39.3	mg/kg	
	SB2N	0-2	SWR-SR-RA6-SB2N0002-00	49.5	mg/kg	
	SB2W	0-2	SWR-SR-RA6-SB2W0002-00	53.2	mg/kg	

Notes:

Soil samples removed during soil remediation

Sample Grid identifiers:

POI – point of interest

RA1 – remedial action location #1 RA2 – remedial action location #2 RA3 – remedial action location #3

RA4 – remedial action location #4 RA5 – remedial action location #5 RA6 – remedial action location #6

SB1E – soil boring - 1st step out to the southeast - 2.5 ft from center SB1N – soil boring - 1st step out to the north - 2.5 ft from center

SB1W – soil boring - 1st step out to the southwest - 2.5 ft from center SB2E – soil boring - 2nd step out to the southeast - 5 ft from center SB2N – soil boring - 2nd step out to the north - 5 ft from center SB2W – soil boring - 2nd step out to the southwest - 5 ft from center SB3E – soil boring - 3rd step out to the southeast - 7.5 ft from center SB3N – soil boring - 3rd step out to the north - 7.5 ft from center

SB3W – soil boring - 3rd step out to the southwest - 7.5 ft from center SB4E – soil boring - 4th step out to the southeast - 10 ft from center

SB4W – soil boring - 4th step out to the southwest - 10 ft from center SBC – soil boring at center

SR – Spaulding-Rankin site SWR – site-wide remediation WL – Woodway Lane

bgs – below ground surface ft – feet HI – hazard index ID – identification mg/kg – milligrams per kilogram

Edited Table G-1

(Cobalt concentrations in blue highlighted cells removed the pre-excavation cobalt concentrations and replaced with 11 mg/kg backfill soil cobalt concentration)

Location	Triangle Grid ID	Depth (ft bgs)	Sample ID	Result	Units	Recommended Action
POI21/23-03	Original Sample	4-5	POI21/23-03	11.0	mg/kg	Excavate 2-ft x 5-ft x 5-ft trench to remove old 287.8 mg/kg cobalt hit at 4-5 ft bgs.
SWR-SR-RA1	SBC	0-1	SWR-SR-RA1-SBC0001-00	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA1-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA1-SBC0203-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA1-SBC0304-00	11.0	mg/kg	
	SBC	4-5	SWR-SR-RA1-SBC0405-00	11.0	mg/kg	
	SBC	5-6	SWR-SR-RA1-SBC0506-00	5.2	mg/kg	
	SBC	6-7	SWR-SR-RA1-SBC0607-00	18.0	mg/kg	
	SB1E	3-4	SWR-SR-RA1-SB1E0304-00	29.0	mg/kg	
	SB1N	3-5	SWR-SR-RA1-SB1N0305-00	38.6	mg/kg	
	SB1W	2-3	SWR-SR-RA1-SB1W0203-00	49.2	mg/kg	
	SB1W	2-3	SWR-SR-RA1-SB1W0203-01	43.8	mg/kg	
	SB2E	2-4	SWR-SR-RA1-SB2E0204-00	55.1	mg/kg	
	SB2N	3-5	SWR-SR-RA1-SB2N0305-00	47.0	mg/kg	
	SB2N	3-5	SWR-SR-RA1-SB2N0305-01	34.7	mg/kg	
	SB2W	2-3	SWR-SR-RA1-SB2W0203-00	44.8	mg/kg	
A4710WL6	Original Sample	5-7	A4710WL6	11.0	mg/kg	Excavate 2-ft x 5-ft x 7-ft trench to remove old 87.6 mg/kg cobalt hit at 5-7 ft bgs.
SWR-SR-RA2	SBC	0-1	SWR-SR-RA2-SBC0001-00	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA2-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA2-SBC0203-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA2-SBC0304-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA2-SBC0304-01	11.0	mg/kg	
	SBC	4-5	SWR-SR-RA2-SBC0405-00	11.0	mg/kg	
	SBC	5-6	SWR-SR-RA2-SBC0506-00	11.0	mg/kg	
	SBC	6-7	SWR-SR-RA2-SBC0607-00	11.0	mg/kg	
	SBC	7-8	SWR-SR-RA2-SBC0708-00	49.6	mg/kg	
	SBC	8-9	SWR-SR-RA2-SBC0809-00	29.5	mg/kg	
	SB1E	0-2	SWR-SR-RA2-SB1E0002-00	41.4	mg/kg	
	SB1N	0-2	SWR-SR-RA2-SB1N0002-00	47.0	mg/kg	
	SB1W	0-2	SWR-SR-RA2-SB1W0002-00	52.6	mg/kg	

	SB2E	0-2	SWR-SR-RA2-SB2E0002-00	47.6	mg/kg	
	SB2N	0-2	SWR-SR-RA2-SB2N0002-00	40.8	mg/kg	
	SB2W	0-2	SWR-SR-RA2-SB2W0002-00	47.9	mg/kg	
POI21/23-06	Original Sample	4-5	POI21/23-06	11.0	mg/kg	5-ft excavation (limited by the house to the north and the patio to the southeast) to remove old 426.5 mg/kg cobalt hit at 4-5 ft bgs.
SWR-SR-RA3	SBC	0-1	SWR-SR-RA3-SBC0001-00	11.0	mg/kg	
	SBC	0-1	SWR-SR-RA3-SBC0001-01	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA3-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA3-SBC0203-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA3-SBC0304-00	11.0	mg/kg	
	SBC	4-5	SWR-SR-RA3-SBC0405-00	11.0	mg/kg	
	SB2E	3-5	SWR-SR-RA3-SB2E0305-00	11.0	mg/kg	
	SB2N	3-5	SWR-SR-RA3-SB2N0305-00	11.0	mg/kg	
	SB1N	3-5	SWR-SR-RA3-SB1N0305-00	11.0	mg/kg	
	SB1N	3-5	SWR-SR-RA3-SB1N0305-01	11.0	mg/kg	
	SBC	5-6	SWR-SR-RA3-SBC0506-00	39.3	mg/kg	Excavation meets HI goal of 2 - left in ground.
	SBC	6-7	SWR-SR-RA3-SBC0607-00	134.0	mg/kg	
	SBC	7-8	SWR-SR-RA3-SBC0708-00	27.2	mg/kg	
	SBC	8-9	SWR-SR-RA3-SBC0809-00	150.0	mg/kg	
	SBC	9-10	SWR-SR-RA3-SBC0910-00	10.1	mg/kg	
	SB1E	3-5	SWR-SR-RA3-SB1E0303-00	29.4	mg/kg	
	SB1W	3-5	SWR-SR-RA3-SB1W0305-00	64.7	mg/kg	
	SB2W	3-5	SWR-SR-RA3-SB2W0305-00	76.0	mg/kg	
Location	**Triangle Grid ID**	**Depth (ft bgs)**	**Sample ID**	**Result**	**Units**	**Recommended Action**
POI21/23-10	OriginalSample	0-2	POI21/23-10	11.0	mg/kg	Excavate 7-ft x 10-ft x 5-ft pit to remove old239.1 mg/kg cobalt hit at 0-2 ft bgs.
SWR-SR-RA4	SBC	0-1	SWR-SR-RA4-SBC0001-00	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA4-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA4-SBC0203-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA4-SBC0304-00	11.0	mg/kg	
	SBC	4-5	SWR-SR-RA4-SBC0405-00	11.0	mg/kg	
	SB1E	0-2	SWR-SR-RA4-SB1E0002-00	11.0	mg/kg	
	SB1E	0-2	SWR-SR-RA4-SB1E0002-01	11.0	mg/kg	
	SB1N	0-2	SWR-SR-RA4-SB1N0002-00	11.0	mg/kg	
	SB1W	0-2	SWR-SR-RA4-SB1W0002-00	11.0	mg/kg	
	SB2E	0-2	SWR-SR-RA4-SB2E0002-00	11.0	mg/kg	
	SB2W	0-2	SWR-SR-RA4-SB2W0002-00	11.0	mg/kg	
	SBC	5-6	SWR-SR-RA4-SBC0506-00	56.0	mg/kg	

	SBC	6-7	SWR-SR-RA4-SBC0607-00	41.5	mg/kg	
	SBC	7-8	SWR-SR-RA4-SBC0708-00	72.8	mg/kg	
	SBC	8-9	SWR-SR-RA4-SBC0809-00	42.0	mg/kg	
	SBC	9-10	SWR-SR-RA4-SBC0910-00	22.0	mg/kg	
	SB2N	0-2	SWR-SR-RA4-SB2N0002-00	40.7	mg/kg	
	SB3E	0-2	SWR-SR-RA4-SB3E0002-00	36.2	mg/kg	
	SB3E	0-2	SWR-SR-RA4-SB3E0002-01	36.1	mg/kg	
	SB3W	0-2	SWR-SR-RA4-SB3W0002-00	66.9	mg/kg	
	SB4E	0-2	SWR-SR-RA4-SB4E0002-00	31.9	mg/kg	
	SB4W	0-2	SWR-SR-RA4-SB4W0002-00	47.0	mg/kg	
POI21/23-11	Original Sample	0-2	POI21/23-11	11.0	mg/kg	Excavate 2-ft x 5-ft x 8-ft pit to remove old 142.3 mg/kg cobalt hit at 0-2 ft bgs.
SWR-SR-RA5	SBC	0-1	SWR-SR-RA5-SBC0001-00	11.0	mg/kg	
	SBC	0-1	SWR-SR-RA5-SBC0001-01	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA5-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA5-SBC0203-00	11.0	mg/kg	
	SBC	3-4	SWR-SR-RA5-SBC0304-00	11.0	mg/kg	
	SBC	4-5	SWR-SR-RA5-SBC0405-00	11.0	mg/kg	
	SBC	5-6	SWR-SR-RA5-SBC0506-00	11.0	mg/kg	
	SBC	6-7	SWR-SR-RA5-SBC0607-00	11.0	mg/kg	
	SBC	7-8	SWR-SR-RA5-SBC0708-00	11.0	mg/kg	
	SBC	8-9	SWR-SR-RA5-SBC0809-00	50.4	mg/kg	Excavation meets HI goal of 2 - left in ground.
	SBC	9-10	SWR-SR-RA5-SBC0910-00	136.0	mg/kg	
	SB1E	0-2	SWR-SR-RA5-SB1E0002-00	46.4	mg/kg	
	SB1N	0-2	SWR-SR-RA5-SB1N0002-00	38.6	mg/kg	
	SB1N	0-2	SWR-SR-RA5-SB1N0002-01	26.8	mg/kg	
	SB1W	0-2	SWR-SR-RA5-SB1W0002-00	57.5	mg/kg	
	SB2E	0-2	SWR-SR-RA5-SB2E0002-00	37.5	mg/kg	
	SB2N	0-2	SWR-SR-RA5-SB2N0002-00	48.0	mg/kg	
	SB2W	0-2	SWR-SR-RA5-SB2W0002-00	25.0	mg/kg	
Location	**Triangle Grid ID**	**Depth (ft bgs)**	**Sample ID**	**Result**	**Units**	**Recommended Action**
A4710WL7	Original Sample	5-7	A4710WL7	11.0	mg/kg	Excavate 2-ft x 2-ft x 7-ft trench to remove old 113 mg/kg cobalt hit at 5-7 ft bgs.
SWR-SR-RA6	SBC	0-1	SWR-SR-RA6-SBC0001-00	11.0	mg/kg	
	SBC	1-2	SWR-SR-RA6-SBC0102-00	11.0	mg/kg	
	SBC	2-3	SWR-SR-RA6-SBC0203-00	48.9	mg/kg	
	SBC	3-4	SWR-SR-RA6-SBC0304-00	58.2	mg/kg	
	SBC	4-5	SWR-SR-RA6-SBC0405-00	51.9	mg/kg	

	SBC	5-6	SWR-SR-RA6-SBC0506-00	41.1	mg/kg	
	SBC	6-7	SWR-SR-RA6-SBC0607-00	50.5	mg/kg	
	SBC	6-7	SWR-SR-RA6-SBC0607-01	79.4	mg/kg	
	SBC	7-8	SWR-SR-RA6-SBC0708-00	56.2	mg/kg	
	SBC	8-9	SWR-SR-RA6-SBC0809-00	50.2	mg/kg	
	SBC	9-10	SWR-SR-RA6-SBC0910-00	41.5	mg/kg	
	SB1E	0-2	SWR-SR-RA6-SB1E0002-00	67.6	mg/kg	
	SB1E	0-2	SWR-SR-RA6-SB1E0002-01	50.3	mg/kg	
	SB1N	0-2	SWR-SR-RA6-SB1N0002-00	54.0	mg/kg	
	SB1W	0-2	SWR-SR-RA6-SB1W0002-00	51.8	mg/kg	
	SB2E	0-2	SWR-SR-RA6-SB2E0002-00	39.3	mg/kg	
	SB2N	0-2	SWR-SR-RA6-SB2N0002-00	49.5	mg/kg	
	SB2W	0-2	SWR-SR-RA6-SB2W0002-00	53.2	mg/kg	

Notes:

Blue highlighted cells signify cobalt exceedances that determined the excavation footprint.

Sample Grid identifiers:
POI – point of interest
RA1 – remedial action location #1 RA2 – remedial action location #2 RA3 – remedial action location #3 RA4 – remedial action location #4 RA5 – remedial action location #5 RA6 – remedial action location #6
SB1E – soil boring - 1st step out to the southeast - 2.5 ft from center SB1N – soil boring - 1st step out to the north - 2.5 ft from center SB1W – soil boring - 1st step out to the southwest - 2.5 ft from center SB2E – soil boring - 2nd step out to the southeast - 5 ft from center SB2N – soil boring - 2nd step out to the north - 5 ft from center SB2W – soil boring - 2nd step out to the southwest - 5 ft from center SB3E – soil boring - 3rd step out to the southeast - 7.5 ft from center SB3N – soil boring - 3rd step out to the north - 7.5 ft from center SB3W – soil boring - 3rd step out to the southwest - 7.5 ft from center SB4E – soil boring - 4th step out to the southeast - 10 ft from center SB4W – soil boring - 4th step out to the southwest - 10 ft from center SBC – soil boring at center
SR – Spaulding-Rankin site SWR – site-wide remediation WL – Woodway Lane
bgs – below ground surface ft – feet
HI – hazard index ID – identification
mg/kg – milligrams per kilogram

1	**UCL Statistics for Uncensored Full Data Sets**										
2											
3	User Selected Options										
4	Date/Time of Computation	ProUCL 5.2 30-Sep-23 14:07:47									
5	From File	WorkSheet.xls									
6	Full Precision	OFF									
7	Confidence Coefficient	95%									
8	Number of Bootstrap Operations	2000									
9											
10											
11	**SREU with 11mg/kg for excv soil**										
12											
13	**General Statistics**										
14	Total Number of Observations	113					Number of Distinct Observations	58			
15							Number of Missing Observations	0			
16	Minimum	5.2					Mean	32			
17	Maximum	150					Median	26.8			
18	SD	26.59					Std. Error of Mean	2.501			
19	Coefficient of Variation	0.831					Skewness	1.888			
20											
21	**Normal GOF Test**										
22	Shapiro Wilk Test Statistic	0.763					**Shapiro Wilk GOF Test**				
23	1% Shapiro Wilk P Value	0					Data Not Normal at 1% Significance Level				
24	Lilliefors Test Statistic	0.254					**Lilliefors GOF Test**				
25	1% Lilliefors Critical Value	0.0967					Data Not Normal at 1% Significance Level				
26	**Data Not Normal at 1% Significance Level**										
27											
28	**Assuming Normal Distribution**										
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**				
30	95% Student's-t UCL	36.15					95% Adjusted-CLT UCL (Chen-1995)	36.59			
31							95% Modified-t UCL (Johnson-1978)	36.23			
32											
33	**Gamma GOF Test**										
34	A-D Test Statistic	8.119					**Anderson-Darling Gamma GOF Test**				
35	5% A-D Critical Value	0.767					Data Not Gamma Distributed at 5% Significance Level				
36	K-S Test Statistic	0.296					**Kolmogorov-Smirnov Gamma GOF Test**				
37	5% K-S Critical Value	0.0874					Data Not Gamma Distributed at 5% Significance Level				
38	**Data Not Gamma Distributed at 5% Significance Level**										
39											
40	**Gamma Statistics**										
41	k hat (MLE)	1.776					k star (bias corrected MLE)	1.735			
42	Theta hat (MLE)	18.02					Theta star (bias corrected MLE)	18.45			
43	nu hat (MLE)	401.3					nu star (bias corrected)	392			
44	MLE Mean (bias corrected)	32					MLE Sd (bias corrected)	24.3			
45							Approximate Chi Square Value (0.05)	347.1			
46	Adjusted Level of Significance	0.0479					Adjusted Chi Square Value	346.6			
47											
48	**Assuming Gamma Distribution**										
49	95% Approximate Gamma UCL	36.14					95% Adjusted Gamma UCL	36.2			
50											
51	**Lognormal GOF Test**										

	A	B	C	D	E	F	G	H	I	J	K	L
52					Shapiro Wilk Test Statistic	0.818	**Shapiro Wilk Lognormal GOF Test**					
53					10% Shapiro Wilk P Value	0	Data Not Lognormal at 10% Significance Level					
54					Lilliefors Test Statistic	0.302	**Lilliefors Lognormal GOF Test**					
55					10% Lilliefors Critical Value	0.0766	Data Not Lognormal at 10% Significance Level					
56	**Data Not Lognormal at 10% Significance Level**											
57												
58	**Lognormal Statistics**											
59					Minimum of Logged Data	1.649				Mean of logged Data	3.159	
60					Maximum of Logged Data	5.011				SD of logged Data	0.788	
61												
62	**Assuming Lognormal Distribution**											
63					95% H-UCL	37.35				90% Chebyshev (MVUE) UCL	40.04	
64					95% Chebyshev (MVUE) UCL	43.68				97.5% Chebyshev (MVUE) UCL	48.74	
65					99% Chebyshev (MVUE) UCL	58.68						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution**											
69												
70	**Nonparametric Distribution Free UCLs**											
71					95% CLT UCL	36.12				95% BCA Bootstrap UCL	36.59	
72					95% Standard Bootstrap UCL	36.03				95% Bootstrap-t UCL	36.88	
73					95% Hall's Bootstrap UCL	37.08				95% Percentile Bootstrap UCL	36.14	
74					90% Chebyshev(Mean, Sd) UCL	39.51				95% Chebyshev(Mean, Sd) UCL	42.91	
75					97.5% Chebyshev(Mean, Sd) UCL	47.62				99% Chebyshev(Mean, Sd) UCL	56.89	
76												
77	**Suggested UCL to Use**											
78					95% Student's-t UCL	36.15						
79												
80	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
81	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
82	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
83												

Site-specific Resident Soil Inputs for SREU

Variable	Resident Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{2-6} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{6-16} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{res-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07
AF_{res-c} (skin adherence factor - child) mg/cm ^{2}	0.2	0.2
AT_{res} (averaging time - resident carcinogenic)	365	365

Output generated 30SEP2023:13:20:11

Site-specific Resident Soil Inputs for SREU

Variable	Resident Soil Default Value	Site-Specific Value
BW_{0-2} (mutagenic body weight) kg	15	15
BW_{2-6} (mutagenic body weight) kg	15	15
BW_{6-16} (mutagenic body weight) kg	80	80
BW_{16-26} (mutagenic body weight) kg	80	80
BW_{res-a} (body weight - adult) kg	80	80
BW_{res-c} (body weight - child) kg	15	15
$DFS_{res-adj}$ (age-adjusted soil dermal factor) mg/kg	103390	103390
$DFSM_{res-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	428260	428260
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration) years	2	2
ED_{2-6} (mutagenic exposure duration) years	4	4
ED_{6-16} (mutagenic exposure duration) years	10	10
ED_{16-26} (mutagenic exposure duration) years	10	10
ED_{res-a} (exposure duration - adult) years	20	20
ED_{res-c} (exposure duration - child) years	6	6
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency) days/year	350	350
EF_{2-6} (mutagenic exposure frequency) days/year	350	350
EF_{6-16} (mutagenic exposure frequency) days/year	350	350
EF_{16-26} (mutagenic exposure frequency) days/year	350	350
EF_{res-a} (exposure frequency - adult) days/year	350	350
EF_{res-c} (exposure frequency - child) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time) hours/day	24	24
ET_{2-6} (mutagenic exposure time) hours/day	24	24
ET_{6-16} (mutagenic exposure time) hours/day	24	24
ET_{16-26} (mutagenic exposure time) hours/day	24	24
ET_{res-a} (adult exposure time) hours/day	24	24
ET_{res-c} (child exposure time) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	2
$IFS_{res-adj}$ (age-adjusted soil ingestion factor) mg/kg	36750	36750

Output generated 30SEP2023:13:20:11

Site-specific Resident Soil Inputs for SREU

Variable	Resident Soil Default Value	Site-Specific Value
$IFSM_{res\text{-}adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3	166833.3
$IRS_{0\text{-}2}$ (mutagenic soil intake rate) mg/day	200	200
$IRS_{2\text{-}6}$ (mutagenic soil intake rate) mg/day	200	200
$IRS_{6\text{-}16}$ (mutagenic soil intake rate) mg/day	100	100
$IRS_{16\text{-}26}$ (mutagenic soil intake rate) mg/day	100	100
$IRS_{res\text{-}a}$ (soil intake rate - adult) mg/day	100	100
$IRS_{res\text{-}c}$ (soil intake rate - child) mg/day	200	200
LT (lifetime) years	70	70
$SA_{0\text{-}2}$ (mutagenic skin surface area) cm^2/day	2373	2373
$SA_{2\text{-}6}$ (mutagenic skin surface area) cm^2/day	2373	2373
$SA_{6\text{-}16}$ (mutagenic skin surface area) cm^2/day	6032	6032
$SA_{16\text{-}26}$ (mutagenic skin surface area) cm^2/day	6032	6032
$SA_{res\text{-}a}$ (skin surface area - adult) cm^2/day	6032	6032
$SA_{res\text{-}c}$ (skin surface area - child) cm^2/day	2373	2373
TR (target risk) unitless	1.0E-06	1.0E-06
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

Output generated 30SEP2023:13:20:11

Site-specific

Resident Risk-Based Regional Screening Levels (RSL) for Soil at SREU

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA
Cobalt	7440-48-4	No	No	Inorganics	-		9.00E-03	P	3.00E-04	P	6.00E-06	P	1	-	1

Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc}\ (cm^3/g)	K_d\ (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C\ (K)	T_C\ Ref	Chemical Type	D_{ia}\ (cm^2/s)	D_{iw}\ (cm^2/s)
-	-	-	4.50E+01	-	-		3200.15	CRC	7398.48	YAWS	INORGANIC	-	-

D_A\ (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL Child THQ=2 (mg/kg)	Dermal SL Child THQ=2 (mg/kg)	Inhalation SL Child THQ=2 (mg/kg)
-	1.36E+09	-	-	-	-	-	4.24E+02	4.24E+02	4.69E+01	-	1.70E+04

Noncarcinogenic SL Child THI=2 (mg/kg)	Ingestion SL Adult THQ=2 (mg/kg)	Dermal SL Adult THQ=2 (mg/kg)	Inhalation SL Adult THQ=2 (mg/kg)	Noncarcinogenic SL Adult THI=2 (mg/kg)	Screening Level (mg/kg)
4.68E+01	5.01E+02	-	1.70E+04	4.86E+02	4.68E+01 nc

Output generated 30SEP2023:13:20:11

Site-specific Resident Risk for Soil at SREU

Chemical	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc}\ (cm^3/g)	K_d\ (cm^3/g)	HLC (atm-m^3/mole)
Cobalt	-		9.00E-03	P	3.00E-04	P	6.00E-06	P	1	-	1	-	-	-	4.50E+01	-
*Total Risk/HI	-		-		-		-		-	-	-	-	-	-	-	-

Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_c\ (K)	T_c\ Ref	Chemical Type	D_{ia}\ (cm^2/s)	D_{iw}\ (cm^2/s)	D_A\ (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Concentration (mg/kg)
-		3200.15	CRC	7398.48	YAWS	INORGANIC	-	-	-	1.36E+09	-	-	-	3.62E+01
-		-		-			-	-	-	-	-	-	-	-

Ingestion Risk	Dermal Risk	Inhalation Risk	Carcinogenic Risk	Ingestion Child HQ	Dermal Child HQ	Inhalation Child HQ	Noncarcinogenic Child HI	Ingestion Adult HQ	Dermal Adult HQ	Inhalation Adult HQ	Noncarcinogenic Adult HI
-	-	8.52E-08	8.52E-08	1.54E+00	-	4.25E-03	1.54E+00	1.44E-01	-	4.25E-03	1.49E-01
-	-	*8.52E-08*	*8.52E-08*	*1.54E+00*	-	*4.25E-03*	*1.54E+00*	*1.44E-01*	-	*4.25E-03*	*1.49E-01*

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Table G-2: Final Site-Wide Remedial Action Report Table
Soil Sampling Results for Metals at Southern AU EU

Notes: This table was taken from the Final Soil Remediation Property Report for Southern American University Exposure Unit (USACE, April 2021).

Location ID	Grid ID	Depth (ft)	Soil Sample ID	Date Collected	Analyte	Result	Units	Recommended Action
SWR-SAU-RA1	SB1E	0-1	SWR-SAU-RA1-SB1E-0001-00	9-9-2019	Cobalt	4.27	mg/kg	
SWR-SAU-RA1	SB1E	4-5	SWR-SAU-RA1-SB1E-0405-00	11-6-2019	Cobalt	14.5	mg/kg	
SWR-SAU-RA1	SB1N	0-1	SWR-SAU-RA1-SB1N-0001-00	9-9-2019	Cobalt	3.99	mg/kg	
SWR-SAU-RA1	SB1N	4-5	SWR-SAU-RA1-SB1N-0405-00	11-6-2019	Cobalt	24.4	mg/kg	
SWR-SAU-RA1	SB1W	0-1	SWR-SAU-RA1-SB1W-0001-00	9-9-2019	Cobalt	4.21	mg/kg	
SWR-SAU-RA1	SB1W	4-5	SWR-SAU-RA1-SB1W-0405-00	11-6-2019	Cobalt	13.9	mg/kg	
SWR-SAU-RA1	SB2E	0-1	SWR-SAU-RA1-SB2E-0001-00	9-9-2019	Cobalt	5.02	mg/kg	
SWR-SAU-RA1	SB2E	4-5	SWR-SAU-RA1-SB2E-0405-00	11-6-2019	Cobalt	34.5	mg/kg	
SWR-SAU-RA1	SB2N	0-1	SWR-SAU-RA1-SB2N-0001-00	9-9-2019	Cobalt	3.14	mg/kg	
SWR-SAU-RA1	SB2N	4-5	SWR-SAU-RA1-SB2N-0405-00	11-6-2019	Cobalt	11.0	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-00	9-9-2019	Cobalt	4.13	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-01	9-9-2019	Cobalt	3.70	mg/kg	
SWR-SAU-RA1	SB2W	4-5	SWR-SAU-RA1-SB2W-0405-00	11-6-2019	Cobalt	34.2	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-00	9-6-2019	Cobalt	4.57	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-01	9-6-2019	Cobalt	4.40	mg/kg	
SWR-SAU-RA1	SBC	1-2	SWR-SAU-RA1-SBC0102-00	9-6-2019	Cobalt	5.63	mg/kg	
SWR-SAU-RA1	SBC	2-3	SWR-SAU-RA1-SBC0203-00	9-6-2019	Cobalt	11.4	mg/kg	
SWR-SAU-RA1	SBC	3-4	SWR-SAU-RA1-SBC0304-00	9-6-2019	Cobalt	**49.4**	mg/kg	
SWR-SAU-RA1	SBC	4-5	SWR-SAU-RA1-SBC0405-00	9-6-2019	Cobalt	**60.1**	mg/kg	
SWR-SAU-RA1	SBC	5-6	SWR-SAU-RA1-SBC0506-00	9-6-2019	Cobalt	**79.0**	mg/kg	
SWR-SAU-RA1	SBC	6-7	SWR-SAU-RA1-SBC0607-00	11-6-2019	Cobalt	**53.1**	mg/kg	
SWR-SAU-RA1	SBC	7-8	SWR-SAU-RA1-SBC0708-00	11-6-2019	Cobalt	**56.4**	mg/kg	
SWR-SAU-RA1	SBC	8-9	SWR-SAU-RA1-SBC0809-00	11-6-2019	Cobalt	**51.8**	mg/kg	
SWR-SAU-RA1	SBC	9-10	SWR-SAU-RA1-SBC0910-00	11-6-2019	Cobalt	**75.7**	mg/kg	
SWR-SAU-RA1	SB1E	0-1	SWR-SAU-RA1-SB1E-0001-00	9-9-2019	Vanadium	26.9	mg/kg	
SWR-SAU-RA1	SB1E	4-5	SWR-SAU-RA1-SB1E-0405-00	11-6-2019	Vanadium	94.8	mg/kg	
SWR-SAU-RA1	SB1N	0-1	SWR-SAU-RA1-SB1N-0001-00	9-9-2019	Vanadium	24.1	mg/kg	
SWR-SAU-RA1	SB1N	4-5	SWR-SAU-RA1-SB1N-0405-00	11-6-2019	Vanadium	71.2	mg/kg	

Soil excavation was conducted at the SAU- RA1 center point down to 10 feet to ensure that the cobalt concentrations exceeding the cleanup criteria 3 to 10 feet were removed.

Location ID	Grid ID	Depth (ft)	Soil Sample ID	Date Collected	Analyte	Result	Units	Recommended Action
SWR-SAU-RA1	SB1W	0-1	SWR-SAU-RA1-SB1W-0001-00	9-9-2019	Vanadium	25.4	mg/kg	
SWR-SAU-RA1	SB1W	4-5	SWR-SAU-RA1-SB1W-0405-00	11-6-2019	Vanadium	33.7	mg/kg	
SWR-SAU-RA1	SB2E	0-1	SWR-SAU-RA1-SB2E-0001-00	9-9-2019	Vanadium	22.1	mg/kg	
SWR-SAU-RA1	SB2E	4-5	SWR-SAU-RA1-SB2E-0405-00	11-6-2019	Vanadium	170.0	mg/kg	
SWR-SAU-RA1	SB2N	0-1	SWR-SAU-RA1-SB2N-0001-00	9-9-2019	Vanadium	24.6	mg/kg	
SWR-SAU-RA1	SB2N	4-5	SWR-SAU-RA1-SB2N-0405-00	11-6-2019	Vanadium	108.0	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-00	9-9-2019	Vanadium	28.4	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-01	9-9-2019	Vanadium	28.4	mg/kg	
SWR-SAU-RA1	SB2W	4-5	SWR-SAU-RA1-SB2W-0405-00	11-6-2019	Vanadium	48.7	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-00	9-6-2019	Vanadium	26.6	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-01	9-6-2019	Vanadium	24.6	mg/kg	
SWR-SAU-RA1	SBC	1-2	SWR-SAU-RA1-SBC0102-00	9-6-2019	Vanadium	29.0	mg/kg	
SWR-SAU-RA1	SBC	2-3	SWR-SAU-RA1-SBC0203-00	9-6-2019	Vanadium	44.5	mg/kg	
SWR-SAU-RA1	SBC	3-4	SWR-SAU-RA1-SBC0304-00	9-6-2019	Vanadium	93.8	mg/kg	
SWR-SAU-RA1	SBC	4-5	SWR-SAU-RA1-SBC0405-00	9-6-2019	Vanadium	104.0	mg/kg	
SWR-SAU-RA1	SBC	5-6	SWR-SAU-RA1-SBC0506-00	9-6-2019	Vanadium	80.8	mg/kg	
SWR-SAU-RA1	SBC	6-7	SWR-SAU-RA1-SBC0607-00	11-6-2019	Vanadium	67.3	mg/kg	
SWR-SAU-RA1	SBC	7-8	SWR-SAU-RA1-SBC0708-00	11-6-2019	Vanadium	101.0	mg/kg	
SWR-SAU-RA1	SBC	8-9	SWR-SAU-RA1-SBC0809-00	11-6-2019	Vanadium	77.1	mg/kg	
SWR-SAU-RA1	SBC	9-10	SWR-SAU-RA1-SBC0910-00	11-6-2019	Vanadium	84.6	mg/kg	
SWR-SAU-RA2	SB1E	0-1	SWR-SAU-RA2-SB1E0001-00	9-9-2019	Cobalt	5.23	mg/kg	Soil excavation was conducted at the SAU- RA2 center point down to 1 foot to ensure that the cobalt detected in the original sampling point (AU-02 with 193 mg/kg of cobalt) was removed.
SWR-SAU-RA2	SB1N	0-1	SWR-SAU-RA2-SB1N0001-00	9-9-2019	Cobalt	5.23	mg/kg	
SWR-SAU-RA2	SB1W	0-1	SWR-SAU-RA2-SB1W0001-00	9-9-2019	Cobalt	7.48	mg/kg	
SWR-SAU-RA2	SB2E	0-1	SWR-SAU-RA2-SB2E0001-00	9-9-2019	Cobalt	6.07	mg/kg	
SWR-SAU-RA2	SB2N	0-1	SWR-SAU-RA2-SB2N0001-00	9-9-2019	Cobalt	4.86	mg/kg	
SWR-SAU-RA2	SB2W	0-1	SWR-SAU-RA2-SB2W0001-00	9-9-2019	Cobalt	3.85	mg/kg	
SWR-SAU-RA2	SBC	0-1	SWR-SAU-RA2-SBC0001-00	9-6-2019	Cobalt	2.74	mg/kg	
SWR-SAU-RA2	SBC	1-2	SWR-SAU-RA2-SBC0102-00	9-6-2019	Cobalt	8.68	mg/kg	
SWR-SAU-RA3	SB1	1-3	SWR-SAU-RA3-SB10103-00	9-6-2019	Mercury	0.54	mg/kg	No soil excavation was proposed at SAU-RA3 - all soil analysis results were below the cleanup criteria for mercury.
SWR-SAU-RA3	SB2	1-3	SWR-SAU-RA3-SB20103-00	9-5-2019	Mercury	0.39	mg/kg	
SWR-SAU-RA3	SB3	0-1	SWR-SAU-RA3-SB30001-00	9-5-2019	Mercury	0.43	mg/kg	
SWR-SAU-RA3	SB3	1-2	SWR-SAU-RA3-SB30102-00	9-5-2019	Mercury	0.31	mg/kg	
SWR-SAU-RA3	SB3	2-3	SWR-SAU-RA3-SB30203-00	9-5-2019	Mercury	0.26	mg/kg	

Location ID	Grid ID	Depth (ft)	Soil Sample ID	Date Collected	Analyte	Result	Units	Recommended Action
SWR-SAU-RA3	SB3	3-4	SWR-SAU-RA3-SB30304-00	9-5-2019	Mercury	0.12	mg/kg	
SWR-SAU-RA3	SB4	1-3	SWR-SAU-RA3-SB40103-00	9-5-2019	Mercury	0.36	mg/kg	
SWR-SAU-RA3	SB4	1-3	SWR-SAU-RA3-SB40103-01	9-5-2019	Mercury	0.38	mg/kg	
SWR-SAU-RA3	SB5	1-3	SWR-SAU-RA3-SB50103-00	9-5-2019	Mercury	0.57	mg/kg	
SWR-SAU-RA3	SB6	1-3	SWR-SAU-RA3-SB60103-00	9-5-2019	Mercury	0.29	mg/kg	
SWR-SAU-RA3	SB7	1-3	SWR-SAU-RA3-SB70103-00	9-5-2019	Mercury	0.13	mg/kg	
SWR-SAU-RA3	SB8	1-3	SWR-SAU-RA3-SB80103-00	9-6-2019	Mercury	0.74	mg/kg	
SWR-SAU-RA3	SB9	1-3	SWR-SAU-RA3-SB90103-00	9-6-2019	Mercury	1.37	mg/kg	
SWR-SAU-RA3	SB10	1-3	SWR-SAU-RA3-SB100103-00	9-6-2019	Mercury	0.57	mg/kg	
SWR-SAU-RA3	SB11	1-3	SWR-SAU-RA3-SB110103-00	9-5-2019	Mercury	0.25	mg/kg	
SWR-SAU-RA3	SB11	1-3	SWR-SAU-RA3-SB110103-01	9-5-2019	Mercury	0.31	mg/kg	
SWR-SAU-RA3	SB12	1-3	SWR-SAU-RA3-SB120103-00	9-5-2019	Mercury	0.38	mg/kg	
SWR-SAU-RA3	SB13	1-3	SWR-SAU-RA3-SB130103-00	9-5-2019	Mercury	0.56	mg/kg	
SWR-SAU-RA3	SB14	1-3	SWR-SAU-RA3-SB140103-00	9-5-2019	Mercury	0.76	mg/kg	
SWR-SAU-RA3	SB15	1-3	SWR-SAU-RA3-SB150103-00	9-6-2019	Mercury	1.13	mg/kg	
SWR-SAU-RA3	SB16	1-3	SWR-SAU-RA3-SB160103-00	9-6-2019	Mercury	1.19	mg/kg	

Notes:

Soil samples removed during soil remediation

Red Text indicates sample results that exceed the listed cleanup goal.

Sample Grid identifiers:
SBC - center soil boring
SB12 - soil boring 12 in the 4x4-foot sampling grid SB1W - west soil boring, 1st step-out at 2.5 feet SB2N - north soil boring, 2nd step-out at 5 feet
ft - feet
mg/kg - milligram per kilogram

Edited Table G-2
Pre-excavation cobalt concentrations replaced with backfill soil cobalt concentration, and removed vanadium/mercury results since did not exceed RGs

Location ID	Grid ID	Depth (ft)	Soil Sample ID	Date Collected	Analyte	Result	Units	Recommended Action
SWR-SAU-RA1	SB1E	0-1	SWR-SAU-RA1-SB1E-0001-00	9-9-2019	Cobalt	4.27	mg/kg	Soil excavation was conducted at the SAU- RA1 center point down to 10 feet to ensure that the cobalt concentrations exceeding the cleanup criteria 3 to 10 feet were removed.
SWR-SAU-RA1	SB1E	4-5	SWR-SAU-RA1-SB1E-0405-00	11-6-2019	Cobalt	14.5	mg/kg	
SWR-SAU-RA1	SB1N	0-1	SWR-SAU-RA1-SB1N-0001-00	9-9-2019	Cobalt	3.99	mg/kg	
SWR-SAU-RA1	SB1N	4-5	SWR-SAU-RA1-SB1N-0405-00	11-6-2019	Cobalt	24.4	mg/kg	
SWR-SAU-RA1	SB1W	0-1	SWR-SAU-RA1-SB1W-0001-00	9-9-2019	Cobalt	4.21	mg/kg	
SWR-SAU-RA1	SB1W	4-5	SWR-SAU-RA1-SB1W-0405-00	11-6-2019	Cobalt	13.9	mg/kg	
SWR-SAU-RA1	SB2E	0-1	SWR-SAU-RA1-SB2E-0001-00	9-9-2019	Cobalt	5.02	mg/kg	
SWR-SAU-RA1	SB2E	4-5	SWR-SAU-RA1-SB2E-0405-00	11-6-2019	Cobalt	34.5	mg/kg	
SWR-SAU-RA1	SB2N	0-1	SWR-SAU-RA1-SB2N-0001-00	9-9-2019	Cobalt	3.14	mg/kg	
SWR-SAU-RA1	SB2N	4-5	SWR-SAU-RA1-SB2N-0405-00	11-6-2019	Cobalt	11.0	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-00	9-9-2019	Cobalt	4.13	mg/kg	
SWR-SAU-RA1	SB2W	0-1	SWR-SAU-RA1-SB2W-0001-01	9-9-2019	Cobalt	3.70	mg/kg	
SWR-SAU-RA1	SB2W	4-5	SWR-SAU-RA1-SB2W-0405-00	11-6-2019	Cobalt	34.2	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	0-1	SWR-SAU-RA1-SBC0001-0-01	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	1-2	SWR-SAU-RA1-SBC0102-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	2-3	SWR-SAU-RA1-SBC0203-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	3-4	SWR-SAU-RA1-SBC0304-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	4-5	SWR-SAU-RA1-SBC0405-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	5-6	SWR-SAU-RA1-SBC0506-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	6-7	SWR-SAU-RA1-SBC0607-00	11-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	7-8	SWR-SAU-RA1-SBC0708-00	11-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	8-9	SWR-SAU-RA1-SBC0809-00	11-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA1	SBC	9-10	SWR-SAU-RA1-SBC0910-00	11-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA2	SB1E	0-1	SWR-SAU-RA2-SB1E0001-00	9-9-2019	Cobalt	5.23	mg/kg	Soil excavation was conducted at the SAU- RA2 center point down to 1 foot to ensure that the cobalt detected in the original sampling point (AU-02 with 193 mg/kg of cobalt) was removed.
SWR-SAU-RA2	SB1N	0-1	SWR-SAU-RA2-SB1N0001-00	9-9-2019	Cobalt	5.23	mg/kg	
SWR-SAU-RA2	SB1W	0-1	SWR-SAU-RA2-SB1W0001-00	9-9-2019	Cobalt	7.48	mg/kg	
SWR-SAU-RA2	SB2E	0-1	SWR-SAU-RA2-SB2E0001-00	9-9-2019	Cobalt	6.07	mg/kg	
SWR-SAU-RA2	SB2N	0-1	SWR-SAU-RA2-SB2N0001-00	9-9-2019	Cobalt	4.86	mg/kg	
SWR-SAU-RA2	SB2W	0-1	SWR-SAU-RA2-SB2W0001-00	9-9-2019	Cobalt	3.85	mg/kg	
SWR-SAU-RA2	SBC	0-1	SWR-SAU-RA2-SBC0001-00	9-6-2019	Cobalt	11.00	mg/kg	
SWR-SAU-RA2	SBC	1-2	SWR-SAU-RA2-SBC0102-00	9-6-2019	Cobalt	8.68	mg/kg	

Blue highlighted cells signify cobalt exceedances that determined the excavation footprint.

1	**UCL Statistics for Uncensored Full Data Sets**										
2											
3	User Selected Options										
4	Date/Time of Computation	ProUCL 5.2 30-Sep-23 14:38:36									
5	From File	WorkSheet.xls									
6	Full Precision	OFF									
7	Confidence Coefficient	95%									
8	Number of Bootstrap Operations	2000									
9											
10											
11	**SAUEU with 11 mg/kg to excv soil**										
12											
13	**General Statistics**										
14	Total Number of Observations			32			Number of Distinct Observations				19
15							Number of Missing Observations				0
16	Minimum			3.14			Mean				10.45
17	Maximum			34.5			Median				11
18	SD			7.656			Std. Error of Mean				1.353
19	Coefficient of Variation			0.733			Skewness				2.102
20											
21	**Normal GOF Test**										
22	Shapiro Wilk Test Statistic			0.721			**Shapiro Wilk GOF Test**				
23	1% Shapiro Wilk Critical Value			0.904			Data Not Normal at 1% Significance Level				
24	Lilliefors Test Statistic			0.315			**Lilliefors GOF Test**				
25	1% Lilliefors Critical Value			0.18			Data Not Normal at 1% Significance Level				
26	**Data Not Normal at 1% Significance Level**										
27											
28	**Assuming Normal Distribution**										
29	**95% Normal UCL**						**95% UCLs (Adjusted for Skewness)**				
30	95% Student's-t UCL			12.74			95% Adjusted-CLT UCL (Chen-1995)				13.21
31							95% Modified-t UCL (Johnson-1978)				12.83
32											
33	**Gamma GOF Test**										
34	A-D Test Statistic			1.579			**Anderson-Darling Gamma GOF Test**				
35	5% A-D Critical Value			0.755			Data Not Gamma Distributed at 5% Significance Level				
36	K-S Test Statistic			0.23			**Kolmogorov-Smirnov Gamma GOF Test**				
37	5% K-S Critical Value			0.157			Data Not Gamma Distributed at 5% Significance Level				
38	**Data Not Gamma Distributed at 5% Significance Level**										
39											
40	**Gamma Statistics**										
41	k hat (MLE)			2.667			k star (bias corrected MLE)				2.438
42	Theta hat (MLE)			3.918			Theta star (bias corrected MLE)				4.286
43	nu hat (MLE)			170.7			nu star (bias corrected)				156
44	MLE Mean (bias corrected)			10.45			MLE Sd (bias corrected)				6.692
45							Approximate Chi Square Value (0.05)				128.1
46	Adjusted Level of Significance			0.0416			Adjusted Chi Square Value				126.8
47											
48	**Assuming Gamma Distribution**										
49	95% Approximate Gamma UCL			12.72			95% Adjusted Gamma UCL				12.86
50											
51	**Lognormal GOF Test**										
52	Shapiro Wilk Test Statistic			0.901			**Shapiro Wilk Lognormal GOF Test**				
53	10% Shapiro Wilk Critical Value			0.941			Data Not Lognormal at 10% Significance Level				
54	Lilliefors Test Statistic			0.219			**Lilliefors Lognormal GOF Test**				
55	10% Lilliefors Critical Value			0.142			Data Not Lognormal at 10% Significance Level				
56	**Data Not Lognormal at 10% Significance Level**										
57											
58	**Lognormal Statistics**										
59	Minimum of Logged Data			1.144			Mean of logged Data				2.147
60	Maximum of Logged Data			3.541			SD of logged Data				0.621
61											
62	**Assuming Lognormal Distribution**										
63	95% H-UCL			13.03			90% Chebyshev (MVUE) UCL				13.94

	A	B	C	D	E	F	G	H	I	J	K	L
64	95% Chebyshev (MVUE) UCL					15.58	97.5% Chebyshev (MVUE) UCL					17.86
65	99% Chebyshev (MVUE) UCL					22.34						
66												
67	**Nonparametric Distribution Free UCL Statistics**											
68	**Data do not follow a Discernible Distribution**											
69												
70	**Nonparametric Distribution Free UCLs**											
71	95% CLT UCL					12.67	95% BCA Bootstrap UCL					13.11
72	95% Standard Bootstrap UCL					12.64	95% Bootstrap-t UCL					13.41
73	95% Hall's Bootstrap UCL					13.92	95% Percentile Bootstrap UCL					12.87
74	90% Chebyshev(Mean, Sd) UCL					14.51	95% Chebyshev(Mean, Sd) UCL					16.35
75	97.5% Chebyshev(Mean, Sd) UCL					18.9	99% Chebyshev(Mean, Sd) UCL					23.91
76												
77	**Suggested UCL to Use**											
78	95% Student's-t UCL					12.74						
79												
80	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
81	Recommendations are based upon data size, data distribution, and skewness using results from simulation studies.											
82	However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.											
83												

Site-specific Resident Soil Inputs for Southern AUEU

Variable	Resident Soil Default Value	Site-Specific Value
A (PEF Dispersion Constant)	16.2302	16.2302
A (VF Dispersion Constant)	11.911	11.911
A (VF Dispersion Constant - mass limit)	11.911	11.911
B (PEF Dispersion Constant)	18.7762	18.7762
B (VF Dispersion Constant)	18.4385	18.4385
B (VF Dispersion Constant - mass limit)	18.4385	18.4385
City (PEF Climate Zone) Selection	Default	Default
City (VF Climate Zone) Selection	Default	Default
C (PEF Dispersion Constant)	216.108	216.108
C (VF Dispersion Constant)	209.7845	209.7845
C (VF Dispersion Constant - mass limit)	209.7845	209.7845
foc (fraction organic carbon in soil) g/g	0.006	0.006
F(x) (function dependent on U_m/U_t) unitless	0.194	0.194
n (total soil porosity) L_{pore}/L_{soil}	0.43396	0.43396
p_h (dry soil bulk density) g/cm ^{3}	1.5	1.5
p_h (dry soil bulk density - mass limit) g/cm ^{3}	1.5	1.5
PEF (particulate emission factor) m ^{3}/kg	1359344438	1359344438
p_s (soil particle density) g/cm ^{3}	2.65	2.65
Q/C_{wind} (g/m^2-s per kg/m^3)	93.77	93.77
Q/C_{vol} (g/m^2-s per kg/m^3)	68.18	68.18
Q/C_{vol} (g/m^2-s per kg/m^3 - mass limit)	68.18	68.18
A_s (PEF acres)	0.5	0.5
A_s (VF acres)	0.5	0.5
A_s (VF mass-limit acres)	0.5	0.5
AF_{0-2} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{2-6} (mutagenic skin adherence factor) mg/cm ^{2}	0.2	0.2
AF_{6-16} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{16-26} (mutagenic skin adherence factor) mg/cm ^{2}	0.07	0.07
AF_{res-a} (skin adherence factor - adult) mg/cm ^{2}	0.07	0.07
AF_{res-c} (skin adherence factor - child) mg/cm ^{2}	0.2	0.2
AT_{res} (averaging time - resident carcinogenic)	365	365

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Site-specific Resident Soil Inputs for Southern AUEU

Variable	Resident Soil Default Value	Site-Specific Value
BW_{0-2} (mutagenic body weight) kg	15	15
BW_{2-6} (mutagenic body weight) kg	15	15
BW_{6-16} (mutagenic body weight) kg	80	80
BW_{16-26} (mutagenic body weight) kg	80	80
BW_{res-a} (body weight - adult) kg	80	80
BW_{res-c} (body weight - child) kg	15	15
$DFS_{res-adj}$ (age-adjusted soil dermal factor) mg/kg	103390	103390
$DFSM_{res-adj}$ (mutagenic age-adjusted soil dermal factor) mg/kg	428260	428260
ED_{res} (exposure duration) years	26	26
ED_{0-2} (mutagenic exposure duration) years	2	2
ED_{2-6} (mutagenic exposure duration) years	4	4
ED_{6-16} (mutagenic exposure duration) years	10	10
ED_{16-26} (mutagenic exposure duration) years	10	10
ED_{res-a} (exposure duration - adult) years	20	20
ED_{res-c} (exposure duration - child) years	6	6
EF_{res} (exposure frequency) days/year	350	350
EF_{0-2} (mutagenic exposure frequency) days/year	350	350
EF_{2-6} (mutagenic exposure frequency) days/year	350	350
EF_{6-16} (mutagenic exposure frequency) days/year	350	350
EF_{16-26} (mutagenic exposure frequency) days/year	350	350
EF_{res-a} (exposure frequency - adult) days/year	350	350
EF_{res-c} (exposure frequency - child) days/year	350	350
ET_{res} (exposure time) hours/day	24	24
ET_{0-2} (mutagenic exposure time) hours/day	24	24
ET_{2-6} (mutagenic exposure time) hours/day	24	24
ET_{6-16} (mutagenic exposure time) hours/day	24	24
ET_{16-26} (mutagenic exposure time) hours/day	24	24
ET_{res-a} (adult exposure time) hours/day	24	24
ET_{res-c} (child exposure time) hours/day	24	24
THQ (target hazard quotient) unitless	0.1	2
$IFS_{res-adj}$ (age-adjusted soil ingestion factor) mg/kg	36750	36750

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Site-specific Resident Soil Inputs for Southern AUEU

Variable	Resident Soil Default Value	Site-Specific Value
$IFSM_{res\text{-}adj}$ (mutagenic age-adjusted soil ingestion factor) mg/kg	166833.3	166833.3
$IRS_{0\text{-}2}$ (mutagenic soil intake rate) mg/day	200	200
$IRS_{2\text{-}6}$ (mutagenic soil intake rate) mg/day	200	200
$IRS_{6\text{-}16}$ (mutagenic soil intake rate) mg/day	100	100
$IRS_{16\text{-}26}$ (mutagenic soil intake rate) mg/day	100	100
$IRS_{res\text{-}a}$ (soil intake rate - adult) mg/day	100	100
$IRS_{res\text{-}c}$ (soil intake rate - child) mg/day	200	200
LT (lifetime) years	70	70
$SA_{0\text{-}2}$ (mutagenic skin surface area) cm^2/day	2373	2373
$SA_{2\text{-}6}$ (mutagenic skin surface area) cm^2/day	2373	2373
$SA_{6\text{-}16}$ (mutagenic skin surface area) cm^2/day	6032	6032
$SA_{16\text{-}26}$ (mutagenic skin surface area) cm^2/day	6032	6032
$SA_{res\text{-}a}$ (skin surface area - adult) cm^2/day	6032	6032
$SA_{res\text{-}c}$ (skin surface area - child) cm^2/day	2373	2373
TR (target risk) unitless	1.0E-06	1.0E-06
T_w (groundwater temperature) Celsius	25	25
$Theta_a$ (air-filled soil porosity) L_{air}/L_{soil}	0.28396	0.28396
$Theta_w$ (water-filled soil porosity) L_{water}/L_{soil}	0.15	0.15
T (exposure interval) s	819936000	819936000
T (exposure interval) yr	26	26
U_m (mean annual wind speed) m/s	4.69	4.69
U_t (equivalent threshold value)	11.32	11.32
V (fraction of vegetative cover) unitless	0.5	0.5

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Site-specific

Resident Risk-Based Regional Screening Levels (RSL) for Soil at Southern AUEU

Key: I = IRIS; P = PPRTV; O = OPP; A = ATSDR; C = Cal EPA; X = PPRTV Screening Level; H = HEAST; D = OW; W = TEF applied; E = RPF applied; G = see user guide; U = user provided; ca = cancer; nc = noncancer; * = where: nc SL < 100X ca SL; ** = where nc SL < 10X ca SL; SSL values are based on DAF=1; max = ceiling limit exceeded; sat = Csat exceeded.

Chemical	CAS Number	Mutagen?	Volatile?	Chemical Type	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA
Cobalt	7440-48-4	No	No	Inorganics	-		9.00E-03	P	3.00E-04	P	6.00E-06	P	1	-	1

Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc}\ (cm^3/g)	K_d\ (cm^3/g)	HLC (atm-m^3/mole)	Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_C\ (K)	T_C\ Ref	Chemical Type	D_{ia}\ (cm^2/s)	D_{iw}\ (cm^2/s)
-	-	-	4.50E+01	-	-		3200.15	CRC	7398.48	YAWS	INORGANIC	-	-

D_A\ (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Ingestion SL TR=1E-06 (mg/kg)	Dermal SL TR=1E-06 (mg/kg)	Inhalation SL TR=1E-06 (mg/kg)	Carcinogenic SL TR=1E-06 (mg/kg)	Ingestion SL Child THQ=2 (mg/kg)	Dermal SL Child THQ=2 (mg/kg)	Inhalation SL Child THQ=2 (mg/kg)
-	1.36E+09	-	-	-	-	-	4.24E+02	4.24E+02	4.69E+01	-	1.70E+04

Noncarcinogenic SL Child THI=2 (mg/kg)	Ingestion SL Adult THQ=2 (mg/kg)	Dermal SL Adult THQ=2 (mg/kg)	Inhalation SL Adult THQ=2 (mg/kg)	Noncarcinogenic SL Adult THI=2 (mg/kg)	Screening Level (mg/kg)
4.68E+01	5.01E+02	-	1.70E+04	4.86E+02	4.68E+01 nc

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Site-specific Resident Risk for Soil at Southern AUEU

Chemical	SF_o (mg/kg-day)$^{-1}$	SF_o Ref	IUR (ug/m^3)$^{-1}$	IUR Ref	RfD (mg/kg-day)	RfD Ref	RfC (mg/m^3)	RfC Ref	GIABS	ABS	RBA	Soil Saturation Concentration (mg/kg)	S (mg/L)	K_{oc}\ (cm^3/g)	K_d\ (cm^3/g)	HLC (atm-m^3/mole)
Cobalt	-		9.00E-03	P	3.00E-04	P	6.00E-06	P	1	-	1	-	-	-	4.50E+01	-
*Total Risk/HI	-		-		-		-		-	-	-	-	-	-	-	-

Henry's Law Constant Used in Calcs (unitless)	H` and HLC Ref	Normal Boiling Point BP (K)	BP Ref	Critical Temperature T_c\ (K)	T_c\ Ref	Chemical Type	D_{ia}\ (cm^2/s)	D_{iw}\ (cm^2/s)	D_A\ (cm^2/s)	Particulate Emission Factor (m^3/kg)	Volatilization Factor Unlimited Reservoir (m^3/kg)	Volatilization Factor Mass Limit (m^3/kg)	Volatilization Factor Selected (m^3/kg)	Concentration (mg/kg)
-		3200.15	CRC	7398.48	YAWS	INORGANIC	-	-	-	1.36E+09	-	-	-	1.27E+01
-		-		-			-	-	-	-	-	-	-	-

Ingestion Risk	Dermal Risk	Inhalation Risk	Carcinogenic Risk	Ingestion Child HQ	Dermal Child HQ	Inhalation Child HQ	Noncarcinogenic Child HI	Ingestion Adult HQ	Dermal Adult HQ	Inhalation Adult HQ	Noncarcinogenic Adult HI
-	-	2.99E-08	2.99E-08	5.41E-01	-	1.49E-03	5.43E-01	5.07E-02	-	1.49E-03	5.22E-02
-	-	*2.99E-08*	*2.99E-08*	*5.41E-01*	-	*1.49E-03*	*5.43E-01*	*5.07E-02*	-	*1.49E-03*	*5.22E-02*

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APPENDIX H – RISK SUMMARY TABLES FROM SOIL REMEDIATION AT PSB

Table 11
Exposure Point Concentration Summary
Spring Valley PSB Remediation Property Report

Scenario Timeframe: Current/Future
Medium: Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL	Maximum Concentration	Exposure Point Concentration		
						Value	Statistic	Rationale
Soil	Benzo(A)Pyrene	mg/kg	0.22	0.21	0.38	0.21	95% KM (t) UCL	(1)
	Aluminum	mg/kg	14,829	16,555	35,000	16,555	95% Student's-t UCL	(1)
	Antimony	mg/kg	1.64	1.87	8.40	1.87	Gamma Adjusted KM-UCL	(2)
	Arsenic	mg/kg	4.56	5.45	18.00	5.45	95% KM Approximate Gamma UCL	(2)
	Cobalt	mg/kg	12.3	14.1	63.4	14.1	95% H-UCL	(3)
	Copper	mg/kg	62.1	80.29	456	80.3	95% H-UCL	(3)
	Iron	mg/kg	21,088	31,375	89,700	31,375	95% Chebyshev (Mean, Sd) UCL	(4)
	Lead	mg/kg	30.1	30.1	355	30.1	Arithmetic Mean	(5)
	Manganese	mg/kg	283	341	1,040	341	95% Adjusted Gamma UCL	(2)
	Mercury, Elemental	mg/kg	0.49	0.92	4.91	0.92	95% KM (Chebyshev) UCL	(4)
	Nickel	mg/kg	35.2	80.9	429	80.9	95% Chebyshev (Mean, Sd) UCL	(4)
	Vanadium	mg/kg	55.7	91.2	460	91.2	95% Chebyshev (Mean, Sd) UCL	(4)

Notes:

The EPC is based on the lower of the 95% UCL and the maximum detected concentration.

Rationale Codes:

(1) Based on ProUCL recommendation, data is normally distributed.

(2) Based on ProUCL recommendation, data is gamma distributed.

(3) Based on ProUCL recommendation, data is lognormally distributed.

(4) Data distribution is not discernable, UCL selection is based on ProUCL recommendation.

(5) Lead is a special case, the arithmetic mean is the EPC for lead. See text.

% – percent

EPC – exposure point concentration

mg/kg – milligram(s) per kilogram

PSB – Public Safety Building

UCL – upper confidence limit

Table 12
Risk Summary for Spring Valley PSB Area
Spring Valley PSB Remediation Property Report

Soil COPC	EPC (mg/kg)	Residential Soil RSL		Residential		Industrial Soil RSL		Industrial Worker	
		Cancer TR, 1E-06	Non-Cancer THQ, 1.0	Cancer Risk	Hazard Quotient	Cancer TR, 1E-06	Non-Cancer THQ, 1.0	Cancer Risk	Hazard Quotient
Benzo(A)Pyrene	0.21	1E-01	2E+01	2E-06	1E-02	2E+00	2E+02	1E-07	1E-03
Aluminum	16,555	--	8E+04	--	2E-01	--	1E+06	--	2E-02
Antimony	1.87	--	3E+01	--	6E-02	--	5E+02	--	4E-03
Arsenic	5.45	7E-01	4E+01	8E-06	2E-01	3E+00	5E+02	2E-06	1E-02
Cobalt	14.13	4E+02	2E+01	3E-08	6E-01	2E+03	4E+02	7E-09	4E-02
Copper	80.29	--	3E+03	--	3E-02	--	5E+04	--	2E-03
Iron	31,375	--	6E+04	--	6E-01	--	8E+05	--	4E-02
Lead	30.06	--	--	--	--	--	--	--	--
Manganese	341	--	2E+03	--	2E-01	--	3E+04	--	1E-02
Mercury, Elemental	0.92	--	1E+01	--	8E-02	--	5E+01	--	2E-02
Nickel	80.92	2E+04	2E+03	5E-09	5E-02	6E+04	2E+04	1E-09	4E-03
Vanadium	91.20	--	4E+02	--	2E-01	--	6E+03	--	2E-02
Soil Cancer Risks Total:				***1E-05***				***2E-06***	
Soil Hazard Index Total:					***2.2***				*0.2*

Notes:

BOLD CR or HQ indicates a risk above respective point of departure (>1E-06 for CR and >1.0 for HI). Total risk estimates presented as one significant figure per USEPA RAGS.

The EPC is based on the lower of the 95% UCL and the maximum detected concentration.

CR = EPC*TR/RSL (based on TR of 1E-06)

Non-cancer hazard quotient = EPC/RSL (based on THQ of 1)

-- indicates no benchmark available

% – percent

> – greater than

COPC – contaminant of potential concern

CR – cancer risk

EPC – exposure point concentration

FUDS – Formerly Used Defense Site

HI – hazard index

HQ – hazard quotient

mg/kg – milligram per kilogram

PSB – Public Safety Building

RAGS – Risk Assessment Guidance for Superfund

RSL – Regional Screening Level

THQ – target hazard quotient

TR – target risk

UCL – upper confidence limit

USEPA – U.S. Environmental Protection Agency

APPENDIX I – FYR DATA ANALYSIS AND RESULTS FROM GEOPHYSICAL INVESTIGATIONS AND ROE REFUSAL LETTERS AT 4055 52ND TERRACE

FYR Data Analysis of 4055 52nd Terrace, Spring Valley

During the RI, the property owners at 4055 52nd Terrace granted ROE (the property owners at this property have not changed since the RI), and the property was investigated and fully delineated to determine nature and extent of potential MEC and CWM contamination. The investigation of 4055 52nd Terrace during the RI was conducted in a phased approach.

The property was initially investigated in 2009 to identify geophysical anomalies. The instruments used during the 2009 investigation were the Geonics EM61-MK2 High Sensitivity Metal Detector and Geometrics G-858 Cesium Vapor Magnetometer (in gradiometer configuration). The geophysical survey area measured approximately 0.20 acres and includes all accessible areas within 4055 52nd Terrace. Prior to data collection, all geophysical instruments were assembled and inspected to ensure proper performance and function. Site noise tests were performed before and after the geophysical surveys. These tests were designed to identify static levels of background noise, which allowed for the discrimination of noise caused by instrument malfunction and site characteristics. Multiple single item electromagnetic and magnetic anomalies were identified during the survey at the property and selected automatically using the UX-Detect Blakely peak-picking algorithm. A normal level of peak detection was used to select all electromagnetic peaks above a 22 millivolt (mV) cut-off level. The cut-off level of 22 mV was used because it is below the lowest typical electromagnetic target response, so it is a conservative threshold level to use to ensure targets are not missed during the survey. Parameters for this analysis were statistically determined from both static and dynamic test data collected at the 4055 52nd Terrace property. A total of 79 targets, comprising 54 electromagnetic and 61 magnetic point sources, were identified on the geophysical plots for 4055 52nd Terrace. These anomalies were selected based on response characteristics observed in the geophysical data. Of the total number identified, 35 were coincident or co-located electromagnetic and magnetic anomalies. The Anomaly Review Board for Spring Valley, which consisted of representatives from USACE, USEPA, and DOEE, devised a Geophysical Anomaly Target Prioritization scheme for determining which anomalies would be selected for further investigation. The possible classification outcomes for each point source anomaly ranging from A indicating the highest priority, to D, indicating the lowest priority. Of the 79 total targets run through the classification scheme, 27 targets (34.2% of the total targets) achieved the priority ranking value of A, 11 targets (13.9% of total) achieved a priority ranking of B, 15 anomalies (19.0% of total) achieved a priority ranking of C. The remaining 26 targets, or 32.9%, achieved a priority ranking of D (USACE, 2011).

The next phase of investigation at 4055 52nd Terrace was conducted between 2010 and 2011. This investigation focused on reacquiring the anomalies identified during the 2009 investigation and intrusively investigate the 53 single item anomalies that were ranked A through C during the 2009 investigation. The reacquisition process consisted of locating and identifying the low probability anomalies using a Geonics® EM61-MK2 time-domain electromagnetic detector (EM61-MK2) and the Geometrics G-858 Cesium Vapor Magnetometer (G-858). Quality control (QC) testing of the EM61-MK2 and G-858 was conducted daily on each instrument, which consisted of static background and spike tests performed during the geophysical reacquisition, digital geophysical mapping, and post-excavation QC. Once the targets were reacquired, the intrusive investigations were conducted by hand digging in open air. After the target had been dug, the EM61-MK2 and G-858 were used to verify that the anomaly source had been removed at each anomaly location. One anomaly (52-14) was not investigated at the request of the homeowner due to its location beneath hardscape. The 53 single item anomalies were investigated, and all were found to be related to cultural debris; no MEC, MD, or CWM items or other AUES-related items were identified at these locations. Seven single item anomalies achieved 90 percent reduction, while 46 single item anomalies did not. Anomalies that did not achieve 90 percent reduction were due to the item being left in place, high residual background levels produced by nearby items with magnetic characteristics or were reduced to background levels. Items left in place include tree root baskets (Target IDs 52-3, 52-17, 52-18, 52-20, 52-22, 52-30, 52-49, and 52-63), utilities (Target IDs 52-3, 52-65, and 52-80), irrigation lines (Target IDs 52-21 and 52-77), and concrete support items (Target IDs 52-39, 52-62, and 52-82). In the case of anomalies Target IDs 52-1 and 52-2 which did not achieve 90 percent reductions, it was determined that a linear

subsurface object located directly above and parallel to a marked gas and electric lines which resulted in a distribution of EM and magnetic values at and between those anomalies. Similarly, the distribution of EM and magnetic values in the area of anomalies 52-47 and 52-65 indicated a subsurface electrical line buried along the edge of the reinforced concrete footing of the stone patio (USACE, 2011).

The conclusions of the RI found that no MEC or MD was found at this property during the RI, nor was MEC or MD found at the properties abutting the property (Figure 5 in **Appendix F**). MD was found east of 4055 52nd Terrace on properties on 52nd Street, and MEC and MD were found in the Dalecarlia Parkway west of the 4055 52nd Terrace property. The MEC HA score from the 2015 RI for the Static Test Fire Areas, which includes the Static Test Fire Area West where the property in question is located, was calculated and the results were a score of four (4) (please refer to Table 2). A MEC HA score of four correlates to a low explosive hazard condition. Based on the results of the RI, the 4055 52nd Terrace property was sufficiently delineated through geophysical surveys and intrusive investigations of targets. However, due to the MEC and MD finds during the RI at other properties within the Static Test Fire Areas, the Static Test Fire Areas were selected as remedial action areas in the DD. During the remedial action implementation, no MEC was found in the properties surrounding 4055 52nd Terrace, only MD (unidentified fragmentation) was found in properties east and south of 4055 52nd Terrace (See Figure 7 in **Appendix F**). During the remedial action, the MPV and analog coverage of the Static Test Fire Area West achieved 94.9% coverage of the area and conducted 1,407 intrusive target investigations and no MEC was found within the Static Test Fire Area West. Table I-1 shows the coverage that was achieved at the areas of concern selected for remedial action, as presented in the *Draft-Final Site-Wide Remedial Action Report*.

Table I-1: Remedial Action Coverage and Findings

Remedial Action Area	Property Owner Participation Rate	MPV and Analog Coverage of Accessible Areas	Intrusive Target Investigations Completed	MEC Finds Removed
AOI-13	100%	93.7%	254	Yes – one 3-inch Stokes mortar (considered to be from AUES)
Static Test Fire Area East	100%	94.6%	545	Yes – one 3-inch smoothbore cannonball (Civil War era; not considered to be from AUES)
Static Test Fire Area West (4055 52nd Terrace is located in this area)	95%	94.9%	1,407	No MEC found
Function Test Range Impact Area	100%	94.3%	949	Yes – one Livens projectile (considered to be from AUES)

FINAL GEOPHYSICAL INVESTIGATION REPORT

4055 52nd TERRACE
Spring Valley FUDS
Washington, DC

Prepared for:

BALTIMORE DISTRICT
U.S. ARMY CORPS OF ENGINEERS
Baltimore, Maryland

and

U.S. ARMY ENGINEERING & SUPPORT CENTER
Huntsville, Alabama

Contract Number: **W912DR-06-D-0002**
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ERT Project #: 3007-008

October 2009

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FINAL GEOPHYSICAL INVESTIGATION REPORT

4055 52nd TERRACE
Spring Valley FUDS
Washington, DC

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Date

ERT – Project Manager
Neil Jones

10/13/09
Date

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TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

AS	Analytical Signal
AUES	American University Experiment Station
CWM	Chemical Warfare Materiel
DGM	Digital Geophysical Mapping
DOD	Department of Defense
DQO	Data Quality Objective
EM	Electromagnetic
EM61-MK2	Geonics EM61-MK2 metal detector
ERT	Earth Resources Technology, Inc.
ft	Feet
FUDS	Formerly Used Defense Sites
GPO	Geophysical Prove-out
G-858	Geometrics G-858 cesium vapor magnetometer
G-856	Geometrics G-856 proton precession magnetometer
m	Meter
MEC	Munitions and Explosives of Concern
mV	milliVolts
NAD83	North American Datum 1983
nT	nanoTesla
PVC	Polyvinyl chloride
QA	Quality Assurance
QC	Quality Control
SOW	Scope of Work
St.	Street
TDEM	Time-domain Electromagnetic
USACE	U.S. Army Corp of Engineers
µsec	Microseconds

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1.0 INTRODUCTION

1.1 Purpose

Earth Resources Technology, Inc. (ERT), under contract with the U.S. Army Corps of Engineers (USACE), Baltimore District, performed a geophysical investigation on 11 February 2009 at 4055 52nd Terrace located within the Spring Valley Formerly Used Defense Site (FUDS) of Washington, DC. The geophysical survey was conducted on the open accessible areas within the survey boundaries. Electromagnetic (EM61-MK2) and magnetometry (G-858) surveying methods were used to collect geophysical data needed to characterize the subsurface conditions. The area of investigation is part of the Spring Valley FUDS, which was utilized during World War I by the United States Government. Burial pits and trenches containing munitions and explosives of concern and chemical warfare materiel (MEC/CWM) have been encountered recently at this site and additional pits or trenches may still exist. Areas of Interest (AOI) and Points of Interest (POI) have been identified on historical documentation in the region of 4055 52nd Terrace including AOI 24 and POI 39 as well as groundscars interpreted from aerial photographs dated 1918. The property has been subjected to cuts up to 14 feet (ft).

1.2 Background

During World War I, the United States Government established the American University Experiment Station (AUES) to investigate the testing, production, and effects of noxious gases, antidotes, and protective masks. The AUES was located on the grounds of the current American University and used additional property in the vicinity to conduct this research and development on CWM, to include mustard and lewisite agents, and adamsite, irritants, and smokes. After the war, these activities were transferred to other locations and the site was returned to the owners. Since that time, numerous munitions-related items have been encountered in both burial pits and as single, isolated items throughout the Spring Valley FUDS project site. The Army has implemented a geophysical mapping strategy to investigate suspect properties to determine the potential for the presence of MEC and CWM.

1.3 Report Organization

This report documents field activities, equipment functionality checks, quality control (QC) and geophysical results for the Spring Valley FUDS geophysical investigation. Section 2 discusses principles and applications of electromagnetic and magnetometry surveying methods and data analysis including QC test discussion. Section 3 presents the results and EM61-MK2 and G-858 survey maps. Section 4 presents the conclusion and recommendations based on the results of the survey. All QC test results are presented in **Appendix A**. The methods for prioritizing geophysical anomalies are outlined in **Appendix B**, and the data processing logs are presented in **Appendix C**.

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2.0 GEOPHYSICAL SURVEY EQUIPMENT AND METHODS

ERT conducted geophysical investigations using the equipment and methods described in this section.

2.1 Geophysical Prove-Out

Prior to performing geophysical site investigations, Geophysical Prove-Out Surveys were performed at two test plots located on the Sibley Area Federal Property. The Prove-Out Surveys were conducted on 10 April 2008. Each survey grid contained "seeded' items, buried under the grid to simulate targets that might be found during a Spring Valley site investigation. ERT was given the locations of seed items in one grid. Seed item descriptions and locations in the second grid were not provided to ERT. The objectives of the Geophysical Prove-Out were as follows:

- Demonstrate that the geophysical investigation systems/equipment are operating properly.
- Test the grid survey and navigation method.
- Assess the operators' performance and update procedures to assist in the development of operator measurement techniques.
- Establish a baseline of performance capabilities for the selected instruments.
- Establish decision parameters for target selection by the site geophysicists.
- Evaluate navigational/position systems for positional accuracy of identified targets.
- Evaluate data collection speed, minimum along-track sampling, and minimum line separation distance.

The Prove-Out Grids were geophysically mapped in the same detail and with the same procedures as planned for project site investigations. Field plots and anomaly summaries marking the location of seeded items detected in the Prove-Out Grids were presented to USACE for review. Based on their review, the field crew demonstrated that all aspects of the geophysical mapping and analysis system were working and the results were approved.

2.2 Location Surveying and Surface Feature Mapping

Prior to initiating the geophysical surveys at the 4055 52nd Terrace, land surveying and surface mapping was performed in accordance with *Data Item Description* (DID) *MR-005-07, Geospatial Information and Electronic Submittals*. The surveys were completed to establish survey boundaries and map surface features necessary to collect and interpret the geophysical data. A comprehensive map of the physical features surveyed at the property was developed and overlain on the geophysical plots. Items annotated on this map included, but were not limited to, water valves, utility poles, fence lines, and walkways. These features were plotted on the geophysical base maps to assist the interpreting geophysicist in differentiating between surface interference and possible subsurface sources.

The geophysical survey area measures approximately 0.20 acres and includes all accessible areas within 4055 52nd Terrace. Significant cultural features within the 4055 52nd Terrace property include perimeter fences, a driveway and several walking paths, large flower beds in the rear of the property, a raised patio and built-in potters at the end of the driveway.

Prior to the geophysical mapping of the 4055 52nd Terrace property, a licensed surveyor established a relative (X, Y) Cartesian coordinate grid. Grid nodes were marked at 20-ft intervals across the survey area to accurately lay out survey transects and provided control for the geophysical mapping. Coordinate locations for the surveyed grid nodes are provided in **Table 2-1**. Coordinates are presented in Maryland State Plane, North American Datum 1983. Units are in U.S. Survey Feet.

2.3 Geophysical Investigations

Geophysical mapping was performed in accordance with *DID MR-005-05, Geophysical Investigation Plan (GIP)*. ERT performed geophysical mapping and evaluations using geophysical equipment, configurations, and processes as described in the GIP. ERT used the Geonics EM61-MK2 High Sensitivity Metal Detector and Geometrics G-858 Cesium Vapor Magnetometer (in gradiometer configuration). These instruments were demonstrated to be the most effective in previous Prove-Out Grid surveys and have been accepted by the Spring Valley Partnering Group. The following instrumentation and equipment were used to perform the geophysical investigation:

2.3.1 Geophysical Survey Grid

Prior to data collection, the property was prepared for geophysical survey by stretching 300 ft fiberglass measuring tapes across the property at a 4-ft spacing as a transect guide and placing plastic pin flags in the ground at a 20-ft spacing for fiducial markers. Grid control points, previously placed by the licensed surveyor, were used as a guide when laying out the geophysical survey grid.

2.3.2 Electromagnetics

The EM61-MK2 is a Time Domain Electromagnetic (TDEM) system. The EM61-MK2 generates 150 electromagnetic (EM) pulses per second from an air-cored copper transceiver coil. After each pulse, secondary EM fields are induced briefly in moderately conductive soils and for a longer time in metallic objects. Between each pulse, the EM61-MK2 measures the prolonged buried metal response. This response is recorded in milliVolts (mV). The EM61-MK2 makes four measurements spaced at 216, 366, 660, and 1266 microseconds (µsec) (called “time-gates”) after the initial EM pulse. By collecting multiple time-gates, a measurement of the response decay rate can be made, which provides further information on the nature of buried metals. Each EM pulse and subsequent four time-gates comprise a single data point. The EM61-MK2 was set up to record 10 data points per second in auto mode. The transceiver coil is 1.0 meter (m) wide by 0.5 m and sits on wheels 40.5 centimeters (cm) above the ground. Effective detection depth for the EM61-MK2 is a function of target characteristic (i.e., composition, mass, and orientation) and local terrain noise. Tests conducted at Spring Valley and other sites found that the EM61-MK2 was capable of detecting 60 millimeter (mm) and 81 mm items at maximum depths of 3 ft (Weston, 2004). The EM61-MK2 can detect larger masses (i.e., 55-gallon drums) at depths of greater than 10 ft (Geonics, 1996).

The line and fiducial method was used with 2-ft spacing between survey lines and 20-ft fiducial marks. A speed of 3 mph or less was maintained to guarantee sufficient along-track sampling. Line numbers along with starting and ending positions were recorded in a field notebook. Files

were named using the date followed by incremental letters, so that the first file collected on 10 May 2008 would be named 051008A with the file extension .R61. Data are stored in an Allegro field computer on an internal flash memory card. The data were collected using a fixed relative grid system, with the origin of each test plot at (0, 0). The coordinates of the corners of each grid have been previously surveyed in the Maryland State Plane system. All digital geophysical mapping (DGM) data were translated from the relative grid coordinates to the Maryland State Plane coordinates during data processing (see Section 2.5).

2.3.3 Magnetometery

A Geometrics G-858 was used for the magnetic survey. Using self-oscillating split-beam Cesium vapor (non-radioactive Cs-133), this magnetometer measures the earth's total geomagnetic field (magnetic flux density) at a particular location in units of nanoTeslas (nT) with an accuracy of ±1.0 nT. It collects a maximum of 10 magnetic readings per second. The total field consists of three components: the main field of the earth, the external field that is primarily caused by the sun and ionosphere, and local variations caused by objects at the site. The main field and external field normally remain relatively constant over the period of time of a field investigation. Local variations are attributable to anomalies near the surface such as buried metal objects or above-ground objects containing ferrous metal. Measurements of the total magnetic field were collected using two sensors spaced 1.0 meter apart in the vertical orientation, with the lower sensor kept 15.5 cm above the ground surface. In this way the total field and the vertical magnetic gradient could be recorded concurrently. The vertical gradient minimizes terrain noise and maximizes the sensitivity toward buried ferrous materiel. A 15.5 cm long plastic rod is extended from the lower sensor to help maintain a constant distance between the sensor and the ground surface.

A Geometrics G-856 base station magnetometer was used to monitor diurnal variation in the ambient local magnetic field that may have occurred during the course of the survey. Prior to surveying, both instruments were time-synchronized and programmed following the manufacturer's instruction manual.

Magnetometer surveys were performed along the same survey lines that were used for EM data collection, with 2-ft spacing between lines and 20-ft fiducial marks. A speed of 3 mph or less was maintained to guarantee sufficient along-track sampling. The G-858 was set to collect data in the mapped survey mode, with 10 readings collected per second. Line numbers along with starting and ending positions were recorded in a field notebook. Files were saved using the default naming convention, which uses incremental numbers, so that the first file saved would be dataset1 followed by dataset2 and so on. The G-858 saves files to an internal hard drive with the .bin extension. The data were collected using a fixed relative grid system, with the origin of each test plot at (0, 0). The coordinates of the corners of each grid have been previously surveyed in the Maryland State Plane system. All DGM data were translated from the relative grid coordinates to the Maryland State Plane coordinates during data processing (see Section 2.5).

2.4 Quality Control

Prior to data collection, all geophysical instruments were assembled and inspected at the Sibley GPO area to ensure proper performance and function. Measurements were made to verify sensor spacing and sensor distance from the ground. ERT performed the QC tests as required in the

SOW at the Sibley GPO site on each survey day. Results of the QC tests are included in **Appendix A**. All equipment was allowed to warm up for five minutes or more before performing any QC tests or data collection.

In addition to the standard QC tests, ERT performed site noise tests with both the EM61 MK2 and G-858 each day at the 4055 52nd Terrace property. This test was performed to determine the level of site-specific noise, and was performed before and after data collection at the same location with each instrument and each test. The test was performed by collecting one minute of "static" data, while the instrument was held stationary. This data was then used to evaluate site specific noise levels.

The results of each QC test are provided in the sections below.

2.4.1 Static Tests and Cable Shake Test

The Static and Cable Shake tests were performed as specified in the SOW, at the Sibley GPO site. For both instrument tests, a PVC instrument stand was used to minimize movement of the sensors. A 3-inch steel cylinder was used as the spike for the static response tests. The results of both pre-survey and post-survey Static Tests and the Cable Shake Test are presented in **Appendix A.** The metrics for these tests are: less than 2.5 mV from peak to peak for EM static background tests; less than 1 nT from peak to peak for magnetic static background tests; and less than 20 percent variation in static response tests. All EM61-MK2 and G-858 tests fall within the metrics and show that the instruments were functioning properly.

2.4.2 Positioning QC Tests

Repeat data was collected over 3 percent of the site for both the EM61-MK2 and G-858. Results for the repeatability tests are shown in **Appendix A**. In addition to repeat lines, the instrument response and measured position of known location items are reported in Appendix A, to show navigational accuracy. The repeat lines also serve to provide instrument response QC by ensuring that similar results are indicated by data collected over the same location.

Peak location in the repeatability tests for both the EM61-MK2 and G-858 show less than 0.6 ft of variation. Peak instrument response for both tests show less than 12 percent variation in anomaly magnitude. Peak shape is very similar, the tests show the data to be highly repeatable.

The DGM anomaly positions of a lamp post that were also surveyed by a Maryland licensed civil surveyor are recorded in **Appendix A**. The positional difference between DGM anomaly centers and the licensed surveyor locations are less than 0.3 ft for both instruments. Repeat lines and known location QC positions show repeatability of data and positional accuracy.

2.4.3 Site Noise Tests

In order to evaluate the noise levels at the site, pre-survey and post-survey static tests were performed at the property. These tests are designed to identify static levels of background noise at each site. When combined with the results of static tests performed at the GPO, these tests allow for the discrimination of noise caused by instrument malfunction and site characteristics. Site noise tests were performed in the rear of the property in the center of the grassy area to avoid influence from passing vehicles and surface features. Prior to performing this test, ERT

searched the site using the EM61-MK2 to identify an area that did not appear to be above any targets.

Site noise test results for both the EM61 MK2 and G-858 show relatively low site noise levels. The EM61 MK2 post-survey noise test shows the highest magnitude noise response, with a few isolated channel 1 peaks as high as 10mV. ERT performed the site noise tests in the grassy area in the rear of the property, after performing a sweep with the EM to identify an "anomaly free" area. This test location was selected before the survey and test results show a noise level response typical for the entire site. The post-survey test was performed at the same location as the pre-survey test to identify any changes in noise levels that may have occurred during data collection. Results of the site noise tests are included in **Appendix A**.

2.5 Data Analysis

2.5.1 Data Management

At the completion of the EM61-MK2 and G-858 surveys, data stored in the data loggers were downloaded to a field computer for review by the ERT Site Geophysicist. The data were reviewed on a daily basis for completeness and accuracy. Data were then transferred to the Project Geophysicist who performed data QC review, data analysis and target selection.

2.5.2 EM61-MK2 Data Processing and Target Selection

Pre-Processing

EM data from the Allegro field computer is saved on a flash card that was downloaded upon returning to the ERT office. The data is converted from the .R61 binary format into ASCII format .M61 files using DAT61MK2® software, distributed by Geonics. The ASCII files are then reviewed using Notepad® and DAT61MK2®. Duplicate fiducial marks are removed, line limits are set and marks are positioned. The data is reviewed for data gaps or missing marks. After this preliminary data review is complete, the file is exported to Geosoft .xyz format.

Advanced Processing

EM61-MK2 data is then imported to Geosoft Oasis Montaj® and processed using the following procedures:

- The data were converted from the local grid coordinates to NAD83, Maryland State Plane coordinates in U.S. survey feet.
- Latency corrections are performed using the UCELATENCY application. Verification of proper latency corrections were made by reviewing maps for "chevron effects".
- A noise analysis is performed by reviewing the daily QC test results and performing a statistical analysis.
- All channels were leveled to a common 0-mV median baseline using the UX-detect drift correction algorithm (UXdrift.gx). After leveling the background of all channels, the raw data is compared to the leveled data, with particular attention paid to low level anomalies

to make sure that anomaly shape and magnitude have not been altered, and to be sure that background levels have been properly zeroed.
- Individual channels as well as stacked channels 1-4 were gridded using the minimum curvature algorithm with a cell size of 0.3 ft.
- A series of color maps were produced from the gridded data.
- Line paths were posted over the mapped data, and reviewed for coverage completeness.

Target Selection

Prior to evaluating the data for target selection, potential subsurface anomalies/sources, cultural features (e.g., manhole covers, lamp posts, etc.) identified during the surface mapping tasks were plotted on the base maps used to produce the EM61-MK2 and G-858 contour plots. This process allowed the geophysicist to note anomalous readings coincident with surface debris/features. A high amplitude anomaly coincident with a surface feature may be strong enough to mask the response from a buried object. As a result, at these locations, buried features may go undetected.

The following procedures were followed for target selection:

- A target threshold value was selected that would minimize the amount of target picks without excluding items of interest. The targets were automatically selected using the Blakely method within UX-Detect®. Analysis of data from several properties at Spring Valley has shown that site noise levels can vary significantly, affecting target selection. To be conservative, ERT uses a Blakely peak picking threshold level of 22 mV for the initial automated target selection, which is below the lowest typical EM target response. The threshold was established based on an evaluation of several specific sites and individual targets at Spring Valley.
- Each target/anomaly was then independently reviewed along with information about culturally induced instrument response. Target merging was performed manually, and the merge radius may differ from anomaly to anomaly. A decay curve criteria of channel 1>channel 2>channel 3 >channel 4 responses was used to differentiate targets of interest from other signature sources. Additionally, the data were analyzed using the UX-Detect® "Calculate signal strength, SNR, and size" routine.
- The targets were reviewed along with the results of magnetic data interpretations and assigned a priority rank. The target prioritization methods used are outlined in the memorandum to the USACE, Baltimore District, titled "Proposed analyses and classification scheme for selection and ranking of point source anomalies as determined from geophysical investigation data acquired within the boundaries of the Spring Valley FUDS" and dated 21 March 2008. This memorandum is included as **Appendix B**.
- A prioritized target list was generated for the property.
- A Data Processing Log is included in **Appendix C** for the EM data processing procedures.

2.5.3 G-858 Data Processing and Target Selection

Pre-Processing

Magnetic data from the G-858 and G-856 was downloaded using the software MagMap2000®, distributed by Geometrics. The data from the G-858 was reviewed for completeness. Any corrections to the survey geometry were made and dropouts were removed using the dropout filter. Dropouts were also removed from the G-856 data, followed by a smoothing filter. G-858 and G-856 data were then exported together to a Geosoft .xyz format, inorder to incorporate a diurnal correction, and imported into Geosoft Oasis Montaj®.

Advanced Processing

G-858 magnetic data was imported to Geosoft Oasis Montaj® and processed using the following procedures:

- The data was converted from the local grid coordinates to NAD83, Maryland State Plane coordinates in US survey feet.
- Latency corrections were performed using the UCELATENCY application if necessary. Verification of proper latency corrections were made by reviewing maps for "chevron effects".
- A noise analysis is performed by reviewing the daily QC test results and performing a statistical analysis.
- The vertical magnetic gradient data and the analytical signal (AS) of the vertical gradient were gridded using the minimum curvature algorithm with a cell size of 0.3 ft.
- A series of color maps were produced from the gridded data.
- Line paths were posted over the mapped data, and reviewed for coverage completeness.

Target Selection

The following procedures were followed for target selection:

- A target threshold value was selected that would minimize the amount of target picks without excluding items of interest. The targets were automatically selected using the Blakely method within UX-Detect®. Analysis of data from several properties at Spring Valley has shown that site noise levels can vary significantly, affecting target selection. To be conservative, ERT uses a Blakely peak picking threshold level of 200 nT/m for the initial automated target selection, which is below the lowest typical magnetic target response. The threshold was established based on an evaluation of several specific sites and individual targets at Spring Valley.
- Each target/anomaly was independently reviewed along with information about culturally induced instrument response. Target merging was performed manually, and the merge radius may differ from anomaly to anomaly. Target location centers were reviewed and manually adjusted during target QC by reviewing AS target shape and size in conjunction with vertical gradient target shape and size. Should target locations from these two data

sets disagree, such as in the case of vertical gradient dipoles, a center point was selected that appropriately reflected each set of data.

- The magnetic targets were reviewed with EM targets and assigned a priority rank. The target prioritization methods used are outlined in the USACE, Baltimore District memorandum. This memorandum is included as **Appendix B**.
- A prioritized target list was generated for the property.
- A Data Processing Log is included in **Appendix C** for the G-858 data processing procedures.

3.0 RESULTS

Contour plots of the EM61-MK2 four bottom coil channels and calculated stacked response (1-4) were used to evaluate the electromagnetic data. The contour plot developed for the stacked channels (presented in **Figure 3-1**) provided optimum resolution for interpretation and reporting. The vertical gradient sensor configuration (**Figure 3-2**) and analytical signal (**Figure 3-3**) were used to evaluate the G-858 data. Surface features (i.e., manhole covers, lamp posts, and other utility assets) coincident with anomalous readings are annotated in **Figures 3-1, 3-2 and 3-3** to differentiate them from anomalies that may represent suspected buried MEC related materiel.

Multiple single item electromagnetic and magnetic anomalies were identified and selected automatically using the UX-Detect Blakely peak-picking algorithm. A normal level of peak detection was used to select all EM peaks above a 22-mV cut-off level. Parameters for this analysis were statistically determined from both static and dynamic test data collected at the 4055 52nd Terrace property. All anomalies initially selected by the automatic peak picking routine are digitally recorded within a Geosoft target database. Electromagnetic targets exhibiting atypical decay patterns between the four EM61-MK2 bottom coil time gates were deselected from the target database. The analytic signal was processed from the magnetic data to correctly determine boundaries of magnetic source bodies and to position target locations during the automated peak picking process. Subsequent to applying the target-picking algorithm, a manual review process removed all targets associated with cultural features. In addition, anomalies exhibiting characteristics indicative of buried conductive metal that may not have been chosen by the algorithm were identified and added to the electromagnetic and magnetic target database. Following completion of the target picking routine, electromagnetic and magnetic anomalies were comparatively analyzed for co-located positions. Co-located electromagnetic and magnetic anomalies often have offset centers due to separate instrument responses.

Table 3-1 lists all targets exhibiting properties and characteristics anticipated from potential individual MEC items. Targets included in this table were interpreted based on response amplitude, decay characteristics, size, and relationship between electromagnetic and magnetic data. All targets believed to be too small to be part of MEC material or are part of cultural features remain electronically in the Geosoft target databases and can be reassessed at any time.

A total of 79 targets, comprising 54 electromagnetic and 61 magnetic point sources, were identified on the geophysical plots for 4055 52nd Terrace. These anomalies were selected based on response characteristics observed in the geophysical data. Of the total number identified, 35 were coincident or co-located electromagnetic and magnetic anomalies. Each point source anomaly location and response is listed in **Table 3-1**. Electromagnetic targets without co-located magnetic targets may suggest buried non-ferrous material or ambient cultural noise. Magnetic targets without a corresponding electromagnetic anomaly may suggest deeper ferrous material falling outside the detection limits of the EM61-MK2 instrumentation.

Anomalies were assigned a ranking value based on the criteria established for each of the two factors as given in the classification scheme described in **Appendix B**. There are a total of seven possible classification outcomes for each point source anomaly ranging from A indicating the

highest priority, to D, indicating the lowest priority. Ranked targets are also given a number to indicate whether the corresponding anomaly lies within a MEC related POI, AOI or ground scar locations as interpreted from historic aerial photographs. The number 1 is used to indicate the anomaly is located within such a feature, and the number 2 is used to identify an anomaly that is not located within such a feature. All of 4055 52nd Terrace falls within the boundaries of POI 39, as well as ground scars interpreted from historic aerial photographs dated 1918. The boundaries of these features are colored coded and shown on **Figures 3-1, 3-2** and **3-3**. For this reason, all ranked targets at 4055 52nd Terrace have been given a priority level of 1 for Factor II of the prioritization process (see **Appendix B**).

The total number of anomalies detected at the 4055 52nd Terrace property along with their respective priority value and the percent of the total that they constitute is presented in **Table 3-2**. The symbols used to display target locations on **Figures 3-1, 3-2**, and **3-3** are scaled to show the target priority level. Priority A targets are represented by the largest symbols, priority B and C are represented by slightly smaller symbols, and priority D anomalies are represented by the smallest symbols.

Of the 79 total targets run through the classification scheme, 27 targets (34.2% of the total targets) achieved the priority ranking value of A1, 11 targets (13.9% of total) achieved a priority ranking of B1, 15 anomalies (19.0% of total) achieved a priority ranking of C1. The remaining 26 targets, or 32.9%, achieved a priority ranking of D. The individual percentages are shown in **Table 3-2**.

4.0 CONCLUSIONS

On 11 February 2009 ERT conducted both electromagnetic (EM61-MK2) and magnetic (G-858) surveys at the 4055 52nd Terrace property in order to locate and characterize anomalies that may represent potential individual MEC/CWM items, burial pits or trenches. POI 39 as well as 1918 ground scars have been identified from historical documentation in the region of 4055 52nd Terrace and adjacent properties. Most of 4055 52nd Terrace has been subjected to as much as 14 of cuts.

For all geophysical activities at the 4055 52nd Terrace property, ERT performed all required QC function checks. Site noise tests determined that site noise levels were low.

A total of 79 targets, comprising 54 electromagnetic and 61 magnetic point sources, were identified on the geophysical plots for 4055 52nd Terrace. These anomalies were selected based on response characteristics observed in the geophysical data. Of the total number identified, 35 were coincident or co-located electromagnetic and magnetic anomalies. Each point source anomaly location and response is listed in **Table 3-1**.

Anomalies were assigned a ranking value based on the criteria established for each of the two factors as given in the classification scheme described in **Appendix B.** Nearly all of the property falls within the boundaries of identified POI/AOI and ground scar features, as such all ranked targets have been assigned a priority 1 under Factor II of the prioritization process. Of the 79 total targets run through the classification scheme, 27 targets (34.2% of the total targets) achieved the priority ranking value of A1, 11 targets (13.9% of total) achieved a priority ranking of B1, 15 anomalies (19.0% of total) achieved a priority ranking of C1. The remaining 26 targets, or 32.9%, achieved a priority ranking of D. The individual percentages are shown in **Table 3-2**.

The use of the EM61-MK2 high sensitivity metal detector and Geometrics G-858 magnetometer resulted in characterization of the subsurface environment sufficient to fulfill the requirements presented in the SOW (ERT, 2008).

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5.0 REFERENCES

Geonics, Ltd., 1996, www.geonics.com/em61.html.

USAESCH (U.S. Army Engineering Support Center, Huntsville). 2003a. Munitions Response Data Item Description (DID) MR-005-05 *Geophysical Investigation Plan*.

USAESCH (U.S. Army Engineering Support Center, Huntsville). 2003b. Munitions Response Data Item Description (DID) MR-005-07 *Geospatial Information and Electronic Submittals*.

Weston, 2004. Revised Work Plan for the Geophysical Mapping Investigations of Potential MEC/CWM Sites, Spring Valley Formerly Used Defense Site, Washington DC.

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FIGURES

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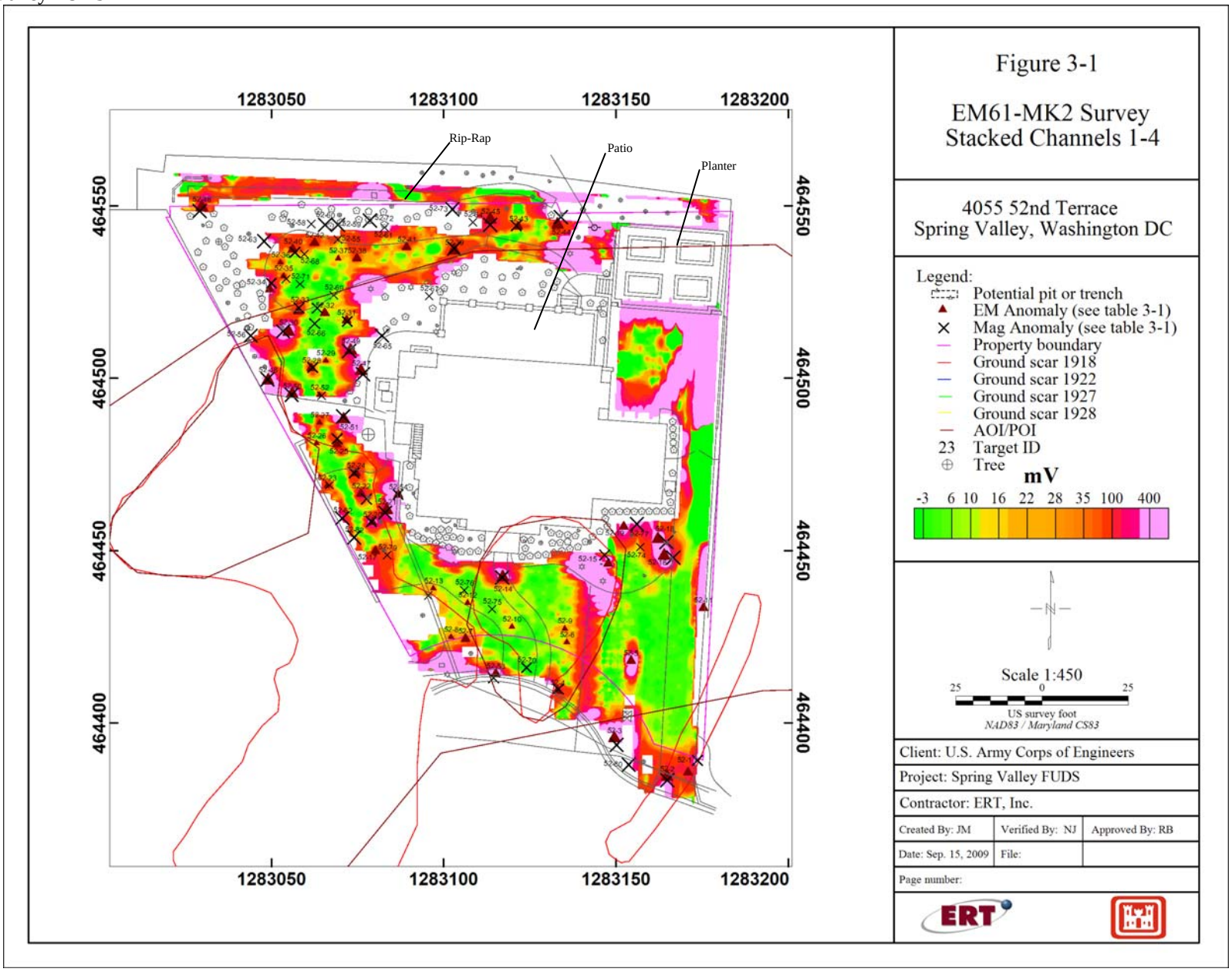
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1283150
1283200
464550
464500
464450
464400
Rip-Rap
Patio
Planter
Figure 3-1
EM61-MK2 Survey
Stacked Channels 1-4
4055 52nd Terrace
Spring Valley, Washington DC
Legend:
Potential pit or trench
EM Anomaly (see table 3-1)
Mag Anomaly (see table 3-1)
Property boundary
Ground scar 1918
Ground scar 1922
Ground scar 1927
Ground scar 1928
AOI/POI
23 Target ID
Tree
mV
-3 6 10 16 22 28 35 100 400
N
Scale 1:450
25 0 25
US survey foot
NAD83 / Maryland CS83
Client: U.S. Army Corps of Engineers
Project: Spring Valley FUDS
Contractor: ERT, Inc.
Created By: JM
Verified By: NJ
Approved By: RB
Date: Sep. 15, 2009
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Page number:
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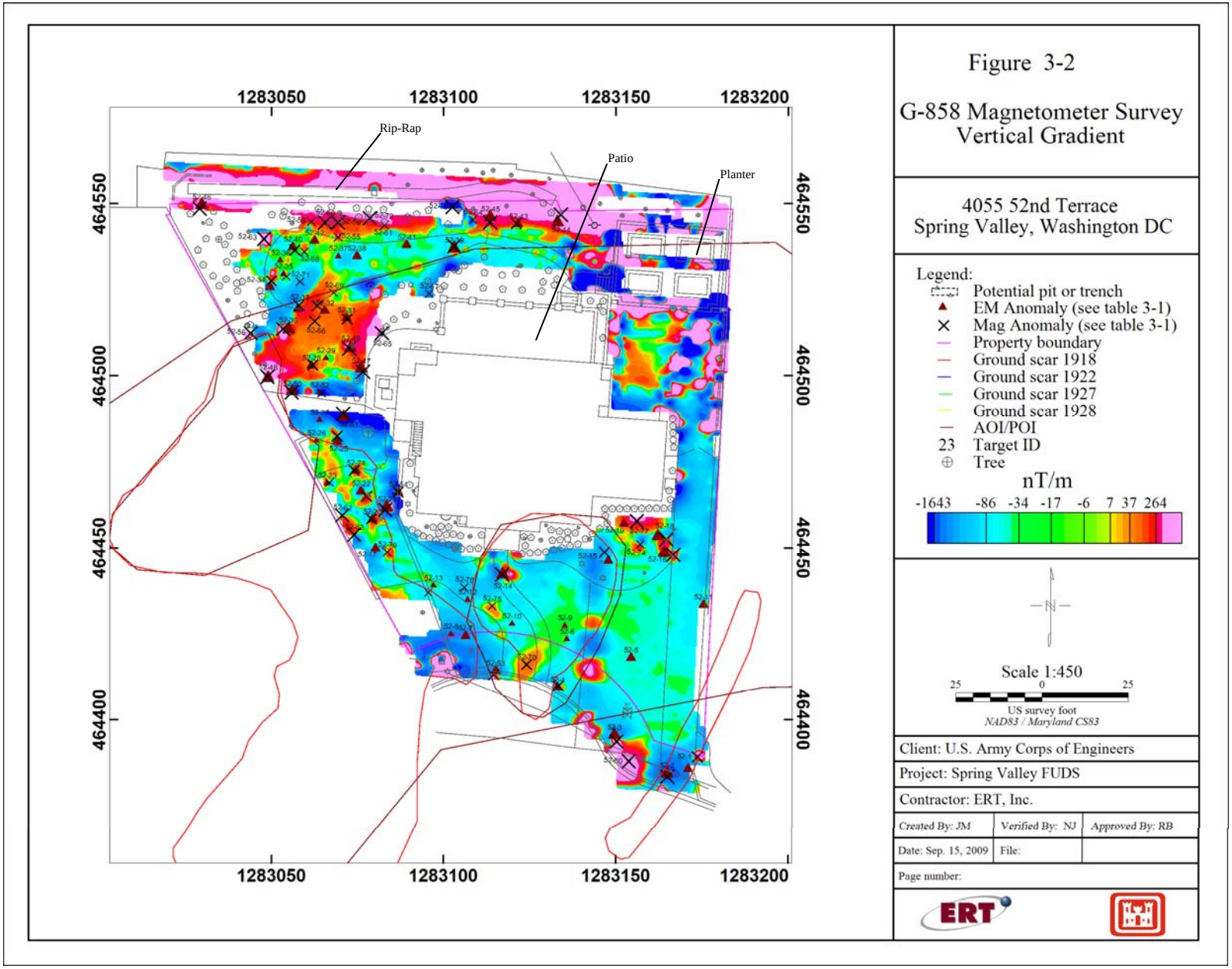
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1283100
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464550
464500
464450
464400
Rip-Rap
Patio
Planter
Figure 3-2
G-858 Magnetometer Survey
Vertical Gradient
4055 52nd Terrace
Spring Valley, Washington DC
Legend:
Potential pit or trench
EM Anomaly (see table 3-1)
Mag Anomaly (see table 3-1)
Property boundary
Ground scar 1918
Ground scar 1922
Ground scar 1927
Ground scar 1928
AOI/POI
23 Target ID
Tree
nT/m
-1643 -86 -34 -17 -6 7 37 264
Scale 1:450
25 0 25
US survey foot
NAD83 / Maryland CS83
Client: U.S. Army Corps of Engineers
Project: Spring Valley FUDS
Contractor: ERT, Inc.
Created By: JM
Verified By: NJ
Approved By: RB
Date: Sep. 15, 2009
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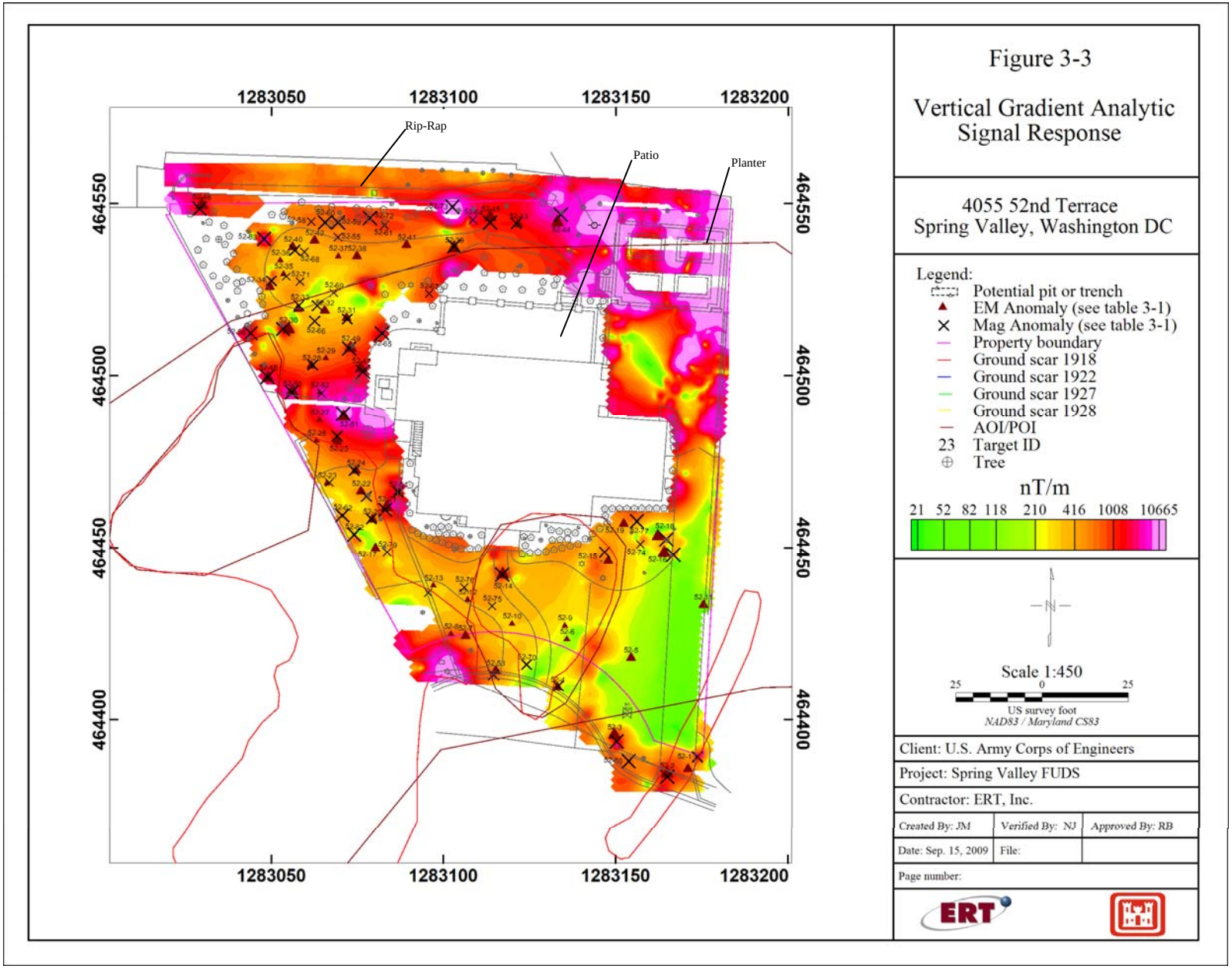
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1283100
1283150
1283200
464550
464500
464450
464400
Rip-Rap
Patio
Planter
Figure 3-3
Vertical Gradient Analytic Signal Response
4055 52nd Terrace
Spring Valley, Washington DC
Legend:
Potential pit or trench
EM Anomaly (see table 3-1)
Mag Anomaly (see table 3-1)
Property boundary
Ground scar 1918
Ground scar 1922
Ground scar 1927
Ground scar 1928
AOI/POI
23 Target ID
Tree
nT/m
21 52 82 118 210 416 1008 10665
Scale 1:450
25 0 25
US survey foot
NAD83 / Maryland CS83
Client: U.S. Army Corps of Engineers
Project: Spring Valley FUDS
Contractor: ERT, Inc.
Created By: JM
Verified By: NJ
Approved By: RB
Date: Sep. 15, 2009
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TABLES

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Table 2-1
4055 52nd Terrace
Grid Control Point Coordinates

X	Y	Easting	Northing
0	140	1283018.67	464547.25
0	160	1283019.67	464567.22
20	120	1283037.64	464526.28
20	140	1283038.64	464546.25
20	160	1283039.64	464566.23
40	80	1283055.62	464485.33
40	100	1283056.62	464505.30
40	120	1283057.62	464525.28
40	140	1283058.62	464545.25
40	160	1283059.62	464565.23
60	40	1283073.60	464444.38
60	60	1283074.60	464464.35
60	80	1283075.60	464484.33
60	100	1283076.60	464504.30
60	120	1283077.59	464524.28
60	140	1283078.59	464544.25
60	160	1283079.59	464564.23
80	20	1283092.58	464423.40
80	40	1283093.57	464443.38
80	100	1283096.57	464503.30
80	120	1283097.57	464523.28
80	140	1283098.56	464543.19
80	160	1283099.57	464563.23
100	20	1283112.52	464422.41
100	40	1283113.55	464442.38
100	120	1283117.54	464522.28
100	140	1283118.54	464542.26
100	160	1283119.54	464562.23
120	20	1283132.53	464421.41
120	40	1283133.52	464441.38
120	120	1283137.52	464521.28
120	140	1283138.52	464541.26
120	160	1283139.52	464561.23
140	0	1283151.50	464400.43
140	20	1283152.50	464420.41
140	40	1283153.50	464440.38
140	60	1283154.50	464460.36
140	100	1283156.50	464500.31
140	120	1283157.49	464520.28
140	140	1283158.49	464540.26
140	160	1283159.49	464560.23
160	0	1283171.48	464399.43
160	20	1283172.48	464419.41
160	40	1283173.47	464439.38
160	60	1283174.47	464459.36
160	80	1283175.47	464479.33
160	100	1283176.47	464499.31
160	120	1283177.47	464519.28

X	Y	Easting	Northing
160	140	1283178.47	464539.26
160	160	1283179.47	464559.24

*Easting, Northing coordinates are in NAD83, Maryland State Plane, Units are in US survey feet.

Table 3-1
4055 52nd Terrace
Target Anomaly List

Target ID	Easting	Northing	X	Y	Stack (mV)	CH1	CH2	CH3	CH4	Vertical Gradient (nT/m)		Factor 1		Factor 2	Classification
										Peak	Trough	EM Target Size (ft²)	Mag Target Size (ft)	Coincident with AOIs, POIs, Ground Scars	
52-2	1283164.80	464384.30	153.91	-12.05	108.72	48.50	31.79	19.16	9.28	^	-1103.00	61.55	>6	TRUE	**A1**
52-14	1283117.10	464442.30	103.55	40.10	448.10	169.29	131.91	91.72	54.88	686.36	-794.41	80.06	>6	TRUE	**A1**
52-18	1283162.10	464453.40	147.94	53.43	5163.03	2501.68	1573.81	806.59	280.69	364.21	-334.07	81.04	>6	TRUE	**A1**
52-51	1283071.00	464488.00	55.23	83.44	14913.38	6917.76	4490.77	2386.47	1118.37	127.45	-4861.58	58.54	>6	TRUE	**A1**
52-50	1283056.00	464495.40	39.88	90.08	2216.38	939.24	648.66	399.27	229.21	1206.53	-2607.28	49.63	>6	TRUE	**A1**
52-48	1283049.00	464499.30	32.69	93.62	3089.79	1515.47	939.78	422.93	211.62	2178.93	1881.51	40.00	>6	TRUE	**A1**
52-47	1283076.00	464502.00	59.52	97.67	377.34	171.34	109.86	69.24	26.90	334.91	-817.27	50.27	>6	TRUE	**A1**
52-49	1283073.00	464508.00	56.22	103.51	418.01	195.89	133.26	69.27	19.59	835.11	-3.24	61.92	>6	TRUE	**A1**
52-30	1283055.00	464513.40	37.98	108.01	1948.52	910.87	588.29	323.74	125.79	1827.73	-412.62	74.37	>6	TRUE	**A1**
52-3	1283149.50	464395.50	138.24	-5.02	18331.56	7990.58	5506.84	3271.24	1577.12	2876.08	-589.21	55.24	>6	TRUE	**A1**
52-45	1283113.50	464546.10	94.77	143.58	151.74	71.36	42.92	22.06	15.26	411.00	^	72.60	>6	TRUE	**A1**
52-44	1283133.00	464544.60	114.32	143.06	154.95	69.26	42.77	29.48	20.60	3316.52	2533.01	40.73	>6	TRUE	**A1**
52-46	1283029.80	464549.60	11.00	142.91	240.11	106.04	77.98	38.59	17.63	1280.63	209.25	42.39	>6	TRUE	**A1**
52-73	1283102.49	464548.97	83.63	145.90	*	*	*	*	*	938.13	-8809.71	-	>6	TRUE	**A1**
52-72	1283078.54	464545.72	59.88	141.46	*	*	*	*	*	640.00	^	-	>6	TRUE	**A1**
52-77	1283156.00	464457.70	141.63	57.42	*	*	*	*	*	554.89	-18.75	-	>6	TRUE	**A1**
52-80	1283153.62	464387.83	142.75	-12.48	*	*	*	*	*	653.00	^	-	>6	TRUE	**A1**
52-82	1283074.00	464453.80	59.93	49.43	*	*	*	*	*	275.33	-722.86	-	>6	TRUE	**A1**
52-60	1283065.57	464544.48	46.98	139.57	*	*	*	*	*	412.20	357.52	-	>6	TRUE	**A1**
52-56	1283044.00	464512.30	27.05	106.36	*	*	*	*	*	1479.15	-579.01	-	>6	TRUE	**A1**
52-59	1283069.31	464544.48	50.72	139.76	*	*	*	*	*	372.00	^	-	>6	TRUE	**A1**
52-62	1283070.56	464459.42	56.21	54.87	*	*	*	*	*	137.00	-150.00	-	>6	TRUE	**A1**
52-63	1283047.86	464539.74	29.53	133.95	*	*	*	*	*	2936.11	-706.96	-	>6	TRUE	**A1**
52-65	1283082.04	464512.30	65.03	108.26	*	*	*	*	*	877.34	-1280.39	-	>6	TRUE	**A1**
52-16	1283163.90	464448.60	149.97	48.73	961.24	447.14	298.94	161.08	53.97	666.10	-184.80	88.81	>6	TRUE	**A1**
52-21	1283083.50	464461.80	69.02	57.89	180.48	80.58	56.95	28.00	14.95	330.10	-1073.13	53.32	>6	TRUE	**A1**
52-39	1283103.00	464537.10	84.73	134.07	129.18	71.45	38.15	10.80	8.82	111.00	-107.00	42.81	>6	TRUE	**A1**
52-17	1283080.20	464449.80	66.32	45.75	118.02	63.79	35.75	13.74	4.94	^	^	52.82	-	TRUE	**B1**
52-19	1283152.20	464457.00	137.87	56.53	615.47	259.87	184.09	108.44	63.22	^	^	70.82	-	TRUE	**B1**
52-1	1283170.80	464385.60	160.01	-13.85	141.48	63.71	42.86	22.98	11.95	1385.67	-646.73	57.34	<6	TRUE	**B1**
52-5	1283154.30	464418.00	141.91	17.69	6896.05	3043.79	2079.32	1182.11	579.59	^	^	51.36	-	TRUE	**B1**
52-20	1283079.30	464458.20	65.00	54.09	700.21	376.15	216.10	88.64	19.47	703.83	-1050.17	41.25	<6	TRUE	**B1**
52-22	1283076.00	464466.30	61.30	62.01	821.71	450.19	263.36	94.20	13.91	351.74	-459.90	32.33	>6	TRUE	**B1**
52-33	1283057.70	464519.40	40.37	114.13	138.89	61.67	42.49	24.85	9.86	289.00	-468.00	33.80	>6	TRUE	**B1**
52-4	1283133.00	464409.30	121.07	7.94	235.51	104.18	68.90	41.36	20.93	60.81	-157.19	45.06	<6	TRUE	**B1**
52-24	1283074.50	464472.30	59.50	67.93	140.86	63.72	44.26	24.04	8.87	182.04	-175.16	44.04	<6	TRUE	**B1**
52-54	1283086.78	464466.15	72.07	62.41	25164.85	10639.79	7518.45	4593.77	2412.84	2709.71	-2432.89	40.00	<6	TRUE	**B1**
52-53	1283115.06	464414.27	102.87	12.00	1125.40	521.37	349.24	180.51	74.28	704.31	-559.75	40.00	<6	TRUE	**B1**
52-11	1283175.30	464433.30	162.12	34.02	5238.96	2387.53	1551.75	883.87	411.24	^	^	25.26	-	TRUE	**C1**
52-38	1283074.80	464534.70	56.69	130.27	57.97	26.64	17.31	8.90	5.26	^	^	32.67	-	TRUE	**C1**
52-41	1283089.20	464538.00	70.90	134.28	62.81	15.30	35.78	17.47	-5.60	^	^	24.39	-	TRUE	**C1**
52-42	1283062.50	464539.20	44.18	134.15	94.34	42.37	34.18	10.21	7.44	^	^	26.75	-	TRUE	**C1**
52-7	1283106.30	464424.30	93.66	21.58	45.36	20.53	13.90	5.68	5.33	^	^	22.29	-	TRUE	**C1**
52-15	1283147.70	464446.20	133.91	45.52	2236.67	998.95	707.23	379.81	151.29	26.07	-258.37	30.85	<6	TRUE	**C1**
52-25	1283069.10	464480.70	53.69	76.05	130.63	70.90	35.93	17.12	6.62	32.00	-785.49	36.89	<6	TRUE	**C1**
52-32	1283065.50	464518.80	48.19	113.92	35.19	19.47	10.14	3.87	1.72	185.00	^	11.01	>6	TRUE	**C1**
52-34	1283049.60	464525.70	31.97	120.02	1051.50	424.53	323.52	198.30	104.46	921.18	-723.10	34.01	<6	TRUE	**C1**
52-40	1283056.20	464537.40	37.98	132.04	138.65	66.94	44.29	24.57	2.87	172.83	-52.96	35.96	<6	TRUE	**C1**
52-43	1283121.60	464544.00	102.96	141.89	67.50	29.98	29.29	8.56	-0.31	127.00	^	27.05	<6	TRUE	**C1**
52-28	1283061.60	464502.90	45.09	97.85	66.17	38.57	14.60	9.74	3.30	146.00	-89.00	24.57	<6	TRUE	**C1**
52-31	1283071.80	464516.70	54.59	112.14	26.68	14.67	6.36	5.03	0.57	118.00	^	11.04	>6	TRUE	**C1**
52-70	1283124.00	464416.00	111.75	14.18	^	^	^	^	^	69.50	^	-	>6	TRUE	**C1**
52-66	1283062.58	464515.79	45.43	110.77	^	^	^	^	^	88.42	49.39	-	>6	TRUE	**C1**
52-36	1283052.60	464533.50	34.58	127.96	68.10	37.04	16.69	14.74	-0.39	^	^	19.29	-	TRUE	**D**
52-27	1283064.00	464487.00	48.29	82.09	116.66	41.73	34.13	25.11	15.71	^	^	16.61	-	TRUE	**D**
52-26	1283063.10	464481.00	47.69	76.05	24.04	16.06	3.69	2.64	1.69	^	^	7.06	-	TRUE	**D**
52-29	1283065.80	464505.00	49.18	100.15	47.17	20.48	16.30	8.13	2.45	^	^	11.77	-	TRUE	**D**
52-37	1283069.40	464534.70	51.29	130.00	28.77	17.71	12.64	6.62	-8.19	^	^	7.77	-	TRUE	**D**
52-10	1283119.80	464427.90	106.96	25.85	23.92	17.32	4.58	1.53	0.48	^	^	11.63	-	TRUE	**D**
52-9	1283135.10	464427.30	122.27	26.02	28.26	20.84	4.05	2.81	0.56	^	^	18.62	-	TRUE	**D**
52-12	1283106.90	464434.80	93.73	32.10	22.03	16.59	3.01	1.41	1.03	^	^	8.97	-	TRUE	**D**
52-8	1283102.10	464424.90	89.43	21.97	41.77	20.46	11.58	7.35	2.37	^	^	15.71	-	TRUE	**D**
52-6	1283135.70	464423.40	123.07	22.15	23.49	13.22	6.90	2.83	0.50	^	^	16.25	-	TRUE	**D**
52-23	1283066.10	464468.70	51.30	63.92	115.18	50.33	30.60	21.67	12.65	111.54	-177.34	19.81	<6	TRUE	**D**
52-52	1283064.00	464495.00	47.89	90.08	103.07	37.93	30.37	23.64	11.13	^	-2197.00	14.29	<6	TRUE	**D**
52-35	1283053.50	464529.60	35.67	124.11	78.46	41.79	26.69	5.23	4.74	105.10	-94.86	19.16	<6	TRUE	**D**
52-13	1283097.00	464439.00	83.64	35.80	27.62	18.22	6.44	2.87	0.13	-25.00	-76.00	18.99	<6	TRUE	**D**
52-75	1283114.00	464433.00	100.91	30.66	^	^	^	^	^	62.14	-147.65	-	<6	TRUE	**D**
52-71	1283058.34	464527.26	40.62	122.02	^	^	^	^	^	^	-239.00	-	<6	TRUE	**D**

Target ID	Easting	Northing	X	Y	Stack (mV)	CH1	CH2	CH3	CH4	Vertical Gradient (nT/m)		Factor 1	Factor 2		Classification
										Peak	Trough	EM Target Size (ft²)	Mag Target Size (ft)	Coincident with AOIs, POIs, Ground Scars	
52-67	1283095.75	464523.77	78.16	120.40	*	*	*	*	*	^	-669.00	-	<6	TRUE	**D**
52-74	1283157.00	464451.00	142.96	50.78	^	^	^	^	^	256.70	-719.21	-	<6	TRUE	**D**
52-69	1283068.07	464524.02	50.50	119.27	^	^	^	^	^	74.00	-26.00	-	<6	TRUE	**D**
52-76	1283105.98	464438.47	92.63	35.71	^	^	^	^	^	^	-167.00	-	<6	TRUE	**D**
52-79	1283083.53	464448.69	69.70	44.81	^	^	^	^	^	220.25	-300.48	-	<6	TRUE	**D**
52-55	1283069.31	464540.24	50.93	135.52	^	^	^	^	^	547.38	-119.46	-	<6	TRUE	**D**
52-61	1283082.78	464543.73	64.21	139.68	^	^	^	^	^	363.00	^	-	<6	TRUE	**D**
52-68	1283059.59	464535.99	41.43	130.80	^	^	^	^	^	130.02	-60.63	-	<6	TRUE	**D**
52-58	1283061.58	464544.73	42.99	139.62	*	*	*	*	*	458.20	-105.64	-	<6	TRUE	**D**
52-64	1283108.48	464545.22	89.80	142.46	*	*	*	*	*	26.83	-2515.91	-	<6	TRUE	**D**

Note: 1) Coordinates are in North American Datum (NAD) 83, Maryland CS83 projection. Units are U.S. Survey Feet.

2) Accuracy is based on Charles P. Johnson and Associates survey data.

3) Anomaly characteristics calculated from digital geophysical mapping data collected February, 2009

^ Denotes that data was collected, but no peaks were found.

* Denotes that either EM or mag data was not collected.

Table 3-2
4055 52nd Terrace
Target Statistics

Priority Level	Number of Targets	Percentage of Targets
A1	27	34.2%
A2	0	0%
B1	11	13.9%
B2	0	0%
C1	15	19.0%
C2	0	0%
D	26	32.1%
Total	**79**	**100%**

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APPENDIX A
QC TEST RESULTS

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Area: 52nd St. **Location i.d.:** 4055 **QC Check by:** JW

Dataset: 0211_EM_QC / 0211_Mag_QC **Survey Date:** 02/11/09 **Date:** 03/16/09

Static Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	021109A/mag_dataset1					021109Z/mag_dataset1					
Line #:	1.0					201.0					
Min:	-3.1	-1.35	-0.66	-0.44	1	-3.52	-1.02	-0.53	-0.54	-1.51	
Max:	1.32	0.32	0.49	0.53	1.54	0.12	0.56	0.52	0.42	-0.22	
Mean:	-1.69	-0.57	-0.01	0.09	1.25	-2.02	-0.25	0.05	-0.01	-1.23	2.5mV p-p
Std:	0.5	0.25	0.18	0.16	0.09	0.63	0.25	0.17	0.15	0.14	

Comments: EM values are reported in milivolts

Mag data values are in nT/m

Cable Shake Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	021109A/mag_dataset1					021109Z/mag_dataset1					
Line #:	2.0					202.0					
Min:	-7.22	-3.24	-0.99	-0.45	1.02	-8.73	-2.04	-0.54	-0.49	-0.99	
Max:	-2.85	-1	0.17	0.42	1.47	-3.97	0.04	0.77	0.38	0.21	
Mean:	-4.62	-1.88	-0.35	-0.03	1.21	-5.68	-0.89	0.24	-0.06	-0.71	no spikes
Std:	0.61	0.34	0.18	0.15	0.07	0.61	0.3	0.2	0.16	0.18	2mV p-p

Comments: EM values are reported in milivolts.

Mag data values are in nT/m

Static Spike Test

Sensor #1

	Pre Survey					Post Survey					Metric
	CH 1	CH 2	CH3	CH4	G858	CH 1	CH 2	CH3	CH4	G858	
File Name	021109A/mag_dataset1					021109Z/mag_dataset1					
Line #:	3.0					203.0					
Min:	79.16	48.44	24.34	9.23	-182.03	77.64	49.4	25.22	9.58	-186.32	
Max:	83.47	51	25.77	10.37	-180.26	81.84	51.59	26.43	10.62	-183.2	
Mean:	80.83	49.57	24.98	9.75	-181.4	79.43	50.41	25.85	10.15	-184.96	+/- 20%
Std:	0.68	0.39	0.22	0.17	0.19	0.79	0.31	0.18	0.16	0.16	& 2.5 mV p-p

Comments: EM values are reported in milivolts. Non spike data is ignored.

Mag data values are in nT/m

FORM 6-2
NAVIGATION QC FUNCTION LOG

QC Check: JM
Date: 7/14/2009

Area.: 52nd Street
Dataset: 4055_EM
Location ID: 4055
Survey Date: 2/11/2009

2-Line Repeat Data Test

Comments:

	EM Pre/Post Survey		Mag Pre/Post Survey		Metric
	Lines 40.0/40.1		Lines 24.0/24.1		
	Latency Correction		**Latency Correction**		
Sensor	4				
	Stack Anomaly Amplitude mV	**Distance Offset (ft)**	**VG Anomaly Amplitude nT/m**	**Distance Offset (ft)**	
Peak 1					
Forward	457.02	0.36	50.68	0.58	
Return	408.4	W	44.19	W	
Peak 2					
Forward	547.23	0.53	102.31	0.62	
Return	407.59	W	85.18	E	

Ran up and back line twice for both am and pm.

File: 4055_em_repeat.gdb
File: 4055_mag_repeat.gdb

Known Location QC Points Detected (Dynamic)

Comments:

Location ID	
Lamp Post	
Easting	1283079.00
Northing	464526.00
EM Anomaly Offset	
Dist. (ft)	0.00
Direction	N/A

Location ID		Metric
Lamp Post		
Easting	1283079.00	
Northing	464526.00	
Mag Anomaly Offset		
Dist. (ft)	0.30	<=2-ft
Direction	N	

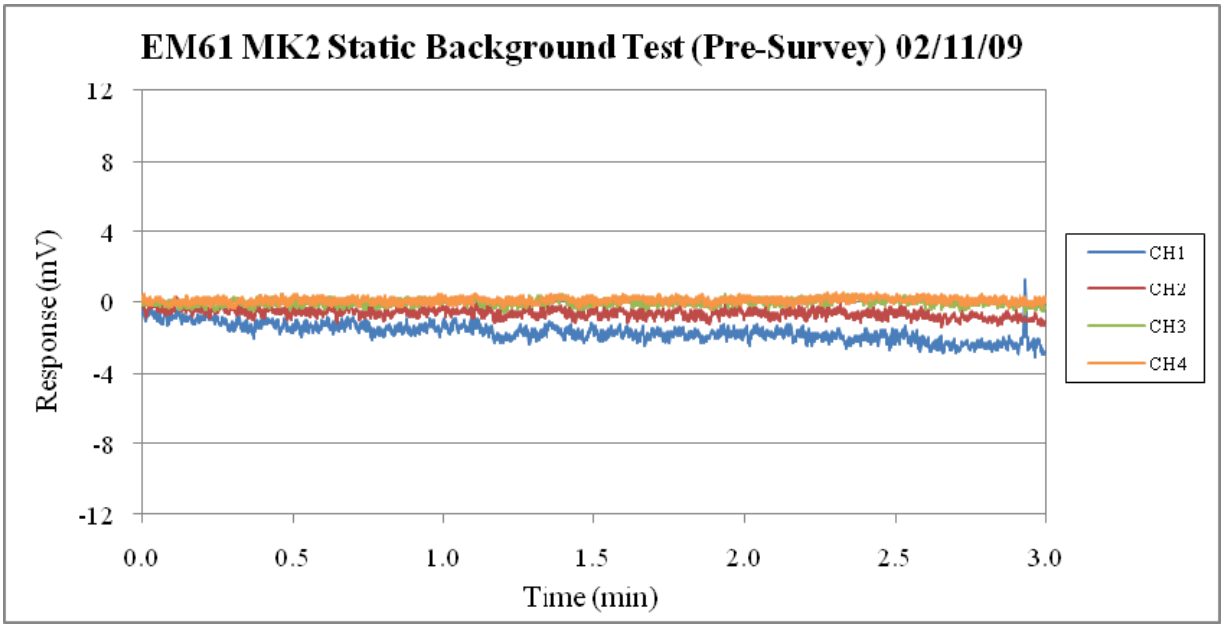
File: 4055_em.gdb
File: 4055_mag.gdb

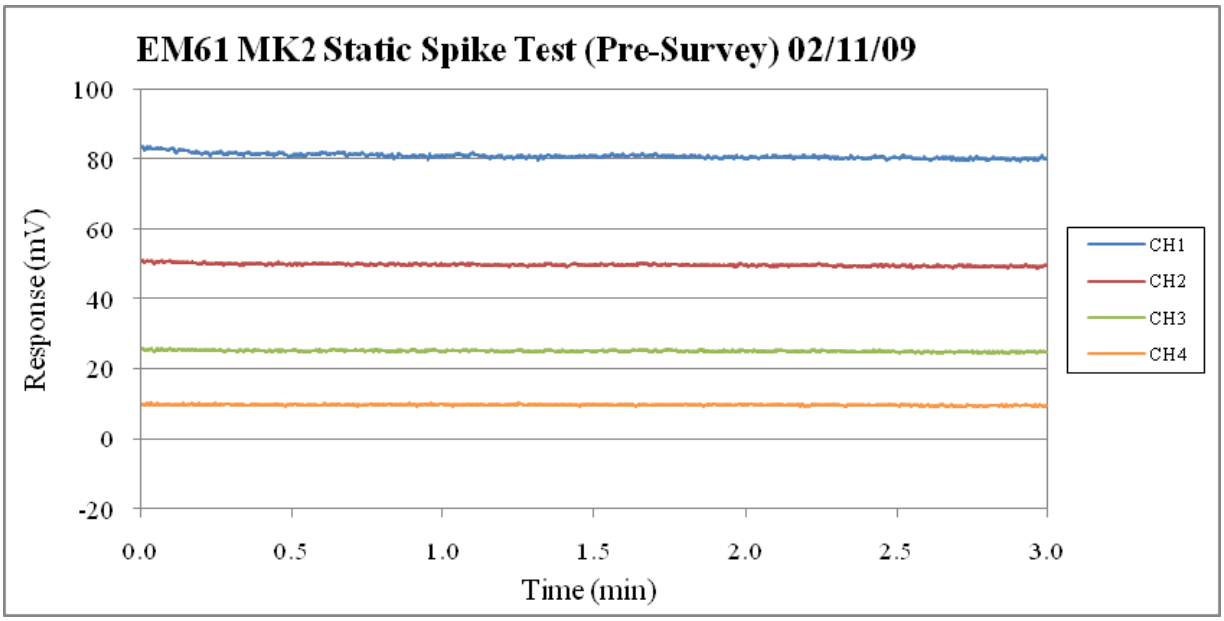
Data Sampling

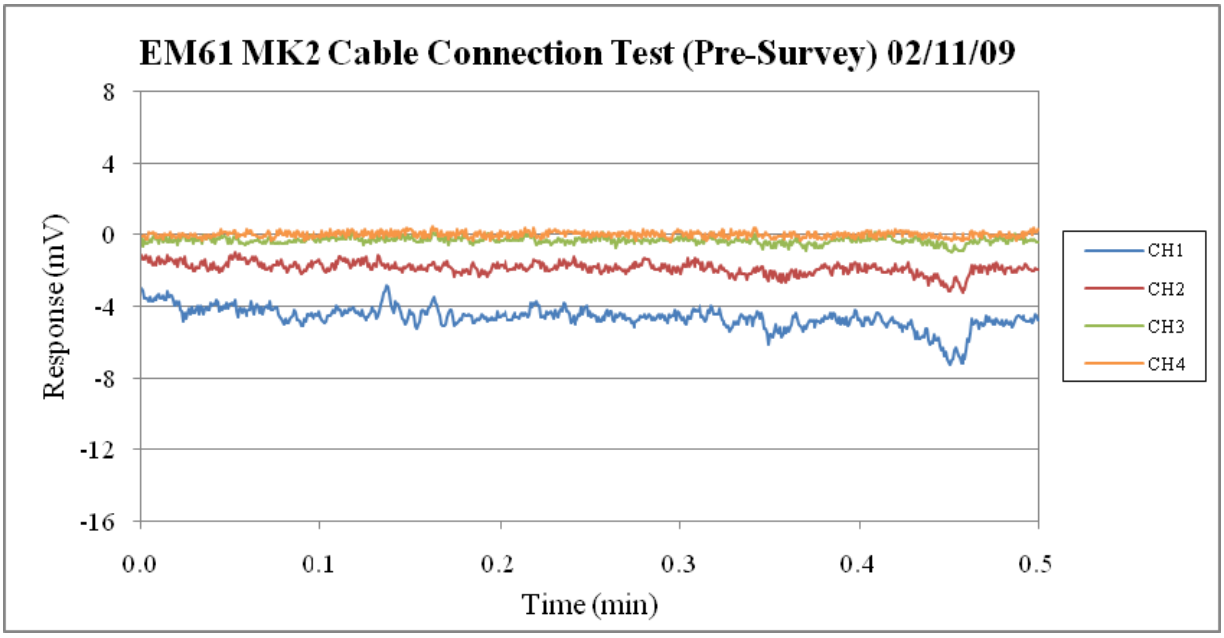
Comments:

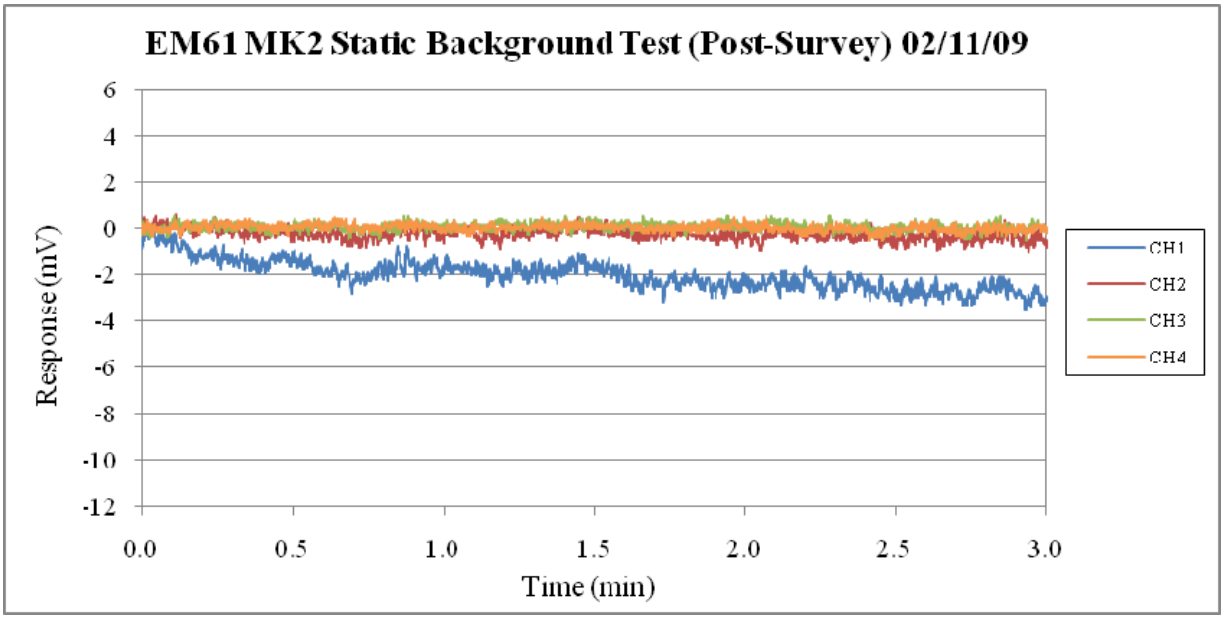
Along Track / Across Track Sampling		Metric
Along Track (ft)	0.3 ft	0.8 ft
Across Track (ft)	2	2 ft
Speed	99.9%	<3 mph
Total Area Surveyed (acres)		
This Data Set	0.2	

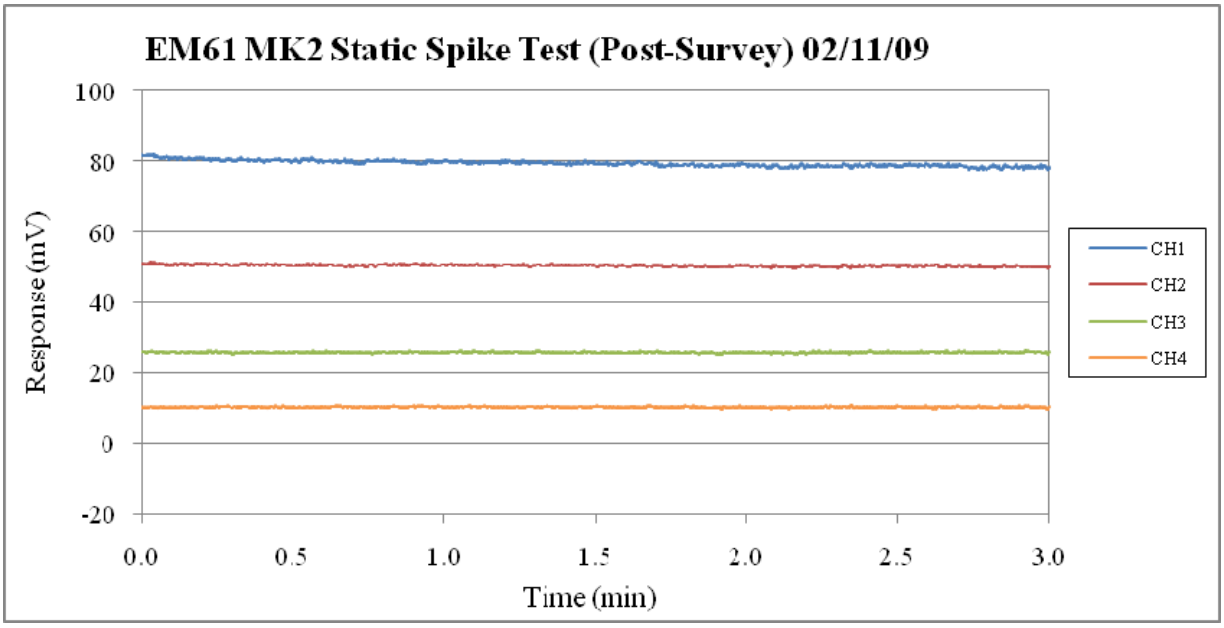
UXProcess Velocity Calc on survey dataset

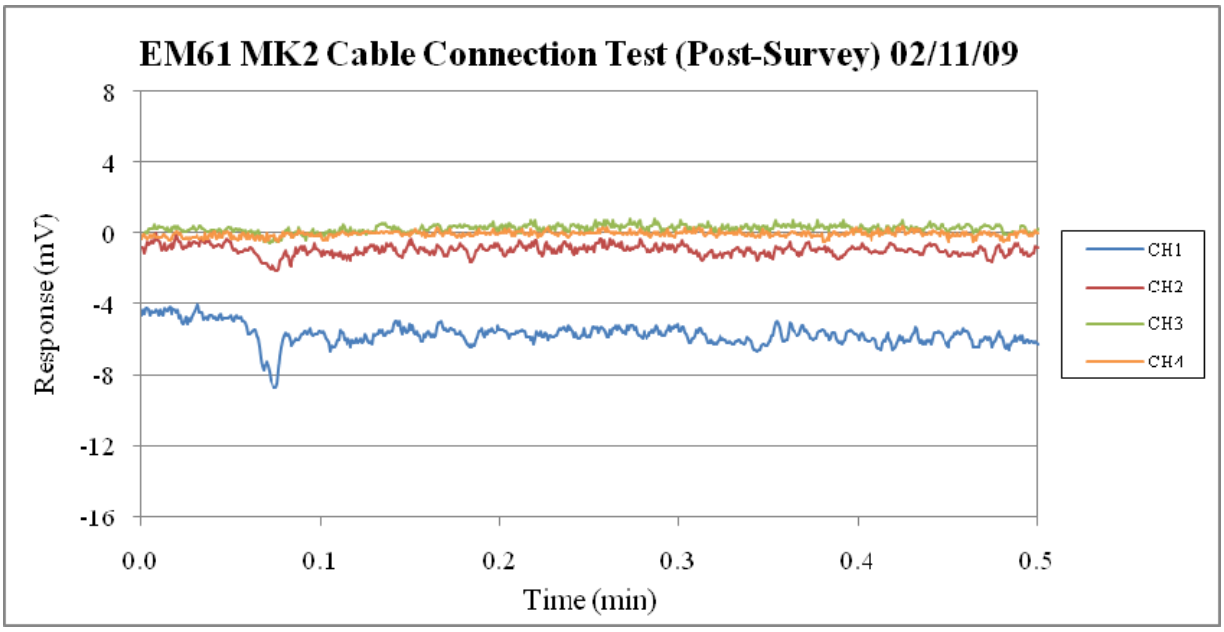

EM61 MK2 Static Background Test (Pre-Survey) 02/11/09
Response (mV)
12
8
4
0
-4
-8
-12
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

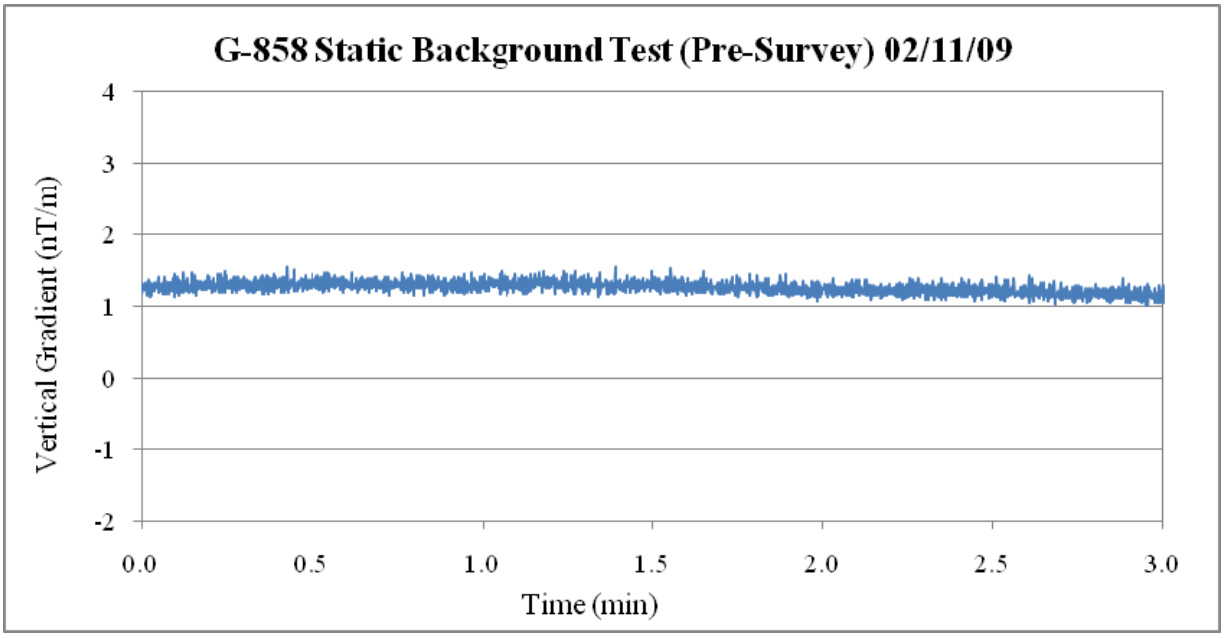

EM61 MK2 Static Spike Test (Pre-Survey) 02/11/09
Response (mV)
100
80
60
40
20
0
-20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

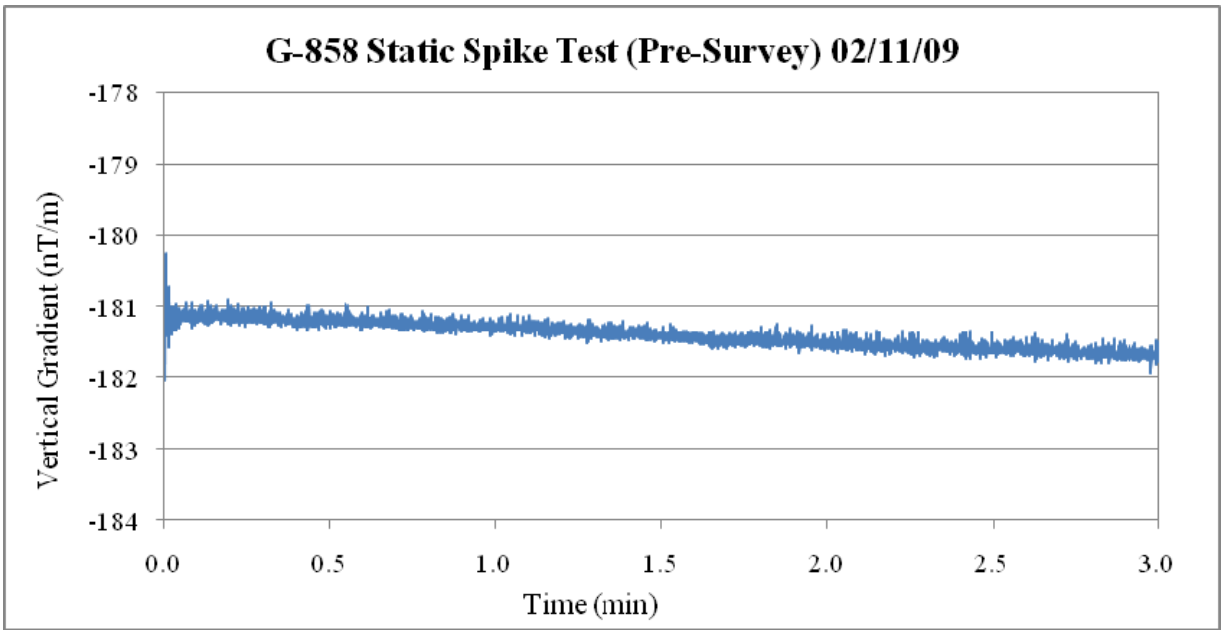

EM61 MK2 Cable Connection Test (Pre-Survey) 02/11/09
Response (mV)
8
4
0
-4
-8
-12
-16
0.0
0.1
0.2
0.3
0.4
0.5
Time (min)
CH1
CH2
CH3
CH4

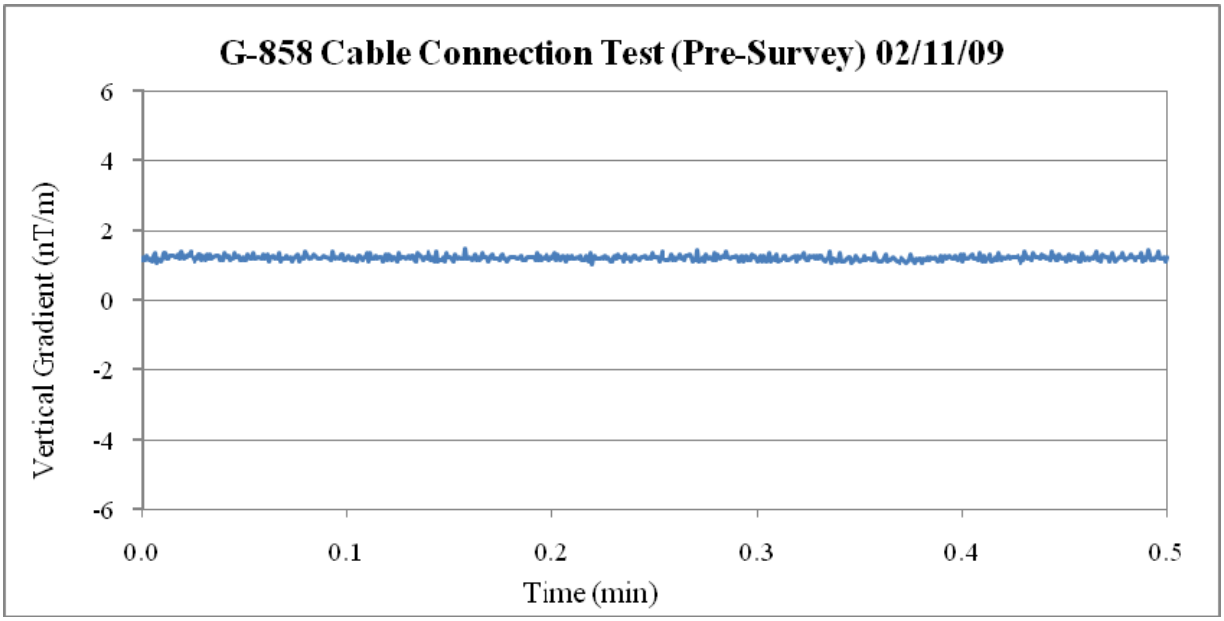

EM61 MK2 Static Background Test (Post-Survey) 02/11/09
Response (mV)
6
4
2
0
-2
-4
-6
-8
-10
-12
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

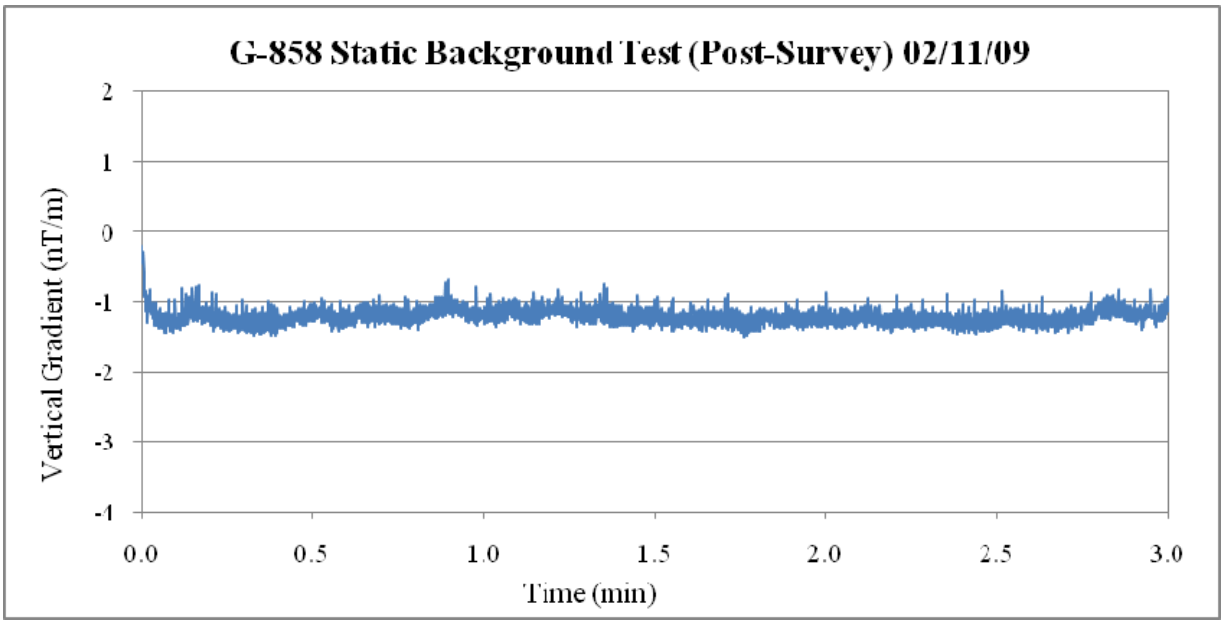

EM61 MK2 Static Spike Test (Post-Survey) 02/11/09
Response (mV)
100
80
60
40
20
0
-20
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)
CH1
CH2
CH3
CH4

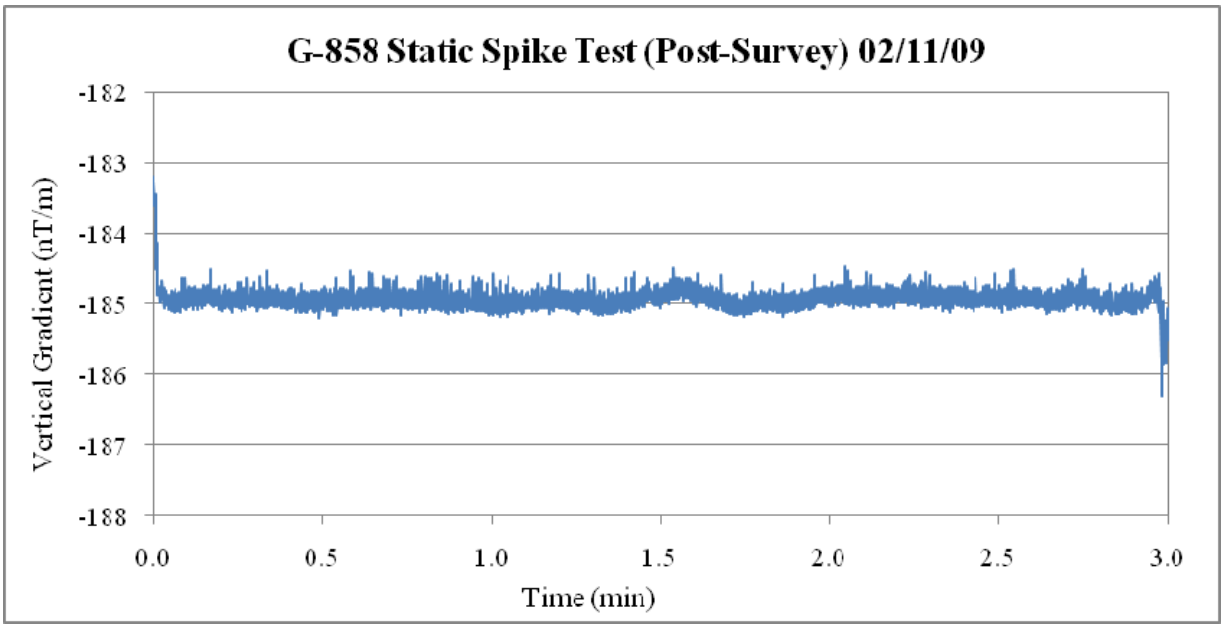

EM61 MK2 Cable Connection Test (Post-Survey) 02/11/09
Response (mV)
8
4
0
-4
-8
-12
-16
0.0
0.1
0.2
0.3
0.4
0.5
Time (min)
CH1
CH2
CH3
CH4

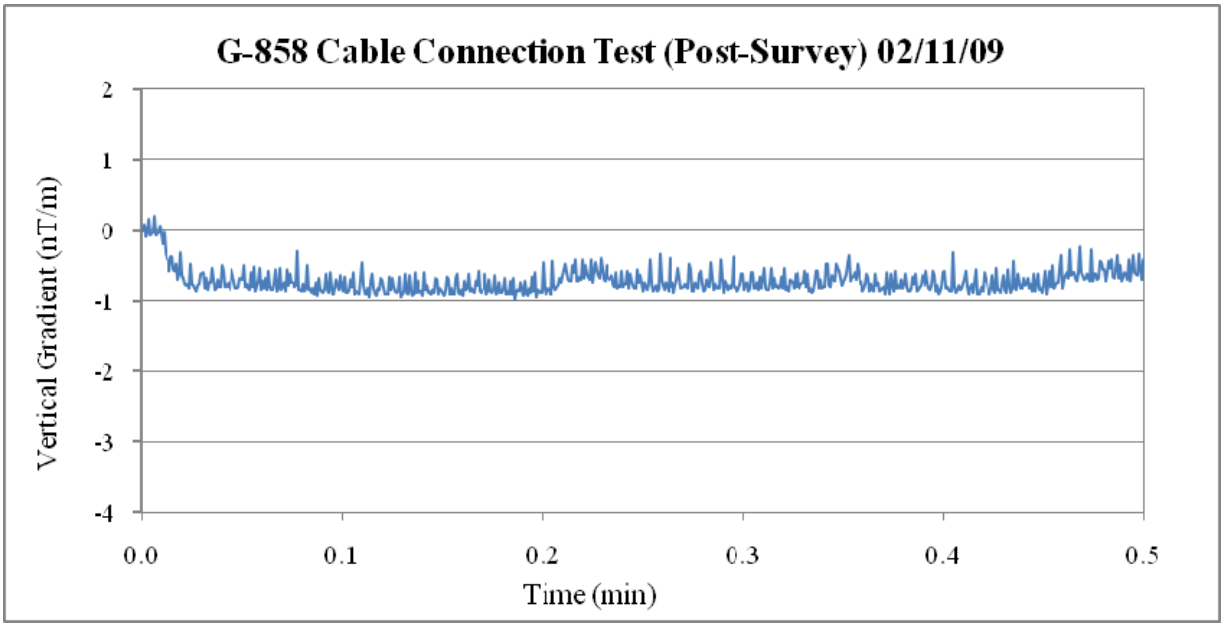

G-858 Static Background Test (Pre-Survey) 02/11/09
Vertical Gradient (nT/m)
4
3
2
1
0
-1
-2
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)

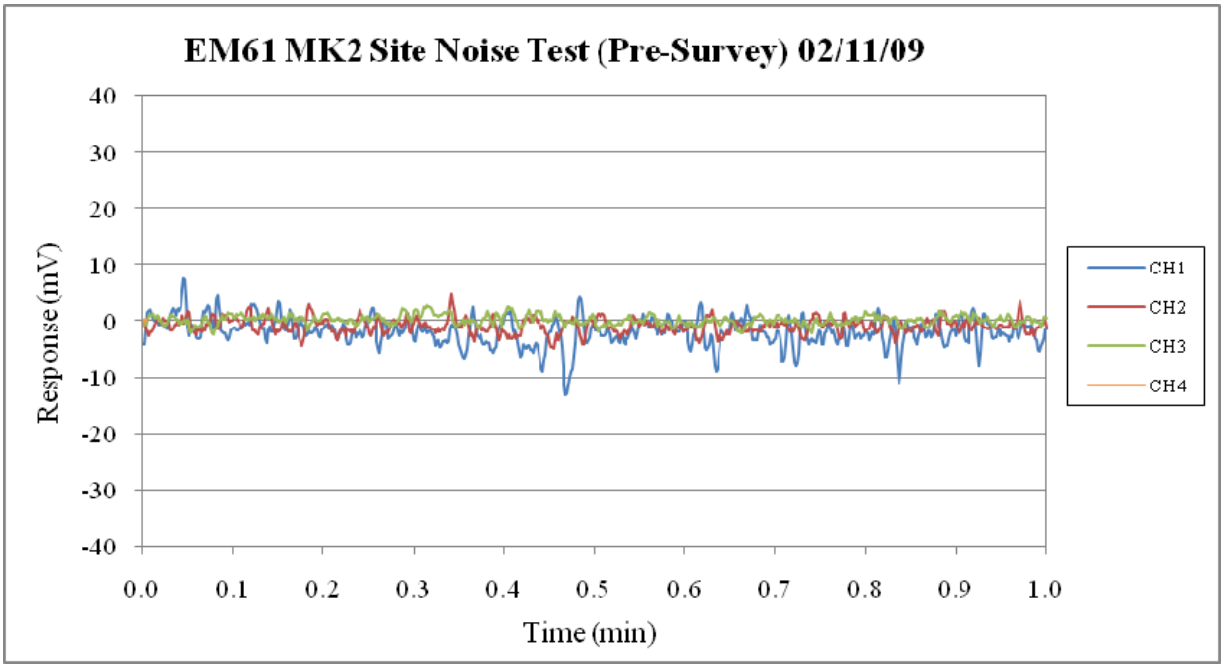

G-858 Static Spike Test (Pre-Survey) 02/11/09
Vertical Gradient (nT/m)
-178
-179
-180
-181
-182
-183
-184
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)

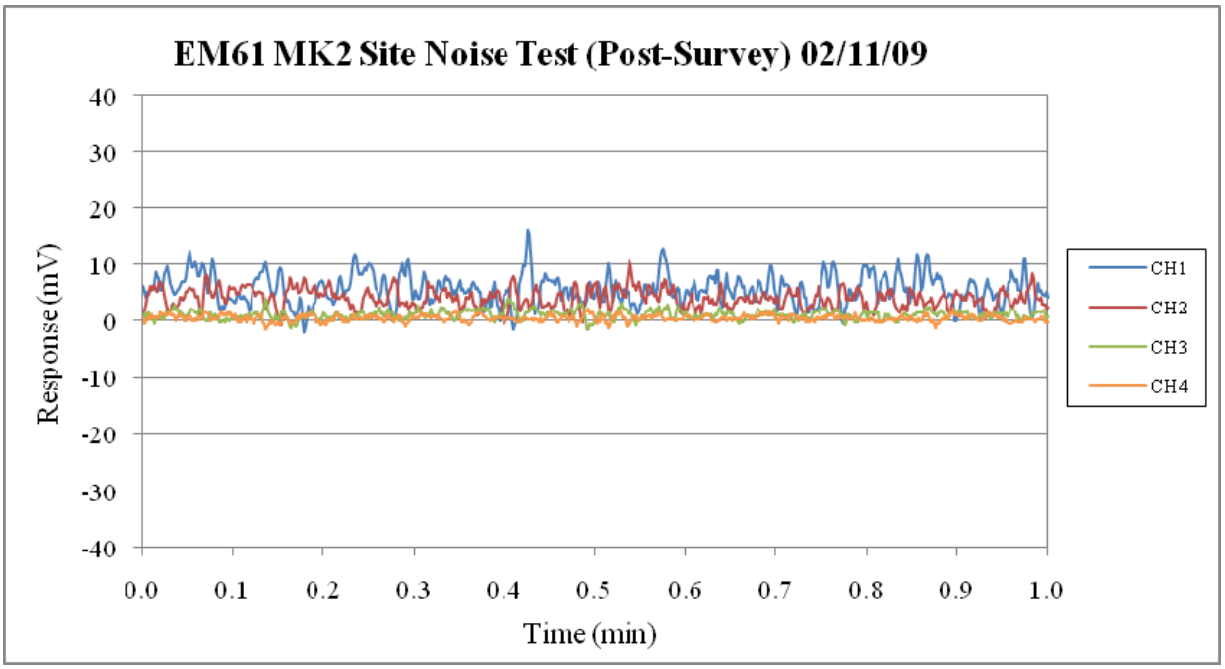

G-858 Cable Connection Test (Pre-Survey) 02/11/09
Vertical Gradient (nT/m)
6
4
2
0
-2
-4
-6
0.0
0.1
0.2
0.3
0.4
0.5
Time (min)

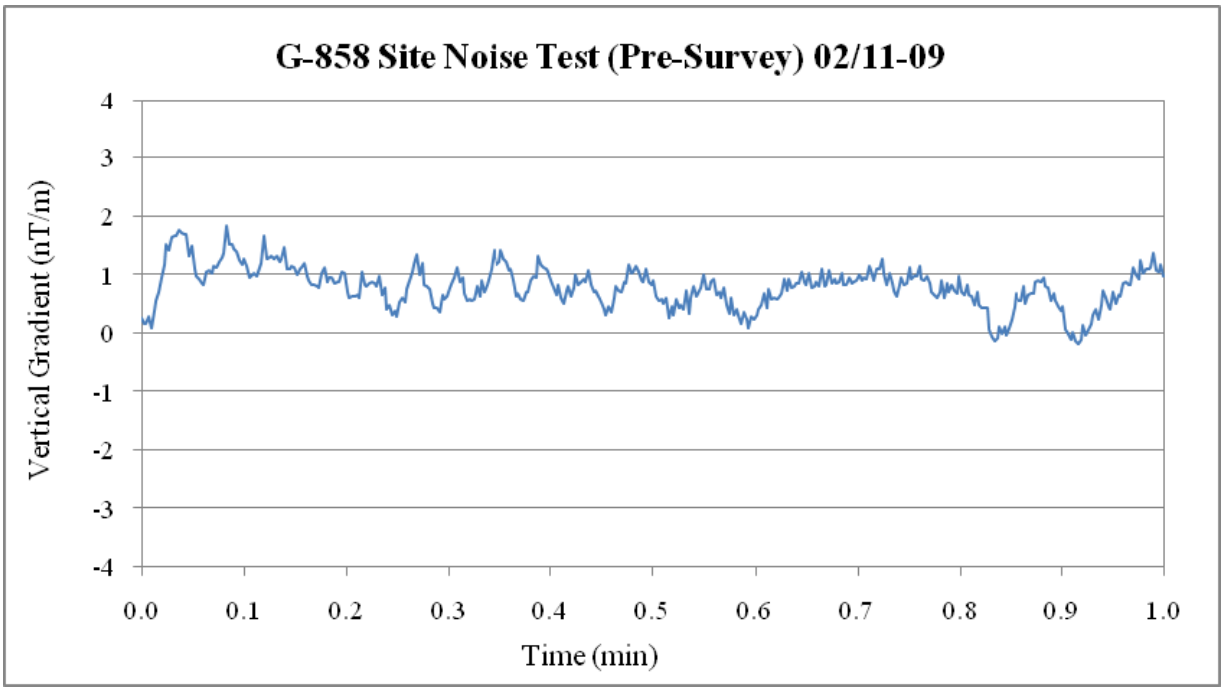

G-858 Static Background Test (Post-Survey) 02/11/09
Vertical Gradient (nT/m)
2
1
0
-1
-2
-3
-4
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)

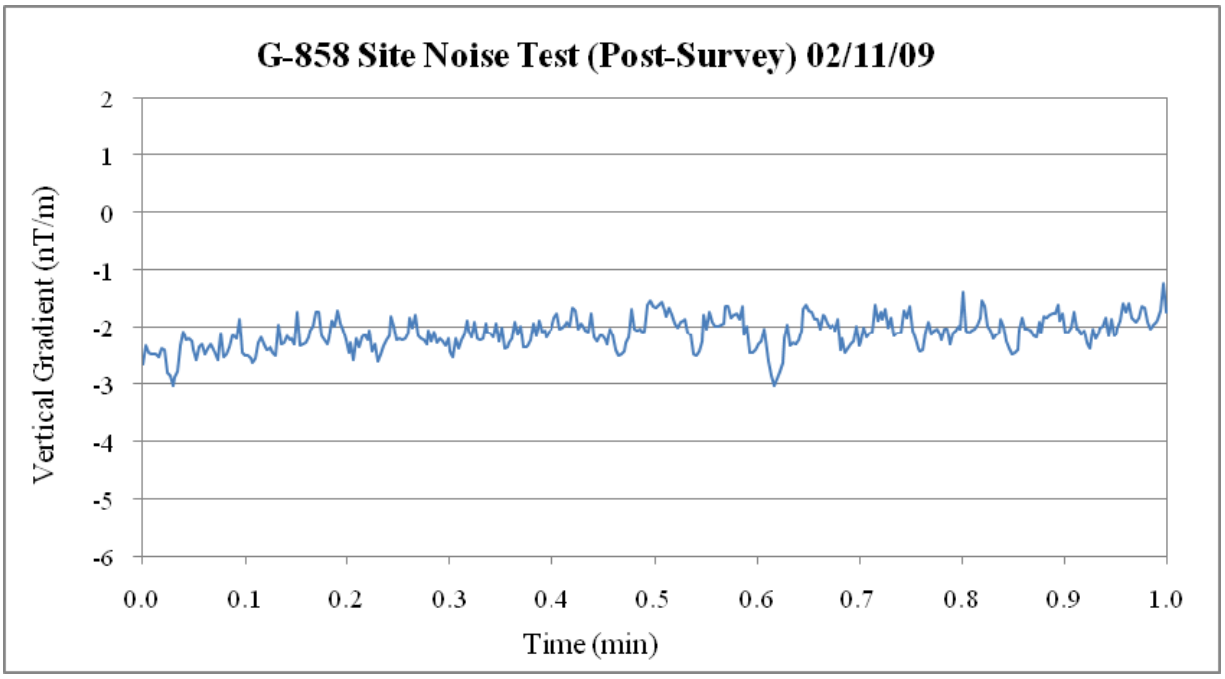

G-858 Static Spike Test (Post-Survey) 02/11/09
Vertical Gradient (nT/m)
-182
-183
-184
-185
-186
-187
-188
0.0
0.5
1.0
1.5
2.0
2.5
3.0
Time (min)

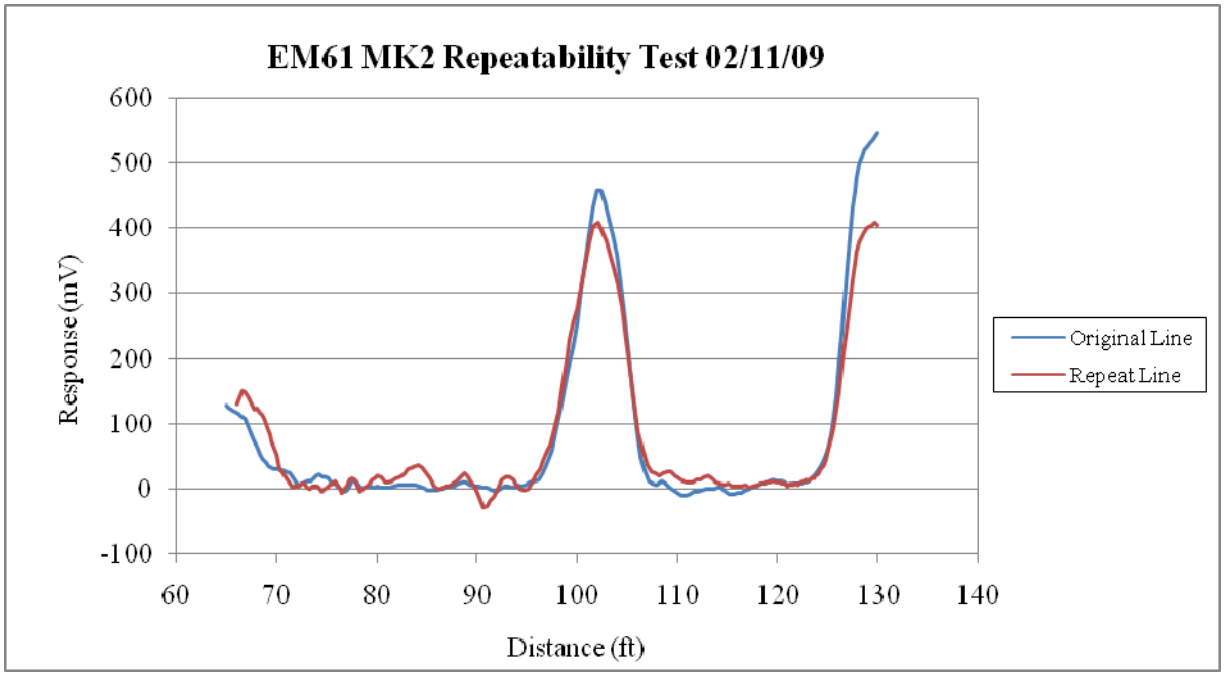

G-858 Cable Connection Test (Post-Survey) 02/11/09
Vertical Gradient (nT/m)
2
1
0
-1
-2
-3
-4
0.0
0.1
0.2
0.3
0.4
0.5
Time (min)

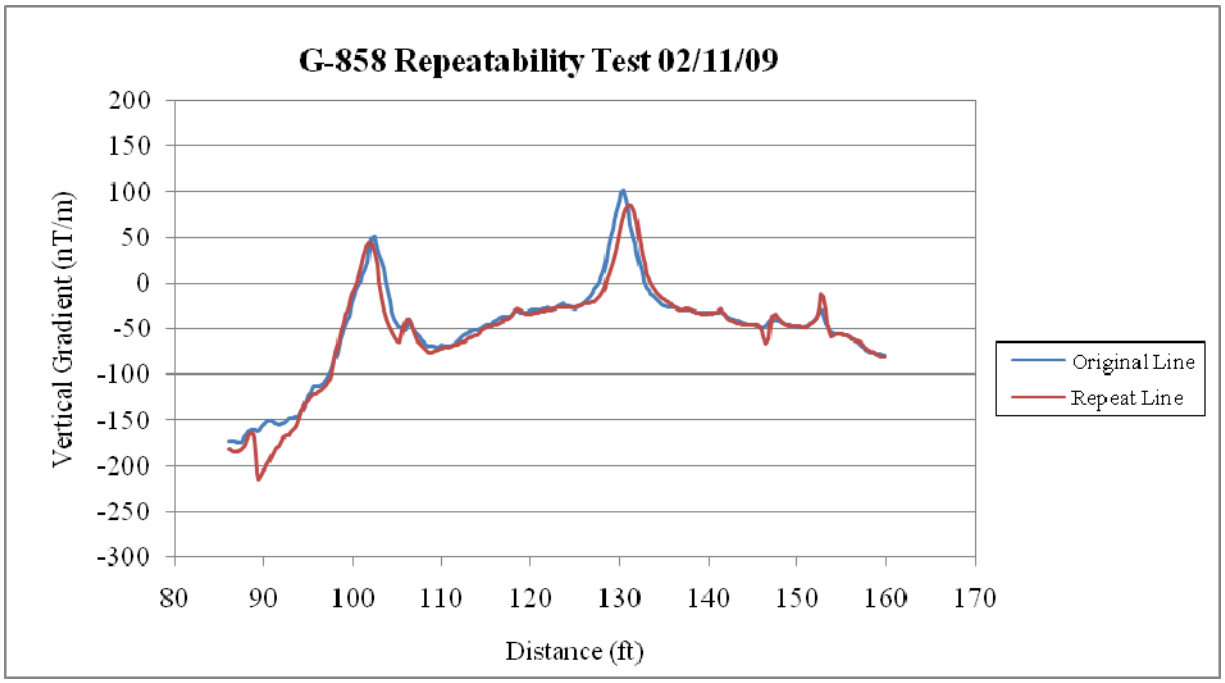

EM61 MK2 Site Noise Test (Pre-Survey) 02/11/09
Response (mV)
40
30
20
10
0
-10
-20
-30
-40
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4


EM61 MK2 Site Noise Test (Post-Survey) 02/11/09
Response (mV)
40
30
20
10
0
-10
-20
-30
-40
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)
CH1
CH2
CH3
CH4


G-858 Site Noise Test (Pre-Survey) 02/11-09
Vertical Gradient (nT/m)
4
3
2
1
0
-1
-2
-3
-4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)


G-858 Site Noise Test (Post-Survey) 02/11/09
Vertical Gradient (nT/m)
2
1
0
-1
-2
-3
-4
-5
-6
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Time (min)


EM61 MK2 Repeatability Test 02/11/09
Response (mV)
600
500
400
300
200
100
0
-100
60
70
80
90
100
110
120
130
140
Distance (ft)
Original Line
Repeat Line


G-858 Repeatability Test 02/11/09
Vertical Gradient (nT/m)
200
150
100
50
0
-50
-100
-150
-200
-250
-300
80
90
100
110
120
130
140
150
160
170
Distance (ft)
Original Line
Repeat Line

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APPENDIX B
Geophysical Anomaly Target Prioritization Memo

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Memo

To: Christopher Evans, Tom Colozza, Amy Walker, and Andy Schwartz

From: John Williams, Brian Junck, and John Gerhard

Date: 21 March 2008

Subject: Proposed analyses and classification scheme for selection and ranking of point source anomalies as determined from geophysical investigation data acquired within the boundaries of the Spring Valley FUDS.

Introduction

The Spring Valley Geophysical Team has developed an analytical process for evaluating and classifying point source anomalies for geophysical investigation data acquired within the boundaries of the Spring Valley Formerly Used Defense Site (FUDS) in Washington, DC. This classification scheme incorporates a detailed process as developed by United States Army Corps of Engineers (USACE), designed to establish a logical basis for selection and prioritization of point source anomalies based on the attributes of the geophysical signature and correlation to the findings presented in the USEPA's EPIC report. The intent of developing this Classification Scheme is two-fold: (1) to exclude from future dig lists those anomalies (i.e., smaller scrap items) currently being encountered in the excavation effort that do not fit a prescribed geophysical profile of Munitions and Explosives of Concern (MEC), and (2) to provide to the Spring Valley Anomaly Review Board (ARB) a summary of the anomalies that should be given priority for further investigation.

Proposed Classification Scheme Concept

Our primary method of prioritization uses geophysical factors (Factor 1) such as anomaly size (anomaly area) for EM61-MK2 and anomaly size (dipole/monopole size) and coincident signatures for Mag G-858 to initially score each anomaly. Based on this scoring each anomaly is placed into one of four categories. In Category A, the anomaly exhibits with high certainty all of the characteristics of an object 75mm or greater in diameter. Category B is an anomaly that exhibits some of the characteristics of an object 75mm in diameter or greater, with low to moderate certainty. Category C anomalies exhibit a few characteristics of an object 75mm or greater in diameter, but cannot be ruled out as being an item of interest. In Category D, the anomaly exhibits with high certainty none of the characteristics of an object 75mm or greater in diameter.

The process was tested using Geophysical Prove-out (GPO) and production survey data (for

75mm and similar items) to develop a baseline to "prove-out" or validate specific routines and criteria that are most applicable. It is important to point out that Factor 1 is intended as a secondary step, complementary to the current target selection process utilized for the Spring Valley geophysics as described in the Final Work Plan (WESTON, 2004).

Factor 2 looks at the correlation of the anomaly location relative to EPIC historical features (Areas and Points of Interest [AOIs and POIs]) and other features (Range Fan and Ground Scars). The correlation is used to segregate the anomalies in Categories A, B, and C into higher and lower priority bins. A process flow diagram detailing the criteria and logic is presented in Attachment A, and supporting details are provided below.

Factor 1 – Evaluation of EM and Magnetic Anomaly Characteristics

Baseline Evaluation of Test Data.

In order to test and help establish the necessary criteria, independent baseline analyses were performed by USACE and WESTON geophysical personnel on multiple GPO databases (Spring Valley, Seneca Army Depot, and Tobyhanna Artillery Range) containing 75mm and similar sized items. For the EM data, a USACE geophysicist analyzed the data from the Spring Valley GPO (the known 75mm's that were separate from background anomalies, Figure B-1) and additional 75mm GPO data from another site (Seneca Army Depot, Figure B-2). The data were analyzed using the Geosoft UX-Process tool '*Calculate SNR, signal strength and size*' routine. From this evaluation, the analyst established thresholds for size, along with a set of criteria to assist in grouping EM anomalies into Categories A, B, C, or D. Based on the anomaly footprints for the known 75mm's an optimum window size of '9' was determined to capture most of the pertinent signal and allowed the background to be calculated interactively.

For the mag process WESTON and USACE evaluated magnetometer data (for known 75mm's that were separate from background anomalies) from the Spring Valley and Tobyhanna Artillery Range (TOAR) -FUDS GPO surveys. For those targets that were selected using the current process, the team evaluated anomaly widths of vertical gradient data for both dipole and monopole magnetic signatures. Measurements for the total width of dipole signatures include both positive and negative lobes; for monopoles the total width of the positive peak was used. In Figure B-3 (presented in Attachment B), Item 3-2 is a typical dipole signature that includes both positive and negative lobes with a width of 8.4 feet. For Items 2-2 and 6-2 the largest widths are 6.1 feet and 7.2 feet, respectively. A cutoff value of 6 feet was determined as a conservative width for our classification scheme. It was also validated against mag anomaly P1 SP-7, a 75mm item buried in the Sibley P1 GPO grid.

Proposed criteria and procedures for evaluation categorization of EM and Magnetic Anomaly characteristics

Factor 1 of the proposed classification scheme uses a combination of automated Geosoft GX routines (built into the Oasis software platform currently used to analyze the Spring Valley geophysical data), and a more robust manual review. It involves using the set of criteria and parameters as determined from a baseline for comparison for similar known items described above. EM anomalies are evaluated using UX-Process tools to 'Calculate SNR, signal strength and size and Target Classification' tools and predefined parameters for similar type items expected at Spring Valley. Mag anomalies are evaluated based on signal characteristics,

magnetic dipole peak and trough width, and monopole peak width criteria. An additional component of the Factor 1 analyses involves a more robust manual review to capture outlier anomalies. It is important to point out that the existing target selection process remains intact and that Factor 1 is intended as a secondary complementary procedure.

As shown in the flow process diagram in Attachment A, an anomaly can have three conditions under Factor 1 of the classification scheme: (1) EM-only anomaly, (2) Coincident EM and Mag anomaly, and (3) Mag-only anomaly.

For each condition, a series of tests is used to place the anomaly in one of four categories or bins. The four categories are:

- Category A - Possible MEC shallow, (equivalent to shallow items from the surface to 22 inches deep). Category A is an anomaly that exhibits with high certainty all of the characteristics of an object 75mm or greater in diameter.
- Category B - Possible MEC deep, (equivalent to deeper items, at greater depth than 22 inches). Category B is an anomaly that exhibits some of the characteristics of an object 75mm in diameter or greater, with low to moderate certainty.
- Category C – Possible MEC deep. Category C anomalies exhibits few characteristics of an object 75mm or greater in diameter, but cannot be ruled out as being an item of interest.
- Category D - Not indicative of MEC. Category D anomalies exhibit with high certainty none of the characteristics of an object 75mm or greater in diameter.

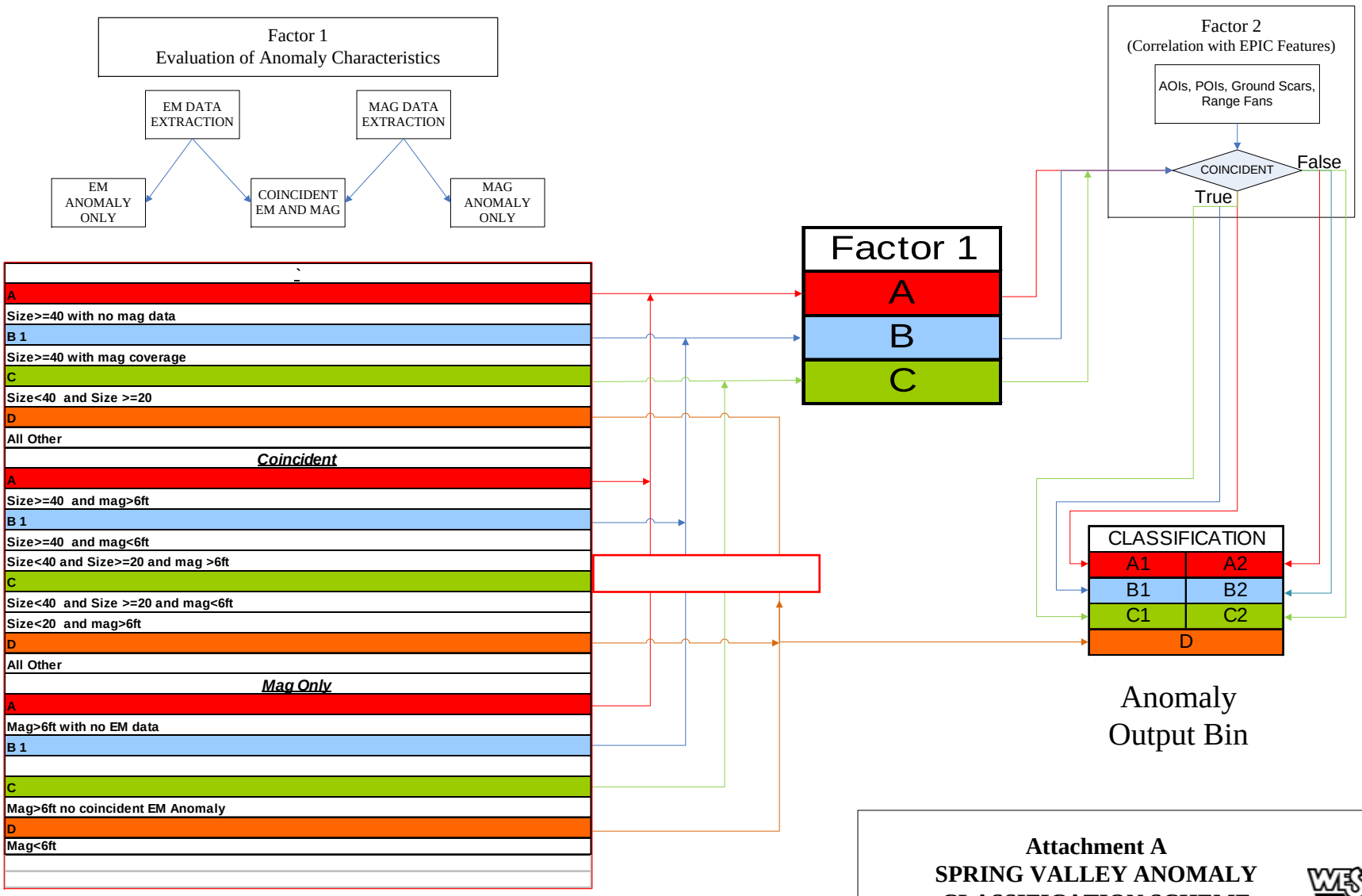
Two criteria (EM size and Mag Size) are used to sort the anomalies. The routines and criteria summarized in the flow process diagram (Attachment A) for the geophysics data are the only scoring we use to segregate anomalies into Categories A, B, C and D. Factor 2, described below segregates Categories A, B and C into higher and lower priorities.

Factor 2 - Correlation of anomaly locations relative to EPIC Historical features

Factor 2, the secondary method of prioritization, compares the location coordinates of EM61-MK2 and Mag (G-858) anomalies in Categories A, B and C to other factors such as POI/AOI boundaries, Range Fan locations, and EPIC ground scars. The correlation between the two is used to segregate anomalies in Categories A, B, C into higher and lower priority bins. Category A1 is a higher priority than A2; Category B1 is a higher priority than B2 and Category C1 is a higher priority than C2. An anomaly in Category A, B or C coincident with one of the above EPIC features would automatically be sorted into bins A1, B1 or C1, respectively. If there is no correlation, the anomaly would be sorted to lower priority bins, A2, B2, or C2, respectively. Since Categories A, B, and C capture the anomalies of interest there is no need to further address Category D anomalies with Factor 2.

Using this approach, the Geophysical Team will prioritize point source anomalies encountered at the Spring Valley FUDS properties. This classification scheme will provide the Spring Valley Geophysical team with a mechanism to present to the Anomaly Review Board (ARB) partners a more reliable dig list of anomalies requiring either further investigation or no further action.

ATTACHMENT A
PROCESS FLOW DIAGRAM


Factor 1
Evaluation of Anomaly Characteristics
EM DATA EXTRACTION
MAG DATA EXTRACTION
EM ANOMALY ONLY
COINCIDENT EM AND MAG
MAG ANOMALY ONLY
A
Size>=40 with no mag data
B 1
Size>=40 with mag coverage
C
Size<40 and Size >=20
D
All Other
Coincident
A
Size>=40 and mag>6ft
B 1
Size>=40 and mag<6ft
Size<40 and Size>=20 and mag >6ft
C
Size<40 and Size >=20 and mag<6ft
Size<20 and mag>6ft
D
All Other
Mag Only
A
Mag>6ft with no EM data
B 1
C
Mag>6ft no coincident EM Anomaly
D
Mag<6ft
Factor 2
(Correlation with EPIC Features)
AOIs, POIs, Ground Scars, Range Fans
COINCIDENT
False
True
Factor 1
A
B
C
CLASSIFICATION
A1
A2
B1
B2
C1
C2
D
Anomaly Output Bin
Attachment A
SPRING VALLEY ANOMALY CLASSIFICATION SCHEME
JAWrev April 01, 2008

ATTACHMENT B
TEST DATA EVALUATION

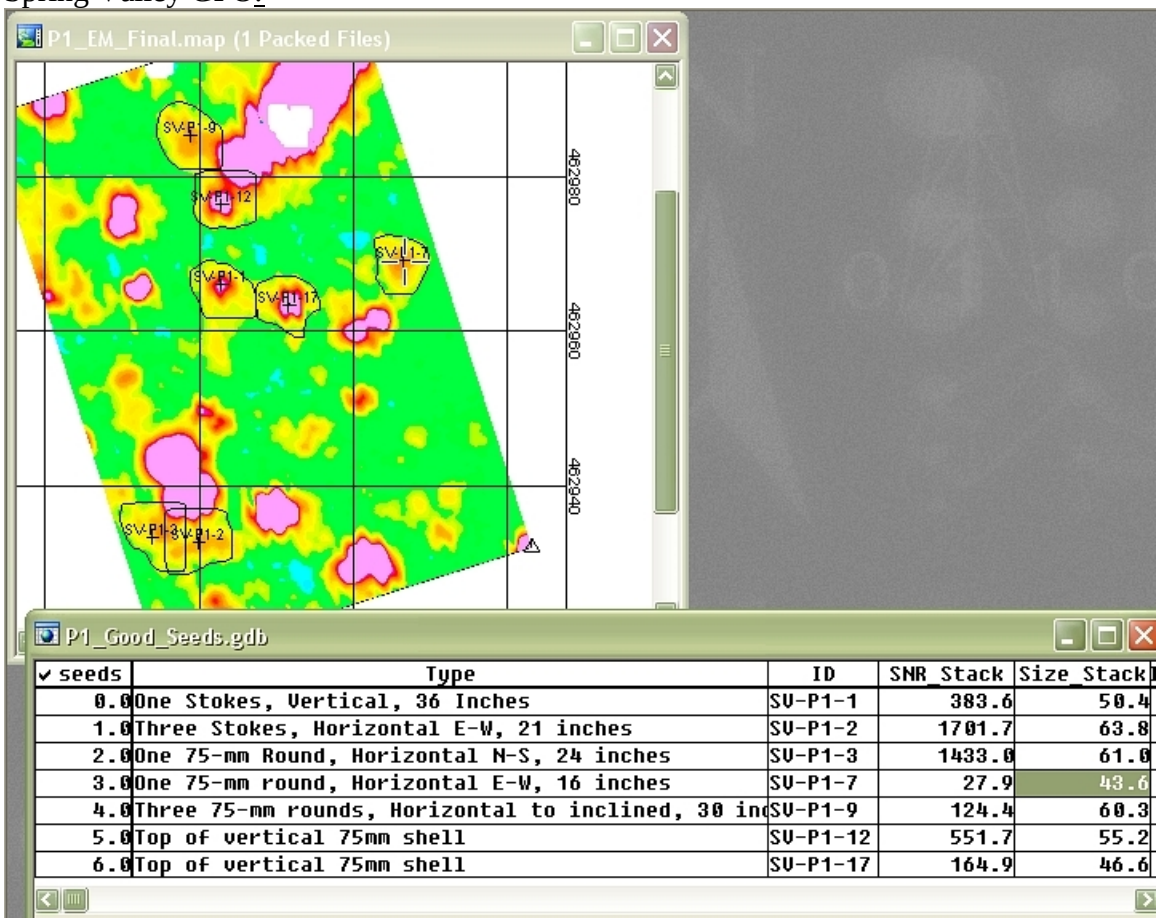
ATTACHMENT B - USACE Recommended steps to calculate anomaly characteristics from EM61MK2 data, Spring Valley:

1) Using WESTON's maps, ensure color scale is appropriate to better see the background values and some of the smaller anomalies. From WESTON's initial target list, add some targets back that were masked out that appeared interesting on the map. Visually review the targets to determine if they are real (Display the line paths on the map - if an anomaly is only present between lines, it is a gridding artifact and should be removed from the list. For this test, we left them in the list for the next few steps and most of them fell off the list because the 'size' was too small).

2) Using this new target list, run the UX-Process tool 'Calculate SNR, signal strength and size'. Parameters: the grid file for the survey gdb/grd; the target list, a window size of '9' to capture most of the interesting signal, and calculate background interactively. The 'background' is somewhat of a judgment call, but using a color scale where targets of interest are clearly visible, draw a polygon in an area that appears to contain no targets. This can be done multiple times in different locations on the map before running to compare the calculated values. The background value will be variable between properties. New channels are created in your target gdb: size, signal strength (not used) and SNR.

Use the 'Display target window' tool to show all of the polygons on the map. The polygons are data that are considered 'signal' and are the area calculated for 'size'. It is not foolproof, and they need to be visually reviewed. The SNR tool works by finding the highest peak within the window around the target and going out until it reaches background in all directions. If targets are close to large cultural features, the starting point may get drawn away and give erroneous results. This will be obvious when viewed on the map. If it worked correctly, the polygons will be drawn fairly well around the anomalies. (Notes: some versions of UX-Process have difficulty in displaying the polygons. Visually examining the polygons is an important step!)

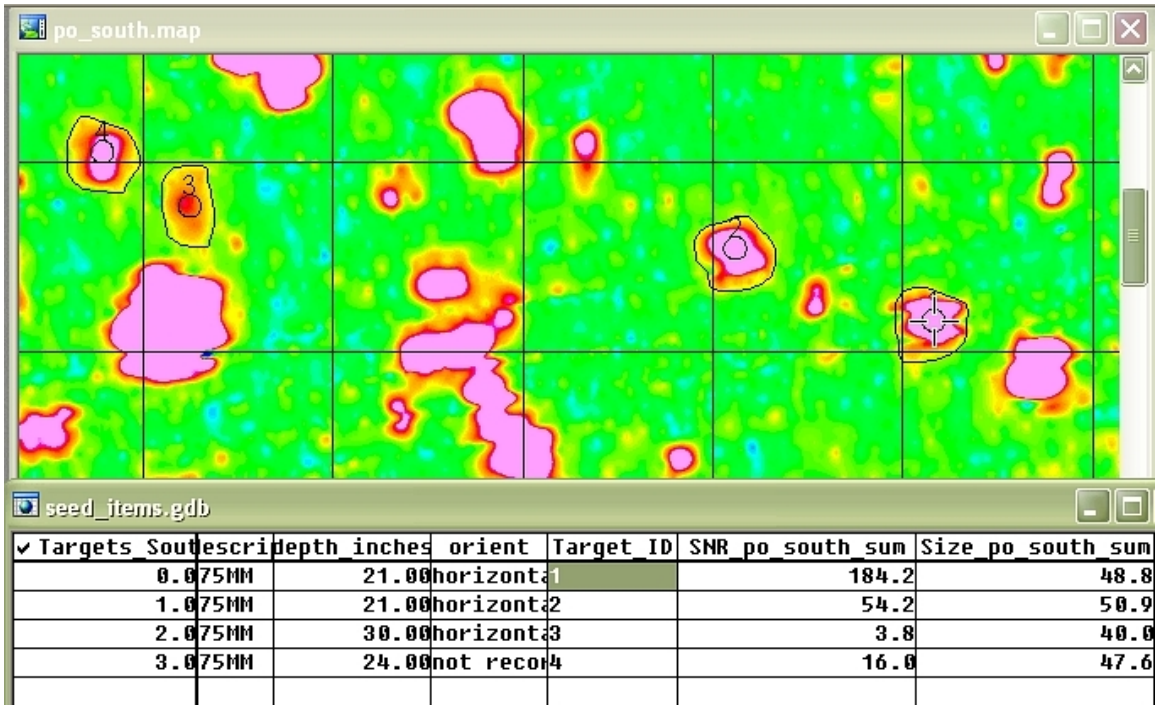
Spring Valley GPO*:*



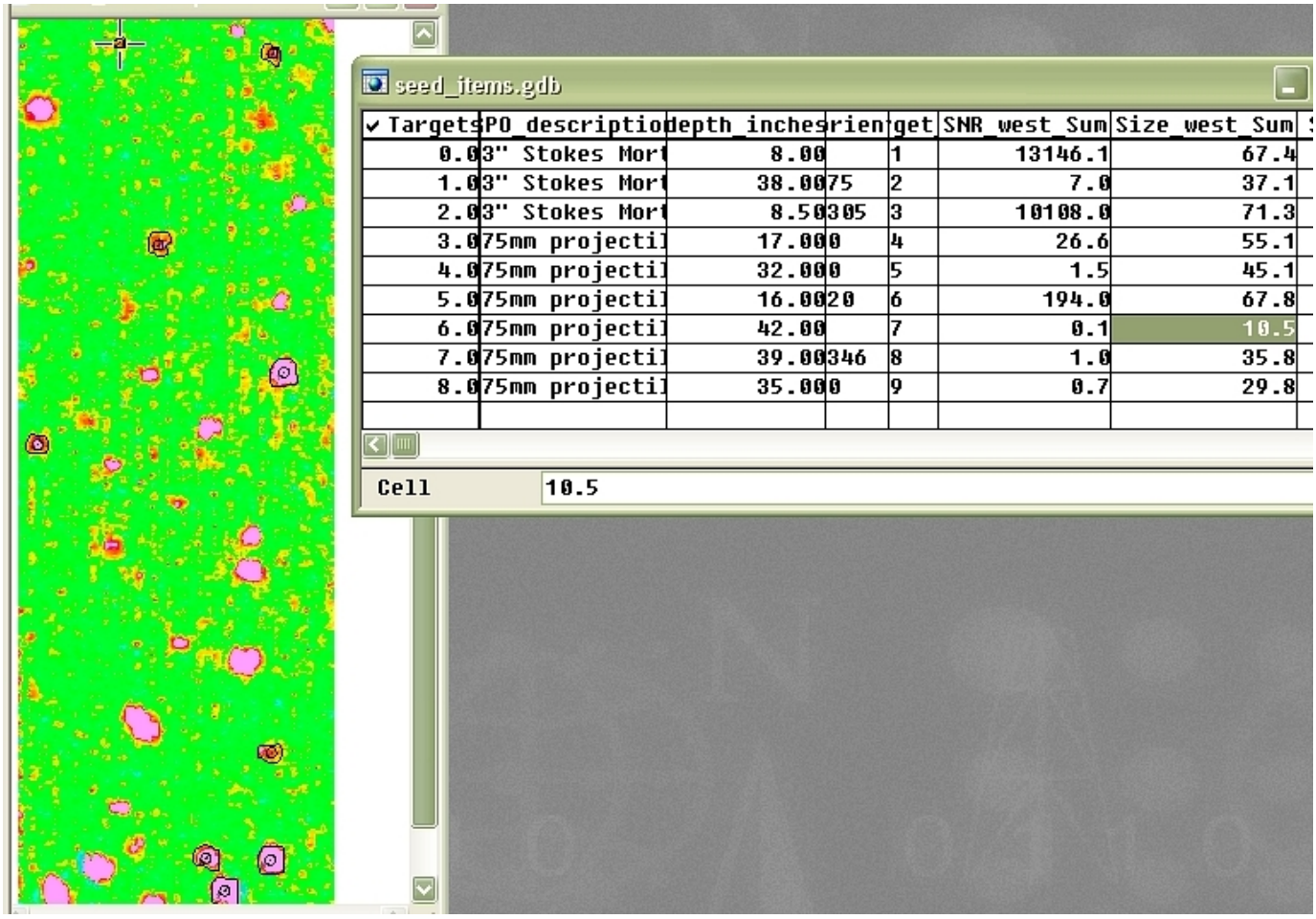
seeds	Type	ID	SNR_Stack	Size_Stack
0.0	One Stokes, Vertical, 36 Inches	SV-P1-1	383.6	50.4
1.0	Three Stokes, Horizontal E-W, 21 inches	SV-P1-2	1701.7	63.8
2.0	One 75-mm Round, Horizontal N-S, 24 inches	SV-P1-3	1433.0	61.0
3.0	One 75-mm round, Horizontal E-W, 16 inches	SV-P1-7	27.9	43.6
4.0	Three 75-mm rounds, Horizontal to inclined, 30 inc	SV-P1-9	124.4	60.3
5.0	Top of vertical 75mm shell	SV-P1-12	551.7	55.2
6.0	Top of vertical 75mm shell	SV-P1-17	164.9	46.6

Figure B-1
Reference: Spring Valley GPO (WESTON, 2002)

Additional GPO:



Targets_Sou	descri	depth_inches	orient	Target_ID	SNR_po_south_sum	Size_po_south_sum
0.0	75MM	21.00	horizonta	1	184.2	48.8
1.0	75MM	21.00	horizonta	2	54.2	50.9
2.0	75MM	30.00	horizonta	3	3.8	40.0
3.0	75MM	24.00	not recor	4	16.0	47.6



Targets	PO_descriptio	depth_inches	orien	get	SNR_west_Sum	Size_west_Sum
0.0	3" Stokes Mort	8.00		1	13146.1	67.4
1.0	3" Stokes Mort	38.00	75	2	7.6	37.1
2.0	3" Stokes Mort	8.50	305	3	10108.6	71.3
3.0	75mm projectil	17.00	0	4	26.6	55.1
4.0	75mm projectil	32.00	0	5	1.5	45.1
5.0	75mm projectil	16.00	20	6	194.0	67.8
6.0	75mm projectil	42.00		7	0.1	10.5
7.0	75mm projectil	39.00	346	8	1.6	35.8
8.0	75mm projectil	35.00	0	9	0.7	29.8

Figure B-2
Reference Site: Seneca Army Depot GPO (WESTON, 2003)

Determination of Mag Anomaly Widths – (ft) for 75-mm items Tobyhanna GPO Grid

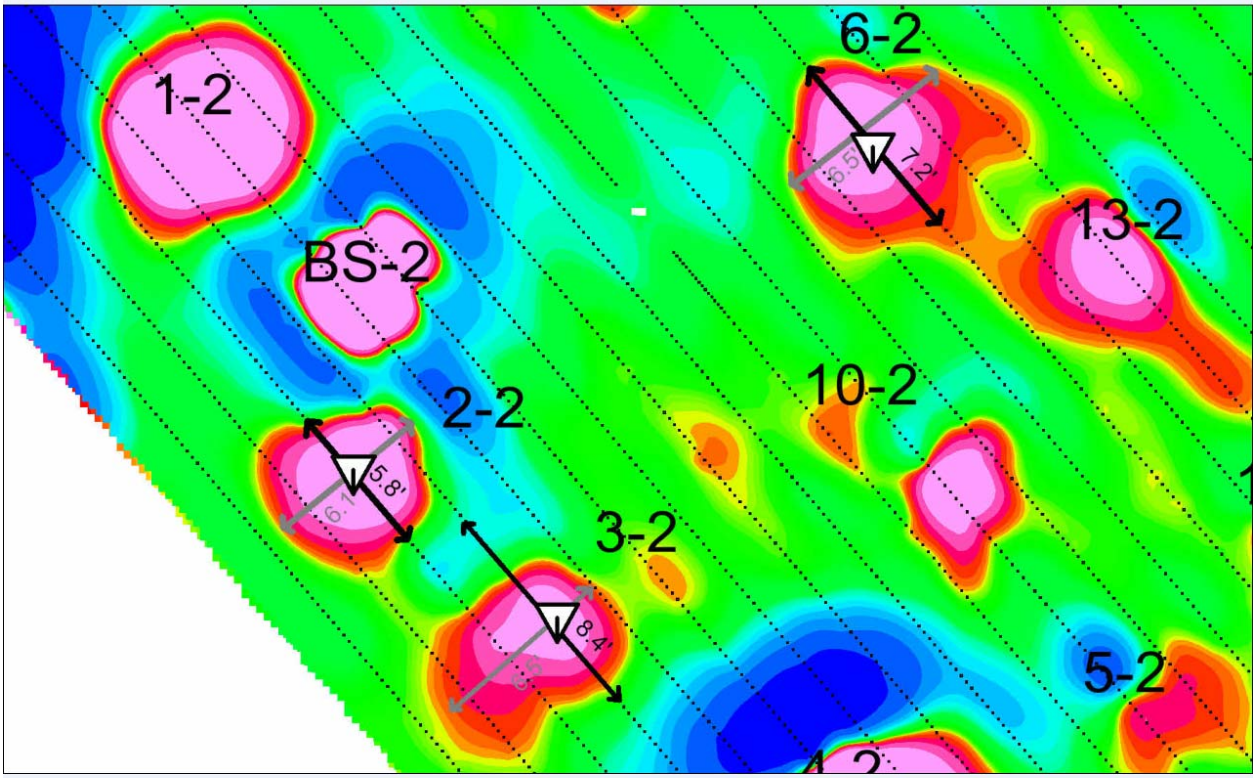


Figure B-3
Reference Site: Tobyhanna Artillery Range (TOAR) FUDS Site GPO (WESTON, 2004)

APPENDIX C
Data Processing Logs

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FORM 6-5
DATA PROCESSING LOG

SITE: Spring Valley FUDS

AREA: 4055 52nd Terrace

Survey Dates: 02/11/09
Sensor: EM61-MK2
Crew: G.A.

ERT GP:
NJ (Init.) 08/07/09 (Date)
ERT QC:
JW (Init.) 07/28/09 (Date)

Sensor Verification QC Log(s)
Form 6-1 Sensor_021109.xls

Navigation Verification QC Log(s)
Form 6-2 Navigation_021109.xls

Initial Review

Navigation Correction
Instrument Latency Correction: 4 fiducials (0.4 Sec)

Data Leveling / Diurnal Correction
Geosoft UX-Detect Drift Correction:

```
SETINI      UXDRIFT.LOW=10
SETINI      UXDRIFT.HIGH=70
SETINI      UXDRIFT.BLOCK=200
SETINI      UXDRIFT.LINES=S
GX          uxdrift.gx
```

Data Cataloging and Coordinate Conversion
Final coordinate projection: NAD 83, State Plane, Maryland Zone.
Units: US Survey Foot

Data Filtering N/A

Data Location Plot Review

Comments

Log files:

Log files:

Field data files:
021109A.R61
021109AA.R61
021109B.R61
021109C.R61
021109R.R61
021109ZZ.R61
021109Z.R61

Initial (x,y,z) files:
021109A.xyz
021109AA.xyz
021109B. xyz
021109C.xyz
021109R. xyz
021109ZZ.xyz
021109Z.xyz

Processed (x,y,z) files;
0211_EM_QC.gdb
0211_EM.gdb
0211_EM_repeat.gdb

FORM 6-5
DATA PROCESSING LOG

ERT GP:
NJ 08/07/09
Init. Date
ERT QC:
JW 07/28/09
Init. Date

SITE: Spring Valley FUDS

Survey Dates: 02/11/09
Sensor: G-858 & G-856

AREA: 4055 52nd Terrace

Crew: G.A.

Sensor Verification QC Log(s)
Form 6-1 Sensor_021109.xls

Navigation Verification QC Log(s)
Form 6-2 Navigation_021109.xls

Initial Review

Navigation Correction
No Lag Correction Applied

Data Leveling / Diurnal Correction
No Drift Correction Applied

Data Cataloging and Coordinate Conversion
Final coordinate projection: NAD 83, State Plane, Maryland Zone.
Units: US Survey Foot

Data Filtering N/A

Data Location Plot Review

Comments

.

Log files:

Field data files:
DateSet_1.stn
DateSet_2.stn
DateSet_3.stn

Initial (x,y,z) files:
Detaset1.xyz
Detaset2.xyz
Detaset3.xyz

Processed (x,y,z) files;
0211_mag_QC.gdb
0211_mag_repeat.gdb
0211_mag.gdb

Site Background/Noise Analysis Log
4055 52nd Terrace, Spring Valley FUDS

Try at several different areas

SETINI UCEANALYSETARGET.BGMODE="Interactive"
SETINI UCEANALYSETARGET.BACKGROUND="6.1678"
SETINI UCEANALYSETARGET.NOISE="3.1456"
SETINI UCEANALYSETARGET.SIZECALC="Monopole"
SETINI UCEANALYSETARGET.POLYSPEC="Create target windows"
SETINI UCEANALYSETARGET.WINDOWSIZE="9"

EM-61 MK2 Geosoft Inputs

UCEANALYSETARGET.BGMODE="User defined"
SETINI UCEANALYSETARGET.BACKGROUND="7"
SETINI UCEANALYSETARGET.NOISE="3"
SETINI UCEANALYSETARGET.SIZECALC="Monopole"
SETINI UCEANALYSETARGET.POLYSPEC="Use existing"

US Army Corps
of Engineers®
Baltimore District

Delivery Order No. 0001
MAMMS Contract No.
W912DR-09-D-0005

SITE-SPECIFIC ANOMALY INVESTIGATION REPORT FOR 4055 52nd TERRACE MILITARY MUNITIONS RESPONSE PROGRAM

SPRING VALLEY FORMERLY USED DEFENSE SITE – OPERABLE UNIT 5 SPRING VALLEY, WASHINGTON, D.C. FUDS PROPERTY NO. C03DC0918

FINAL DOCUMENT
September 2011

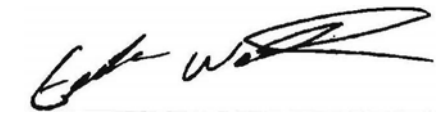
Prepared by:

Shaw® Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, MD 21040

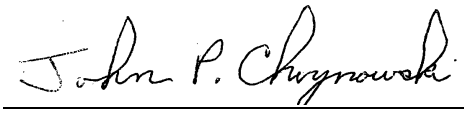
SITE-SPECIFIC ANOMALY INVESTIGATION REPORT
FOR
4055 52nd TERRACE
MILITARY MUNITIONS RESPONSE PROGRAM

SPRING VALLEY FORMERLY USED DEFENSE SITE – OPERABLE UNIT 5
SPRING VALLEY, WASHINGTON, D.C.
FUDS PROPERTY NO. C03DC0918

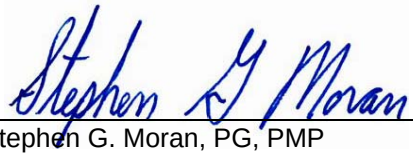
FINAL DOCUMENT



Eeda Wallbank
Shaw Scientist



John P. Choynowski
Shaw Project Manager



Stephen G. Moran, PG, PMP
Shaw Program Manager

Prepared for:

USACE, BALTIMORE DISTRICT
10 SOUTH HOWARD STREET
BALTIMORE, MD 21201

Prepared by:

SHAW ENVIRONMENTAL, INC.
2113 EMMORTON PARK ROAD
EDGEWOOD, MD 21040

SEPTEMBER 2011

EXECUTIVE SUMMARY

E.S.01 The low probability anomaly investigations at 4055 52nd Terrace NW were conducted in accordance with the Site-Wide Work Plan (WP) for the Spring Valley Formerly Used Defense Site (SVFUDS), Washington, D.C., March 2007, and the Final Site-Specific Work Plan (SSWP) for Anomaly Investigation at 4055 52nd Terrace, Spring Valley, Washington D.C., Shaw, January 2010.

E.S.02 Fifty-one (51) of 52 single item anomalies were successfully investigated on 21 October 2010. One anomaly (52-14) was not investigated due to its location under hardscape. On 06 January 2011, two additional anomalies were investigated (X-1 and X-2) as directed by USACE. No Munitions and Explosives of Concern/Recovered Chemical Warfare Materiel (MEC/RCWM) items or other American University Experiment Station (AUES)-related items were encountered in any of the 53 anomalies resolved at 4055 52nd Terrace.

E.S.03 Pre-excavation landscape evaluations were conducted by ESA in December 2009. Plants, shrubs, and other hardscape features near the area of excavation were identified during this evaluation and their values assessed. After the intrusive investigation was completed, all debris was cleaned up and removed from the property. There is no further need for restoration.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ATTACHMENTS

A CD of this report and work plans is included with this document.

LIST OF ACRONYMS AND ABBREVIATIONS

AOI .....Area of Interest
ARB .....Anomaly Review Board
AUES.....American University Experiment Station
CENAB .....U.S. Army Corps of Engineers, Baltimore District
CWM .....Chemical Warfare Materiel
DCMR.....District of Columbia Municipal Regulations
DDOE .....District of Columbia Department of the Environment
DERP .....Defense Environmental Restoration Program
EM61-MK2 .....Geonics® EM61-MK2 Time-Domain Electromagnetic Detector
ESA .....Environmental Systems Analysis, Inc.
FUDS.....Formerly Used Defense Sites
G-858 .....Geometrics® G-858 Cesium Vapor Magnetometer
HTW .....Hazardous and Toxic Waste
IAW.....In Accordance With
JMT .....Johnson, Mirmirman & Thompson
MAMMS.....Multiple Award Military Munitions Services
MEC .....Munitions and Explosives of Concern
mg/kg.....milligrams per kilogram
OESS .....Ordnance and Explosives Safety Specialist
PM .....Project Manager
POI .....Point of Interest
PSHM .....Project Safety and Health Manager
QC .....Quality Control
RCWM.....Recovered Chemical Warfare Materiel
Shaw .....Shaw Environmental, Inc.
SSWP.....Site-Specific Work Plan
SUXOS.....Senior Unexploded Ordnance Supervisor
SVFUDS.....Spring Valley Formerly Used Defense Site
USACE.....U.S. Army Corps of Engineers
USEPA .....U.S. Environmental Protection Agency
UXO.....Unexploded Ordnance
UXOQCS.....Unexploded Ordnance Quality Control Specialist
UXOSO .....Unexploded Ordnance Safety Officer
WP.....Work Plan

1.0 INTRODUCTION

This report describes the activities conducted while performing an anomaly investigation at the Spring Valley Formerly Used Defense Site (SVFUDS) residential property located at 4055 52nd Terrace, Washington, D.C. (see **Figure 1-1**). Shaw Environmental, Inc. (Shaw) prepared this report under contract to the U.S. Army Corps of Engineers (USACE), Baltimore District (CENAB). This work is being performed in accordance with Contract No. W912DR-09-D-0005, Delivery Order No. 0001. This project falls under the Defense Environmental Restoration Program (DERP)/Formerly Used Defense Sites (FUDS).

1.1 PROJECT AUTHORIZATION

The activities performed under this Scope of Work fall under the DERP/FUDS Program. The work was conducted in compliance with the applicable federal, state, and local guidance, including the District of Columbia Hazardous Waste Management Act §6-701 *et seq*., and the Munitions Rule 20 District of Columbia Municipal Regulations (DCMR) 4512, as applicable or relevant and appropriate requirements under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980. All activities involving work in areas potentially contaminated with Munitions and Explosives of Concern (MEC) or Recovered Chemical Warfare Materiel (RCWM) related items were conducted in compliance with the USACE, Department of the Army, and Department of Defense requirements regarding personnel, equipment, and procedures.

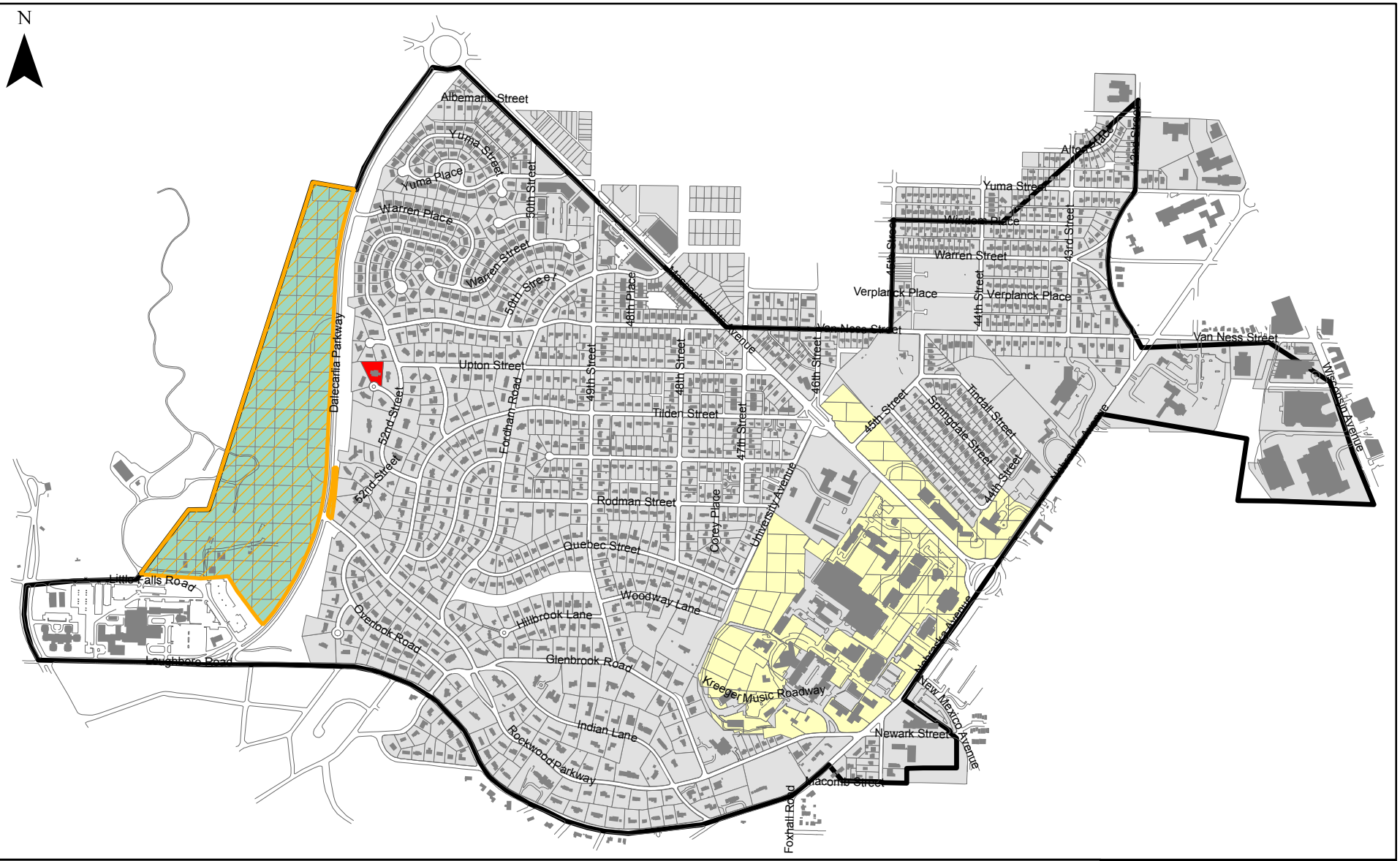
The details and procedures that are common to all SVFUDS activities under this contract are described in the *Site-Wide Work Plan (WP) for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington, D.C.,* prepared by Parsons for USACE (USACE, 2007), hereafter referred to as the Site-Wide WP. The site-specific activities for 4055 52nd Terrace are described in the *Site-Specific Work Plan for 4055 52nd Terrace Anomaly Investigation* (Shaw, 2010), hereafter referred to as the SSWP.

This project was conducted by Shaw under contract with CENAB. Other organizations that provided technical input for this project include the U.S. Environmental Protection Agency (USEPA) and the District of Columbia Department of the Environment (DDOE). **Table 1-1** lists the site parties and their responsibilities.

Table 1-1
Organizations and Responsibilities

Responsibility	Organization
Project Manager (PM) Site Operations Officer Ordnance and Explosives Safety Specialist (OESS)	CENAB
Implementing Agency	CENAB
Contractor [PM, Senior Unexploded Ordnance Supervisor (SUXOS), Project Safety and Health Manager (PSHM), Geophysicist, Quality Control (QC) Manager, and UXO Safety Officer (UXOSO)/UXO QC Specialist* (UXOQCS) (UXO Technician III)]	Shaw
Site Surveyor	Johnson, Mirmirman & Thompson (JMT)
Site Restoration Contractor	Fine Earth Landscapers
Waste Disposal Contractor	Potomac Environmental, Inc.
Non-Hazardous Waste Landfill	King & Queen Landfill, Little Plymouth, VA
Landscape Surveyor	Environmental Systems Analysis, Inc. (ESA)

*Note that Mr. Robert Harrison replaced Mr. Bobby Manders as the UXOQCS and that all necessary and applicable qualifications and documentation has been provided to USACE OESS and is on file at the Federal Property.



Projection : NAD_1983_UTM_Zone_18N

U.S. ARMY
CORPS OF ENGINEERS
BALTIMORE DISTRICT

MULTIPLE AWARD MILITARY MUNITIONS SERVICES

FIGURE NUMBER 1-1

SPRING VALLEY
SITE LOCATION
4055 52ND TR NW

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Project Number: 135177

Additionally, the Anomaly Review Board (ARB) played a major role in this investigation. The ARB is composed of selected members of USACE, USEPA, and DDOE. Through a review process, the ARB determined which anomalies were going to be investigated. This process included evaluating the anomalies based on their geophysical readings. Each anomaly was judged against a formal written standard, and a quality assurance check of the geophysical survey results was performed. This was done to ensure that each identified anomaly was fully evaluated and that anomalies were dismissed only after a rigorous review of the geophysical investigation results.

1.2 SCOPE AND OBJECTIVE

The scope of this project was to reacquire and intrusively investigate 52 single item anomalies. This work was performed under the Site-Wide WP, which addresses the general excavation of anomalies and associated Hazardous and Toxic Waste (HTW) contamination removal. The Site-Wide WP also addressed mobilization, demobilization, geophysical investigations, topographical and landscape surveys, and other activities required prior to intrusive investigation. The object of the Site-Wide WP is to address all relevant investigation scenarios in a manner that protects the public and personnel performing the investigations, and minimizes impacts to normal activities.

The SSWP describes the site-specific activities for intrusively investigating anomalies at 4055 52nd Terrace. The activities performed in accordance with (IAW) procedures presented in the SSWP are discussed in **Section 2.0** of this report. Results from these activities are provided in **Section 3.0**. A summary of the investigations conducted at 4055 52nd Terrace is provided in **Section 4.0**.

1.3 BACKGROUND

Previous investigations across the entire SVFUDS are described in detail in Section 1.8 of the Site-Wide WP. The following section describes the previous investigations that have been carried out on the 4055 52nd Terrace property.

1.3.1 Site Location

SVFUDS, designated DERP-FUDS Property No. C03DC0918, is located in the Spring Valley neighborhood of northwest Washington, D.C. The 668-acre area currently includes approximately 1,600 private residences, foreign embassies, American University, Wesley Seminary, and numerous commercial properties. 4055 52nd Terrace is located in the western portion of the SVFUDS (**Figure 1-1**).

1.3.2 Site History

See Subchapter 1.6 of the Site-Wide WP, Site History.

1.3.3 Previous Investigations

A geophysical survey was conducted at 4055 52nd Terrace in February 2009 to locate and map electromagnetic and magnetic anomalies. The ARB subsequently determined that 52 single item anomalies require intrusive investigation. The CENAB probability assessment had determined that the probability of encountering MEC/Chemical Warfare Materiel (CWM) during the intrusive anomaly investigation is “seldom,” or the likelihood for the occurrence of a mishap, as “Unlikely but possible to occur.” **Figure 1-2** shows the anomalies that were identified for investigation at 4055 52nd Terrace.

A review of historical aerial photographs from 1918, 1922, 1927, and 1928 was performed by Parsons Engineering in 2008-2009. This review identified disturbed areas and other ground features located throughout the SVFUDS. Ground scars have been identified on historical aerial photographs from 1918 on 4055 52nd Terrace. Point of Interest (POI) 10 – Possible Target or Test Site and a portion of POI 11 – Scattered Ground Scars are located on the property. Adjacent properties are located within Area of Interest (AOI 24) – Antimony Detection Area and POI 39 – Static Test Fire Area. In addition, the property is located within a down range area of concern that may contain buried MEC.

Arsenic screening sampling was performed at this property in June 2001. None of the surface or soil boring samples exceeded the screening level of 12.6 parts per million. Specialty parameter screening sampling for Lewisite breakdown products, sulfur mustard, mustard breakdown products, explosives, and total cyanide was also performed in June 2001. None of the soil boring sample results were found above detection limits at a 6.5-foot depth.

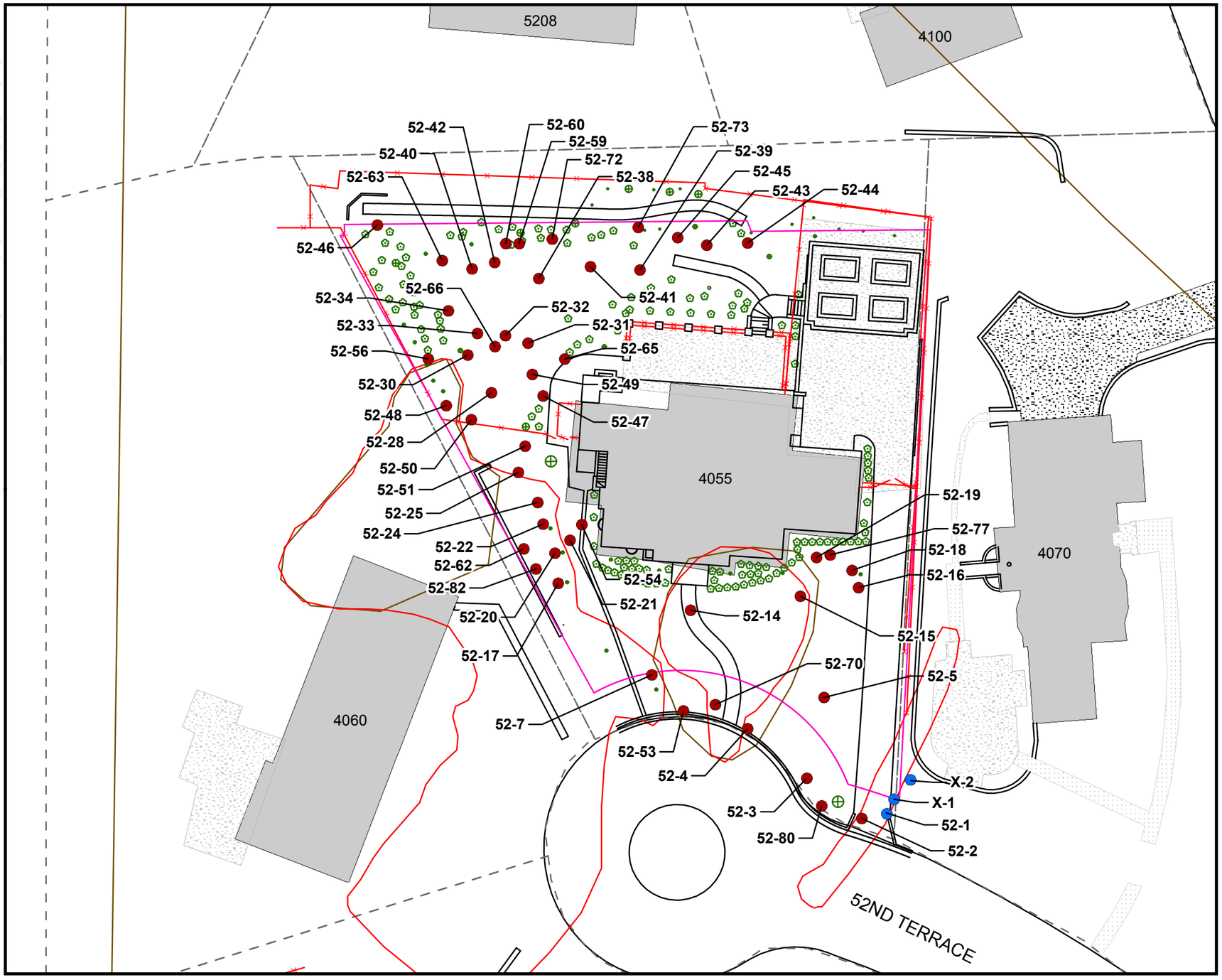

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Figure 1-2
Site Map
4055 52nd Terrace

Spring Valley Site-Wide
Washington, DC

Legend

- Anomalies that were Investigated
- Anomaly that were Investigated in January 2011
- Property Boundary
- Trees\Landscape
- Fence
- Wall
- Parcels
- Buildings
- Driveway
- Deck or Porch
- Sidewalk
- Ground Scar 1918
- Ground Scar 1922
- Ground Scars 1927
- Ground Scars 1928
- AOI/POI

0 30 60 Feet

1 inch equals 30 feet

Scale:	1:360
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Shaw Shaw Environmental, Inc.

2.0 DISCUSSION

2.1 INTRODUCTION

This section describes the anomaly investigation activities performed IAW with the SSWP at 4055 52nd Terrace, including pre-mobilization, mobilization, anomaly investigations, disposal, site restoration, and demobilization. Site-Specific Logbook Entries are provided in **Attachment A**.

2.2 PRE-MOBILIZATION ACTIVITIES

IAW with the SSWP, prior to the commencement of geophysical survey activities, Miss Utility marked the locations of known utility lines at the property. A pre-excavation landscape survey was conducted by ESA on 15 December 2009. Selected photographs from the survey are presented in **Attachment B**. The land surveyor, JMT, located and marked the selected 52 single item anomalies on 19 October 2010 and returned on 3 January 2011 to locate and mark anomaly X-1 and X-2.

Anomaly reacquisition was performed on 21 October 2010 and 6 January 2011. The reacquisition process consisted of locating and identifying the low probability anomalies using a Geonics® EM61-MK2 time-domain electromagnetic detector (EM61-MK2) and the Geometrics G-858 Cesium Vapor Magnetometer (G-858) (Shaw, 2010). Shaw geophysical personnel refined each anomaly location to pinpoint the peak target response of the anomalies, and recorded background and peak target response values.

QC testing of the EM61-MK2 and G-858 was conducted daily on each instrument at the prove-out area located on the eastern side of the Federal Property (see **Figure 1-1**). Testing consisted of static background and spike tests performed during the geophysical reacquisition, digital geophysical mapping, and post-excavation QC.

2.3 MOBILIZATION

The field team mobilized to 4055 52nd Terrace on 21 October 2010 for anomaly reacquisition and to intrusively investigate the anomalies. A second mobilization was conducted in 6 January 2011 for additional reacquisition and intrusive investigation. Equipment and other facilities required for the field activities were mobilized and demobilized from the site each day.

2.4 LOW PROBABILITY ANOMALY INVESTIGATION

2.4.1 Anomaly Investigation

The anomaly investigation was conducted at 4055 52nd Terrace on 21 October 2010 and 6 January 2011. The intrusive investigations were conducted by qualified UXO technicians and were monitored by the CENAB OESS. The intrusive investigations were conducted by hand digging in open air (Shaw, 2010). Fifty-one (51) of the 52 single item anomalies were investigated and identified or removed in October 2010. At the request of the homeowner, anomaly 52-14 was not investigated due to its location beneath fragile walkway stones. Anomalies X-1 and X-2 were investigated and identified in January 2011. Photographs were taken of each excavation and of the recovered materials. Select photographs of recovered materials can be found in **Attachment D**.

IAW the Site-Wide WP, a photoionization detector was used to monitor volatile organic compounds in the breathing zone during all excavation activities.

2.4.2 Excavation Quality Control

Excavation QC was performed following the completion of each anomaly excavation. A Shaw geophysicist used the EM61-MK2 and G-858 to verify that the anomaly source had been removed at each anomaly location. The CENAB OESS was present during the excavation QC to monitor the contractor's work processes and ensure procedures in the work plan were being followed. The EM61-MK2 and G-858 readings taken during the post-excavation QC were compared to the readings taken during reacquisition. IAW the SSWP, if the geophysical signal following anomaly removal was reduced by 90 percent or more compared to the reacquisition reading or the source of the anomaly signal was positively identified, the anomaly was considered to be resolved.

2.5 HTW SOIL REMOVAL

No HTW soil was required to be removed during the anomaly investigation at this property. Soil excavated during the investigation was used to backfill the excavation.

2.6 DISPOSAL

All items recovered during the intrusive investigation of the single item anomalies were identified as cultural debris based on visual inspection of the items by the Shaw UXO personnel. These items were removed from the residence at the close of each day and stored in a roll-off container located on Federal Property. At the conclusion of the SVFUDS activities, the cultural debris items uncovered during intrusive investigation will be transferred to King & Queen Landfill located in Little Plymouth, Virginia, as a non-hazardous waste.

2.7 SITE RESTORATION

The site restoration effort consisted of backfilling the excavations. The need for additional restoration has not yet been identified.

2.8 DEMOBILIZATION

Final demobilization of all equipment from 4055 52nd Terrace took place on 6 January 2011.

3.0 RESULTS

3.1 LOW PROBABILITY ANOMALY INVESTIGATION

Fifty-three (53) single item anomalies were investigated at 4055 52nd Terrace. All anomalies were investigated by hand digging in open air. All 53 single item anomalies were successfully investigated and removed or identified. One anomaly (52-14) was not investigated at the request of the homeowner due to its location beneath hardscape.

The 53 single item anomalies were investigated and all were found to be related to cultural debris; no MEC/CWM items or other American University Experiment Station (AUES)-related items were identified at these locations. **Table 3-1** lists the findings for each single item anomaly. Recovered items were removed from the residence at the close of each day and stored in a roll-off container located on Federal Property. **Attachment C** includes the geophysical survey results for this investigation. **Attachment D** includes selected photographs taken during the anomaly investigation. Seven single item anomalies achieved 90 percent reduction, while 46 single item anomalies did not. Anomalies that did not achieve 90 percent reduction were due to the item being left in place, high residual background levels produced by nearby items with magnetic characteristics, or were reduced to background levels. Items left in place include tree root baskets (52-3, 52-17, 52-18, 52-20, 52-22, 52-30, 52-49, and 52-63), utilities (52-3, 52-65, and 52-80), irrigation lines (52-21 and 52-77), and concrete support items (52-39, 52-62, and 52-82). In the case of anomalies 52-1 and 52-2 which did not achieve 90 percent reductions, it was determined that a linear subsurface object located directly above and parallel to a marked gas and electric lines which resulted in a distribution of EM and magnetic values at and between those anomalies. Similarly, the distribution of EM and magnetic values in the area of anomalies 52-47 and 52-65 indicated a subsurface electrical line buried along the edge of the reinforced concrete footing of the stone patio.

See **Table 3-1** included in **Attachment C** for a description of the cause for each single item anomaly. All single item anomalies that did not achieve 90 percent reductions were considered resolved (identified) and granted USACE concurrence.

3.2 SITE RESTORATION

Following QC and CENAB concurrence that each anomaly had been resolved, the excavations were backfilled with excavated soil. Areas of grass that were temporarily removed were replaced and watered to retain soil moisture. Post-restoration photographs of 4055 52nd Terrace are included in **Attachment B**.

Table 3-1
Geophysical Anomaly Resolution – Single Item Anomalies
4055 52nd Terrace Spring Valley, Washington, D.C.

Original Survey						Reacquisition Survey		Dig Results					Post-Dig Excavation QC Results				
				G-858 Response (nT/m)													
Target ID	Easting	Northing	EM61 Response (mV) (Note 1)	Peak	Trough	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Anomaly Type (Note 2)	Description	Approx Weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly Identified or Removed (Y or N)	USACE Concurrence
52-2	1283165	464384.3	19.16	^	-1103	799	18.5	O	subsurface utility(gas line)	unknown	24 – 36	0	786	n/a	N	Y	DVK
52-14	1283117	464442.3	91.72	686.36	-794.41	907	120	NOT DUG								N	DVK
52-18	1283162	464453.4	806.59	364.21	-334.07	-392	768	S	tree root basket	unknown	6	0.5x0.5x0.5	n/a	720	N	Y	DVK
52-51	1283071	464488	2386.47	127.45	-4861.58	2265	2502	S	cellar window grate	20	3	2x2x0.5	1535	n/a	N	Y	DVK
52-50	1283056	464495.4	399.27	1206.53	-2607.28	4500	1270	O	chain link fence	unknown	0	1x1x1	n/a	1300	N	Y	DVK
52-48	1283049	464499.3	422.93	2178.93	1881.51	-2300	46	O	chain link fence	unknown	0	1x1x1	n/a	50	N	Y	DVK
52-47	1283076	464502	69.24	334.91	-817.27	-332	115	O	reinforcing rod in stone patio, subsurface cable	unknown	2 – 12	1x1x1	n/a	120	N	Y	DVK
52-49	1283073	464508	69.27	835.11	-3.24	-403	129	S	tree root basket	unknown	4	0.5x0.5x0.5	n/a	130	N	Y	DVK
52-30	1283055	464513.4	323.74	1827.73	-412.62	-808	319	S	tree root basket	unknown	6	0.5x0.5x0.5	n/a	320	N	Y	DVK
52-3	1283150	464395.5	3271.24	2876.08	-589.21	-1155	4085	O	water meter cap	10	4	1x1x0.3	-1100	n/a	N	Y	DVK
52-45	1283114	464546.1	22.06	411	^	-289	55	S	magnetized nail	0.1	2 – 12	1x0.5x0.4	-219	n/a	N	Y	DVK
52-44	1283133	464544.6	29.48	3316.52	2533.01	-928	88	O	buried electrical line	unknown	8	1x1x0.75	-379	n/a	N	Y	DVK
52-46	1283030	464549.6	38.59	1280.63	209.25	565	225	S	fence post, spike, spring	4	3 – 6	(3) 0.75x0.75x0.5	-214	n/a	Y	Y	DVK
52-73	1283102	464548.97	*	938.13	-8809.71	-8900	1812	S	4 ft rebar	5	0	1x1x1	8800	n/a	N	Y	DVK

Table 3-1 (Continued)
Geophysical Anomaly Resolution – Single Item Anomalies
4055 52nd Terrace Spring Valley, Washington, D.C.

Original Survey						Reacquisition Survey		Dig Results					Post-Dig Excavation QC Results				
				G-858 Response (nT/m)													
Target ID	Easting	Northing	EM61 Response (mV) Note 1	Peak	Trough	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Anomaly Type Note 2	Description	Approx Weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly Identified or Removed (Y or N)	USACE Concurrence
52-72	1283079	464545.72	*	640	^	-310	n/a	O	no find	n/a	n/a	1x1x1	-310	n/a	N	Y	DVK
52-77	1283156	464457.7	*	554.89	-18.75	-324	36	O	buried irrigation line	unknown	2 – 12	0.5x0.5x0.3	n/a	35	N	Y	DVK
52-80	1283154	464387.83	*	653	^	-875	570	O	iron curb spacer, subsurface utility	unknown	0, 24 - 36	2x1x2	-875	570	N	Y	DVK
52-82	1283074	464453.8	*	275.33	-722.86	829	36	S/O	nails, reinforcing materials in retaining wall	0.1, unknown	2, 24 - 36	(2) 0.3x0.3x0.3	39	n/a	N	Y	DVK
52-60	1283066	464544.48	*	412.2	357.52	-132	30.3	S	turf staple	0.1, unknown	0	0.5x0.5x0.3	-120	n/a	N	Y	DVK
52-56	1283044	464512.3	*	1479.15	-579.01	-2200	52	S	wire bundle	0.3	0	0.5x0.5x0.3	-2180	n/a	N	Y	DVK
52-59	1283069	464544.48	*	372	^	-195	22	S/O	nails, subsurface electrical line	0.1, unknown	2 – 12	1x1x0.5	-196	21	N	Y	DVK
52-62	1283071	464459.42	*	137	-150	110	88	S/O	nails, reinforcing materials in retaining wall	0.1, unknown	2, 24 - 36	0.3x0.3x0.2	92	n/a	N	Y	DVK
52-63	1283048	464539.74	*	2936.11	-706.96	-1180	34	S	tree root basket	unknown	3	1x1x0.3	-1100	n/a	N	Y	DVK
52-65	1283082	464512.3	*	877.34	-1280.39	-792	278	O	reinforcing rod in stone patio, subsurface cable	unknown	2 – 12	1x1x1	280	n/a	N	Y	DVK
52-16	1283164	464448.6	161.08	666.1	-184.8	-889	810	S	tree root basket	unknown	1	0.5x0.5x0.2	n/a	805	N	Y	DVK

Table 3-1 (Continued)
Geophysical Anomaly Resolution – Single Item Anomalies
4055 52nd Terrace Spring Valley, Washington, D.C.

Original Survey						Reacquisition Survey		Dig Results					Post-Dig Excavation QC Results				
Target ID	Easting	Northing	EM61 Response (mV) Note 1	G-858 Response (nT/m) Peak	G-858 Response (nT/m) Trough	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Anomaly Type Note 2	Description	Approx Weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly Identified or Removed (Y or N)	USACE Concurrence
52-21	1283084	464461.8	28	330.1	-1073.13	114	22	S/O	nails, irrigation control valve	0.2, unknown	3	(9) 0.3x0.3x0.3, (1) 1x1x0.3	93	n/a	N	Y	DVK
52-39	1283103	464537.1	10.8	111	-107	-174	9	S	iron anchor embedded in concrete	unknown	6	1.5x1.5x1	10	n/a	N	Y	DVK
52-17	1283080	464449.8	13.74	^	^	-265	20.9	S	tree root basket	unknown	3 – 6	0.5x0.5x0.5	-270	n/a	N	Y	DVK
52-19	1283152	464457	108.44	^	^	-222	42	S	nails	0.1	2	(2) 0.3x0.3x0.3	-192	n/a	N	Y	DVK
52-1	1283171	464385.6	22.98	1385.67	-646.73	381	25.6	O	subsurface utility(gas line)	unknown	24 – 36	n/a	376	n/a	N	Y	DVK
52-5	1283154	464418	1182.11	^	^	-15	0.2	S	screw driver bit	0.01	2.5	1x1x0.3	-8	n/a	N	Y	DVK
52-20	1283079	464458.2	88.64	703.83	-1050.17	101	74	S	tree root basket	unknown	3 – 6	0.5x0.5x0.5	100	n/a	N	Y	DVK
52-22	1283076	464466.3	94.2	351.74	-459.9	208	101	S	tree root basket	unknown	3 – 6	0.2x0.2x0.3	205	n/a	N	Y	DVK
52-33	1283058	464519.4	24.85	289	-468	-176	19	S	scrap metal	1.5	8	1x1x0.75	n/a	1	N	Y	DVK
52-4	1283133	464409.3	41.36	60.81	-157.19	-775	336	S	24" wire	0.5	10	2x1x1	n/a	0.2	N	Y	DVK
52-24	1283075	464472.3	24.04	182.04	-175.16	-128	42	S	turf staples	0.15	2 – 12	0.5x0.5x0.3	3.4	n/a	Y	Y	DVK
52-54	1283087	464466.15	4593.77	2709.71	-2432.89	251	192	O	magnetic rock	0.01	2.5	0.5x0.5x0.5		n/a	Y	Y	DVK
52-53	1283115	464414.27	180.51	704.31	-559.75	298	802	S	iron curb spacer	unknown	0	0	n/a	800	N	Y	DVK
52-38	1283075	464534.7	8.9	^	^	64	10	S	twisted wire	0.1	3	1x1x0.3	n/a	2	N	Y	DVK
52-41	1283089	464538	17.47	^	^	59	6.8	S	turf staple	0.1	2	1x1x0.2	n/a	1.8	N	Y	DVK
52-42	1283063	464539.2	10.21	^	^	40	8	S	nail	0.1	2	0.3x0.3x0.3	n/a	2.1	N	Y	DVK

Table 3-1 (Continued)
Geophysical Anomaly Resolution – Single Item Anomalies
4055 52nd Terrace Spring Valley, Washington, D.C.

Original Survey						Reacquisition Survey		Dig Results					Post-Dig Excavation QC Results				
				G-858 Response (nT/m)													
Target ID	Easting	Northing	EM61 Response (mV) Note 1	Peak	Trough	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Anomaly Type Note 2	Description	Approx Weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly Identified or Removed (Y or N)	USACE Concurrence
52-7	1283106	464424.3	5.68	^	^	298	14	S	18" iron fence post	2	18	2x1x1.5	n/a	0.5	Y	Y	DVK
52-15	1283148	464446.2	379.81	26.07	-258.37	379	769	O	tree root basket	unknown	8	0.75x0.75x0.75	n/a	129	N	Y	DVK
52-25	1283069	464480.7	17.12	32	-785.49	346	39	S	fence post	4	6	1x1x0.75	32	n/a	Y	Y	DVK
52-32	1283066	464518.8	3.87	185	^	1.8	0.2	S	nail	0.1	3	0.5x0.5x0.5	-39	n/a	N	Y	DVK
52-34	1283050	464525.7	198.3	921.18	-723.1	64	45	S	iron legs of lawn flamingo, 6" aluminum spike	1	0, 3	0, 1.5x1.5x0.3	1.9	n/a	Y	Y	DVK
52-40	1283056	464537.4	24.57	172.83	-52.96	44	1	O	turf staple	0.1	2	0.5x0.5x0.5	28	n/a	N	Y	DVK
52-43	1283122	464544	8.56	127	^	-598	61		subsurface electrical line	unknown	4	2x2x0.5	-585	n/a	N	Y	DVK
52-28	1283062	464502.9	9.74	146	-89	88	9		piece of wire	0.1	5	1x1x0.5	n/a	0.8	Y	Y	DVK
52-31	1283072	464516.7	5.03	118	^	-146	0.6		nail	0.1	1	0.3x0.3x0.3	n/a	0.1	N	Y	DVK
52-70	1283124	464416	^	69.5	^	-118	1.5		magnetic game piece	0.1	2	1x1x0.3	-39	n/a	N	Y	DVK
52-66	1283063	464515.79	^	88.42	49.39	-76	1		magnetic rocks	10	6	1.5x1.5x1	-129	n/a	N	Y	DVK
X-1						-	292.4	S	corner stake	2	2	0.5 x 0.5 x0.3	-	292.4	N	Y	DVK
X-2						-	459	S	root basket	unknown	2	0.5 x 0.5 x0.5	-	459	N	Y	DVK

Note 1: Channel 3
Note 2: U = UXO; A = Small Arms Ammunition; S = Scrap
F = Frag; NC = No Contact; LIP = Left in Place
MD = Munitions Debris; O = Other; NA = Not Applicable
DVK = David V. King, CENAB, USACE

4.0 SUMMARY

The low probability anomaly investigation at 4055 52nd Terrace was conducted in accordance with the Site-Wide WP (USACE, 2007) and the SSWP (Shaw, 2010).

Fifty-three (53) single item anomalies were investigated in October 2010 and January 2011. No MEC/CWM items or other AUES-related items were encountered during the intrusive investigation of the anomalies at 4055 52nd Terrace. Pre-excavation landscape evaluations were conducted by ESA under contract to Shaw in December 2009. Plants, shrubs, and other hardscape features near the area of excavation were identified during this evaluation and their values assessed. All excavations were backfilled and restored after completion of the intrusive activities. No trees were required to be removed or damaged during the low probability investigation.

5.0 REFERENCES

Shaw Environmental, Inc. (Shaw). 2010. *Site-Specific Work Plan for 4055 52nd Terrace Anomaly Investigation, Spring Valley Formerly Used Defense Site – Operable Unit 5, Spring Valley, Washington, D.C.* Final Document. Prepared for U.S. Army Corps of Engineers. January 2010.

U.S. Army Corps of Engineers (USACE). 2007. *Site-Wide Work Plan for the Spring Valley Formerly Used Defense Site, Spring Valley, Washington, D.C.* Prepared by Parsons. March 2007.

U.S. Army Corps of Engineers (USACE). 2009a. *MEC/CWM Probability Assessment, Intrusive Anomaly Investigation at Five Residential Properties, Spring Valley FUDS, Washington, D.C.* 23 December 2009.

U.S. Army Corps of Engineers (USACE). 2009b. Memorandum for Record. *"Anomaly Review Board Results, Five Group 2B Properties, 22nd September 2009, Spring Valley FUDS, Washington, D.C."* Final. 2 November 2009.

Attachment A
Site-Specific Logbook Entries

③

20/10/10 Spring Valley

0700 - Safety/JSA Brief.

0800 - Hold up PAO Person Late cant Start Till He is on Site.

0845 - Started Digging Site 5112 52nd Court.

1200 Lunch

1230 Back to work.

1600 Secured digging. Completed 5/12 52nd court. 38 anomalies. Picked up Tools equipment Cleaw Site Picked up all Flags Filled all Holes.

1700 Departed Site.

William Dilbo

④

21/10/10

0700 - Morning meeting. Safety Brief/ JSA. Work will be done at 4055 52nd Terrace.

0800 Started digging.

1230 Lunch.

1300 Back to work.

1630 Secured digging. Completed ALL 52 anomalies.

52-1 Not Dug driveway

52-2 Not Dug driveway

52-47 Dug hole No Find USACE Signed off Power Line for Lights.

52-65 Dug hole No Find USACE Singed off Power Line for Lights.

52-72 No Find Large metal Drain Cover

52-14 Side walk in front of house Not Dug.

1700 Picked up TOOLS tequip met A. cleaned site Filled in ALL holes Departed Site.

William Dilbo

(13) 6/1/11 Spring Valley.

0400 I Took Marco To Airport.
0600 Back from Airport & AT work.
0700 Safety Brief / JSA. Signed new Mawin Joshua Jenkins Tech II. Readed Workplan & Signed.
0730 Loaded Tools & equipment. Checked Mag AT Test Plot.
0800 Departed for ~~4809~~ WRO 4055 52nd St. for Anomaly.
0845 Started Digging.
0915 Completed
0925 Departed for 4809 Woodway Lane.
0930 Arrived.
0940 Started Digging.
1200 Lunch.
1230 Back to work.
1600 Secured digging. Cleaned up Site. Filled in Holes. Completed 28 anomalies.
1700 Departed Site. End of day.

William Dickson

(14)

Spring Valley 7/1/11

0700 Safety Brief / JSA. 1 pm
Heiron Signs in.
0730 Checked Mag at Test Plot. Loaded equipment.
0745 Departed Trailer for 4809 Woodway Lane.
0800 Arrived.
0815 Started Digging.
1200 Lunch.
~~1600~~ WRO Completed 4809 Woodway Ln. 18 Anomalies. Lunch.
1230 Arrived at 4930 Rodman St.
1245 Started Digging.
1600 Secured Digging. Checked Holes dug. Picked up Tools & equipment.
1700 Depart Site. End of day.

William Dickson

Attachment B
Landscape Survey Results

Landscape Appraisal of Existing Conditions

Location:
4055 52nd Terrace
Washington, D.C.

Prepared For:
Shaw Environmental, Inc.
2113 Emmorton Park Road
Edgewood, MD 21040

Prepared By:
Environmental Systems Analysis, Inc.
162 West Street
Annapolis, MD 21401

Graham Landscape Architecture
229 Prince George Street
Annapolis, MD 21401

December 15, 2009

The following report contains a landscape appraisal of existing conditions on the property of **4055 52nd Terrace,** Washington, D.C. The appraisal was performed on **December 15, 2009**.

The following appraisal is based on an inventory of all existing landscape on the site and *The Guide for Plant Appraisal* (9th Edition, 2000) and the *Mid-Atlantic Tree Species Rating Guide (2007)*. For all plants that are of a size that can be transplanted from a nursery, the direct replacement cost method was used. On plants that are too large to be reasonably transplanted, the trunk formula was be used, which considers age and relative health. All plant costs assume plant material adheres to American Standards for Nursery Stock set forth by American Nursery and Landscape Association.

In the replacement cost method, the basic cost of the plant is determined by using local nursery catalogues, and adding estimated installation costs. For these plants, catalogues from wholesale nurseries were used. Reductions in cost for volume of work performed and typical billing rates for competent contractors were used.

The attached sketch shows the location of each plant on the property and the following key lists each plant and lists an appraisal value for each type of plant. Worksheets calculating the appraisal values follow this report.

All statements and estimates made in this report are unbiased and have been made using the best professional judgment of the appraiser.

Signed,

Abbi Huntzinger, RLA

Abigail Voorhees, PE

SPRING VALLEY FUDS LANDSCAPE APPRAISAL
TREES, SHRUBS, PERENNIALS

Site Address: 4055 52nd Terrace
Date: 12/15/09
Time: 9am
Crew: AV, AH
Recorder: AH
Photographer: AV
Videographer: AV

Key	Qty.	Plant Name	Size	Notes	Condition Rating A	Species Rating B	Site Rating C	Contribution Rating D	Placement Rating E	Location Rating F=CxDxE/3	Replacement Tree Size	Replacement Trunk Area (TA/r)3 G	Appraised Trunk Area (ATA/a)3 H	Appraised Tree Trunk Increase (TA/incr) I=H-G	Replacement Plant Cost ($) J	Installation Cost of Replacement ($) K	Perfect Specimen Installed Cost ($) 1 L=J+K	Unit Tree Cost ($) M=L/G	Basic Tree Cost ($) N=(IxM)+L	Adjusted Installed Plant Cost ($) O=LxBxAxF	Add'l Regional Information P	Removal and Clean Up Costs ($) Q	Final Appraised Value ($/each) R=O+Q	Tree Formula Method	Replacement Cost Method
A	1	Pine	24"	Good Condition	85%	85%	85%	80%	85%	83%	5"	20	452	432		2,500	2,500	125	56,500				34,000	*	
B	10	American Holly	20'H	Good Condition	85%	90%	85%	85%	80%	83%	5"	20	50	30		1,350	1,350	68	3,375				2,200	*	
C	TBD 2	Liriope	Sq. Ft.	Good Condition	85%	80%	85%	85%	85%	85%					10	20	30			17			20		*
D	1	Weeping Cherry	8"	Good Condition	90%	95%	90%	95%	95%	93%	4"	13	50	37		900	900	69	3,462				2,800	*	
E	18	Japanese Holly	3'	Fair Condition	80%	85%	80%	85%	80%	82%					45	113	158			87			90		*
F	TBD 2	Perennials		Good Condition	90%	95%	90%	90%	90%	90%					5	10	15			12			10		*
G	TBD 2	Pachysandra	Sq. Ft.	Good Condition	90%	80%	85%	85%	85%	85%					10	20	30			18			20		*
H	4	Ornamental Shrub	2'	Good Condition	85%	85%	85%	85%	85%	85%					35	70	105			64			60		*
I	1	Hemlock	7"	Fair Condition-bare side, sheared	80%	85%	85%	85%	85%	85%	4"	13	38	25		1,000	1,000	77	2,923				1,690	*	
J	1	Ornamental Tree	3"	Good Condition	90%	95%	90%	90%	90%	90%					125	250	375			289			290		*
K	1	Japanese Holly	2'	Poor Condition	65%	85%	80%	85%	80%	82%					45	113	158			71			70		*
L	19	Azalea	2'	Good Condition	85%	85%	85%	85%	85%	85%					50	100	150			92			90		*
M	2	Holly Shrub	8'	Fair Condition-limbed up to be tree form	75%	80%	85%	85%	85%	85%					125	250	375			191			190		*
N	4	Hydrangea	1-2'	Good Condition	90%	85%	80%	85%	80%	82%					45	113	158			98			100		*
O	1	Stewardia	2",2",1"	Good Condition	90%	95%	90%	95%	95%	93%	3"	7	20	13		1,000	1,000	143	2,857				2,300	*	
P	1	American Holly	9"	Good Condition	85%	90%	85%	85%	80%	83%	5"	20	64	44		1,350	1,350	68	4,320				2,750	*	
Q	TBD 2	Annuals			90%	95%	90%	90%	90%	90%					1	2	3			2			0		*
R	1	Hemlock	6"	Fair Condition-bare back, sheared	80%	85%	85%	85%	85%	85%	4"	13	28	15		1,000	1,000	77	2,154				1,240	*	
S	1	Holly Shrub	20'		85%	80%	85%	85%	85%	85%					450	900	1,350			780			780		*
T	3	Crape Myrtle	25'	Good Condition	90%	80%	95%	95%	95%	95%	5"	20	28	8		1,000	1,000	50	1,400				960	*	
U	3	Azalea	4'	Fair Condition-thin, mature	80%	85%	85%	85%	85%	85%					50	100	150			87			90		*
V	1	Climbing Hydrangea	25'	Good Condition	90%	85%	80%	85%	80%	82%					100	200	300			187			190		*
W	1	Maple	33",15"		95%	95%	90%	95%	95%	93%	7"	38	1,809	1,771		3,000	3,000	79	142,816				120,300	*	
X	1	Holly Shrub	4"		85%	80%	85%	85%	85%	85%					450	900	1,350			780			780		*
Y	1	Pine	17"	Good Condition	85%	85%	85%	80%	85%	83%	7"	38	227	189		3,000	3,000	79	17,921				10,800	*	
Z	1	Rhododendron	4'	Good Condition	90%	90%	80%	85%	85%	83%					150	300	450			304			300		*
AA	1	Dogwood	9"	Good Condition	90%	95%	90%	95%	95%	93%	4"	13	64	51		1,000	1,000	77	4,923				3,930	*	
BB	3	Cherry Laurel	4'	Good Condition	80%	90%	90%	90%	85%	88%					45	90	135			86			90		*
CC	1	Crape Myrtle	20'	Good Condition	90%	80%	95%	95%	95%	95%	5"	20	28	8		1,000	1,000	50	1,400				960	*	
DD	1	Ornamental vine		Good Condition	85%	85%	90%	90%	90%	90%					100	200	300			195			200		*
EE	1	Rose	6'	Good Condition	90%	85%	80%	85%	80%	82%					60	120	180			112			110		*
FF	5	Lavender		Good Condition	85%	85%	85%	85%	85%	85%					50	100	150			92			90		*
GG	1	Azalea	3'	Good Condition	85%	85%	85%	85%	85%	85%					50	100	150			92			90		*
HH	5	OL Hydrangea	6-10'	Good Condition	90%	85%	90%	85%	80%	85%					65	163	228			148			150		*
II	1	Cherry Laurel	1'	Good Condition	80%	90%	90%	90%	85%	88%					45	90	135			86			90		*
JJ	1	Boxwood	3'	Fair Condition-thinning	80%	85%	85%	90%	85%	87%					85	170	255			150			150		*
KK	3	Spirea	4'	Good Condition	85%	85%	80%	85%	80%	82%					45	113	158			93			90		*
LL	2	Ornamental Lilac	8'	Good Condition	90%	85%	90%	85%	80%	85%					50	100	150			98			100		*
MM	8	Hydrangea	5-6'	Good Condition	90%	85%	80%	85%	80%	82%					50	125	175			109			110		*
NN	4	Viburnum	8-10'	Good Condition	85%	90%	80%	85%	80%	82%					830	1,660	2,490			1,556			1,560		*
OO	2	Holly Shrub	4-5'	Good Condition	85%	80%	85%	85%	85%	85%					125	250	375			217			220		*
PP	1	Dogwood	8"	Fair Condition-mature	75%	95%	90%	95%	95%	93%	4"	13	50	37		1,000	1,000	77	3,846				2,560	*	
QQ	5	Spread Yew	2'	Fair Condition-mature	75%	90%	80%	85%	80%	82%					65	130	195			107			110		*
RR	TBD 2	Perennials		Good Condition	90%	95%	90%	90%	90%	90%					5	10	15			12			10		*
SS	1	Ornamental vine	5'	Fair Condition	80%	85%	90%	90%	90%	90%					100	200	300			184			180		*
TT	1	Hydrangea	3'	Good Condition	90%	85%	80%	85%	80%	82%					45	113	158			98			100		*
UU	2	Esp. fruit trees	5'	Good Condition	90%	90%	85%	85%	85%	85%					200	400	600			413			410		*
VV	1	Southern Magnolia	3",2"	Good Condition	90%	90%	90%	95%	95%	93%	3"	7	20	13		1,000	1,000	143	2,857				2,160	*	
WW	5	American Holly	20'	Good Condition	85%	90%	85%	85%	80%	83%	5"	20	28	8		1,350	1,350	68	1,890				1,200	*	
XX	1	Dogwood	4",3"	Fair Condition-mature	75%	95%	90%	95%	95%	93%	4"	13	38	25		1,000	1,000	77	2,923				1,940	*	
YY	1	Kousa Dogwood	5",4",4",4"	Good Condition	95%	95%	90%	95%	95%	93%	4"	13	227	214		1,000	1,000	77	17,462				14,710	*	
ZZ	3	Nandina	3'	Good Condition	85%	75%	85%	80%	85%	83%					50	100	150			80			80		*
AAA	1	Hardwood	21"	Fair Condition-crowded	85%	90%	80%	85%	80%	82%	7"	38	346	308		3,000	3,000	79	27,316				17,100	*	
BBB	1	American Holly	3"	Fair Condition-crowded	80%	90%	85%	85%	80%	83%					450	900	1,350			810			810		*
CCC	1	Hardwood	17"	Fair Condition-crowded	85%	90%	80%	85%	80%	82%	7"	38	227	189		3,000	3,000	79	17,921				11,200	*	
DDD	1	Pine	9"	Fair Condition-crowded	75%	85%	85%	80%	85%	83%	7"	38	64	26		3,000	3,000	79	5,053				2,700	*	
EEE	1	Pine	16"	Fair Condition-crowded	75%	85%	85%	80%	85%	83%	7"	38	201	163		3,000	3,000	79	15,868				8,400	*	
FFF	1	American Holly	3"	Fair Condition-crowded	80%	90%	85%	85%	80%	83%					450	900	1,350			810			810		*
GGG	1	Pine	10"	Fair Condition-crowded	75%	85%	85%	80%	85%	83%	7"	38	79	41		3,000	3,000	79	6,237				3,300	*	
HHH	1	Pine	5"	Fair Condition-mature, crowded	75%	85%	85%	80%	85%	83%					100	200	300			159			160		*
III	1	Pine	10"	Fair Condition-mature, crowded	75%	85%	85%	80%	85%	83%	7"	38	79	41		3,000	3,000	79	6,237				3,300	*	
JJJ	1	Laurel	8-10'	Fair Condition	75%	90%	90%	90%	85%	88%					45	90	135			80			80		*

1 For large trees, Basic Tree Cost was used, S=AxN
2 To Be Determined. Area for items will be measured and compensation based on the area removed.
3 As listed in 'Guide for Plant Appraisal'

SPRING VALLEY FUDS LANDSCAPE APPRAISAL
TREES, SHRUBS, PERENNIALS

Site Address: 4055 52nd Terrace
Date: 12/15/09
Time: 9am
Crew: AV, AH
Recorder: AH
Photographer: AV
Videographer: AV

Key	Qty.	Plant Name	Size	Notes	Condition Rating A	Species Rating B	Site Rating C	Contribution Rating D	Placement Rating E	Location Rating F=CxDxE/3	Replacement Tree Size	Replacement Trunk Area (TA/r)3 G	Appraised Trunk Area (ATA/a)3 H	Appraised Tree Trunk Increase (TA/incr) I=H-G	Replacement Plant Cost ($) J	Installation Cost of Replacement ($) K	Perfect Specimen Installed Cost ($) 1 L=J+K	Unit Tree Cost ($) M=L/G	Basic Tree Cost ($) N=(IxM)+L	Adjusted Installed Plant Cost ($) O=LxBxAxF	Add'l Regional Information P	Removal and Clean Up Costs ($) Q	Final Appraised Value ($/each) R=O+Q	Tree Formula Method	Replacement Cost Method
KKK	1	Southern Magnolia	4'	Poor Condition	75%	90%	90%	95%	95%	93%	3"	7	7	0		1,000	1,000	143	1,000				630	*	
LLL	10	Azalea	3-4'	Good Condition	85%	85%	85%	85%	85%	85%					50	100	150			92			90		*
MMM	1	Pine	20"	Fair Condition	75%	85%	85%	80%	85%	83%	7"	38	314	276		3,000	3,000	79	24,789				13,200	*	
NNN	5	Boxwood	4'	Good Condition	85%	85%	85%	90%	85%	87%					85	170	255			160			160		*
OOO	1	Pine	16"	Fair Condition	75%	85%	85%	80%	85%	83%	7"	38	201	163		3,000	3,000	79	15,868				8,400	*	
PPP	6	Arborvitae	25-30'	Fair Condition	75%	85%	85%	85%	85%	85%					45	90	135			73			70		*
QQQ	2	Azalea	3-4'	Poor Condition-shaded	65%	85%	85%	85%	85%	85%					50	100	150			70			70		*
RRR	3	Ornamental Shrub	5-6'	Fair Condition	75%	85%	85%	85%	85%	85%					35	70	105			57			60		*
SSS	1	Southern Magnolia	7"	Good Condition	90%	90%	90%	95%	95%	93%	3"	7	38	31		1,000	1,000	143	5,429				4,100	*	
TTT	1	Rhododendron	4'	Fair Condition	80%	95%	85%	85%	85%	85%					150	300	450			291			290		*
UUU	1	Pieris	5'	Poor Condition	65%	85%	85%	90%	85%	87%					45	90	135			65			60		*
VVV	1	Pine	22"	Fair Condition	75%	85%	85%	80%	85%	83%	7"	38	380	342		3,000	3,000	79	30,000				15,900	*	
WWW	1	Boxwood	3-4'	Fair Condition-crowded	80%	85%	85%	90%	85%	87%					85	170	255			150			150		*
XXX	2	Japanese Holly	3-4'	Fair Condition-crowded	80%	85%	80%	85%	80%	82%					45	113	158			87			90		*
YYY	20	Azalea	4'	Good Condition	85%	85%	85%	85%	85%	85%					50	100	150			92			90		*
ZZZ	1	Japanese Cherry	10"	Fair Condition-mature	75%	95%	90%	95%	95%	93%	4"	13	79	66		900	900	69	5,469				3,600	*	
AAAA	TBD 2	Lawn (Sod per sq ft)		Suitable for conditions on site	90%	95%	90%	90%	90%	90%					1	2	3			2			2		*

1 For large trees, Basic Tree Cost was used, S=AxN
2 To Be Determined. Area for items will be measured and compensation based on the area removed.
3 As listed in 'Guide for Plant Appraisal'

SPRING VALLEY FUDS LANDSCAPE APPRAISAL
SUMMARY

Site Address: 4055 52nd Terrace
Date: 12/15/09
Time: 9am
Crew: AV, AH
Recorder: AH
Photographer: AV
Videographer: AV

Key	Qty.	Plant Name	Size	Notes	Condition Rating A	Perfect Specimen Installed Cost ($) 1 L=J+K	Basic Tree Cost ($) N=(IxM)+L	Corp Reimbursement Value 1 S=AxL	Qty. Removed	Corps Reimbursement ($)
A	1	Pine	24"	Good Condition	85%	2,500	56,500	48,000	0	0
B	10	American Holly	20'H	Good Condition	85%	1,350	3,375	2,870	0	0
C	TBD 2	Liriope	Sq. Ft.	Good Condition	85%	30		30	0	0
D	1	Weeping Cherry	8"	Good Condition	90%	900	3,462	3,120	0	0
E	18	Japanese Holly	3'	Fair Condition	80%	158		130	0	0
F	TBD 2	Perennials		Good Condition	90%	15		10	0	0
G	TBD 2	Pachysandra	Sq. Ft.	Good Condition	90%	30		30	0	0
H	4	Ornamental Shrub	2'	Good Condition	85%	105		90	0	0
I	1	Hemlock	7"	Fair Condition-bare side, sheared	80%	1,000	2,923	2,340	0	0
J	1	Ornamental Tree	3"	Good Condition	90%	375		340	0	0
K	1	Japanese Holly	2'	Poor Condition	65%	158		100	0	0
L	19	Azalea	2'	Good Condition	85%	150		130	0	0
M	2	Holly Shrub	8'	Fair Condition-limbed up to be tree form	75%	375		280	0	0
N	4	Hydrangea	1-2'	Good Condition	90%	158		140	0	0
O	1	Stewardia	2",2",1"	Good Condition	90%	1,000	2,857	2,570	0	0
P	1	American Holly	9"	Good Condition	85%	1,350	4,320	3,670	0	0
Q	TBD 2	Annuals			90%	3		3	0	0
R	1	Hemlock	6"	Fair Condition-bare back, sheared	80%	1,000	2,154	1,720	0	0
S	1	Holly Shrub	20'		85%	1,350		1,150	0	0
T	3	Crape Myrtle	25'	Good Condition	90%	1,000	1,400	1,260	0	0
U	3	Azalea	4'	Fair Condition-thin, mature	80%	150		120	0	0
V	1	Climbing Hydrangea	25'	Good Condition	90%	300		270	1	0
W	1	Maple	33",15"		95%	3,000	142,816	135,700	0	0
X	1	Holly Shrub	4"		85%	1,350		1,150	0	0
Y	1	Pine	17"	Good Condition	85%	3,000	17,921	15,200	0	0
Z	1	Rhododendron	4'	Good Condition	90%	450		410	0	0
AA	1	Dogwood	9"	Good Condition	90%	1,000	4,923	4,430	0	0
BB	3	Cherry Laurel	4'	Good Condition	80%	135		110	0	0
CC	1	Crape Myrtle	20'	Good Condition	90%	1,000	1,400	1,260	0	0
DD	1	Ornamental vine		Good Condition	85%	300		260	0	0
EE	1	Rose	6'	Good Condition	90%	180		160	1	0
FF	5	Lavender		Good Condition	85%	150		130	0	0
GG	1	Azalea	3'	Good Condition	85%	150		130	0	0
HH	5	OL Hydrangea	6-10'	Good Condition	90%	228		200	0	0
II	1	Cherry Laurel	1'	Good Condition	80%	135		110	0	0
JJ	1	Boxwood	3'	Fair Condition-thinning	80%	255		200	0	0
KK	3	Spirea	4'	Good Condition	85%	158		130	0	0
LL	2	Ornamental Lilac	8'	Good Condition	90%	150		140	0	0
MM	8	Hydrangea	5-6'	Good Condition	90%	175		160	0	0
NN	4	Viburnum	8-10'	Good Condition	85%	2,490		2,120	0	0
OO	2	Holly Shrub	4-5'	Good Condition	85%	375		320	0	0
PP	1	Dogwood	8"	Fair Condition-mature	75%	1,000	3,846	2,880	0	0
QQ	5	Spread Yew	2'	Fair Condition-mature	75%	195		150	0	0
RR	TBD 2	Perennials		Good Condition	90%	15		10	0	0
SS	1	Ornamental vine	5'	Fair Condition	80%	300		240	0	0
TT	1	Hydrangea	3'	Good Condition	90%	158		140	0	0
UU	2	Esp. fruit trees	5'	Good Condition	90%	600		540	0	0
VV	1	Southern Magnolia	3",2"	Good Condition	90%	1,000	2,857	2,570	0	0
WW	5	American Holly	20'	Good Condition	85%	1,350	1,890	1,610	0	0
XX	1	Dogwood	4",3"	Fair Condition-mature	75%	1,000	2,923	2,190	0	0
YY	1	Kousa Dogwood	5",4",4",4"	Good Condition	95%	1,000	17,462	16,590	0	0
ZZ	3	Nandina	3'	Good Condition	85%	150		130	0	0
AAA	1	Hardwood	21"	Fair Condition-crowded	85%	3,000	27,316	23,200	0	0
BBB	1	American Holly	3"	Fair Condition-crowded	80%	1,350		1,080	0	0
CCC	1	Hardwood	17"	Fair Condition-crowded	85%	3,000	17,921	15,200	0	0
DDD	1	Pine	9"	Fair Condition-crowded	75%	3,000	5,053	3,790	0	0
EEE	1	Pine	16"	Fair Condition-crowded	75%	3,000	15,868	11,900	0	0
FFF	1	American Holly	3"	Fair Condition-crowded	80%	1,350		1,080	0	0
GGG	1	Pine	10"	Fair Condition-crowded	75%	3,000	6,237	4,680	0	0
HHH	1	Pine	5"	Fair Condition-mature, crowded	75%	300		230	0	0
III	1	Pine	10"	Fair Condition-mature, crowded	75%	3,000	6,237	4,680	0	0
JJJ	1	Laurel	8-10'	Fair Condition	75%	135		100	0	0

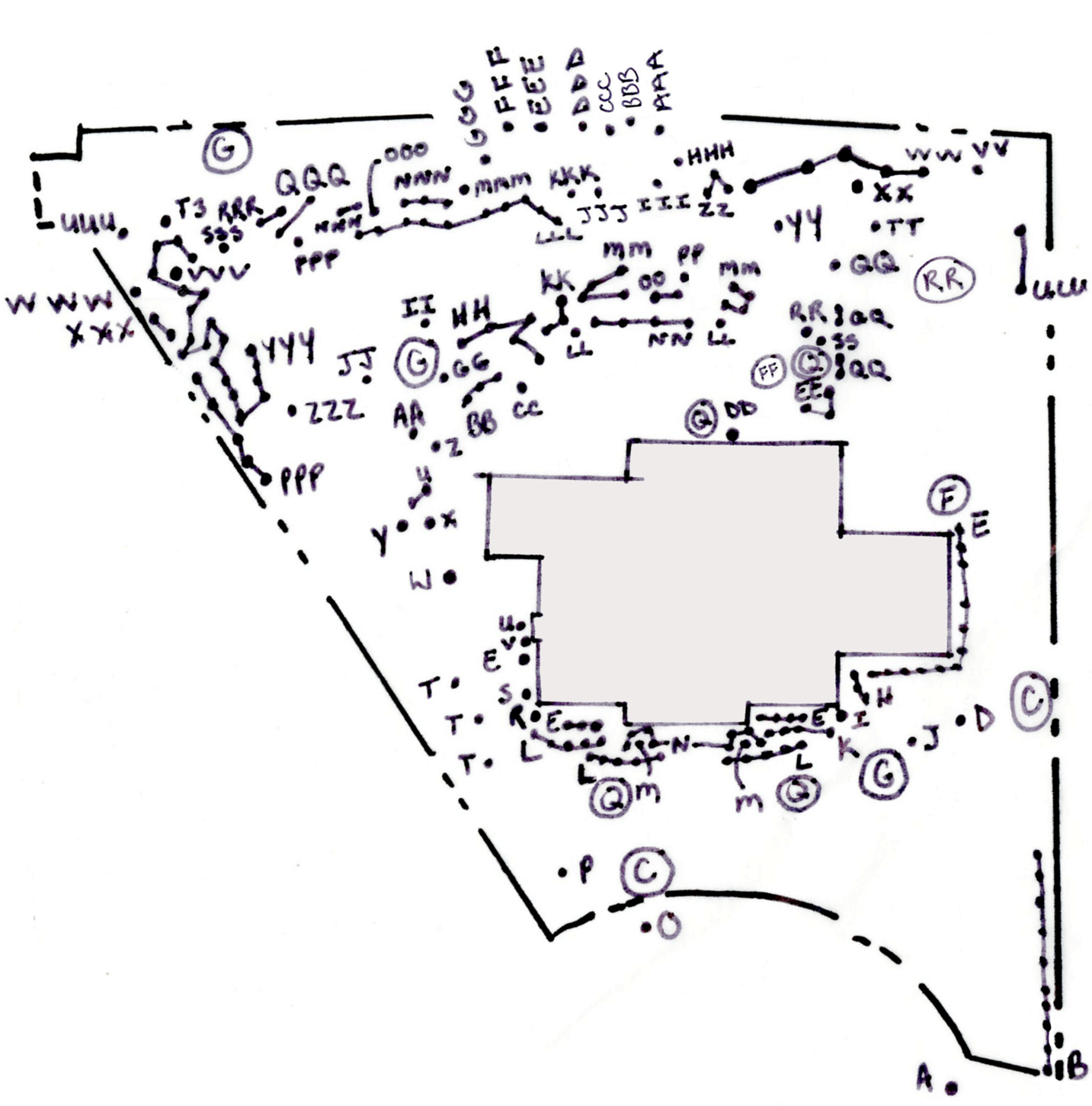
1 For large trees, Basic Tree Cost was used, S=AxN
2 To Be Determined. Area for items will be measured and compensation based on the area removed.

SPRING VALLEY FUDS LANDSCAPE APPRAISAL
SUMMARY

Site Address: 4055 52nd Terrace
Date: 12/15/09
Time: 9am
Crew: AV, AH
Recorder: AH
Photographer: AV
Videographer: AV

KKK	1	Southern Magnolia	4'	Poor Condition	75%	1,000	1,000	750	0	0
Key	**Qty.**	**Plant Name**	**Size**	**Notes**	**Condition Rating A**	**Perfect Specimen Installed Cost ($) 1 L=J+K**	**Basic Tree Cost ($) N=(IxM)+L**	**Corp Reimbursement Value 1 S=AxL**	**Qty. Removed**	**Corps Reimbursement ($)**
LLL	10	Azalea	3-4'	Good Condition	85%	150		130	0	0
MMM	1	Pine	20"	Fair Condition	75%	3,000	24,789	18,600	0	0
NNN	5	Boxwood	4'	Good Condition	85%	255		220	0	0
OOO	1	Pine	16"	Fair Condition	75%	3,000	15,868	11,900	0	0
PPP	6	Arborvitae	25-30'	Fair Condition	75%	135		100	0	0
QQQ	2	Azalea	3-4'	Poor Condition-shaded	65%	150		100	0	0
RRR	3	Ornamental Shrub	5-6'	Fair Condition	75%	105		80	0	0
SSS	1	Southern Magnolia	7"	Good Condition	90%	1,000	5,429	4,890	0	0
TTT	1	Rhododendron	4'	Fair Condition	80%	450		360	0	0
UUU	1	Pieris	5'	Poor Condition	65%	135		90	0	0
VVV	1	Pine	22"	Fair Condition	75%	3,000	30,000	22,500	0	0
WWW	1	Boxwood	3-4'	Fair Condition-crowded	80%	255		200	0	0
XXX	2	Japanese Holly	3-4'	Fair Condition-crowded	80%	158		130	0	0
YYY	20	Azalea	4'	Good Condition	85%	150		130	0	0
ZZZ	1	Japanese Cherry	10"	Fair Condition-mature	75%	900	5,469	4,100	0	0
AAAA	TBD 2	Lawn (Sod per sq ft)		Suitable for conditions on site	90%	3		3	0	0

1 For large trees, Basic Tree Cost was used, S=AxN
2 To Be Determined. Area for items will be measured and compensation based on the area removed.



EXISTING CONDITIONS MAPPING

4055 52nd Terrace, NW
Washington, DC

4055 52nd Terrace

Pre Excavation
Landscape Photographs

4055 52nd Terrace

4055 52nd Terrace, driveway

4055 52nd Terrace, side of house and driveway

4055 52nd Terrace, side patio

4055 52nd Terrace, front yard / left side yard

4055 52nd Terrace, front yard landscaping

4055 52nd Terrace, backyard

4055 52nd Terrace, backyard

4055 52nd Terrace, backyard looking up at house

4055 52nd Terrace, right side of backyard

4055 52nd Terrace

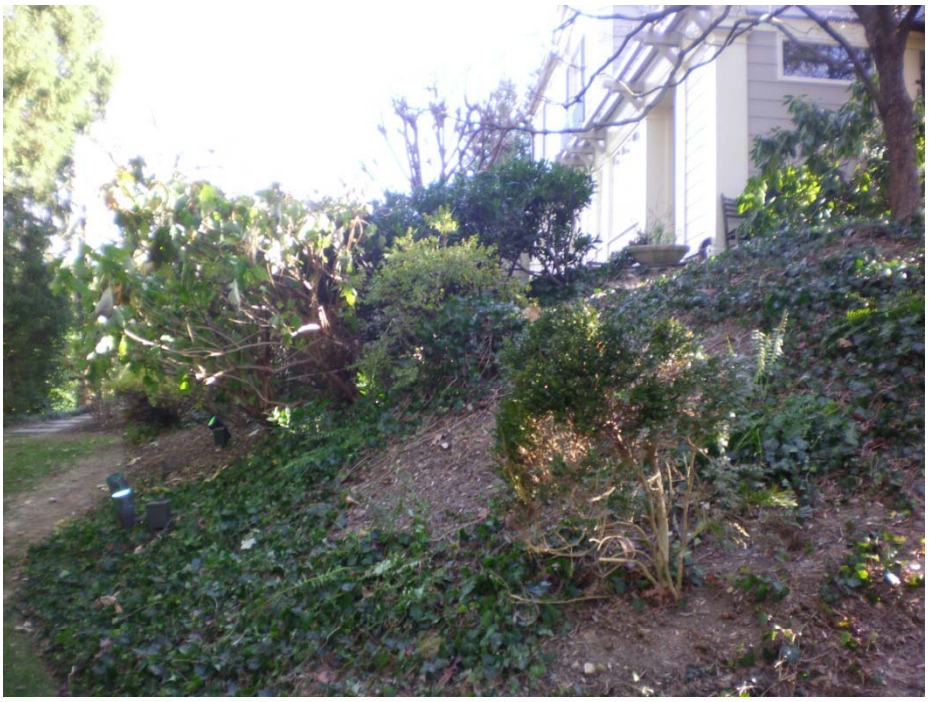
Post Restoration
Landscape Photographs

4055 52nd Terrace, front yard - right side

4055 52nd Terrace, front yard - left side

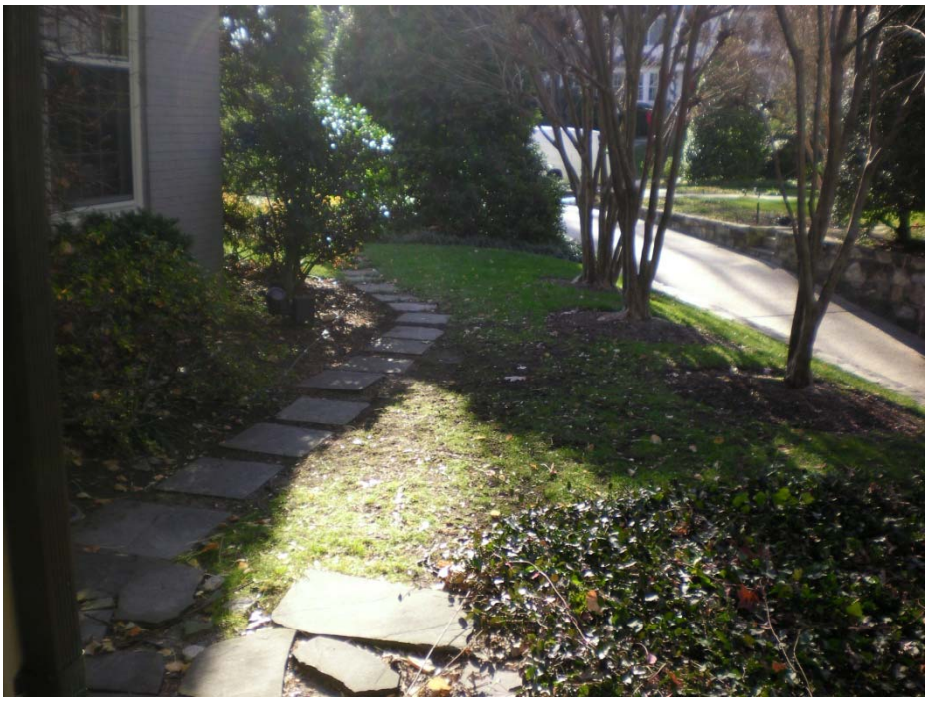
4055 52nd Terrace, side of house

4055 52nd Terrace, backyard



4055 52nd Terrace, backyard facing house

4055 52nd Terrace, backyard facing away from house



4055 52nd Terrace, side of house, access to backyard

4055 52nd Terrace left side of front yard

Attachment C
Geophysical Survey Results

Table 3-1

Geophysical Dig Sheet for Anomalies at 4055 52nd Terrace

Original Survey							Reacquisition Survey					Dig Results							Post-Dig Excavation QC Results									
Target ID	Easting	Northing	EM61 Response (mV) Note 1	Vertical Gradient (nT/m) Peak	Vertical Gradient (nT/m) Trough	Classification	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Offset (R)	Date	Comments	Anomaly Type Note 2	Description	Approx weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Final offset (by inch and direction)	Date	Fill-Yes/No	Excavation Hole Cleared?	QC Initials	Date	Agreement between Dig Results & Geophysical Data? (Y/N)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly identified or Removed (Y or N)	Comment	USACE Concurrence
52-2	1283164.8	464384.3	19.16	^	-1103	A1	799	18.5	0	10/19/10	Directly over marked utility lines. No break between targets 2 and 1.	O	subsurface utility(gas line)	unknown	24 – 36 (est)	0	0	10/21/2010	Y	Y	RH	10/21/2010	Y	786	n/a	N	Y	See Note A, below.	DVK
52-14	1283117.1	464442.3	91.72	686.36	-794.41	A1	907	120	12W	10/19/10	Hardscape not Dug	NOT DUG									RH	10/21/2010					N	Hardscape not Dug	DVK
52-18	1283162.1	464453.4	806.59	364.21	-334.07	A1	-392	768	20SE	10/19/10		S	tree root basket	unknown	6	0.5x0.5x0.5	12S	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	720	N	Y	LIP	DVK
52-51	1283071	464488	2386.47	127.45	-4861.58	A1	2265	2502	34E	10/19/10	Chain link fence located 3 ft N.	S	cellar window grate	20	3	2x2x0.5	30W	10/21/2010	Y	Y	RH	10/21/2010	Y	1535	n/a	N	Y	High residual background values due to proximity of chain link fence (3 ft N).	DVK
52-50	1283056	464495.4	399.27	1206.53	-2607.28	A1	4500	1270	18SW	10/19/10	18 inches from post in chain link fence.	O	chain link fence	unknown	0	1x1x1	20SW	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	1300	N	Y	LIP; Target dug to specified depth. No other hits observed. Approved by USACE representative on site.	DVK
52-48	1283049	464499.3	422.93	2178.93	1881.51	A1	-2300	46	30W	10/19/10	3 feet from chain link fence.	O	chain link fence	unknown	0	1x1x1	28W	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	50	N	Y	LIP; Target dug to specified depth. No other hits observed. Approved by USACE representative on site.	DVK
52-47	1283076	464502	69.24	334.91	-817.27	A1	-332	115	10N	10/19/10	EM access restricted by bushes. Very high EM/mag gradients due to proximity of house.	O	reinforcing rod in stone patio, subsurface cable	unknown	2 – 12	1x1x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	120	N	Y	See Note B, below.	DVK
52-49	1283073	464508	69.27	835.11	-3.24	A1	-403	129	10E	10/19/10		S	tree root basket	unknown	4	0.5x0.5x0.5	8E	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	130	N	Y	LIP	DVK
52-30	1283055	464513.4	323.74	1827.73	-412.62	A1	-808	319	10NW	10/19/10		S	tree root basket	unknown	6	0.5x0.5x0.5	13W	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	320	N	Y	LIP	DVK
52-3	1283149.5	464395.5	3271.24	2876.08	-589.21	A1	-1155	4085	18SE	10/19/10		O	water meter cap	10	4	1x1x0.3	14SE	10/21/2010	Y	Y	RH	10/21/2010	Y	-1100	n/a	N	Y	LIP	DVK
52-45	1283113.5	464546.1	22.06	411	^	A1	-289	55	0	10/19/10	High background values due to likely ferrous drain 6' N.	S	magnetized nail	0.1	2 – 12	1x0.5x0.4	16NE	10/21/2010	Y	Y	RH	10/21/2010	Y	-219	n/a	N	Y	Very high EM and magnetic background values due to proximity of subsurface drain line (6 ft N).	DVK
52-44	1283133	464544.6	29.48	3316.52	2533.01	A1	-928	88	30NE	10/19/10	EM access restricted by bushes. Very high EM/mag gradients due to proximity of house.	O	buried electrical line	unknown	8	1x1x0.75	0	10/21/2010	Y	Y	RH	10/21/2010	Y	-379	n/a	N	Y	LIP; Very high EM and magnetic background values due to proximity of subsurface drain line (6 ft N).	DVK
52-46	1283029.8	464549.6	38.59	1280.63	209.25	A1	565	225	0	10/19/10	High background values due to likely ferrous drain10' N.	S	fence post, spike, spring	4	3 – 6	(3) 0.75x0.75x0.5	12SE, 8E, 0	10/21/2010	Y	Y	RH	10/21/2010	Y	-214	n/a	Y	Y	Reduced to background.	DVK
52-73	1283102.49	464548.97	*	938.13	-8809.71	A1	-8900	1812	18SW	10/19/10		S	4 ft rebar	5	0	1x1x1	16SW	10/21/2010	Y	Y	RH	10/21/2010	Y	8800	n/a	N	Y	LIP. Rebar used as support for above-surface sprinkler head – unable to remove.	DVK
52-72	1283078.54	464545.72	*	640	^	A1	-310	n/a	14E	10/19/10	EM access restricted by bushes. Very high EM/mag gradients due to proximity of ferrous drain 8' N.	O	no find	n/a	n/a	1x1x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	-310	n/a	N	Y	Very high EM and magnetic background values due to proximity of subsurface drain line (6 ft N).	DVK
52-77	1283156	464457.7	*	554.89	-18.75	A1	-324	36	0	10/19/10	High background values due to house 6' N.	O	buried irrigation line	unknown	2 – 12	0.5x0.5x0.3	24N	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	35	N	Y	LIP	DVK
52-80	1283153.62	464387.83	*	653	^	A1	-875	570	32SW	10/19/10		O	iron curb spacer, subsurface utility	unknown	0, 24" – 36" (est)	2x1x2	30SW	10/21/2010	Y	Y	RH	10/21/2010	Y	-875	570	N	Y	LIP	DVK
52-82	1283074	464453.8	*	275.33	-722.86	A1	829	36	18W	10/19/10	Peak on drop-off retaining wall.	S/O	nails, reinforcing materials in retaining wall	0.1, unknown	2, 24" – 36" (est)	(2) 0.3x0.3x0.3	16W, 6SE	10/21/2010	Y	Y	RH	10/21/2010	Y	39	n/a	N	Y	LIP	DVK
52-60	1283065.57	464544.48	*	412.2	357.52	A1	-132	30.3	0	10/19/10	EM access restricted by bushes. Very high EM/mag gradients due to proximity of ferrous drain 10' N.	S	turf staple	0.1, unknown	0	0.5x0.5x0.3	24SW	10/21/2010	Y	Y	RH	10/21/2010	Y	-120	n/a	N	Y	Reduced to background.	DVK
52-56	1283044	464512.3	*	1479.15	-579.01	A1	-2200	52	28W	10/19/10	Chain link fence located 4 ft N.	S	wire bundle	0.3	0	0.5x0.5x0.3	0	10/21/2010	Y	Y	RH	10/21/2010	Y	-2180	n/a	N	Y	High residual background values due to proximity of chain link fence (4 ft W).	DVK
52-59	1283069.31	464544.48	*	372	^	A1	-195	22	0	10/19/10	Restricted EM access due to trees.	S/O	nails, subsurface electrical line	0.1, unknown	2 – 12	1x1x0.5	12N	10/21/2010	Y	Y	RH	10/21/2010	Y	-196	21	N	Y	Very high EM and magnetic background values due to proximity of subsurface drain line (6 ft N).	DVK
52-62	1283070.56	464459.42	*	137	-150	A1	110	88	12W	10/19/10	Peak on drop-off retaining wall.	S/O	nails, reinforcing materials in retaining wall	0.1, unknown	2, 24" – 36" (est)	0.3x0.3x0.2	12W	10/21/2010	Y	Y	RH	10/21/2010	Y	92	n/a	N	Y	LIP	DVK
52-63	1283047.86	464539.74	*	2936.11	-706.96	A1	-1180	34	24SW	10/19/10	Restricted EM access due to trees.	S	tree root basket	unknown	3	1x1x0.3	10W	10/21/2010	Y	Y	RH	10/21/2010	Y	-1100	n/a	N	Y	LIP	DVK
52-65	1283082.04	464512.3	*	877.34	-1280.39	A1	-792	278	0	10/19/10	Very high EM and magnetic gradients toward house.	O	reinforcing rod in stone patio, subsurface cable	unknown	2 – 12	1x1x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	280	n/a	N	Y	LIP; See Note B, below.	DVK
52-16	1283163.9	464448.6	161.08	666.1	-184.8	A1	-889	810	20N	10/19/10		S	tree root basket	unknown	1	0.5x0.5x0.2	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	805	N	Y	LIP	DVK
52-21	1283083.5	464461.8	28	330.1	-1073.13	A1	114	22	12S	10/19/10		S/O	nails, irrigation control valve	0.2, unknown	3	(9) 0.3x0.3x0.3; (1) 1x1x0.3	2 – 24 (various)	10/21/2010	Y	Y	RH	10/21/2010	Y	93	n/a	N	Y	LIP	DVK
52-39	1283103	464537.1	10.8	111	-107	A1	-174	9	0	10/19/10		S	iron anchor embedded in concrete	unknown	6	1.5x1.5x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	10	n/a	N	Y	LIP	DVK
52-17	1283080.2	464449.8	13.74	^	^	B1	-265	20.9	6SE	10/19/10		S	tree root basket	unknown	3 – 6	0.5x0.5x0.5	16E	10/21/2010	Y	Y	RH	10/21/2010	Y	-270	n/a	N	Y	LIP	DVK
52-19	1283152.2	464457	108.44	^	^	B1	-222	42	0	10/19/10	Very high EM and magnetic gradients toward house.	S	nails	0.1	2	(2) 0.3x0.3x0.3	16W	10/21/2010	Y	Y	RH	10/21/2010	Y	-192	n/a	N	Y	Reduced to background.	DVK
52-1	1283170.8	464385.6	22.98	1385.67	-646.73	B1	381	25.6	0	10/19/10	Directly over marked utility lines. No break between targets 2 and 1.	O	subsurface utility(gas line)	unknown	24 – 36 (est)	n/a	0	10/21/2010	Y	Y	RH	10/21/2010	Y	376	n/a	N	Y	See Note A, below.	DVK
52-5	1283154.3	464418	1182.11	^	^	B1	-15	0.2	0	10/19/10	Very high gradients from house and steel window well.	S	screw driver bit	0.01	2.5	1x1x0.3	0	10/21/2010	Y	Y	RH	10/21/2010	Y	-8	n/a	N	Y	Reduced to background.	DVK
52-20	1283079.3	464458.2	88.64	703.83	-1050.17	B1	101	74	12NW	10/19/10		S	tree root basket	unknown	3 – 6	0.5x0.5x0.5	0	10/21/2010	Y	Y	RH	10/21/2010	Y	100	n/a	N	Y	LIP	DVK
52-22	1283076	464466.3	94.2	351.74	-459.9	B1	208	101	18SW	10/19/10		S	tree root basket	unknown	3 – 6	0.2x0.2x0.3	0	10/21/2010	Y	Y	RH	10/21/2010	Y	205	n/a	N	Y	LIP	DVK
52-33	1283057.7	464519.4	24.85	289	-468	B1	-176	19	0	10/19/10		S	scrap metal	1.5	8	1x1x0.75	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	1	N	Y	Reduced to background.	DVK
52-4	1283133	464409.3	41.36	60.81	-157.19	B1	-775	336	30SW	10/19/10		S	24" wire	0.5	10	2x1x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	0.2	N	Y		DVK
52-24	1283074.5	464472.3	24.04	182.04	-175.16	B1	-128	42	4SW	10/19/10		S	turf staples	0.15	2 – 12	0.5x0.5x0.3	12SW	10/21/2010	Y	Y	RH	10/21/2010	Y	3.4	n/a	Y	Y		DVK
52-54	1283086.78	464466.15	4593.77	2709.71	-2432.89	B1	251	192	0	10/19/10		O	magnetic rock	0.01	2.5	0.5x0.5x0.5	0	10/21/2010	Y	Y	RH	10/21/2010	Y		n/a	Y	Y	Reduced to background.	DVK

Note 1 - Channel 3

Note 2 - O = Other; S = Scrap

DVK = David V. King, CENAB, USACE
EM = Electromagnetic
LIP = Left In Place
N/A = Not Applicable
RH = Robert Harrison (Shaw UXOQC)

Note A: Distribution of EM and magnetic values at and between Targets 52-1 and 52-2 indicate a linear subsurface object located directly above and parallel to marked gas and electric lines. Approved by USACE representative on site.

Note B: Distribution of EM and magnetic values at Targets 52-47 and 52-65 indicate subsurface electrical line buried along the edge of the reinforced concrete footing of a stone patio. Target locations were dug to the specified depth. High EM and magnetic background values due to proximity of house and other objects (5 – 8 ft S). Approved by USACE representative on site.

Table 3-1, Continued

Geophysical Dig Sheet for Anomalies at 4055 52nd Terrace

Original Survey							Reacquisition Survey					Dig Results								Post-Dig Excavation QC Results									
Target ID[a]	Easting[a]	Northing[a]	EM61 Response (mV) Note 1	Vertical Gradient (nT/m) Peak	Vertical Gradient (nT/m) Trough	Classification	Maximum Amplitude (nT)	Maximum Amplitude (mV)	Offset (R)	Date	Comments	Anomaly Type Note 2	Description	Approx weight (lbs)	Depth to Top of Item (inches)	Excavation Dimension ("W" feet by "L" feet by "D" feet)	Final offset (by inch and direction)	Date	Fill-Yes/No	Excavation Hole Cleared?	QC Initials	Date	Agreement between Dig Results & Geophysical Data? (Y/N)	Maximum Amplitude (nT)	Maximum Amplitude (mV)	90% Reduced (Y or N)	Anomaly identified or Removed (Y or N)	Comment	USACE Concurrence
52-53	1283115.06	464414.27	180.51	704.31	-559.75	**B1**	298	802	12SE	10/19/10		S	iron curb spacer	unknown	0	0	12SE	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	800	N	Y	LIP	DVK
52-38	1283074.8	464534.7	8.9	^	^	**C1**	64	10	0	10/19/10	Very high electrical noise.	S	twisted wire	0.1	3	1x1x0.3	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	2	N	Y	Reduced to background values.	DVK
52-41	1283089.2	464538	17.47	^	^	**C1**	59	6.8	20SW	10/19/10	Very high electrical noise.	S	turf staple	0.1	2	1x1x0.2	12E	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	1.8	N	Y	Reduced to background values.	DVK
52-42	1283062.5	464539.2	10.21	^	^	**C1**	40	8	28SW	10/19/10	Very high electrical noise.	S	nail	0.1	2	0.3x0.3x0.3	24SW	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	2.1	N	Y	Reduced to background values.	DVK
52-7	1283106.3	464424.3	5.68	^	^	**C1**	298	14	24S	10/19/10	Restricted EM access due to ornamental plants.	S	18" iron fence post	2	18	2x1x1.5	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	0.5	Y	Y		DVK
52-15	1283147.7	464446.2	379.81	26.07	-258.37	**C1**	379	769	6E	10/19/10	Electrical junction box 3' S.	O	tree root basket	unknown	8	0.75x0.75x0.75	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	129	N	Y	LIP	DVK
52-25	1283069.1	464480.7	17.12	32	-785.49	**C1**	346	39	0	10/19/10		S	fence post	4	6	1x1x0.75	4NE	10/21/2010	Y	Y	RH	10/21/2010	Y	32	n/a	Y	Y	Reduced to background values.	DVK
52-32	1283065.5	464518.8	3.87	185	^	**C1**	1.8	0.2	20E	10/19/10		S	nail	0.1	3	0.5x0.5x0.5	20E	10/21/2010	Y	Y	RH	10/21/2010	Y	-39	n/a	N	Y	Reduced to background values.	DVK
52-34	1283049.6	464525.7	198.3	921.18	-723.1	**C1**	64	45	24SW	10/19/10		S	iron legs of lawn flamingo, 6" aluminum spike	1	0, 3	0, 1.5x1.5x0.3	12W, 28N	10/21/2010	Y	Y	RH	10/21/2010	Y	1.9	n/a	Y	Y		DVK
52-40	1283056.2	464537.4	24.57	172.83	-52.96	**C1**	44	1	0	10/19/10		O	turf staple	0.1	2	0.5x0.5x0.5	2W	10/21/2010	Y	Y	RH	10/21/2010	Y	28	n/a	N	Y	Reduced to background values.	DVK
52-43	1283121.6	464544	8.56	127	^	**C1**	-598	61	0	10/19/10	Very high EM and magnetic gradients from ferrous drain 6' N.		subsurface electrical line	unknown	4	2x2x0.5	10N	10/21/2010	Y	Y	RH	10/21/2010	Y	-585	n/a	N	Y	LIP – Very high EM and magnetic background values due to proximity of subsurface drain line (6 ft N).	DVK
52-28	1283061.6	464502.9	9.74	146	-89	**C1**	88	9	10SE	10/19/10	Electrical noise.		piece of wire	0.1	5	1x1x0.5	0	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	0.8	Y	Y		DVK
52-31	1283071.8	464516.7	5.03	118	^	**C1**	-146	0.6	0	10/19/10			nail	0.1	1	0.3x0.3x0.3	10N	10/21/2010	Y	Y	RH	10/21/2010	Y	n/a	0.1	N	Y	Reduced to background values.	DVK
52-70	1283124	464416	^	69.5	^	**C1**	-118	1.5	0	10/19/10			magnetic game piece	0.1	2	1x1x0.3	18S	10/21/2010	Y	Y	RH	10/21/2010	Y	-39	n/a	N	Y	Reduced to background values.	DVK
52-66	1283062.58	464515.79	^	88.42	49.39	**C1**	-76	1	0	10/19/10			magnetic rocks	10	6	1.5x1.5x1	0	10/21/2010	Y	Y	RH	10/21/2010	Y	-129	n/a	N	Y	Removal of rocks from target location altered magnetic character – rock pile exhibits positive magnetic value. No EM peak.	DVK
X-1							-	292.4	0	01/06/11		S	Corner Stake	2	2	0.5 x 0.5 x0.3	0	01/06/2011	Y	Y	RH	1/6/2011	Y	-	292.4	N	Y	LIP	DVK
X-2							-	459	0	01/06/11		S	Root Basket	unknown	2	0.5 x 0.5 x0.5	0	01/06/2011	Y	Y	RH	1/6/2011	Y	-	459	N	Y	LIP	DVK

Note 1 - Channel 3

Note 2 - O = Other
S = Scrap

DVK = David V. King, CENAB, USACE
EM = Electromagnetic
LIP = Left In Place
N/A = Not Applicable
RH = Robert Harrison (Shaw UXOQC)

Attachment D

Anomaly Investigation Photographs

During the investigation at 4055 52nd Terrace, photographs were taken of the excavations and items that were recovered. This attachment contains a selection of photographs taken during the investigation.

Select Anomaly Photographs

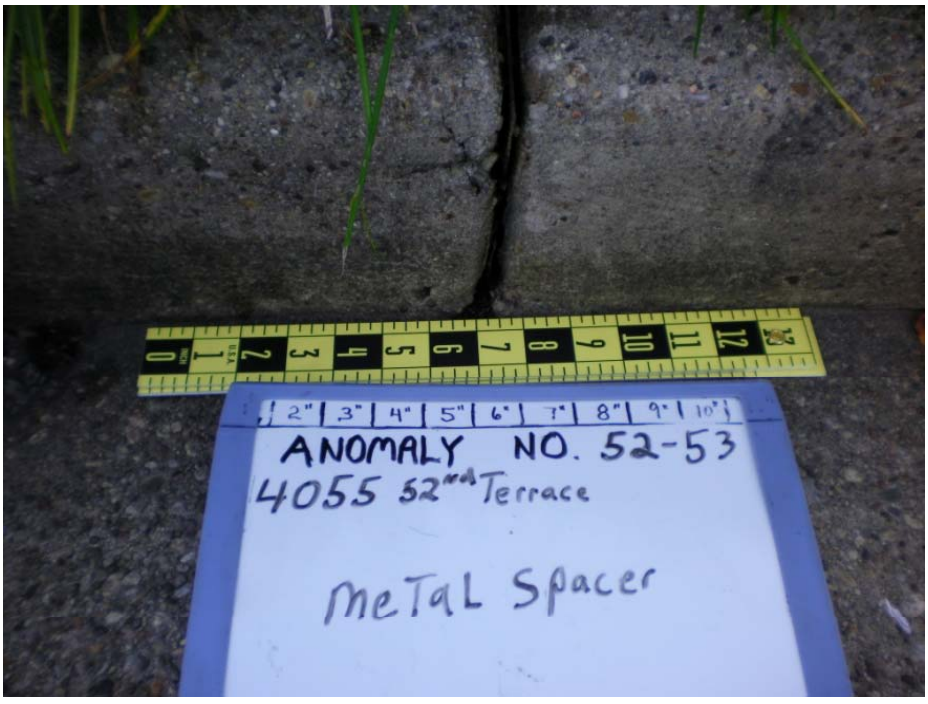
Anomaly 52-4; 24” wire

Anomaly 52-3; water meter cap

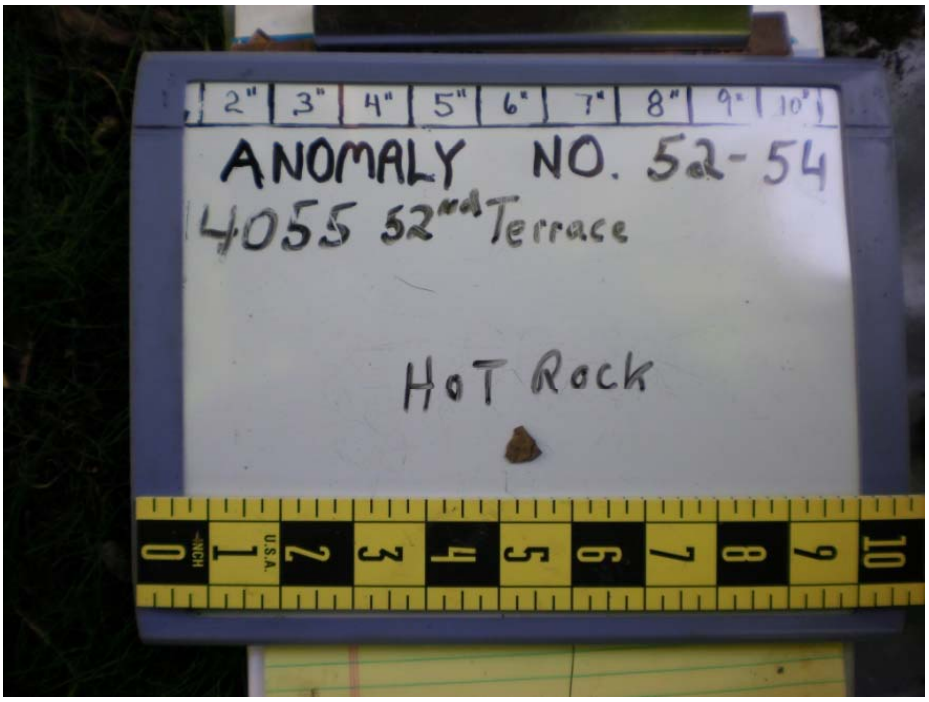
Anomaly 52-19; nails

Anomaly 52-34; nail and lawn ornament

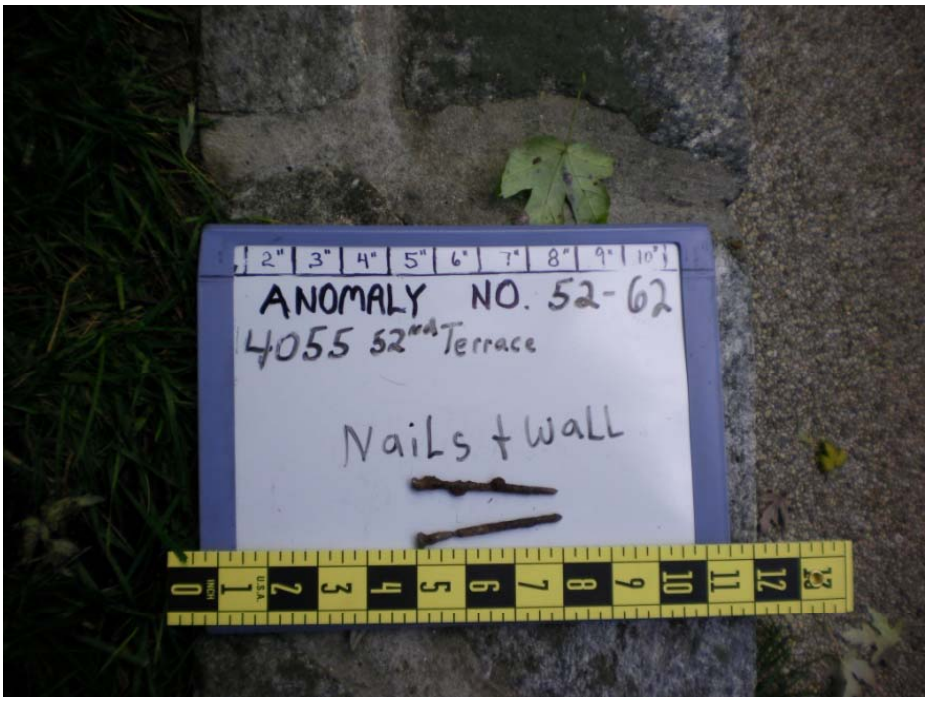
Anomaly 52-46; springs and other metal



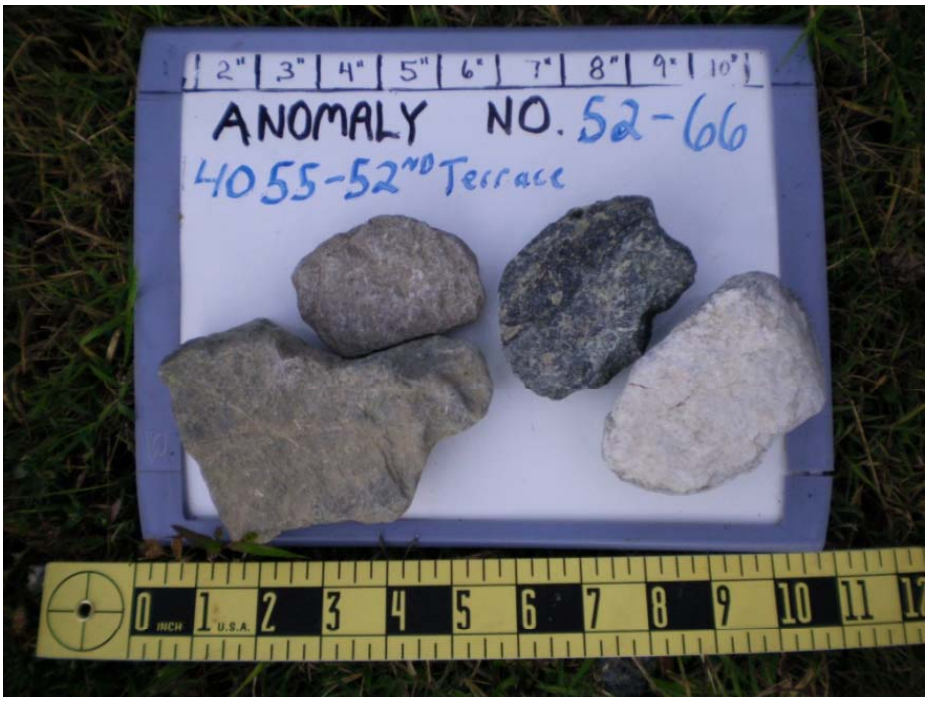
Anomaly 52-53; metal spacer



Anomaly 52-54; hot rock



Anomaly 52-62; nails and wall



Anomaly 52-66; magnetic rocks

Anomaly 52-77; irrigation line

Anomaly X-1; corner stake

Anomaly X-2; root basket

Attachment E
Daily SUXOS and QC Reports and Safety Briefs

Spring Valley Investigation
Spring Valley, Washington D.C.
Contract No.W912DR-09-D-0005
Delivery Order No. 0001

Date: Thursday, October 21, 2010
Report: OCT003

Project Day 3

Daily Quality Control Report

Weather: L 42, H 65, Partly Cloudy, Wind 11 mph.

1. Contractor/Subcontractor and their area of responsibility:

Shaw Environmental, Inc.

2. Operating plant/equipment (Not including hand tools):

GEO EM-61	10 hours
GEO G858	10 hours

3. Work performed today (Location/description/by whom).

UXO Anomaly Investigation at 4055 52nd Terrace (52 anomalies investigated.) See Remarks (10.) for additional information.

4. Control Activities Performed:

None

5. Tests Performed and Test Results:

Daily magnetometer operations check: Test(s) SAT.

6. Materials/Equipment Received:

None this date.

7. Submittals reviewed:

Submittal #	Spec/Plan Ref.	By Whom	Action

None this date.

8. Off-site surveillance activities:

None this date.

9. Job safety:

Tailgate briefing conducted.
JSA completed.

10. Remarks (Instructions given/received, conflicts, delays encountered, etc.):

Location: 4055 52nd Terrace, 52 anomalies investigated.

Anomaly No.

52-1 & 52-2; targets are located under the concrete driveway. USACE OE SS decided not investigate anomalies

52-14; target is located under residence front entrance walkway. USACE OE SS decided not investigate anomaly.

52-65 & 52-47; anomalies determined to be a utility cable and rebar embedded in concrete walkway located within 6 inches of targets.

52-43, 52-72, & 52-59; targets were determined as a buried utility cable and were affected by a large metal drainage pipe located in close proximity.

52-24; anomaly located under walkway on side of house. A section of slate was lifted up, a small magnetic piece was removed and walkway was replaced and returned to the original position.

52-21; anomalies are several nails and a utility control box. The control box was left in place.

52-39; anomaly is a buried concrete block embedded with rebar that was left in place.

52-73; anomaly is a piece of rebar approximately six feet in size that is used to support one backyard sprinkler head. It was left in place.

11. List of Attachments:

Job Safety Analysis

12. Contractor's verification statement:

CERTIFICATION: I certify that the above report is complete and correct and that I or my representative have inspected all work identified on this report performed by Shaw and our subcontractor(s) and have determined to the best of my knowledge and belief that noted work activities are in compliance with the plans and specifications, except as may be noted above.

21 October 2010

UXO QC/H&S

Date

Shaw®

JOB SAFETY ANALYSIS WORKSHEET FORM

DATE: 21 Oct 10
JOB#: 135177
PERMIT#:
ISSUED BY:
SUPERVISOR: Bill Dickson

Location of Job Spring Valley (Unit/Location on Project):		**Job Task Analyzed UXO Anomaly Investigation**
Required PPE: Modified Level D	**Safety Access/ Location** Safe Haven: Federal Trailer Wind Direction:	Supervisor of Work: Bill Dickson JSA Prepared By: R Harrison Are other crews in area? No
Pre-Job Preparation 1. Fill out JSA 2. Review JSA (EVERYONE) 3. Sign JSA (EVERYONE)	Evacuation Route: Route to Federal Trailer Assembly Point:: Federal Trailer	New: X Revised:

Job Task (What you are doing) **UXO Anomaly Investigation** Cutting Concrete	**Audit the Job:** Audit Time:
Potential Hazards **MEC potential, Slips; Trips and Falls; Driving to and from job site;** Using power saw to cut concrete, eye Hazards, noise Hazard, Dust hazard, spark producing	**Supervisor's Comments:**
Recommended Action or Procedure **Use established MEC digging procedures; Watch your footing; Drive defensively; Use HARP in decision making.** USE PPE for concrete cutting, hearing protection, Face shield, safety glasses, gloves. Use water to mitigate Dust and sparks.	**Supervisor's Initials:**

Crew Name Signatures:

[signatures] Keefer, Alan ... Mark Kick, William Dilasi

JOB SAFETY ANALYSIS CHECKLIST FORM

DATE: 21 Oct 10
JOB#: 135177
PERMIT#:
ISSUED BY:
SUPERVISOR: B. Dickson

Job Analyzed: UXO Anomaly Investigation **Project Name:** Spring Valley

Consider the following and check the items which apply to the job, then review with the work crew.

PERMITS
- ✓ Excavation
- Cold Work
- Hot Work
- Confined Space Entry Permit
- All Conditions Met
- Signed-off When Complete
- Other:

PPE
- Chemical Protective Gloves
- ✓ Leather Gloves
- Special Purpose Gloves (e.g. Whizards)
- Chemical Protective Coveralls
- Acid Suit
- Chemical protective Boots
- Chemical Splash Goggles
- ✓ Face Shield
- Respirator
- Fresh Air Ventilation
- ✓ Hearing Protection
- Safety Harness
- Burning Goggles/Welder's Helmet
- Other:

TOOLS
- ✓ Current Inspection
- ✓ Proper Tools for the Job
- ✓ Good Tool Condition
- Qualifications, e.g. explosive actuated tool
- Other:

EMERGENCY EQUIPMENT
- ✓ Fire Extinguishers
- ✓ Safety Shower/Eyewash
- ✓ Evacuation Route Mapped
- Other:

ACCESS
- Scaffold (properly inspected ____)
- Scaffold Training
- NA Ladder (HS 302 followed)
- Man-lift
- Personnel Basket (inspected/approved)
- Operator Training
- Special Provisions
- Other:

WELDING
- Flash-burns
- Combustibles
- Spark Containment
- Shields
- NA Grounding
- Water Hose
- Fire Extinguisher
- Fire Blanket
- Fire Watch
- Sewer Covers
- Other:

OVERHEAD WORK
- Barricades
- NA Signs
- Hole Cover
- Handrail
- Other:

ELECTRICAL
- Locked & Tagged out
- NA Try Start/Stop Switch
- GFCI Test
- Assured Grounding
- Extension Cord Inspection
- Other:

LIFTING
- Forklift
- Boom Truck
- Load Chart
- Angle
- Crane
- Chain-fall
- Proper Rigging Practices
- ✓ Manual Lifting
- Condition of Equipment
- Operator Certification

DRILLING / DIRECT PUSH
- ✓ Underground Utilities
- Overhead Hazards
- Rig Inspected
- Air Monitoring
- ✓ Emergency Procedures
- Other:

HAZARDS (ENVIRONMENTAL)
- Cold Stress
- Heat Stress
- ✓ Heavy Objects
- Hot/Cold Surfaces or Materials
- Inadequate Lighting
- Irritating Plants
- Noise
- Heavy Weather
- Insects/Animals
- Other:

HAZARDS (CHEMICALS)
- Chemical Burn Skin/Eyes
- ✓ Flammable
- Ingestion
- Inhalation
- ✓ Skin Contact

HAZARDS (BODY)
- Fall Potential
- Pinch Points
- ✓ Slip-Trip Potential
- Other:

OTHER WORK IN AREA
- Others Working Overhead
- NA Type Work Others Doing
- PPE Due to Other Work
- Other:

CONFINED SPACE ENTRY
- Permit Required
- NA Permit Completed
- Personnel Trained
- Rescue Services Available

EXCAVATION
- Permit Completed
- Competent Person Supervising
- Underground Utilities
- Overhead Hazards
- Soils Tested
- Heavy Equipment Inspected
- Perimeter Protection
- Daily Inspections
- Protective Systems
- Air Monitoring

SUPERVISOR/FOREMAN RECOMMENDATIONS:

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE WIDE CSS

As Of: 21 OCT 2010

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No.	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
1	10/21	4055 SAND TE	3"		X		MAGNETIC GRAIN PIECE		52-70			OFFSET 24" SOUTH
2	10/21	4055 SAND TE	SURFACE		X	—	GUAR JOINT		52-53			LEFT IN PLACE
3	10/21	4055 SAND TE	12"	—	X	—	5 PIECES OF WIRE SMALL MAGNET		52-4			NO OFFSET
4	10/21	4055 SAND TE	6"		X		WATER METER COVER		52-3			6" SOUTH EAST OFFSET
5	10/21	4055 SAND TE	24"		X		CORE SPACER OVER 3' AREA HIGH BACKGROUND FROM SURVEY		52-61			NO OFFSET LEFT IN PLACE
6	10/21	4055 SAND TE	1"		X		FLOAT GASKET		52-16			LEFT IN PLACE 6" NORTH
7	10/21	4055 SAND TE	6"		X		FOOT GASKET		52-18			LEFT IN PLACE 12" SOUTH
8	10/21	4055 SAND TE	2"		X		WATER LINE		52-77			LEFT IN PLACE 24" NORTH
9	10/21	4055 SAND TE	2" 3"		X X		2 NAILS 1 NAIL		52-19			18" NORTH EAST 24" EAST
10	10/21	4055 SAND TE	8"		X		FOOT GASKET		52-15			LEFT IN PLACE NO OFFSET

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE-WIDE CSS

As Of: 10/21/10

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
1	10/21	4055 52ND TE	5"		X		ROOT BASKET		52-17			LEFT IN PLACE NO OFFSET
2	10/21	4055 52ND TE	2"		X		ROOT BASKET		52-20			LEFT IN PLACE NO OFFSET
3	10/21	4055 52ND TE	1"		X		ROOT BASKET		52-22			LEFT IN PLACE NO OFFSET
4	10/21	4055 52ND TE	3" 2" 2"		X X X		WIRE PLANT SUPPORT WIRE PLANT SUPPORT WIRE		52-24			24" EAST NO OFFSET ROOT GROWN AROUND LEFT IN PLACE 6" WIRE
5	10/21	4055 52ND TE	3" 2"		X X		NAIL / WIRE NAIL		52-62			24" EAST 24" NORTH
6	10/21	4055 52ND TE	2" 3"		X X		MAGNET NAIL		52-81			NO OFFSET EAST 24"
7	10/21	4055 52ND TE	3" 3"		X X		MAGNET MAGNET		52-54			NORTH 12" NO OFFSET
8	10/21	4055 52ND TE	3"		X		METAL WATE		52-51			UNSET 30" EAST
9	10/21	4055 52ND TE	10"		X		FENCE POST		52-25			NO OFFSET
10	10/21	4055 52ND TE	3" 2"		X X		3 NAIL VALVE COVER		52-21			18 SOUTH WEST

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE-WIDE CSS

As Of: 31 OCT 2010

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
1	10/21	GOSS SAND TE	18		X		3" x 1" x 15" SCRAP METAL		S2-7			NO OFFSET
2												
3												
4												
5												
6												
7												
8												
9												
10												

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE-WIDE CSS

As Of: 10/21/10

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
1	10-21	4055 52-5	3 IN				SCREW DRIVER BIT					0
2		4055 52-28	5				WIRE					12 IN N
3		4055 52-48					NO FIND CLEAR IN 3 FT ARC					1 FT HOLE DUG
4		4055 52-56	5				WIRE					22 IN E
5		4055 52-49	8 IN				ROOT BASKET					6 IN E
6		4055 52-30	8 IN				ROOT BASKET					0
7		4055 52-33	8 IN				METAL 2 IN W 8 IN L					0
8		4055 52-CC					GEO					~~20 IN N~~ TCU
9		4055 52-32	4 IN				NAIL					20 IN N
10		4055 52-31	1 IN				NAIL					10 IN N

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE-WIDE CSS

As Of: 10/21/10

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
												14 5
							LAWN ORAMANT					22
1	10-21	4055 52-34	3IN				NAIL					12 S
												12 N
2		4055 52-53	8IN				ROOT BASKET					0
							STAPLE					20 N &W
3		4055 52 40	2IN 9IN				NAIL					20 SE
							STAPLE					
4		4055 52-42	5 2IN				WIRE					0
5		4055 52-46	3IN				10" SPIKES					1FT Hole NW
							NO FENCE FENCE AT 18"					1FT Hole Dug
6		4055 52-50					NO Fined Lighting Deck rebar 2FT					1FT Hole Dug
7		4055 52-65	1FT				No Fined Lighting Deck rebar 2FT					14 W
8		4055 52-47	1FT				STAPLE					10 W
		4055 52-60	5				NAIL					

RECOVERED ITEM INVENTORY LOG

SPRING VALLEY SITE-WIDE CSS

As Of: 10/21/10

No.	DATE	GRID / LOCATION	DEPTH Ft.	CLOSED CAVITY Yes	CLOSED CAVITY No	PID READING	ITEM DISCRIPTION	TRACKING No.	LOCATION	CERTIFIED SCRAP YES	CERTIFIED SCRAP NO	DISPOSITION / COMMENT
1	1021	4055 52-36	5 IN				WIRE					0
2		4055 52-72					NOTHING FOUND					1' HOLE DOG
3		4055 52-41	4 IN				STAPLE					12 N
4		4055 52-39	12 IN				METAL ANGER IN CONCRETE BLOCK					0
5		4055 52-45	4 IN				WIRE					14 N
6		4055 52-43					ELECT CONDUIT					1 FT HOLE
7		4055 52-44	12 IN				ELECT CONDUIT					0
8		4055 52-[illegible]73					5 FT REBAR HOLDING 1 FT S SPRINK HEAD					1 FT HOLE DA
9												
10												

Spring Valley Investigation
Spring Valley, Washington D.C.
Contract No.W912DR-09-D-0005
Delivery Order No. 0001

Date: Thursday, January 06, 2011
Report: JAN003

Daily Quality Control Report

Weather: L 29, H 39, Sunny, Wind Calm.

1. Contractor/Subcontractor and their area of responsibility:

Shaw Environmental, Inc.

2. Operating plant/equipment (Not including hand tools):

GEO EM-61	10 hours
GEO G858	10 hours

3. Work performed today (Location/description/by whom).

UXO Anomaly Investigation at 4055 52nd Terrace (2 anomalies investigated,) and 4809 Woodway Lane (28 anomalies investigated.) See Remarks (10.) for additional information.

4. Control Activities Performed:

None

5. Tests Performed and Test Results:

Daily magnetometer operations check: Test(s) SAT.

6. Materials/Equipment Received:

None this date.

7. Submittals reviewed:

Submittal #	Spec/Plan Ref.	By Whom	Action

None this date.

8. Off-site surveillance activities:

None this date.

9. Job safety:

Tailgate briefing conducted.
JSA completed.

10. Remarks (Instructions given/received, conflicts, delays encountered, etc.):

Location: 4809 Woodway Lane, 28 anomalies investigated.

Anomaly No.

WD-6, 15, & 20; anomalies were no finds. They were dug to required depth and nothing was found.

Property is subject to high levels of electrical interference.

Location: 4055 52nd Terrace, 2 anomalies investigated, no remarks
.

11. List of Attachments:

Job Safety Analysis

12. Contractor's verification statement:

CERTIFICATION: I certify that the above report is complete and correct and that I or my representative have inspected all work identified on this report performed by Shaw and our subcontractor(s) and have determined to the best of my knowledge and belief that noted work activities are in compliance with the plans and specifications, except as may be noted above.

January 11, 2011

UXO QC/H&S

Date

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT, U.S. ARMY CORPS OF ENGINEERS
P.O. BOX 1715
BALTIMORE, MD 21203-1715

September 23, 2011

REPLY TO
ATTENTION OF
Engineering Division

William and Beverly McKee
or Current Owner
4055 52nd Terrace, NW
Washington, DC 20016

Re: Spring Valley Formerly Used Defense Site
Anomaly Investigation Results – 4055 52nd Terrace, NW

Dear Mr. and Mrs. McKee or Current Owner,

This letter concerns the property located at 4055 52nd Terrace in the northwest section of Washington, D.C. This property was part of an area that was held by the United States Government between 1917 and 1920 and known as American University Experiment Station (AUES).

The Defense Environmental Restoration Program (DERP), established by Congress, provides for the cleanup of hazardous substances associated with past U.S. Department of Defense (DoD) activities, consistent with the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). DERP also provides for the correction of other environmental damage from military munitions associated with DoD's past use of property. The U.S. Army Corps of Engineers (USACE) is the Department of Army's agency that executes environmental restoration activities at sites formerly under the jurisdiction of a component of DoD or one of its predecessor agencies (Formerly Used Defense Sites, or FUDS). The 4055 52nd Terrace property is part of a larger area that has been designated as the Spring Valley FUDS.

The Chemical Warfare Service, originally under the Bureau of Mines and later under the War Department (a DoD predecessor agency), used the former AUES as a research and development facility for chemical agents, equipment, and munitions. Historical information indicates that onsite testing, usage, and disposal of ordnance and chemical warfare materiel (CWM) occurred at the AUES between 1917 and 1920.

The USACE has investigated and continues to investigate the nature and extent of the military munitions and CWM contamination within the Spring Valley FUDS, as well as other contamination for which the DoD may have been responsible. A low probability anomaly investigation was conducted at the 4055 52nd Terrace property in October 2010. Fifty-one single-item anomalies were investigated. The fifty-second anomaly was not investigated due to its location under hardscape. Two additional anomalies were intrusively investigated in a follow-on investigation directed by USACE in January 2011. No munitions and explosives of concern (MEC), recovered chemical warfare materiel, or other AUES-related items were encountered during the intrusive investigation of the fifty-three anomalies.

Based on the history of the site, the results of the USACE tests and investigations, and the restoration activities performed to date on the 4701 Woodway Lane property, the USACE believes that all appropriate and necessary requirements to protect public health and safety and the environment with respect to threats from military munitions, CWM, or other contamination associated with prior DoD activities, have been met at the 4055 52nd Terrace property.

Nonetheless, in the unlikely event of future discoveries on the 4055 52nd Terrace property of military munitions, CWM or other contamination associated with prior DoD activities, the USACE is committed to take such response actions as may be necessary consistent with CERCLA, the NCP, and the DERP to address contamination resulting from DoD activities.

The results from our investigation of the 4055 52nd Terrace property will be included as an annex to an overall Remedial Investigation/Feasibility Study (RI/FS) report for the entire Spring Valley project. A copy of the final report for the 4055 52nd Terrace property has been mailed to you. In addition, when the RI/FS is eventually compiled, the community will be notified and asked to comment on it.

If you have questions or comments regarding this letter, please contact the Community Outreach Team at (410) 962-0157.

Sincerely,

Dan G. Noble
Project Manager for Spring Valley

Copy:
US Environmental Protection Agency, Region III (Mr. Steven Hirsh)
District of Columbia, Department of the Environment (Mr. James Sweeney)

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT U.S. ARMY CORPS OF ENGINEERS
2 HOPKINS PLAZA
BALTIMORE, MD 21201

April 27, 2022

Joseph A. Vitello
Site Assessment Manager
Superfund & Emergency Management Division
Environmental Protection Agency Region III
1650 Arch Street (3SD12)
Philadelphia, PA 19103

Dear Mr. Vitello,

This letter concerns the property located at 4055 52nd Terrace NW Washington D.C. This property is the last of the properties slated for clearance as part of the 92 Residential Properties portion of the Spring Valley Site-Wide Remedial Action (RA) as outlined in the 2017 Decision Document. The homeowners at 4055 52nd Terrace, William and Beverly McKee, have declined to participate in the RA.

The Spring Valley (SV) Community Outreach Team made various and repeated attempts over the last few years to communicate with the homeowners at 4055 52nd Terrace to obtain the homeowners' participation. These communications included letters, emails, phone calls/messages, and visits to the property. Our first attempt to obtain the permission of the homeowner was on March 10, 2019, via an in-person visit to the property during neighborhood canvassing.

On March 16, 2022, the SV Community Outreach Team met again with Mr. McKee at 4055 52nd Terrace. Mr. McKee firmly declined participation, explaining that remediation efforts had been conducted at his property multiple times in the past and he was not happy with the state of the property after the work was concluded. Mr. McKee noted that he was not keen on the idea of the possibility of uprooting his trees and plants and replanting new ones. Mr. McKee explained he received a "nice letter" from the U.S. Army Corps of Engineers (USACE) in 2011 that stated his property was clear (see attached Anomaly Assurance letter from 2011). Mr. McKee explained that the letter is sufficient documentation for him, and he does not want anything else to do with the project.

Per Department of Defense policy, we are informing you of our efforts to gain this owner's consent and cooperation for the performance of remedial activities; and we are requesting that you reach out to this property owner to explain the rationale for our request, reinforce the benefits of the activities we propose, and discuss with the property owner the implications – legal and otherwise – if they decline to participate at this time. The USACE stands ready to assist, and as well, will keep open in the near term a window of opportunity to perform the remedial

activities described in the Decision Document for the SVFUDS if the property owner grants access. If no headway can be made on this issue, and sixty (60) days after the date on this letter, the USACE will consider non-access to be a final end-state and will cease efforts to implement remedial activities that require access to the property. Other remedial activities will proceed to include continuing to send this property owner information on munitions recognition and avoidance (3Rs) as required by the Decision Document. Please inform us if you have any success in convincing this property owner to grant us access.

Sincerely,

D. Noble

Dan G. Noble
Project Manager for Spring Valley FUDS

Copy:
Department of Energy and Environment (Mr. Brian Barone)
Weston Solutions (Mr. Chris Moran)
CENAB-OC (Ms. Bethany Blakeman)

Attachment:
Anomaly Assurance letter, 2011

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT U.S. ARMY CORPS OF ENGINEERS
2 HOPKINS PLAZA
BALTIMORE, MD 21201

April 27, 2022

Brian Barone
Chief, Land Remediation and Development Branch
Toxic Substances Division
Department of Energy and Environment
Government of the District of Columbia
1200 1st Street, NE, 5th Fl
Washington D.C. 20002

Dear Mr. Barone,

This letter concerns the property located at 4055 52nd Terrace NW Washington D.C. This property is the last of the properties slated for clearance as part of the 92 Residential Properties portion of the Spring Valley Site-Wide Remedial Action (RA) as outlined in the 2017 Decision Document. The homeowners at 4055 52nd Terrace, William and Beverly McKee, have declined to participate in the RA.

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as well, will keep open in the near term a window of opportunity to perform the remedial activities described in the Decision Document for the SVFUDS if the property owner grants access. If no headway can be made on this issue, and sixty (60) days after the date on this letter, the USACE will consider non-access to be a final end-state and will cease efforts to implement remedial activities that require access to the property. Other remedial activities will proceed to include continuing to send this property owner information on munitions recognition and avoidance (3Rs) as required by the Decision Document. Please inform us if you have any success in convincing this property owner to grant us access.

Sincerely,

D. Noble

Dan G. Noble
Project Manager for Spring Valley FUDS

Copy:
US Environmental Protection Agency, Region III (Mr. Joseph Vitello)
Weston Solutions (Mr. Chris Moran)
CENAB-OC (Ms. Bethany Blakeman)

Attachment:
Anomaly Assurance letter, 2011

DEPARTMENT OF THE ARMY
BALTIMORE DISTRICT. U.S. ARMY CORPS OF ENGINEERS
2 HOPKINS PLAZA
BALTIMORE, MD 21201

July 18, 2022

REPLY TO
ATTENTION OF
Engineering Division

William & Beverly McKee
4055 52nd Terrace NW
Washington, D.C. 20016

Subject: Close-out Letter for 4055 52nd Terrace

Dear Mr. & Mrs. McKee,

This letter provides a formal recognition of the close-out of your property per your request to decline participation in the Spring Valley Formerly Used Defense Site (SVFUDS) remedial action effort. The United States Army of Engineers (USACE) formally recognizes the inability to gain access to the 4055 52nd Terrace property, as of April 27th, 2022.

The effort to gain access to 4055 52nd Terrace to conduct remedial activities has been an ongoing effort for approximately three years. This property is the last of the properties slated for clearance as part of the Explosives Hazards Remedy portion of the Spring Valley Site-Wide Remedial Action (RA) as outlined in the 2017 Decision Document. However, as a result of the access refusals on 4055 52nd Terrace, the USACE contract for completion of the Remedial Action Effort has now closed.

On April 27, 2022, the Army Corps of Engineers sent a Participation Refusal Letter regarding the 4055 52nd Terrace property to the Environmental Protection Agency (EPA) Region III and the Department of Energy & Environment (DOEE) – together referred to as the Partners. Per the Department of Defense (DOD) guidelines, a 60-day review-deadline after the date of the Participation Refusal Letter commenced. This 60-day review period (which ended on June 27, 2022) allotted time for the Partners to decide about further pursuing remedial action efforts at the 4055 52nd property. The Partners decided not to engage in any further efforts on their part to assist the USACE in gaining access. The USACE now considers non-access to be a final end-state and will cease efforts to implement remedial activities that require access to 4055 52nd Terrace, and you will retain any responsibilities for your property under applicable law. Note that other remedial activities in SVFUDS will proceed, and you may continue to receive information on munitions recognition and avoidance (3Rs) as required by the Decision Document.

The Army Corps of Engineers and their Partners, the EPA Region III and DOEE formally recognize your declined participation request in the SVFUDS remedial action efforts and formally close-out the 4055 52nd Terrace property. Therefore, no further action is required, and we thank you for the consideration you have given to our request.

If you have any questions or would like additional information, please do not hesitate to call our Community Outreach Team at 1-410-962-2210.

Sincerely,

D. Noble

Dan G. Noble
Project Manager
for Spring Valley FUDS