

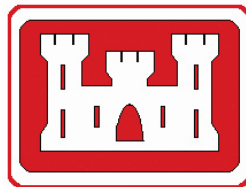
Final

Site Inspection Report
for CC RVAAP-70 East Classification Yard
Ravenna Army Ammunition Plant Restoration Program
Camp Ravenna, Portage and Trumbull Counties, Ohio

October 31, 2018

Contract No.: W912QR-12-D-0002
Delivery Order: 0003

Prepared for:



**U.S. Army Corps of Engineers,
Louisville District
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13. SUPPLEMENTARY NOTES None.					
14. ABSTRACT This Report presents the results of a Site Investigation conducted at the compliance restoration Area of Concern (AOC) CC RVAAP-70, East Classification Yard. The AOC was used for switching and maintaining railroad cars at the former Ravenna Army Ammunition Plant (RVAAP). Potential sources of contamination investigated included railroad/locomotive maintenance activities, fuel releases, and herbicide storage and maintenance. Several polycyclic aromatic hydrocarbons (PAHs - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene), arsenic, and polychlorinated biphenyl (aroclor-1242) were identified as potential contaminants (contamination) in surface soil. Two PAHs, benzo(a)anthracene and benzo(a)pyrene, were identified as potential contaminants in subsurface soil. Based on results of the SI, this AOC is recommended to proceed to a remedial investigation for further evaluation in the CERCLA process.					
15. SUBJECT TERMS Compliance Restoration Site; East Classification Yard; Site Inspection; Remedial Investigation					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT N/A	18. NUMBER OF PAGES 31,599	19a. NAME OF RESPONSIBLE PERSON Edward Heyse
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November 21, 2018

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**Re: US Army Ravenna Ammunition Plt RVAAP
Remediation Response
Project records
Remedial Response
Portage County
267000859220**

**Subject: Final Site Inspection Report, CC-RVAAP-70 East Classification
Yard, September 13, 2018, Portage/Trumbull Counties, OHIO EPA
ID # 267-000859-220**

Dear Mr. Connolly:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office has reviewed the Final Site Inspection Report for CC-RVAAP-70, East Classification Yard dated and received by Ohio EPA on November 1, 2018. Ohio EPA approves the document as submitted.

If you have any questions or concerns related to this review or would like to schedule a meeting or conference call, please free feel to contact me at (330) 963-1170.

Sincerely,

A handwritten signature in black ink, appearing to read "Bob Principe for", is written over the typed name "Edward J. D'Amato".

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Parsons has completed the Final Site Inspection Report CC RVAAP-70 East Classification Yard at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in this project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions was verified. This included review of data quality objectives; technical assumptions, methods, procedures, and materials to be used; the appropriateness of data used and the level of data obtained; and the reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing United States Corps of Engineers policy.

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15 August 2018

(Date)

Report Preparer/Reviewer:

Edward Heyse, Ph.D., P.E.

Project Manager

Parsons



(Signature)

11 September 2018

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Final

**Site Inspection
CC RVAAP-70 East Classification Yard
Ravenna Army Ammunition Plant Restoration Program
Camp Ravenna, Portage and Trumbull Counties, Ohio**

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for the

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Ravenna Army Ammunition Plant Restoration Program

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Ohio EPA = Ohio Environmental Protection Agency

RVAAP = Ravenna Army Ammunition Plant

REIMS = Ravenna Environmental Information Management System

SWDO = Southwest District Office

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LIST OF ACRONYMS AND ABBREVIATIONS

4,4-DDE	4,4-dichlorodiphenyldichloroethylene
4,4-DDT	4,4-dichlorodiphenyltrichloroethane
AOC	area of concern
ARNG	Army National Guard
AST	aboveground storage tank
BSV	Background Screening Value
BUSTR	Bureau of Underground Storage Tank Regulation
Camp Ravenna	Camp Ravenna Joint Military Training Center Ravenna
CCV	continuing calibration verification
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
DLA	Defense Logistics Agency
DUs	decision units
ECC	Environmental Chemical Corporation
ft amsl	feet above mean sea level
ft bgs	feet below ground surface
FWCUG	Facility-Wide Cleanup Goal
FWSAP	Facility-Wide Sampling and Analysis Plan
HQ	hazard quotient
HRR	Historical Records Review
IDW	Investigation-Derived Waste
ISM	incremental sampling methodology
MDC	maximum detected concentration
mg/kg	milligrams per kilogram
MS/MSD	matrix spike/matrix spike duplicate
MTBE	methyl tertiary-butyl ether
NAD83	North American Datum 1983
NAVD88	North American Vertical Datum of 1988
NCP	National Oil and Hazardous Substances Contingency Plan
No.	Number
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per million
QA	quality assurance
QC	quality control
REIMS	Ravenna Environmental Information Management System
RI	Remedial Investigation
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant

LIST OF ACRONYMS AND ABBREVIATIONS (Continued)

SAIC	Science Applications International Corporation
SB	soil boring
SI	Site Inspection
SRCs	site-related chemicals
SS	surface soil sample
SVOCs	semivolatile organic compounds
TAL	target analyte list
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USP&FO	United States Property and Fiscal Officer
USTs	underground storage tanks
VOCs	volatile organic compounds
WOE	weight-of-evidence

EXECUTIVE SUMMARY

This Site Inspection (SI) for Camp Ravenna Compliance Restoration CC RVAAP-70 East Classification Yard area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP), in Portage and Trumbull counties, Ohio was initiated by Environmental Chemical Corporation (ECC), contracted by the United States Army Corps of Engineers (USACE)–Louisville District. Parsons was contracted by the USACE-Louisville District to complete the SI and SI Report under Contract No. W912QR-12-D-0002, Delivery Order No. 0003.

This SI was conducted in accordance with the *Final Inspection and Remedial Investigation Work Plan at Compliance Restoration Sites (Revision 0)* (ECC, 2012), the United States Environmental Protection Agency's (USEPA) *Interim Final Guidance for Performing Site Inspections Under CERCLA* (USEPA, 1992), and Final Work Plan, *Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift* (Parsons, 2017).

Area of Concern

The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), was originally equipped with east and west classification yards during the facility's early operational years to separate railroad cars onto one of several tracks. CC RVAAP-70 East Classification Yard is located east of Load Line 1 and the Main Defense Logistics Agency (DLA) Ore Storage Area in close proximity to the intersection of Ramsdell Road and Irons Road. No documentation was found during the Historical Records Review (HRR) to define the specific years of operation. The CC RVAAP-70 East Classification Yard AOC consists of Building 47-40 (the Round House still exists, but is not actively used), the former herbicide storage shed (former Building 47-60), the containment area for a former aboveground storage tank (AST) (documented spill of No. 5 fuel oil occurred within the containment area in 1986), and an outdoor open wash rack south of Building 47-40 (north of Butts-Kistler Road). A railroad track complex is located east of the AOC and is currently used by the Ohio Army National Guard (OHARNG). Two former 15,000-gallon diesel fuel underground storage tanks (USTs), RV-11 and RV-22, were located west of the wash rack, but were removed in February 1990 and received No Further Action in April 1992 (Science Applications International Corporation [SAIC], 2011b).

The CC RVAAP-70 East Classification Yard was used for switching and maintaining railroad cars. Building 47-40 (Round House) was used for locomotive engine repairs and other maintenance activities (SAIC, 2011b). The former herbicide storage shed was used to store a track-mounted herbicide sprayer and the herbicides used to control vegetation along the railroads at the former RVAAP. Interviewees for the HRR noted an outdoor open wash rack was located to the south of Building 47-40 was used to wash box cars. The wash rack was also reportedly used to wash the engines.

Potential sources of contamination include railroad/locomotive maintenance activities, fuel releases, and herbicide storage and maintenance (SAIC, 2011b). Typical chemicals/products used during locomotive maintenance activities may have included engine washing chemicals, valve oil, electrolytes (battery maintenance), locomotive black paint, solvents for parts degreasing, lubrication oil, metal preservatives, carbolineum, creosote, and cold patch asphalt. In addition, the resident locomotive stored within the Round House building also contained at least two polychlorinated biphenyl (PCB) transformers.

Site Investigation

The HRR (SAIC, 2011b) summarized historical records pertaining to operational history and potential waste releases at CC RVAAP-70 East Classification Yard. The HRR (SAIC, 2011b) made specific recommendations for SI sampling and analysis at the potential release areas within the AOC.

SI field work was detailed in work plans (ECC, 2012 and Parsons, 2017) and sampling was conducted in November and December 2012, April 2013, and January and February 2018. Surface and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of site-related chemicals (SRCs) and identify potential contaminants within the AOC. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

The following decision units (DUs) were defined and investigated:

- Former Fuel Oil Spill Area – DU01
- Drainage Ditch West of Building 47-40 – DU02
- Building 47-40 (Round House)
 - Building 47-40 Round House – Exterior – DU03
 - Building 47-40 Round House – Interior – DU04
- Former Herbicide Storage Shed – DU05
- Outdoor Wash Rack Area – DU06
- Drainage Ditch East of Building 47-40 – DU07

Site-Related Chemicals Identified

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established Background Screening Value (BSV), that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. An SRC may, or may not be, related to the former operations at the AOC.

DU01: Former Fuel Oil Spill Area

Two petroleum hydrocarbons and 10 semivolatile organic compounds (SVOCs) (all polycyclic aromatic hydrocarbons [PAHs]) were identified as SRCs in surface soil. Two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 volatile organic compounds (VOCs) were identified as SRCs in subsurface soil.

DU02 Drainage Ditch West of Building 47-40

Two petroleum hydrocarbons and 13 SVOCs (all PAHs) were identified as SRCs in surface soil.

DU03 Building 47-40 Round House – Exterior

Ten inorganics, 1 PCB, and 18 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, 17 SVOCs, and 5 VOCs were identified as SRCs in subsurface soil.

DU04 Building 47-40 Round House – Interior

Four inorganics, 9 SVOCs (7 PAHs), and 4 VOCs were identified as SRCs in subsurface soil.

DU05 Former Herbicide Storage Shed

One pesticide and 17 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs were identified as SRCs in subsurface soil.

DU06 Outdoor Wash Rack Area

One explosive, one PCB, and 17 SVOCs (14 PAHs) were identified as SRCs in surface soil. One explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs were identified as SRCs in subsurface soil.

DU07 Drainage Ditch East of Building 47-40

Fourteen inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC were identified as SRCs in surface soil.

Potential Chemical Contamination Evaluation

The maximum detected concentration (MDC) of each SRC identified by the SI at each DU was compared to its most stringent Facility-Wide Cleanup Goal (FWCUG) (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential Receptor Regional Screening Level [RSL] if no FWCUG is established) using the target cancer risk level of 10^{-6} or the target hazard quotient (HQ) for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the total petroleum hydrocarbon (TPH) SRCs were compared to Bureau of Underground Storage Tank Regulation (BUSTR) (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of 10^{-6} or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a weight-of-evidence (WOE) approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

Potential contaminants were identified in surface and subsurface soil at CC RVAAP-70 East Classification Yard.

DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

DU02 Drainage Ditch West of Building 47-40

- Surface soil: benzo(a)pyrene

DU03 Building 47-40 Round House

- Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

- Subsurface soil: none

DU04 Building 47-40 Round House – Interior

- Subsurface soil: none

DU05 Former Herbicide Storage Shed

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

DU07 Drainage Ditch East of Building 47-40

- Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

Exposure Pathways

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs or May 2018 RSLs. PAHs were detected in subsurface soil at concentrations above May 2018 RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport with intermittent surface water flow in the ditches may be a migration pathway for potential contaminants related to this AOC.

PAHs have been detected at concentrations above May 2018 RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soils at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

Recommendations

Further evaluation in a Remedial Investigation (RI) is recommended for CC RVAAP-70 East Classification Yard due to potential contaminants in surface and subsurface soil.

DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

DU02 Drainage Ditch West of Building 47-40

- Surface soil: benzo(a)pyrene

DU03 Building 47-40 Round House - Exterior

- Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

DU05 Former Herbicide Storage Shed

- Surface soil: benzo(a)pyrene

DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene

DU07 Drainage Ditch East of Building 47-40

- Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

No further investigation is recommended for subsurface soil at DU03 Building 47-40 Round House - Exterior, DU04 Building 47-40 Round House – Interior, DU05 Former Herbicide Storage Shed, and DU06 Outdoor Wash Rack Area as no potential contaminants were identified.

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1. INTRODUCTION

This Site Inspection (SI) for Camp Ravenna Compliance Restoration CC RVAAP-70 East Classification Yard area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP), in Portage and Trumbull counties, Ohio was initiated by Environmental Chemical Corporation (ECC), contracted by the United States Army Corps of Engineers (USACE)–Louisville District. Parsons was contracted by the USACE-Louisville District to complete the SI under Contract No. W912QR-12-D-0002, Delivery Order No. 0003.

This SI was conducted in accordance with the United States Environmental Protection Agency's (USEPA) *Federal Facilities Remedial Site Inspection Summary Guide* (USEPA, 2005b). The work described in this SI report was conducted in accordance with two work plans: the *Final Site Inspection and Remedial Investigation Work Plan at Compliance Restoration Sites (Revision 0), Ravenna Army Ammunition Plant, Ravenna, Ohio* (ECC, 2012) and the *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift, Camp Ravenna, Portage and Trumbull Counties, Ohio* (Parsons, 2017). The work was also conducted in accordance with the *Facility-Wide Sample and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (Science Applications International Corporation [SAIC], 2011a).

1.1 OBJECTIVES

The purpose of this SI was to evaluate if soil at the CC RVAAP-70 East Classification Yard AOC has chemicals present at concentrations great enough to be defined as contamination. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

1.2 SCOPE

The location of the former RVAAP is provided on Figure 1-1 and the location of CC RVAAP-70 East Classification Yard is shown on Figure 1-2. A site layout diagram of CC RVAAP-70 East Classification Yard is shown on Figure 1-3. Soil samples were collected from potential release areas by ECC in 2012 and 2013, and additional samples were collected by Parsons in 2018. Sample analytical results were assessed to evaluate the presence or absence of contamination. Essential minerals and metals present within background levels are eliminated as potential contaminants. Contamination is identified if the detected concentrations of chemicals were greater than the most stringent Facility-Wide Cleanup Goals (FWCUGs) (SAIC, 2010) established for the Resident Receptor at the former RVAAP in surface or subsurface soils. Concentrations were compared to USEPA Residential Receptor Regional Screening Levels (RSLs) (USEPA, May 2018) at cancer risk of 1×10^{-6} or a hazard quotient (HQ) of 0.1 for those analytes without established FWCUGs, and for polycyclic aromatic hydrocarbons (PAHs) because USEPA updated the toxicity of these compounds after FWCUGs were developed. The potential for contamination to migrate and contact receptors was also evaluated.

1.3 REPORT ORGANIZATION

The SI report is organized into the following sections:

- Section 1 (Introduction) - Provides an overview of the purpose, scope and organization of this SI.
- Section 2 (Area of Concern Background) – Describes Camp Ravenna’s location, operational history, demography, land use, as well as the AOC description, operational history, and previous investigations. This section also describes the environmental setting at Camp Ravenna including geology, hydrogeology, climate, potential human and ecological receptors.
- Section 3 (Field Investigation) – Describes the scope of work completed and the procedures followed during this SI, including a discussion of the sampling rationale for placement of environmental media sampling locations, field activity procedures, laboratory methods, and protocols. Included in this section are the site preparation activities and the field sampling methods for the surface and subsurface soil sampling. Any deviations from the work plan are outlined in this section. In addition, this section details surveying and the characterization and management of wastes generated during the field work.
- Section 4 (Data Evaluation) – Describes the analytical data generated during the SI and discusses the presence or absence of contamination at CC RVAAP-70 East Classification Yard.
- Section 5 (Exposure Pathways) – Describes the potential for contaminants to migrate in the environment and contact receptors.
- Section 6 (Summary and Conclusions) – Summarizes results of this SI and presents conclusions regarding the presence or absence of contamination at CC RVAAP-70 East Classification Yard.
- Section 7 (Recommendations) – Contains recommendations for follow-on actions.
- Section 8 (References) – Lists references used to prepare this document.

The appendices to this document contain the summarized investigation data, including:

- Appendix A – Historical Aerial Photos
- Appendix B – Daily Reports and Field Activity Logs
- Appendix C – Boring Logs
- Appendix D – Data Verification Reports
- Appendix E – Analytical Results, Laboratory Reports, and Chain-of-Custody Forms
- Appendix F – Data Validation Reports
- Appendix G – IDW Disposal Letter Reports
- Appendix H – Site Photographs
- Appendix I – Survey Data
- Appendix J – Regulatory Correspondence Letters and Response to Comments Response



Figure 1-1 General Location and Orientation of Former Ravenna Army Ammunition Plant

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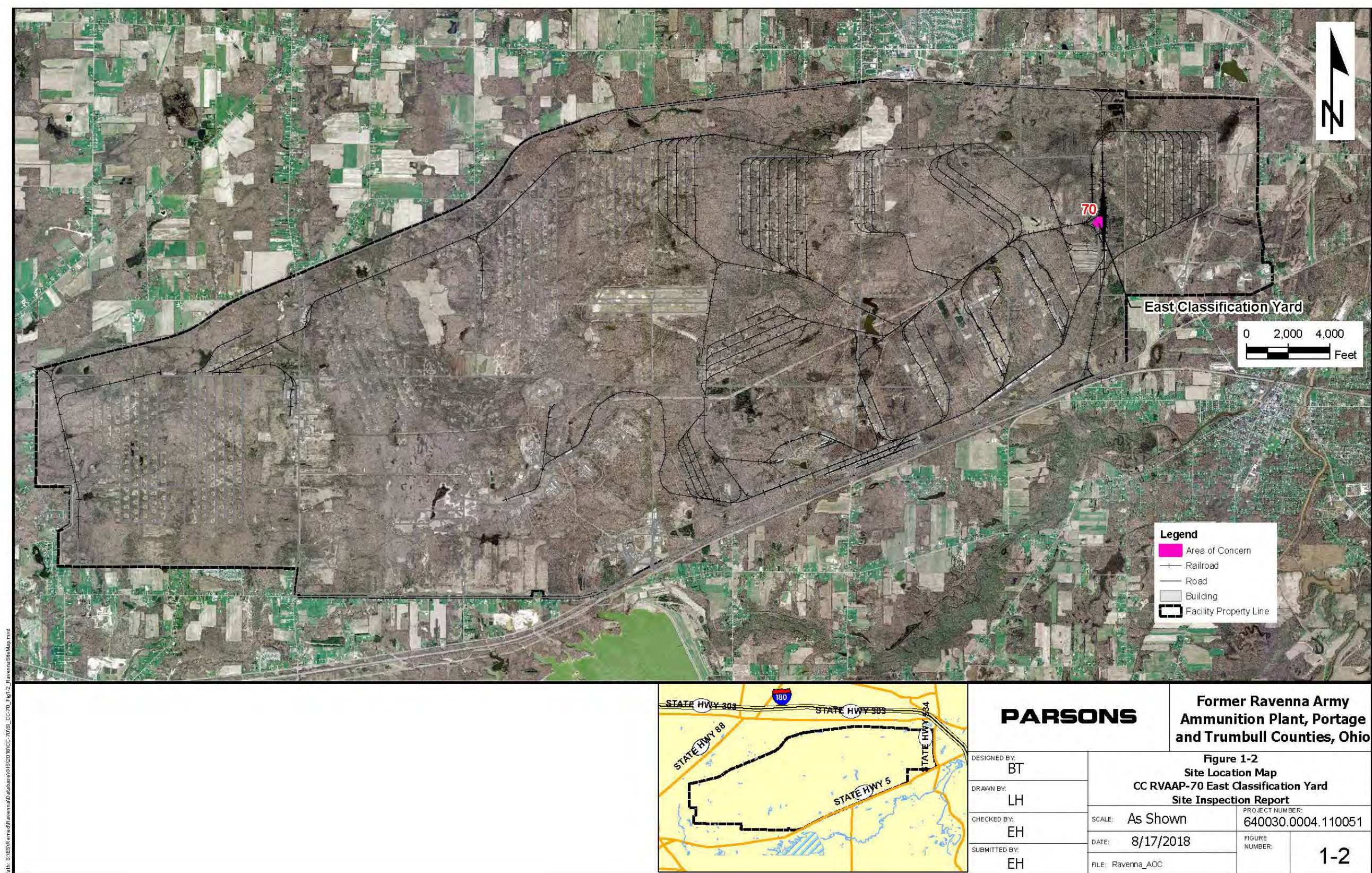


Figure 1-2 Site Location Map

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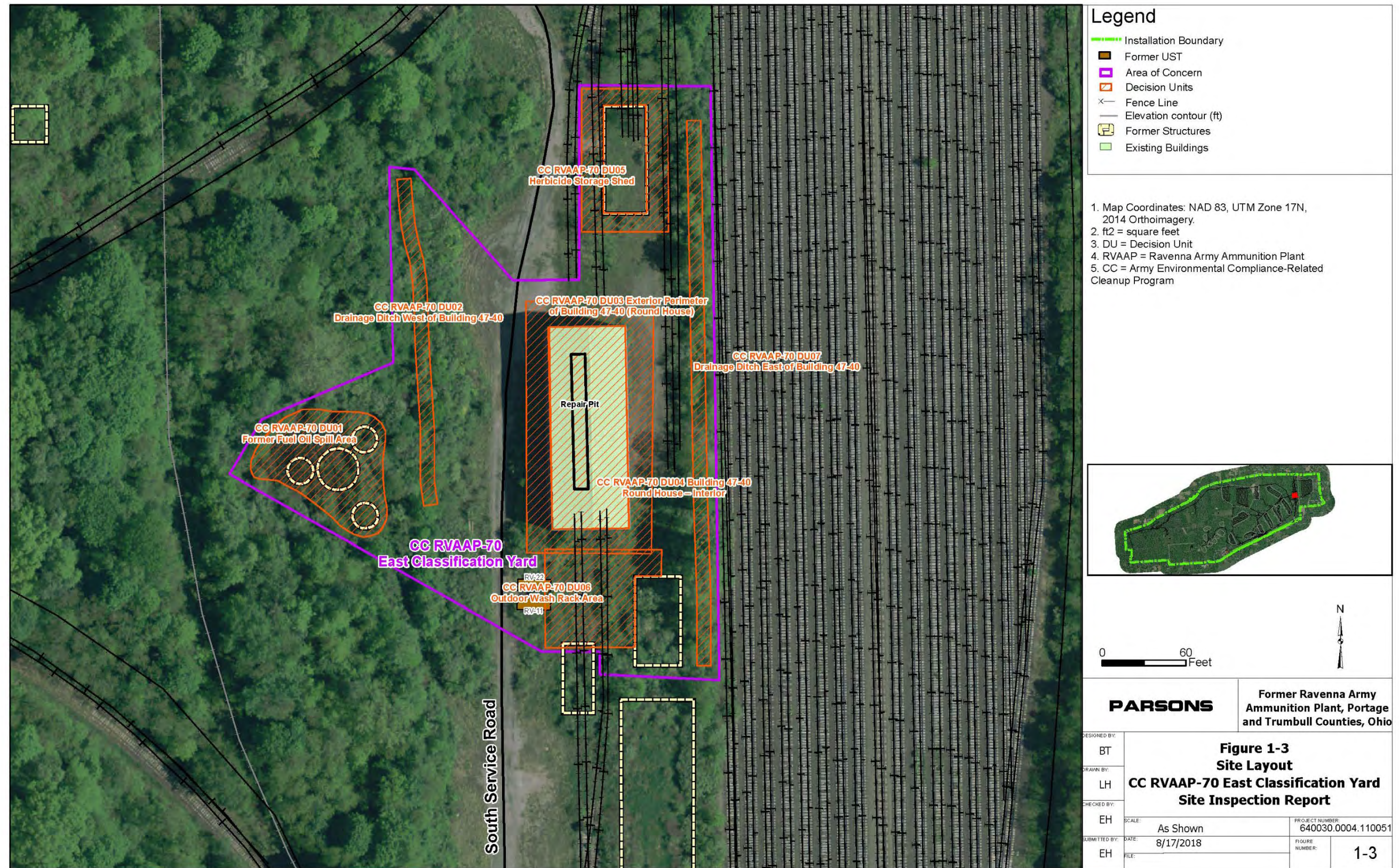


Figure 1-3 Site Layout

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2. AREA OF CONCERN BACKGROUND

2.1 FACILITY-WIDE BACKGROUND

2.1.1 Facility Location and Setting

The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in northeastern Ohio within Portage and Trumbull counties. Camp Ravenna is approximately three (3) miles east/northeast of the City of Ravenna and one (1) mile north/northwest of the City of Newton Falls (Figure 1-1). Camp Ravenna is federally owned and is approximately 11 miles long and 3.5 miles wide. Camp Ravenna is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garret, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north; and State Route 534 to the east. In addition, Camp Ravenna is surrounded by the communities of Windham, Garrettsville, Charlestown, and Wayland.

2.1.2 Demography and Land Use

The 2010 Census reports that the populations of Portage and Trumbull counties are 161,419 and 210,312, respectively. Population centers closest to Camp Ravenna are Ravenna, with a population of 11,724, and Newton Falls, with a population of 4,795.

Camp Ravenna is located in a rural area and is not close to any major industrial or developed areas. Approximately 55 percent of Portage County, in which the majority of Camp Ravenna is located, consists of either woodland or farmland acreage. The closest major recreational area, the Michael J. Kirwan Reservoir (also known as West Branch Reservoir), is south of Camp Ravenna.

The facility, previously known as the RVAAP, was formerly used as a load, assemble, and pack facility for munitions production. As of September 2013, administrative accountability for the entire 21,683-acre facility has been transferred to the United States Property and Fiscal Officer (USP&FO) for Ohio and the property subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site, Camp Ravenna. The RVAAP restoration program involves cleanup of former production/operational areas throughout Camp Ravenna related to former activities conducted under the RVAAP.

2.2 ENVIRONMENTAL SETTING

This section describes the physical features, topography, geology, hydrogeology, and environmental characteristics of Camp Ravenna and CC RVAAP-70 East Classification Yard.

2.2.1 Physiographic Setting

Camp Ravenna is located within the Southern New York Section of the Appalachian Plateaus physiographic province (U.S. Geological Survey, 1968). This province is characterized by elevated uplands underlain primarily by Mississippian and Pennsylvanian age bedrock units that are horizontal or gently dipping. The province is characterized by its rolling topography with incised streams having dendritic drainage patterns. The Southern New York Section has been modified by glaciation, which rounded ridges, filled major valleys, and blanketed many areas with glacially-derived unconsolidated deposits (e.g., sand, gravel, and finer-grained outwash deposits). As a result of glacial activity in this section, old stream drainage patterns were disrupted in many locales, and extensive wetland areas developed.

2.2.2 Topography

The topography of Camp Ravenna is gently undulating with an overall decrease in ground elevation from a topographic high of approximately 1,220 feet above mean sea level (ft amsl) in the far western portion of Camp Ravenna to low areas at approximately 930 ft amsl in the far eastern portion of Camp Ravenna.

USACE mapped Camp Ravenna topography in February 1998 using a 2-ft (60.1-centimeter [cm]) contour interval with an accuracy of 0.02 ft (0.61 cm). USACE based the topographic information on aerial photographs taken during the spring of 1997 (Appendix A). The USACE survey is the basis for the topographical information illustrated in figures included in this report.

Local topography is relatively flat at CC RVAAP-70 East Classification Yard. The ground surface elevation is between 950 and 960 ft amsl (Figure 2-1) and slopes gently to the east.

2.2.3 Surface Soil and Geology

The surficial soil unit at CC RVAAP-70 East Classification Yard is mapped as Mahoning silt loam or Fitchville silt loam (Figure 2-2). These soils are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 feet below ground surface (ft bgs).

2.2.4 Hydrogeology

Groundwater flow across Camp Ravenna is generally to the east. Most wells yield 5 to 20 gallons per minute from sandstone units of the Pottsville Group, of which the Sharon Sandstone is a member (Winslow and White, 1966). Wells may yield as much as 800 gallons per minute where the sandstone units are of large thickness, areal extent, and permeability.

The potentiometric surface for Camp Ravenna aquifers is mapped annually from groundwater elevation measurements in monitoring wells, most recently in the Facility-Wide Groundwater Monitoring Program, RVAAP-66 Facility-Wide Groundwater Annual Report for 2015 (TEC-WESTON Joint Venture, 2016). The groundwater flow direction in the unconsolidated aquifer is generally to the east. Groundwater and/or saturated conditions were not observed in soil borings. Therefore, it has been determined that groundwater does not exist in unconsolidated soils at CC RVAAP-70 East Classification Yard.

2.2.5 Surface Water

Surface water on Camp Ravenna consists primarily of streams and small ponds and lakes. Surface water on the central and eastern portions of the facility flows generally to the northeast, eventually entering the Mahoning River. Surface water on the western portion of the facility generally flows to the south into the Michael J. Kirwan Reservoir. There are no permanent surface waters or wetlands located within CC RVAAP 70 East Classification Yard. Ditches located east and west of Building 47-40 periodically contain water. The closest permanent surface water feature is a tributary to the west branch of the Mahoning River and associated wetlands approximately 2,000 feet north and northeast of AOC CC RVAAP-70 East Classification Yard (Figure 2-5).

2.2.6 Climate

Camp Ravenna is located in a temperate region of Ohio with annual precipitation of 36 to 39 inches. The average July high temperature is 82 °F and the average January low temperature is 18 °F.

2.2.7 Surrounding Land Use

Camp Ravenna is located in northeastern Ohio within Portage County and Trumbull County. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 6 miles to the northwest; Newton Falls 1 mile to the southeast; Charlestown to the southwest; and Wayland 3 miles to the south. The land surrounding Camp Ravenna consist primarily of residential and farm land along with some areas of commercial and light industrial use.

2.2.8 Ecology

Camp Ravenna has a diverse range of vegetation and habitat resources. Habitats present within Camp Ravenna include large tracts of closed-canopy hardwood forest, scrub/shrub open areas, grasslands, wetlands, open-water ponds and lakes, and semi-improved administration areas (OHARNG, 2014).

Vegetation at Camp Ravenna can be grouped into three categories: herb-dominated, shrub-dominated, and tree-dominated. Approximately 60% of Camp Ravenna is covered by forest or tree-dominated vegetation. Camp Ravenna has seven forest formations, four shrub formations, eight herbaceous formations, and one non-vegetated formation (OHARNG, 2014). There is a tree-cutting restriction from 1 April to 30 September.

Surface water features within Camp Ravenna include a variety of streams, ponds, floodplains and wetlands. Numerous streams drain Camp Ravenna, including approximately 19 miles of perennial streams. Approximately 282 acres of ponds are found on Camp Ravenna. These ponds provide valuable habitat and support to wood ducks, hooded mergansers, mallards, Canada geese, and other birds and wildlife species. Some ponds have been stocked with fish and are used for fishing and hunting (OHARNG, 2014). Wetlands are abundant and prevalent throughout Camp Ravenna. These wetland areas include seasonal wetlands, wet fields, and forested wetlands. Most of the wetland areas on Camp Ravenna are the result of natural drainage and beaver activity; however, some wetland areas are associated with anthropogenic settling ponds and drainage areas.

An abundance of wildlife is present on Camp Ravenna; 35 species of land mammals, 214 species of birds, 47 species of fish, and 34 species of amphibians and reptiles have been identified (OHARNG, 2014). The federally threatened Northern Long Eared Bat is present at Camp Ravenna. Ohio State-listed plant and animal species have been identified through confirmed sightings and/or biological inventories at Camp Ravenna.

2.3 AREA OF CONCERN DESCRIPTION AND OPERATIONAL HISTORY

2.3.1 Area of Concern Description

The former RVAAP was originally equipped with east and west classification yards during the facility's early operational years. CC RVAAP-70 East Classification Yard is located east of Load Line 1 and the Main Defense Logistics Agency (DLA) Ore Storage Area in close proximity to the intersection of Ramsdell Road and Irons Road (Figure 1-3). No documentation was found during the Historical Records Review (HRR) to define the specific years of operation of the AOC. The CC RVAAP-70 East Classification Yard AOC consists of Building 47-40 (the Round House still

exists, but is not actively used), the former herbicide storage shed (former Building 47-60), the containment area for a former aboveground storage tank (AST) (documented spill of No. 5 fuel oil occurred within the containment area in 1986), and an outdoor open wash rack south of Building 47-40 (north of Butts-Kistler Road). A railroad track complex is located east of the AOC and is currently used by the OHARNG. Most of the other rail lines in the area have been removed. Two former 15,000-gallon diesel fuel underground storage tanks (USTs), RV-11 and RV-22, were located west of the wash rack, but were removed in February 1990 and received No Further Action in April 1992 (SAIC, 2011b).

The CC RVAAP-70 East Classification Yard was used for switching and maintaining railroad cars. Building 47-40 (Round House) was used for locomotive engine repairs and other maintenance activities (SAIC, 2011b). The former herbicide storage shed was used to store a track-mounted herbicide sprayer and the herbicides used to control vegetation along the railroads at the former RVAAP. Interviewees for the HRR noted an outdoor open wash rack was located to the south of Building 47-40 was used to wash box cars. The wash rack was also reportedly used to wash the engines.

Potential sources of contamination include railroad maintenance activities, fuel release, and herbicide storage and maintenance (SAIC, 2011b). Typical chemicals/products used during locomotive maintenance activities may have included engine washing chemicals, valve oil, electrolytes (battery maintenance), locomotive black paint, solvents for parts degreasing, lubrication oil, metal preservatives, carbolineum, creosote, and cold patch asphalt. In addition, the resident locomotive stored within the Round House building also contained at least two polychlorinated biphenyl (PCB) transformers.

2.3.2 Historical Records Review

The following paragraphs summarize details for CC RVAAP-70 East Classification Yard presented in the *Final Historical Records Review Report for the 2010 Phase I Remedial Investigation Services at Compliance Restoration Sites (9 Areas of Concern), Ravenna Army Ammunition Plant, Ravenna, Ohio* (SAIC, 2011b).

A spill report dated 11 August 1986 documents a leak of No. 5 fuel oil from an AST (Tank 65B) from the CC RVAAP-70 East Classification Yard. The spill report indicates that a broken valve caused the leak. The entire contents of the tank emptied into the bermed containment area. The report indicates the containment area was scarified and the contaminated soil was piled within the containment area. However, no quantities of contaminated soil were noted. The report indicates that approximately 16,632 gallons of fuel oil was salvaged from the containment area and approximately 120 gallons of oil mixed with dirt and straw were to be disposed per Ohio Environmental Protection Agency (Ohio EPA) instructions. The report indicates that straw was placed on oil in areas where the equipment could not reach, such as beneath the support structures and by piping. Samples of the contaminated soil were collected to determine if the contaminated soil could be incinerated in accordance with the regulations at that time, and the soil met the criteria for incineration. No final report regarding the cleanup was found during the HRR. The tanks had since been removed from the AOC and the area was overgrown with vegetation during the HRR site walks. The HRR recommended that surface and subsurface soil within, and in the vicinity of, the former tank containment area and surface soil and dry sediment within any nearby surface water conveyances be analyzed for semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs).

Building 47-40 (Round House) was used as a locomotive maintenance and repair building. Building 47-40 still exists but is no longer used for any purpose. The interior of the building contains a floor pit that was used by personnel to access the undersides of the engines for repair. No documented evidence related to spills or releases were found for the Round House building. Building 47-40 also contained at least two PCB transformers. Service to the transformers is unknown. Interviewees indicated the transformer oil was tested for PCBs; however, no records of testing were discovered during the HRR. Staining from past operations was visible on the concrete floor within the building. No other visible evidence of impacts was noted during the property visit/perimeter survey. The HRR recommended that surface soil and dry sediment samples around doors and service bay entrances and in drainage ditches leading from the building to the storm sewer inlets located around the building be analyzed for target analyte list (TAL) metals, SVOCs, and PCBs. (Note, the HRR term “dry sediment” referred to soil that is only intermittently covered with surface water. “Dry sediment” is surface soil.)

A storage shed used to store herbicides and a track mounted sprayer was located in the CC RVAAP-70 East Classification Yard. Herbicide mixing operations may also have occurred at the building. The interviewees noted the herbicides may have been mixed with waste oil and applied for vegetation control. The HRR did not identify any documents relating to spills or releases from herbicide storage and mixing. No documentation was found, but some herbicide applications used petroleum products (e.g., oil, kerosene, diesel fuel) as carrier agents. No documentation was found pertaining to the amount of herbicides stored in the herbicide storage shed; however, one interviewee noted the amount stored was approximately 20 gallons. No visible signs that a spill or release had occurred (e.g., stained soil, stressed vegetation) were observed in the area of the former herbicide storage shed. The HRR recommended that surface soil near the former shed and in any runoff conveyances be analyzed for herbicides and SVOCs.

Two interviewees noted the presence of an outdoor wash rack, assumed to be used to wash down the box cars and/or the train engines, on site. The wash rack was outdoors and open with no means of collecting wastewater. No documents related to the wash rack were discovered during the HRR. The wash rack was reportedly supplied with water from nearby Well House #15. One interviewee noted there were no controls in place to collect the wash water. Field personnel noted the potential location of the wash rack just south of Building 47-40 and north of Butts-Kistler Road. Concrete AST supports were discovered at the location along with old abandoned pipes and valves, assumed to be water pipes from the well house. No visual evidence of impacts (e.g., stained soil, stressed vegetation) from the tank or wash rack activities was observed. The HRR recommended that surface soil and dry sediment in the vicinity of the former wash rack and any runoff conveyances be analyzed for explosives, SVOCs, and PCBs.

2.3.3 Investigation History

The HRR (SAIC, 2011b) summarized historical records pertaining to operational history and chemical that may have been released during former operations at CC RVAAP-70 East Classification Yard. The HRR (SAIC, 2011b) made specific recommendations for SI sampling and analysis at the potential release areas within the AOC.

Initial SI field work was detailed in a work plan (ECC, 2012) and sampling was conducted in November and December 2012 and April 2013. A work plan was developed for additional sampling (Parsons, 2017), which was conducted at CC RVAAP-70 East Classification Yard in January and February 2018.

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Figure 2-1 Topography

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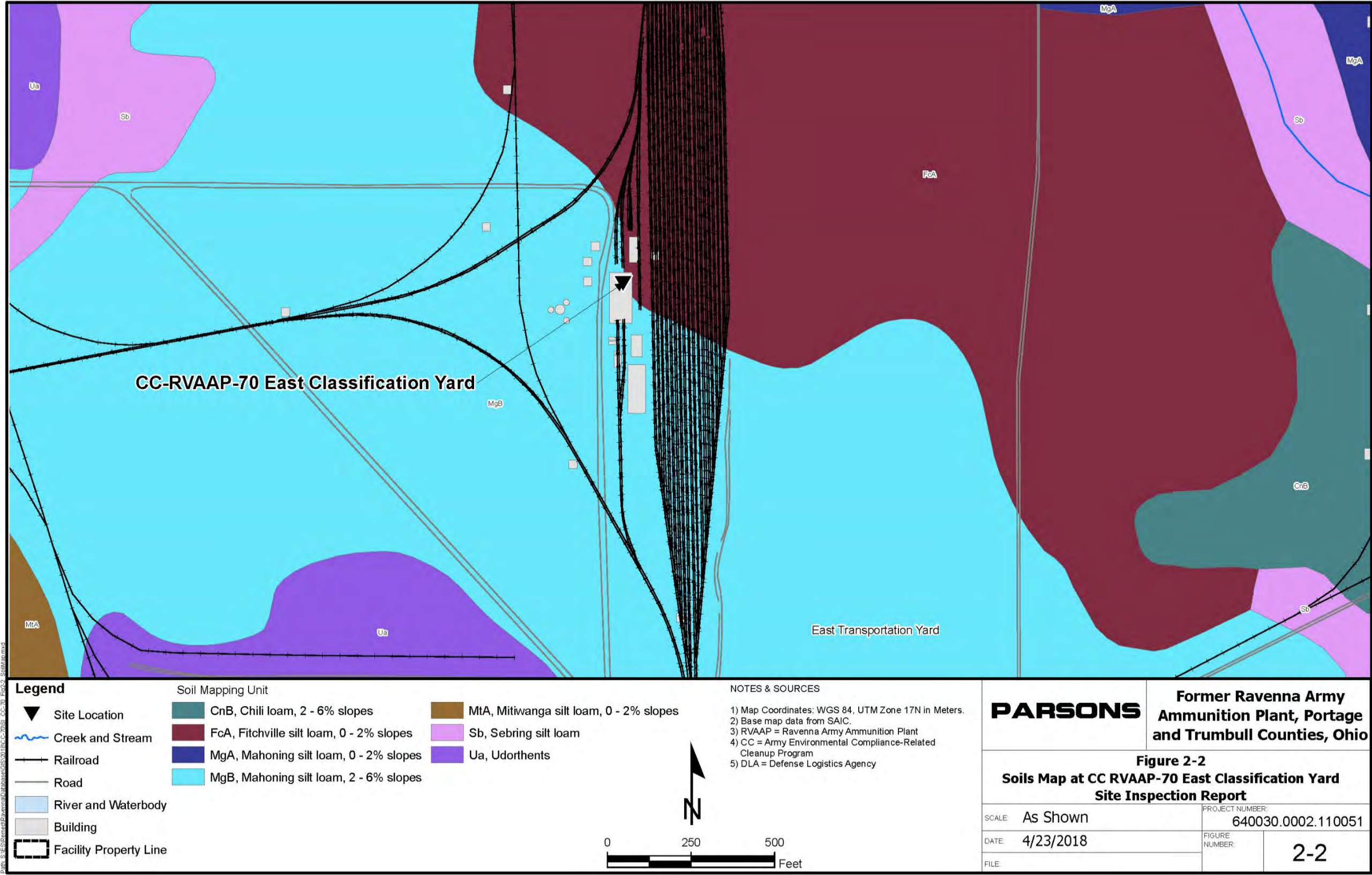


Figure 2-2 Soil Map

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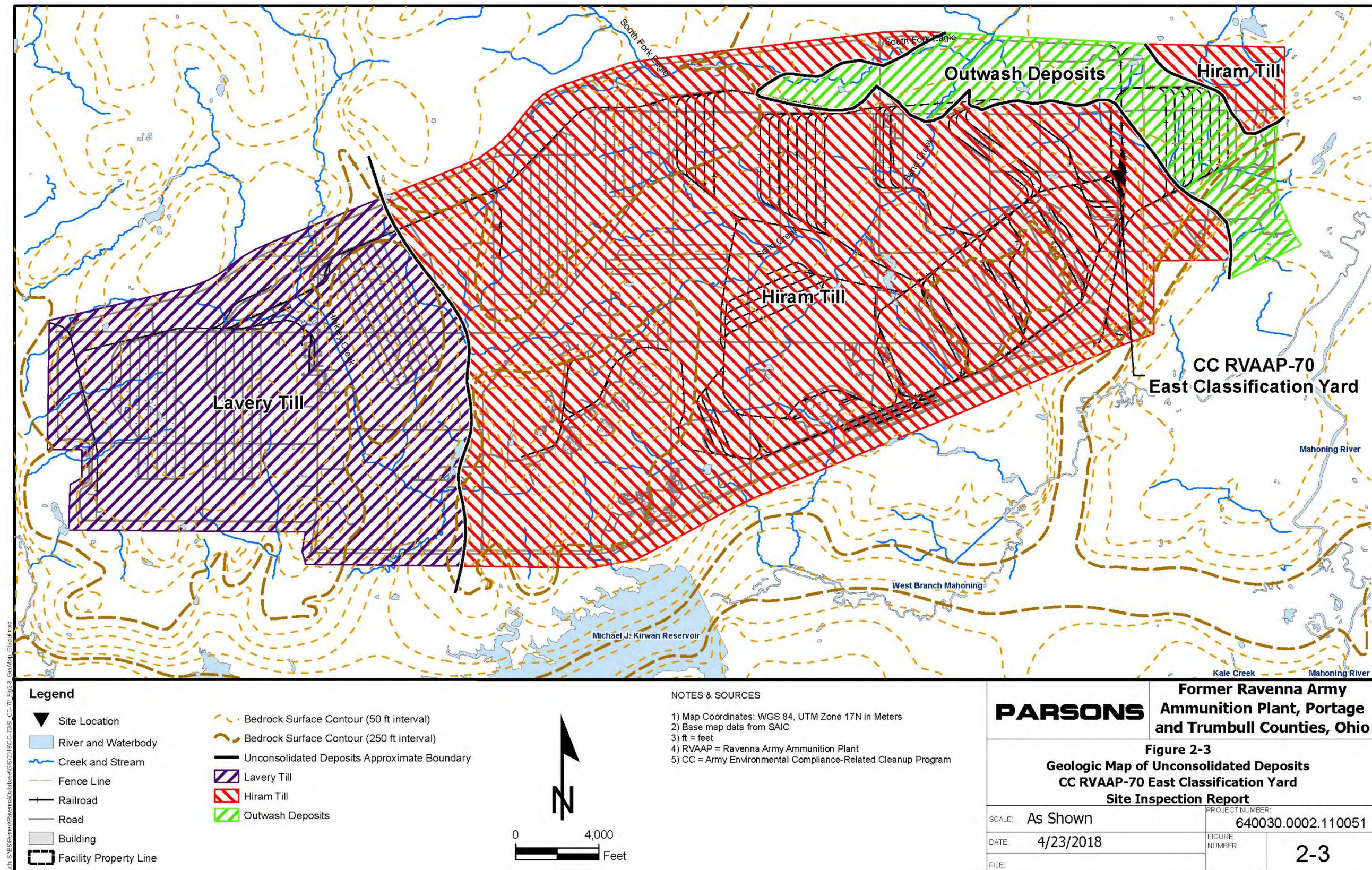


Figure 2-3 Geologic Map of Unconsolidated Deposits

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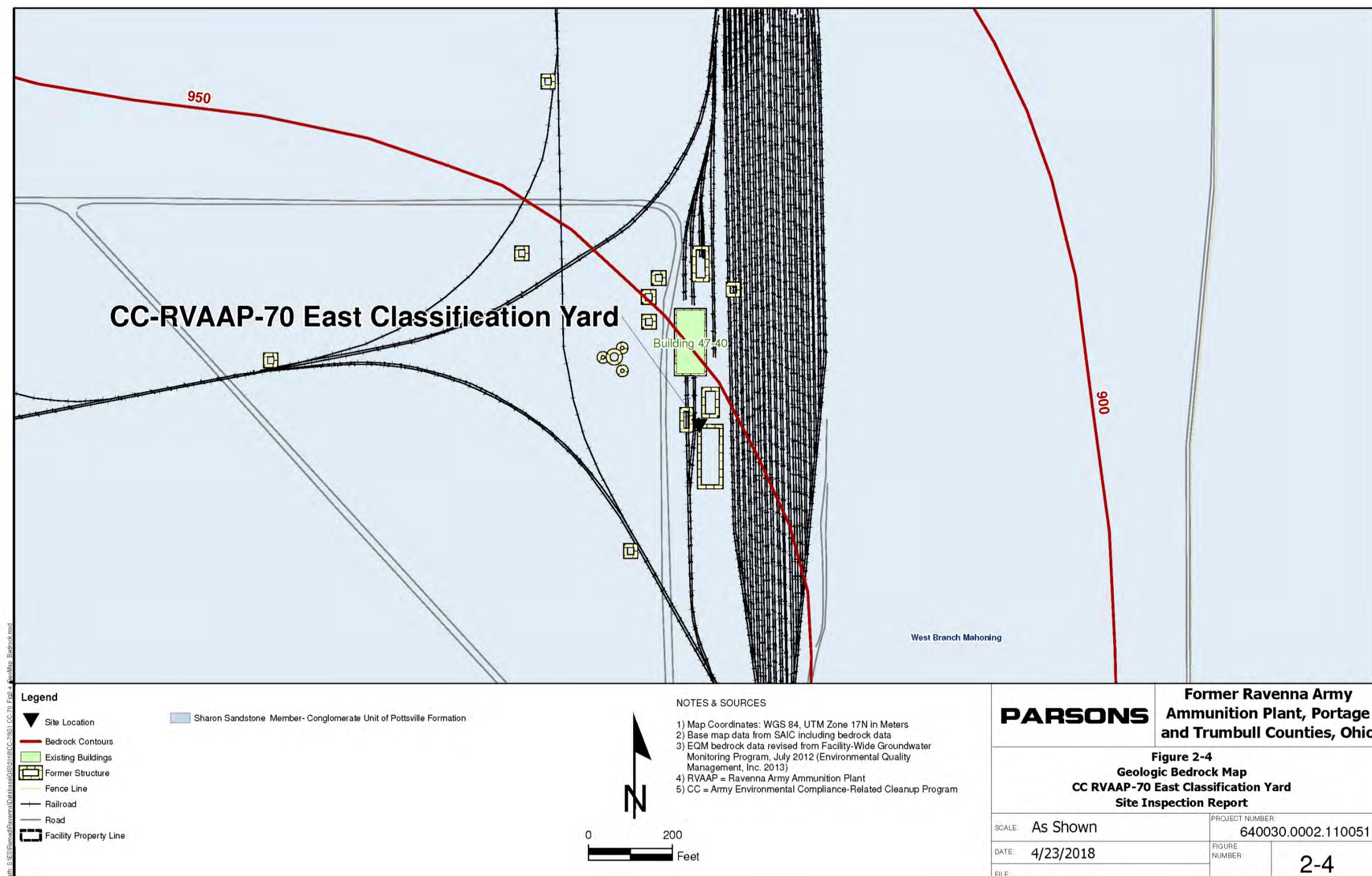


Figure 2-4 Geologic Bedrock Map

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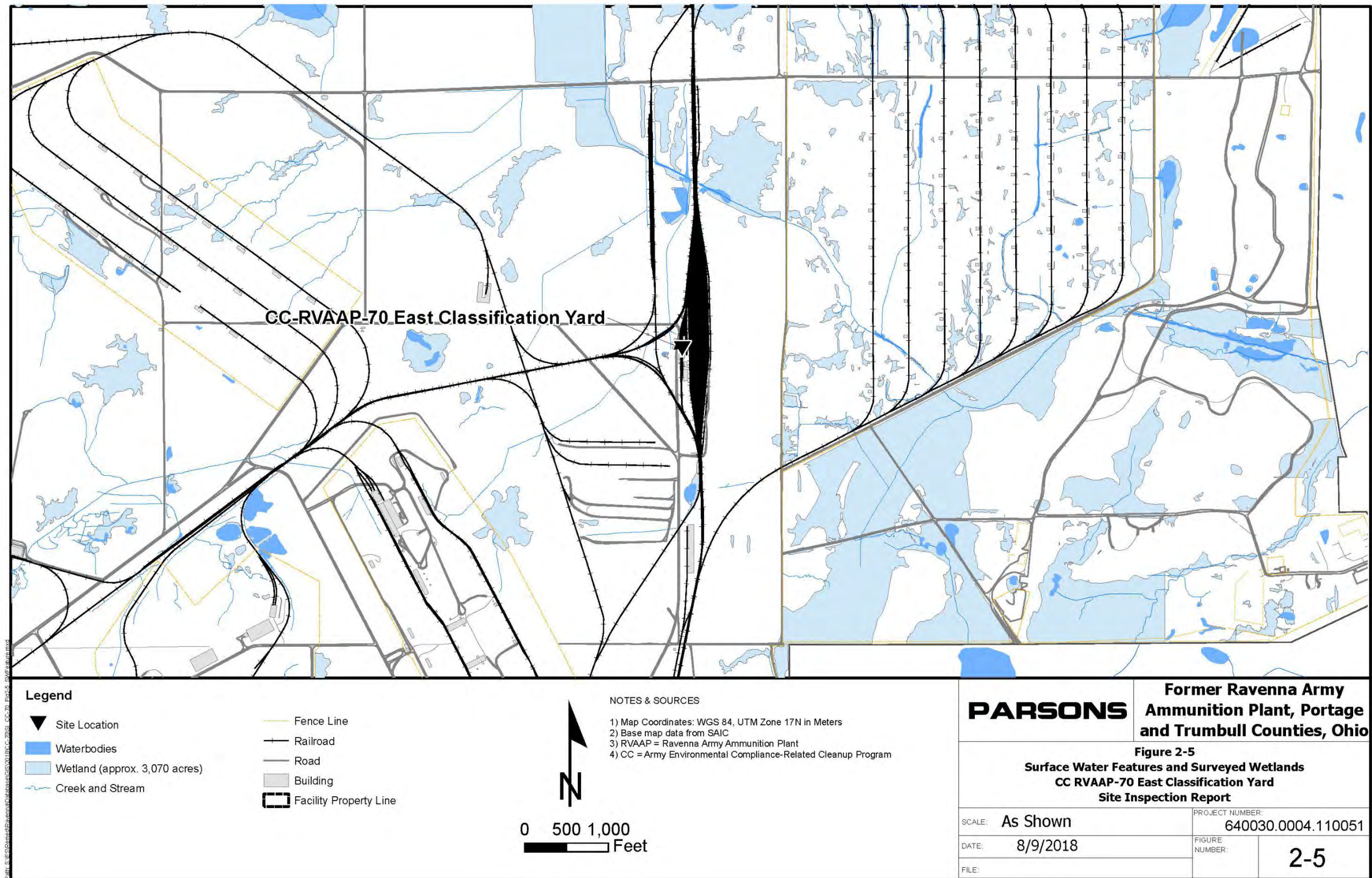


Figure 2-5 Surface Water Features and Surveyed Wetlands

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3. FIELD INVESTIGATION

Field work for this SI was conducted in accordance with *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012), *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull Counties, Ohio* (Parsons, 2017) and the *Facility-Wide Sampling and Analysis Plan for Environmental Investigations at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (SAIC, 2011a), unless specifically noted otherwise (Section 3.4).

3.1 RATIONALE FOR SAMPLING AND ANALYSES

Surface soil and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of site-related chemicals (SRCs) and identify potential contaminants within the AOC. The HRR (SAIC, 2011b) recommended sampling at four locations and two drainage ditches. The AOC was divided into seven decision units (DUs) as illustrated in Figure 3-1. Samples and analyses were selected based primarily on recommendations from the HRR (SAIC, 2011b). The rationale for the sampling approach was detailed in the work plans (ECC, 2012 and Parsons, 2017) and is summarized below. Table 3-1 lists all samples collected, the analyses performed, and rationale for each sample collected.

Note that the HRR and work plans mention sampling “dry sediment” from the drainage ditches and a storm water drain. “Dry sediment” is surface soil that is intermittently covered with water. The samples are compared to surface soil cleanup goals and for purposes of this SI are simply referred to as surface soil. This includes three locations: 70-DD-DU2-SS, 70-CDD-DU7-SS and 70-4740-SB108-SS.

Surface water was not present at this AOC during the SI field work in 2012 and 2018 but was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

In addition to the DU-specific analyses described below, ten percent of samples collected during the 2012-2013 sampling events were submitted for full suite analysis in accordance with the Facility-Wide Sampling and Analysis Plan (FWSAP) (SAIC, 2011a).

Former Fuel Oil Spill Area (DU01)

DU01 was established as the area within the containment berm that surrounded the former AST where No. 5 fuel oil was released. Surface and subsurface soil were sampled to determine if contaminants consistent with a petroleum release were present. In accordance with the work plan (ECC, 2012), one surface soil incremental sampling methodology (ISM) sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 to collect additional subsurface soil for quality assurance (QA) purposes. Surface and subsurface soil samples were analyzed for VOCs, methyl tertiary-butyl ether (MTBE), SVOCs, and three total petroleum hydrocarbons (TPH) carbon chain compounds (C6-C12, C10-C20, and C20-C34) because the potential release at DU01 was petroleum.

Drainage Ditch West of Building 47-40 (DU02)

The HRR (SAIC, 2011b) recommended an evaluation of the dry sediment in the AOC drainage ditches. The drainage ditch to the west of Building 47-40 (DU02) is adjacent to and may have received runoff from the former Fuel Oil Spill Area (DU01). Therefore, in accordance with the work plan (ECC, 2012) one surface soil ISM sample from DU02 was collected and analyzed for the same constituents as DU01; VOCs, MTBE, SVOCs, and TPH.

Building 47-40 Round House – Exterior (DU03)

DU03 was established as a 15-foot zone surrounding the exterior perimeter of Building 47-40 to sample for potential contaminants from locomotive maintenance activities conducted at Building 47-40. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of eight subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 and April 2013 to collect additional subsurface soil for QA purposes. Surface and subsurface soil samples were analyzed for SVOCs, TAL metals, and PCBs.

Building 47-40 Round House – Interior (DU04)

DU04 was established to sample subsurface soil beneath the concrete floor of Building 47-40. Building 47-40 contained a Repair Pit that lies underneath the area where locomotives were maintained. The repair pit is the low point within the building and is therefore the most likely place for finding potential contaminants from activities conducted within Building 47-40. Oily residue and debris covered the bottom of the interior repair pit as well as other areas of the floor including a former oil storage area near the east wall (note, oily residue was removed prior to 2018 sampling to prevent cross-contamination during sampling and to reveal any cracks in the concrete, as discussed in Section 3.2.2). In 2012, subsurface soil samples were collected from five soil borings advanced through the concrete floor of the repair pit (70-4740-DU4-SB1 through 70-4740-DU4-SB5). In accordance with the work plan (ECC, 2012), all samples were analyzed for SVOCs, TAL metals and PCBs to determine if locomotive maintenance chemicals had been released below the floor of the building. Although several soil samples collected from DU04 in 2012 indicate that they were collected from the 0 to 1 ft bgs vertical interval, all of these samples were collected from under the concrete floor of the repair pit, and the repair pit floor is 3.5 feet below the floor grade. Therefore, all of the DU04 samples are subsurface soil, including samples from DU-4740-DU4-SB (070SS-0048M-0001-SO and 070SB-0049M-0001-SO) and 70-4740-DU4-SB1 (070SB-0050M-0001-SO).

Additional sampling was conducted in 2018 in accordance with the second work plan (Parsons, 2017). An additional boring was advanced through the floor of the repair pit to collect subsurface soil samples for VOC analysis (70-4740-SB104) because VOCs were also considered possible locomotive maintenance chemicals. Three additional borings were also advanced through the floor of Building 47-40 in areas that were considered potential release areas and located outside of the repair pit. The boring locations were to be selected from areas that displayed staining and cracks in the concrete, but cracks were not observed. The three selected locations were:

- near a former oil storage rack area along the east wall of the building where the concrete floor was heavily stained (70-4740-SB102),
- at a seam between the wooden flooring and concrete near the east railroad tracks (70-4740-SB101), and

- near the discharge line of a sump found under the north stairs of the repair pit (70-4740-SB103).

Subsurface soil samples from 70-4740-SB101 and 70-4740-SB102 were analyzed for VOCs, SVOCs, PCBs and TAL metals. Subsurface soil samples from 70-4740-SB103 were analyzed for VOCs.

Former Herbicide Storage Shed (DU05)

DU05 was established as a 15-foot zone surrounding the exterior perimeter of the former Herbicide Storage Shed to sample for potential contaminants from herbicide storage and mixing activities. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. A sixth soil boring was advanced in December 2012 to collect additional subsurface soil for QA purposes. Surface and subsurface soil samples were analyzed for SVOCs and herbicides. Subsurface soils collected from 70-4760-DU5-SB2 in 2012 were also analyzed for VOCs and TPH (C6-C12) due to field observations and photoionization detector (PID) field screening vapor headspace results of 75 parts per million (ppm) indicating the likelihood of potential contaminants at this boring.

Outdoor Wash Rack Area (DU06)

DU06 was established in the Outdoor Wash Rack Area located south of Building 47-40. Past operations may have resulted in a release of chemicals to surface soil, by infiltration to subsurface soil, and by overland flow to nearby drainage ditches and storm drains. In accordance with the work plan (ECC, 2012), one surface soil ISM sample was collected, and five soil borings were advanced and a total of seven subsurface samples were collected in November 2012. In 2012, surface and subsurface soil samples were analyzed for SVOCs, PCBs and explosives which are chemicals that could be discharged as a result of washing box cars and locomotives. The subsurface soil sample collected from 70-4759-DU6-SB5 was also analyzed for VOCs and TPH (C6-C12) due to field observations and PID field screening vapor headspace results indicating potential contaminants at this boring.

Additional sampling was conducted in 2018 in accordance with the second work plan (Parsons, 2017). Two soil borings (70-4740-SB105 and 70-4740-SB106) were advanced to collect additional subsurface soil samples for VOC analysis at locations and vertical intervals where elevated PID readings had been noted during the 2012 sampling event.

The storm drain at the southwest corner of Building 47-40 may have received wash water draining from the wash rack. In 2018, a sample of the soil that had accumulated in the storm drain (70-4740-SS108) was collected and analyzed for PCBs, SVOCs, and explosives. An additional soil boring (70-4740-SB107) was drilled as close to the drain as possible and five subsurface soil samples were collected to determine if subsurface soil near this storm drain was impacted by historical activities at the wash rack. Subsurface soil samples were analyzed for VOCs, PCBs, SVOCs, and explosives.

Drainage Ditch East of Building 47-40 (DU07)

The HRR (SAIC, 2011b) recommended an evaluation of the dry sediment in the AOC drainage ditches. The drainage ditch to the east of Building 47-40 is adjacent to and may have received runoff from DU03, DU05 and DU06. In accordance with the work plan (ECC, 2012) one surface

soil ISM sample from DU07 was collected and analyzed for the full analytical suite including VOCs, MTBE, SVOCs, TAL metals, TPH, herbicides, explosives, PCBs, and propellants.

3.2 PRE-SAMPLING SITE PREPARATION

3.2.1 2012 Mobilization

Prior to the 2012 field investigation, a series of pre-mobilization activities were undertaken to ensure that all applicable requirements were met. These included providing any necessary notifications to the Army, Ohio EPA, and other stakeholders.

ECC personnel mobilized to Camp Ravenna on October 22, 2012 to conduct a site walk and pre-mark each of the seven DUs and direct-push boring locations at CC RVAAP-70 East Classification Yard. The pre-mobilization tasks included the following activities:

- Conduct a site walk
- Locate the DUs
- Locate the soil borings
- Decontaminate the sampling equipment.

Site Walk

ECC conducted a site walk at CC RVAAP-70 East Classification Yard on October 22, 2012 to assess current AOC conditions and to note any potential health and safety hazards that could affect the field work of this SI.

Soil Sampling Locations

Each DU and proposed direct-push boring location was marked using wooden stakes, high visibility paint, and flagging. DU03 and DU05 were placed in the field by measuring a 15-ft offset of the corners of Building 47-40 (Round House) (DU03) and the Former Herbicide Storage Shed. The DUs for the Former Fuel Oil Spill Area (DU01) and the Outdoor Wash Rack Area (DU06) were assigned based on review of historical documents during the HRR, available AOC figures, and aerial photographs (Appendix A). The seven DUs are illustrated on Figure 3-1.

Munitions and Explosives of Concern and Utility Clearance Surveys

Munitions and explosives of concern clearance was not required based on HRR findings (SAIC, 2011b), and therefore was not conducted at the CC RVAAP-70 East Classification Yard. No documentation of military munitions being historically located or stored on-site was discovered.

ECC met with Vista Sciences Corporation representatives on October 23, 2012 to discuss utility clearance protocols at the former RVAAP. Mr. James D. McGee, Project Manager for Vista Sciences Corporation, reported that any utility within the CC RVAAP-70 East Classification Yard would either have been previously removed or, if still in place, inactive and not energized. No live/active utilities were encountered during any of the drilling activities conducted at CC RVAAP-70 East Classification Yard.

Site Clearing Activities

Low brush and debris were cleared from proposed surface soil sampling areas and soil boring locations. Paths were cleared into the bermed area of the Former Fuel Oil Spill Area to allow

access for the direct-push drill rig. Cut brush was subsequently chipped and spread on the ground surface.

Site Security

No specific site security was needed to conduct this SI at the CC RVAAP-70 East Classification Yard. However, each work day prior to mobilizing to the AOC, Camp Ravenna Range Control was notified that ECC and subcontractor personnel would be working at CC RVAAP-70 East Classification Yard.

Equipment Decontamination

Prior to beginning surface soil sampling, all sampling equipment was decontaminated at a pre-designated area within Building 1036. The decontaminated sample equipment was then wrapped in aluminum foil. Sufficient sampling equipment was brought to the site each morning to allow for sampling of the DU area without the need to decontaminate additional equipment during the day. All sampling equipment was decontaminated inside Building 1036 at the end of each work day in preparation for sampling the following day.

Prior to commencing subsurface soil sampling, all direct-push drilling rods and equipment were decontaminated using a high-pressure steam cleaner and brushes. During subsurface soil sampling at the CC RVAAP-70 East Classification Yard, direct-push steel samplers were decontaminated between each DU using 5-gallon buckets, Alconox® wash, and brushes. Following the conclusion of subsurface soil sampling, drilling equipment was decontaminated using a high-pressure steam cleaner.

All decontamination fluids were containerized in a Department of Transportation-approved 55-gallon closed steel drum located within secondary containment inside Building 1036. The drum was labeled with contents, date of initial generation, and contact information. All sampling equipment was decontaminated in accordance with the procedures outlined in Section 5.6.2.9 of the FWSAP (SAIC, 2011a).

3.2.2 2018 Mobilization

Utility Clearance

Parsons deployed to the AOC on 29 January 2018. Utility clearance was performed by Underground Detective. No active utilities are present in the vicinity of CC RVAAP-70 East Classification Yard.

Oily Residue Removal and Brush Clearance

Prior to sampling, oily residue and debris were removed from the floor of Building 47-40 and the Interior Repair Pit. The oily residue and debris were removed to reveal areas of the floor that are stained and cracked and therefore the most likely routes that chemicals could have followed to enter the subsurface, and to prevent cross contamination when borings are advanced through the floor. Although the substance was described in the Work Plan as a sludge, the oily residue was relatively dry. Oily residue was present in an interior repair pit that lies underneath the area where locomotives were maintained. The repair pit is the lowest point in the building and represents a location where spills of liquids could have drained. Oily residue was also found near the east wall of the building at the historical oil drum rack, as well as other locations on the floor. On 30 and 31 January 2018, approximately two cubic yards of oily residue and debris were removed from the floor and pit using a mini excavator, bobcat, shovels, and brooms and were placed in a 20-cubic

yard roll-off for sampling and disposal (See Section 3.6). Vegetation in the Outdoor Wash Rack Area was cut and removed on 30 January 2018.

Identify Additional Sample Locations

Sample locations were identified and marked following oily residue and debris removal and brush clearance. The Work Plan (Parsons, 2017) indicated that borings within Building 47-40 be located near stains and cracks in the concrete floor and interior repair pit. The concrete floor was stained in areas but did not appear to be cracked. Soil boring locations were selected as discussed in Section 3.1.

3.3 SAMPLING METHODS

Initial field work was conducted between 5 November and 12 December 2012 and included collecting six surface soil (0-1 ft bgs) ISM samples, advancing 28 soil borings and collecting 39 subsurface soil samples. On 1 April 2013, one additional subsurface soil sample was collected from a soil boring at DU03 (70-4740-DU3-SB6). The sample was re-collected for pesticide analysis to replace prior pesticide sample results, which were qualified as rejected due to low surrogate recovery.

Additional field work was conducted between 2 and 6 February 2018. Nine subsurface samples were collected from four soil boring at DU04 and seven subsurface samples were collected from three soil borings at DU06. Two discrete surface soil samples were collected from and near a storm drain at DU06.

Table 3-1 presents a summary of the media sampled, sample collection methods, and number of samples collected for sampling activities conducted at each area of potential activity at CC RVAAP-70 East Classification Yard. Matrix spike/matrix spike duplicate (MS/MSD) samples were collected at a frequency of 5 percent. Field duplicate samples were collected at a frequency of 10 percent.

3.3.1 Surface Soil Sampling

One surface soil ISM sample was collected from each of DU01, DU03, DU05, and DU06 in 2012. Surface soil ISM samples were also collected in 2012 from each of the two ditches (DU02 and DU07) in the same manner as that for a typical ISM surface soil sample. No surface soil samples were collected at DU04 as the soil sampling was conducted inside Building 47-40 beneath the concrete floor.

The surface soil sample aliquots were collected from 0 to 1 ft bgs using ISM methods as detailed in the *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012), in order to define the lateral extent of contamination in surface soil. Thirty individual soil samples (aliquots) were collected to comprise each ISM sample. The surface soil ISM samples were collected using the method described in Section 5.6.2.1.1 of the FWSAP (SAIC, 2011a).

The samples were collected using a 40-in., one-piece soil step probe with a “T” handle attached to the top. The soil step probe collects a soil core sample that is approximately 12 in. long. A 12-in. section of the sampler is cut away to facilitate collecting the soil sample. The sampler was advanced to 1 ft bgs then withdrawn. The soil sample was then collected from within the core sampler section using a stainless-steel scoopula.

Surface soil samples were collected from 0 to 1 ft bgs. However, if rock or gravel was encountered at depths less than 1 foot, samples were collected from the accessible portion of the 0- to 1-ft interval.

A discrete soil sample was collected in 2018 with a hand auger from the surface water drain at the southwest corner of Building 47-40. The surface water drain collected runoff from DU06 Outdoor Wash Rack, and soil had accumulated in the drain.

3.3.2 Subsurface Soil Sampling

Subsurface soil samples were collected from DU01, DU03, DU04, DU05 and DU06 between 13 November 2012 and 1 April 2013 using a Geoprobe® Model 6620DT direct-push drill rig operated by Frontz Drilling with oversight by ECC. The procedures for hydraulic direct-push sampling were performed in accordance with Section 5.5.2.5.3 of the FWSAP (SAIC, 2011a). Samples were collected using 5-ft long stainless-steel sampling rods lined with acetate Microcore® samplers. Each sample was collected using a dedicated liner specific for that interval. The 5-ft stainless steel sampler was advanced twice at each boring location to reach the depth of 7 ft bgs and 3 times at one boring location to reach the depth of 13 ft bgs. The sampler was then retrieved from the desired depth and the liner removed. The liner was cut open length-wise and the soil was immediately field screened with a PID. Soil samples for headspace screening were collected at 2-ft intervals along the entire sampler using stainless steel scoopulas and the soil was placed in 8-ounce glass jars. The jars were then capped with aluminum foil and a plastic lid. The headspace samples were allowed to warm for approximately 10 minutes. The tip of the PID was inserted into the jar through the aluminum foil and the reading recorded on the boring log. If elevated readings were recorded, a VOC sample was collected using a disposable TerraCore® sampler at that interval. The liner containing the soil was photographed (Appendix H) and soil characteristics for each interval were then logged on the soil boring log (Appendix C). A summary of sampling information was logged on the field forms. Field activity forms and boring logs from the SI are provided in Appendices B and C, respectively. Photographs are provided in Appendix H.

Subsurface soil samples were collected between 2 and 6 February 2018 from DU04 and DU06 using a Geoprobe7822D drill rig operated by Envirocore with Parsons oversight. The procedures for hydraulic direct-push sampling were performed in accordance with Section 5.5.2.5.3 of the FWSAP (SAIC, 2011a). A total of seven borings were installed (70-4740-SB101 through 70-4740-SB107). Borings were logged continuously and a PID was used to screen the soil for volatiles. Borings were abandoned with bentonite.

Composite Subsurface Soil Samples

At least five soil borings were advanced at each of the DUs. Soil was collected and composited from all borings within a DU from the 1-4 ft bgs and 4-7 ft bgs vertical intervals. Analytical results from composite subsurface soil samples represent subsurface concentrations across an entire DU from the two three-foot vertical intervals. Geoprobe rod refusal due to bedrock was encountered at less than four feet below the repair pit floor at DU04, and composite subsurface soil sample intervals were adjusted to accommodate the shallow boring depth.

Discrete Soil Boring Subsurface Soil Samples

During the 2012 and 2013 sample events, soil was collected from the 1-7 ft bgs vertical interval of each individual soil boring. One sample was also collected from a deeper (7-13 ft bgs) interval at DU03 (station 70-4740-DU3-SB1, sample 070SB-0026-0001-SO). Analytical results from these

discrete soil boring samples represent subsurface concentrations from individual soil borings across a six-foot vertical interval. Geoprobe rod refusal due to bedrock was encountered at less than four feet the repair pit floor at DU04, and discrete soil boring subsurface soil sampling intervals were adjusted to accommodate the shallow boring depth.

Discrete soil boring subsurface soil samples were collected from two-foot vertical intervals from the additional soil borings installed in 2018. Samples for VOC analysis were collected using a disposable TerraCore® sampler. Soil borings 70-4740-SB105 and 70-4740-SB106 from the DU06 Outdoor Wash Rack were sampled at only one depth because samples were targeting a vertical interval where slightly elevated PID measurements were detected in 2012. Discrete soil samples from the remaining borings were collected from each two-foot vertical interval from the surface to Geoprobe rod refusal. However, the 0-2-foot interval for borings within Building 47-40 (70-4740-SB101 through 70-4740-SB104 in DU04) were not sampled because this interval consisted of concrete and gravel.

3.4 DEVIATIONS FROM WORK PLAN

Some of the terminology in the *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012) and *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull counties, Ohio* (Parsons, 2017) was inaccurate or outdated. This report uses updated terminology without changing the technical approach as follows:

- The work plans used “horizontal ISM sample” to describe a soil sample that was composited from five or more soil borings from a defined vertical interval (usually 1 - 4 ft bgs or 4 - 7 ft bgs). Horizontal ISM samples are now described as composite subsurface soil samples.
- The work plans used “vertical ISM sample” to describe a soil sample from a single soil boring that was collected from a defined vertical interval (usually 1 – 7 ft bgs). Vertical ISM samples are now referred to as discrete soil boring subsurface soil samples.
- The work plans used “composite sample” to describe a soil sample from a single soil boring that was collected from the 7 to 13 ft bgs vertical interval. Composite samples are now referred to as discrete soil boring subsurface soil samples.
- The work plans used “dry sediment” to refer to soil material that is only intermittently covered with water (such as in the ditches DU02 and DU07). “Dry sediment” is surface soil.

Deviations from the *Final Site Inspection/Remedial Investigation Work Plan at Compliance Restoration Sites* (ECC, 2012) for fieldwork conducted at CC RVAAP-70 East Classification Yard are listed below:

- At DU04, five borings were advanced within the interior repair pit after coring through the concrete floor of the pit. Refusal was encountered at each of the five borings, as sandstone bedrock was encountered ranging from 1 foot to approximately 4 feet below the bottom of the concrete floor of the pit, as follows:
 - SB01 – 12 inches

- SB02 – 15 inches
- SB03 – 48 inches
- SB04 – 46 inches
- SB05 – 34 inches
- Due to shallow refusal and subsequent limited matrix recovery, composite and discrete soil boring subsurface soil sample collection depths were altered. In lieu of the originally planned 1- to 4-ft and 4- to 7-ft composite samples, 0- to 1-ft and 0- to 4-ft (or refusal) composite samples were collected. In lieu of the 1- to 7-ft discrete soil boring sample at each boring, a 0- to 4-ft (or refusal) discrete soil boring sample was collected at each boring.
- On 7 December 2012, three additional direct-push borings were advanced at CC RVAAP-70 East Classification Yard to comply with quality control (QC) requirements regarding the collection of subsurface soil samples for 10 percent full suite analysis. The additional borings, identified as 70-4744-DU1-SB6 at DU01, 70-4740-DU3-SB6 at DU03, and 70-4760-DU5-SB6 at DU05, were each advanced to 7 ft bgs. Samples were collected from the 1- to 7-ft bgs interval and analyzed for full suite analytical parameters.
- On 1 April 2013, one additional direct-push boring was advanced at 70-4740-DU3-SB6 and the 1- to 7-ft interval was sampled for pesticides (sample 070SB-0046M-0001-SB). This sample was collected to ensure project completeness after the original pesticide sample (070SB-0046M-0001-SO collected on 7 December 2012) surrogate failed QC requirements.
- Additional analyses were performed for VOCs and TPH (C6-C12) on discrete soil boring subsurface soil samples collected from 70-4760-DU5-SB2 and 70-4759-DU6-SB5 due to field observations and PID field screening vapor headspace results of 75 and 40 ppm indicating the likelihood of potential contaminants at these borings.

Deviations from the *Final Work Plan, Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034 Motor Pool Hydraulic Lift, Ravenna Army Ammunition Plant Restoration Program, Camp Ravenna, Portage and Trumbull counties, Ohio* (Parsons, 2017) for fieldwork conducted at CC RVAAP-70 East Classification Yard are listed below:

- The Work Plan (Parsons, 2017) specified two soil borings to be installed within the DU04 Building 47-40 interior repair pit and discrete subsurface soil samples analyzed for VOCs. After oily residue and debris were removed from the repair pit, it was observed that although the repair pit floor was stained, the concrete was in good condition (no cracks). One soil boring (70-4740-SB104) was advanced through the repair pit floor as planned. The second boring (70-4740-SB103) was relocated outside of the repair pit. Soil boring 70-4740-SB103 was located near a sump and drain line from the repair pit (near the north end of the pit). Subsurface soil samples from 70-4740-SB103 were analyzed VOCs.

3.5 SURVEYING

Campbell and Associates, Incorporated, Cuyahoga Falls, Ohio, a licensed surveyor in the State of Ohio surveyed the 2012 soil boring locations within CC RVAAP-70 East Classification Yard. All survey data were reported in North American Datum 1983 (NAD83) Universal Transverse Mercator Zone 17 North.

Wellert Corporation, Medina, Ohio, a licensed surveyor in the State of Ohio, surveyed the 2018 soil boring locations. Horizontal coordinates are tied to the Ohio State Plane Coordinate System, Ohio North Zone 3401 NAD83 (2011) per Ohio Department of Transportation Virtual Reference Station Network System. Vertical survey data are referenced to North American Vertical Datum of 1988 (NAVD88) elevations in feet. Coordinates were verified by locating existing National Geodetic Survey & Ravenna Arsenal Control Monuments to confirm coordinates meet project accuracy requirements. During the survey, the locations of 70-4740-SB101 and 70-4740-SB102 were switched. The survey coordinates reported by the Wellert Corporation for 70-4740-SB101 belong to 70-4740-SB102 and vice versa. This error was corrected on the figures included in this report.

3.6 INVESTIGATION-DERIVED WASTE

3.6.1 2012 Waste Handling

Investigation-Derived Waste (IDW) consisted of soil cuttings from subsurface soil sampling, personal protective equipment (PPE), used, empty acetate liners, used TerraCore® samplers, and general non-environmental trash. The soil cuttings were collected in plastic garbage liners, and then placed inside 5-gallon buckets. The buckets for soil cuttings were brought to Building 1036 and placed in labeled 55-gallon open-headed drums.

All IDW, including soil cuttings, PPE, disposable sampling equipment, and decontamination fluids, was properly handled, labeled, characterized, and managed in accordance with Section 8.0 of the FWSAP (SAIC, 2011a), federal and state of Ohio large quantity generator requirements, and the former RVAAP's *Installation Hazardous Waste Management Plan* (BRACO, 2009).

IDW was sampled for disposal characterization on 12 December 2012. Samples were comprised of liquid IDW consisting of decontamination fluids, and solid IDW consisting of drill cuttings. IDW analysis included both liquid and solid full Toxicity Characteristic Leaching Procedure (TCLP), and Reactivity, Corrosivity, and Ignitability analyses. On 15 March 2013, the Ohio EPA approved the IDW letter report for the transport and disposal of the accumulated IDW as a result of executed SI tasks. The Ohio EPA approval letter for the IDW is provided in Appendix G. On 5 April 2013, Emerald Environmental Services, Inc. transported the drummed IDW under a non-hazardous waste manifest to Vexor Technology in Medina, Ohio for proper disposal. The manifest is provided in Appendix G.

3.6.2 2018 Waste Handling

Waste was managed in accordance with Camp Ravenna Waste Management Guidelines and Waste Inspection Form (OHARNG, 2016) and the FWSAP (SAIC, 2011a). Final IDW Reports and manifests are provided in Appendix G.

Investigation-Derived Waste

IDW consisted of soil cuttings and decontamination water. All IDW was containerized in 55-gallon drums and sampled for TCLP (Method 1311) metals, TCLP VOCs, TCLP SVOCs, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. Solid IDW was sampled on 20 February 2018 and liquid IDW was sampled on 6 March 2018. The data were compared to disposal screening criteria, which are from three sources:

- Concentration of Contaminants for Toxicity Characteristic (40 Code of Federal Regulations [CFR] 261.24), as listed in Table 8-1 of the FWSAP;

- Table 8-2 of the FWSAP; and
- 40 CFR 261.23 – Characteristic of Reactivity.

Results of the IDW sampling indicated the solid and liquid IDW were non-hazardous. Solid IDW was transported by American Waste Management Services for disposal at the Waste Management / American Landfill in Waynesburg, Ohio on 13 April 2018. Liquid IDW was transported by American Waste Management Services for disposal at the Waste Management / American Landfill in Waynesburg, Ohio on 27 April 2018.

Oily residue and debris

Oily residue and debris (referred to as “sludge” in the Work Plan [Parsons, 2017] and waste characterization report [Appendix G]) removed from Building 47-40 Round House on 2 February 2018 was placed in a 20-cubic yard roll-off. Samples were collected on 6 February and 5 March 2018 and analyzed for TCLP (Method 1311) metals, TCLP VOCs, TCLP SVOCs, TCLP herbicides, TCLP pesticides, total sulfide, total cyanide, corrosivity (pH), and flashpoint. The data were compared to disposal screening criteria as outlined above. The analyses indicated that the waste was non-hazardous. The oily residue and debris were transported off site on 13 April 2018 for disposal by American Waste Management.

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Table 3-1 Summary of Samples Collected at CC RVAAP-70 East Classification Yard

Area	Decision Unit	Station	Sample ID	Sampling Method	Result Type	Beginning Depth	Ending Depth	Date Collected	Media	Purpose	TAL Metals	Explosives /Propellants	TPH	Pesticides	SVOCs	VOCs
Former Fuel Oil Spill Area	1	70-4744-DU1-SS	070SS-0001M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0011M-0001-SO	Composite	REG	1	4	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0011M-0002-SO	Composite	MS	1	4	14-Nov-12	Subsurface Soil	QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0011M-0002-SO	Composite	MSD	1	4	14-Nov-12	Subsurface Soil	QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB1	070SB-0013M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB2	070SB-0014M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB3	070SB-0015M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB4	070SB-0016M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB4	070SB-0016M-0002-SO	Discrete SB	MS	1	7	14-Nov-12	Subsurface Soil	QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB4	070SB-0016M-0002-SO	Discrete SB	MSD	1	7	14-Nov-12	Subsurface Soil	QC					X	
Former Fuel Oil Spill Area	1	70-4744-DU1-SB5	070SB-0017M-0001-SO	Discrete SB	REG	1	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB5	070SB-0017M-0002-SO	Discrete SB	MS	1	7	14-Nov-12	Subsurface Soil	QC			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB5	070SB-0017M-0002-SO	Discrete SB	MSD	1	7	14-Nov-12	Subsurface Soil	QC			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB	070SB-0012M-0001-SO	Composite	REG	4	7	14-Nov-12	Subsurface Soil	P or A			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0001-SO	Discrete SB	REG	1	7	07-Dec-12	Subsurface Soil	P or A	X	X	X	X	X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0002-SO	Discrete SB	MS	1	7	07-Dec-12	Subsurface Soil	QC		X	X	X	X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0002-SO	Discrete SB	MSD	1	7	07-Dec-12	Subsurface Soil	QC		X	X	X	X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0043M-0001-SO	Discrete SB	FD	1	7	07-Dec-12	Subsurface Soil	QC			X		X	X
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0001-SO	Discrete SB	REG	1	7	12-Dec-12	Subsurface Soil	P or A			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0001-SO	Discrete SB	MS	1	7	12-Dec-12	Subsurface Soil	QC			X			
Former Fuel Oil Spill Area	1	70-4744-DU1-SB6	070SB-0042M-0001-SO	Discrete SB	MSD	1	7	12-Dec-12	Subsurface Soil	QC			X			
Drainage Ditch West of Building 47-40	2	70-DD-DU2-SS	070SS-0002M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A					X	X
Drainage Ditch West of Building 47-40	2	70-DD-DU2-SS	070SS-0002M-0002-SO	ISM	REG	0	1	07-Nov-12	Surface Soil	P or A			X			
Building 47-40 Round House - Exterior	3	70-4740-DU3-SS	070SS-0003M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB2	070SB-0022M-0001-SO	Discrete SB	REG	1	13	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB1	070SB-0026-0001-SO	Discrete SB	REG	7	13	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB	070SB-0019M-0001-SO	Composite	REG	1	4	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB1	070SB-0021M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB3	070SB-0023M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB4	070SB-0024M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB5	070SB-0025M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB	070SB-0020M-0001-SO	Composite	REG	4	7	13-Nov-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SO	Discrete SB	REG	1	7	07-Dec-12	Subsurface Soil	P or A	X	X		X	X	X
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SO	Discrete SB	MS	1	7	07-Dec-12	Subsurface Soil	QC						X
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SO	Discrete SB	MSD	1	7	07-Dec-12	Subsurface Soil	QC						X
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0047M-0001-SO	Discrete SB	FD	1	7	07-Dec-12	Subsurface Soil	QC	X			X	X	
Building 47-40 Round House - Exterior	3	70-4740-DU3-SB6	070SB-0046M-0001-SB	Discrete SB	REG	1	7	01-Apr-13	Subsurface Soil	P or A				X		
Building 47-40 Round House - Interior	4	70-4740-DU4-SB	070SB-0049M-0001-SO	Composite	REG	0	1	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB1	070SB-0050M-0001-SO	Discrete SB	REG	0	1	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SS	070SS-0048M-0001-SO	Composite	REG	0	1	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB2	070SB-0051M-0001-SO	Discrete SB	REG	0	1.25	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB5	070SB-0054M-0001-SO	Discrete SB	REG	0	2.8	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB4	070SB-0053M-0001-SO	Discrete SB	REG	0	3.75	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB3	070SB-0052M-0001-SO	Discrete SB	MS	0	4	07-Dec-12	Subsurface Soil	QC					X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB3	070SB-0052M-0001-SO	Discrete SB	MSD	0	4	07-Dec-12	Subsurface Soil	QC					X	
Building 47-40 Round House - Interior	4	70-4740-DU4-SB3	070SB-0052M-0001-SO	Discrete SB	REG	0	4	07-Dec-12	Subsurface Soil	P or A	X			X	X	
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0065-SO	Discrete SB	REG	2	4	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0065-SO	Discrete SB	MS/MSD	2	4	02-Feb-18	Subsurface Soil	QC	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB101	070SB-101-0062-SO	Discrete SB	REG	2	4	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB104	070SB-104-0072-SO	Discrete SB	REG	2	4	05-Feb-18	Subsurface Soil	P or A						X
Building 47-40 Round House - Interior	4	70-4740-SB103	070SB-103-0069-SO	Discrete SB	REG	2	4	06-Feb-18	Subsurface Soil	P or A						X
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0066-SO	Discrete SB	REG	4	6	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-9066-SO	Discrete SB	FD	4	6	02-Feb-18	Subsurface Soil	QC	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB101	070SB-101-0063-SO	Discrete SB	REG	4	6	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB103	070SB-103-0070-SO	Discrete SB	REG	4	6	06-Feb-18	Subsurface Soil	P or A						X
Building 47-40 Round House - Interior	4	70-4740-SB101	070SB-101-0064-SO	Discrete SB	REG	6	7	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Building 47-40 Round House - Interior	4	70-4740-SB102	070SB-102-0067-SO	Discrete SB	REG	6	8	02-Feb-18	Subsurface Soil	P or A	X			X	X	X
Former Herbicide Storage Shed	5	70-4760-DU5-SS	070SS-0004M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB	070SB-0027M-0001-SO	Composite	MS	1	4	13-Nov-12	Subsurface Soil	QC				X		
Former Herbicide Storage Shed	5	70-4760-DU5-SB	070SB-0027M-0001-SO	Composite	MSD	1	4	13-Nov-12	Subsurface Soil	QC				X		
Former Herbicide Storage Shed	5	70-4760-DU5-SB	070SB-0027M-0001-SO	Composite	REG	1	4	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB1	070SB-0029M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB2	070SB-0030M-0001-SO	Discrete SB	MS	1	7	13-Nov-12	Subsurface Soil	QC			X			
Former Herbicide Storage Shed	5	70-4760-DU5-SB2	070SB-0030M-0001-SO	Discrete SB	MSD	1	7	13-Nov-12	Subsurface Soil	QC			X			
Former Herbicide Storage Shed	5	70-4760-DU5-SB2	070SB-0030M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A			X	X	X	X
Former Herbicide Storage Shed	5	70-4760-DU5-SB3	070SB-0031M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB4	070SB-0032M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB5	070SB-0033M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB	070SB-0028M-0001-SO	Composite	REG	4	7	13-Nov-12	Subsurface Soil	P or A				X	X	
Former Herbicide Storage Shed	5	70-4760-DU5-SB6	070SB-0044M-0001-SO	Discrete SB	REG	1	7	07-Dec-12	Subsurface Soil	P or A	X	X		X	X	X
Former Herbicide Storage Shed	5	70-4760-DU5-SB6	070SB-0044M-0002-SO	Discrete SB	MS	1	7	07-Dec-12	Subsurface Soil	QC				X	X	X
Former Herbicide Storage Shed	5	70-4760-DU5-SB6	070SB-0044M-0002-SO	Discrete SB	MSD	1	7	07-Dec-12	Subsurface Soil	QC				X	X	X
Former Herbicide Storage Shed	5	70-4760-DU5-SB6	070SB-0045M-0001-SO	Discrete SB	FD	1	7	07-Dec-12	Subsurface Soil	QC				X	X	
Outdoor Wash Rack Area	6	70-4740-SS108	070SS-108-0081-SO	Discrete	REG	0	0.5	06-Feb-18	Surface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4740-SS108	070SS-108-0081-SO	Discrete	MS/MSD	0	0.5	06-Feb-18	Surface Soil	QC				X		
Outdoor Wash Rack Area	6	70-4759-DU6-SS	070SS-0005M-0001-SO	ISM	REG	0	1	05-Nov-12	Surface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4740-SB107	070SS-107-0075-SO	Discrete SB	REG	0	1	05-Feb-18	Surface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4740-SB107	070SS-107-0075-SO	Discrete SB	MS/MSD	0	1	05-Feb-18	Surface Soil	QC				X		
Outdoor Wash Rack Area	6	70-4740-SB107	070SS-107-9075-SO	Discrete SB	FD	0	1	05-Feb-18	Surface Soil	QC		X		X	X	
Outdoor Wash Rack Area	6	70-4740-SB107	070SB-107-0080-SO	Discrete SB	REG	9	10	05-Feb-18	Subsurface Soil	P or A		X		X	X	X
Outdoor Wash Rack Area	6	70-4740-SB107	070SB-107-0076-SO	Discrete SB	MS/MSD	1	3	05-Feb-18	Subsurface Soil	QC		X				
Outdoor Wash Rack Area	6	70-4740-SB107	070SB-107-0076-SO	Discrete SB	REG	1	3	05-Feb-18	Subsurface Soil	P or A	X			X	X	X
Outdoor Wash Rack Area	6	70-4759-DU6-SB	070SB-0034M-0001-SO	Composite	REG	1	4	13-Nov-12	Subsurface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4740-SB107	070SB-107-0077-SO	Discrete SB	REG	3	5	05-Feb-18	Subsurface Soil	P or A		X		X	X	X
Outdoor Wash Rack Area	6	70-4759-DU6-SB1	070SB-0036M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4759-DU6-SB2	070SB-0037M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4759-DU6-SB3	070SB-0038M-0001-SO	Discrete SB	REG	1	7	13-Nov-12	Subsurface Soil	P or A		X		X	X	
Outdoor Wash Rack Area	6	70-4759-D														

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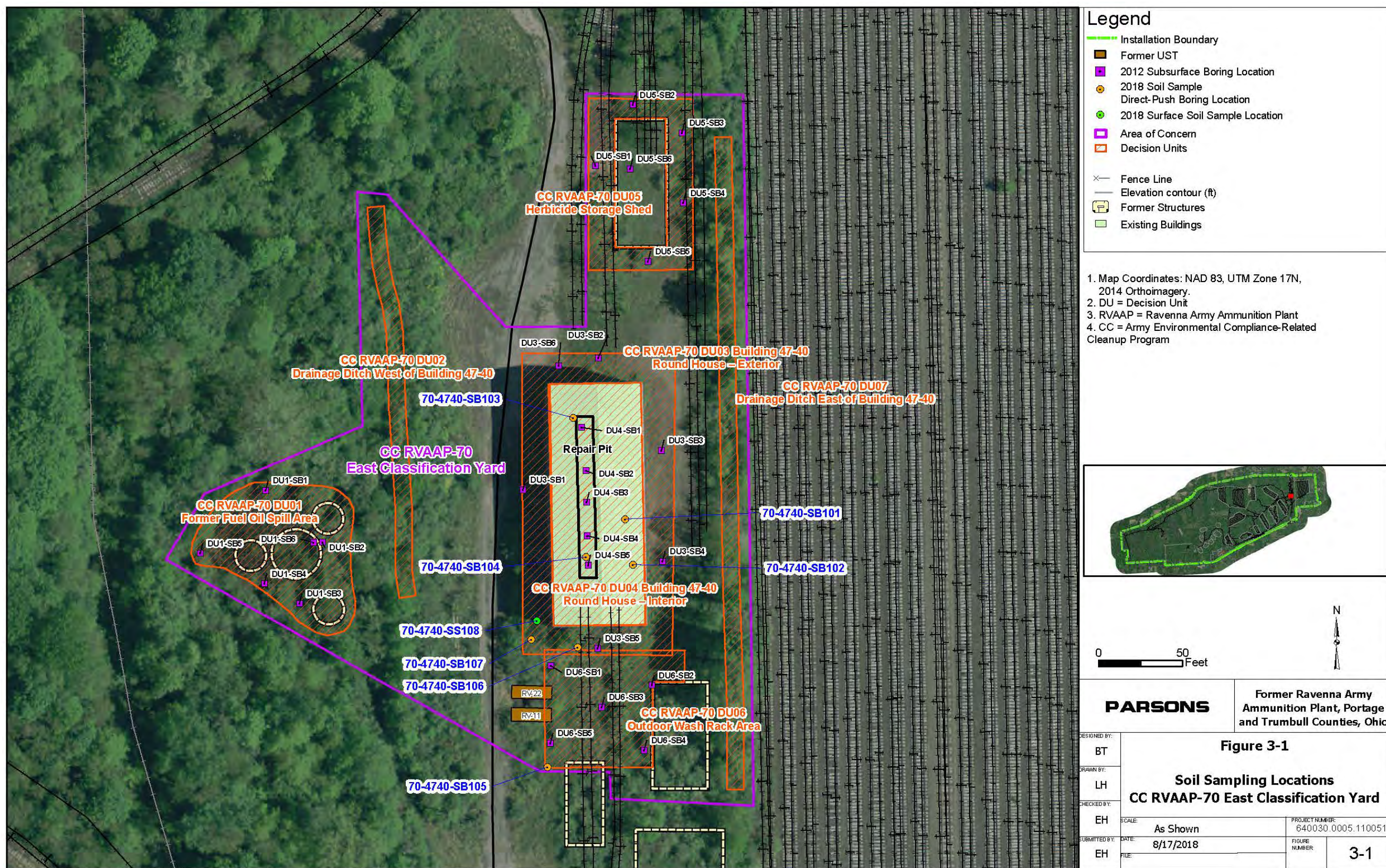


Figure 3-1 Soil Sampling Locations

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4. DATA EVALUATION

This section presents and evaluates the analytical results for CC RVAAP-70 East Classification Yard SI samples. Data are screened to identify SRCs and potential contaminants.

4.1 DATA QUALITY

4.1.1 2012 Data Quality

ECC performed internal data verification on 100 percent of the data and third-party independent data validation on 10 percent of the SI laboratory data.

Data verification was performed on the surface soil and subsurface soil samples. The analytical results were reported by the laboratory in accordance with the FWSAP (SAIC, 2011a).

Data qualifiers were assigned to each result based on the laboratory (TestAmerica Laboratories, Inc.) QA review and verification criteria. Results were qualified as follows:

- “U” indicates not detected.
- “UJ” indicates not detected, reporting limit estimated.
- “J” indicates the analyte was positively identified; however, the associated numerical value is an approximate concentration of the analyte in the sample.
- “R” indicates result not usable.

In addition to assigning qualifiers, the verification process also selected the appropriate result to use when re-analyses or dilutions were performed. Where laboratory surrogate recovery data or laboratory QC samples were outside of analytical method specifications, the verification chemist determined whether laboratory re-analysis should be used in place of an original reported result. If the laboratory reported results for both diluted and undiluted samples, diluted sample results were used for those analytes that exceeded the calibration range of the undiluted sample. A complete discussion of verification process results is contained in the Data Verification Report (Appendix D).

A data validation report was completed for six AOCs where ECC conducted SIs. The *Final Data Validation Report for Compliance Restoration Sites: RVAAP-70 East Classification Yard, RVAAP-71 Barn No. 5 Petroleum Release, RVAAP-72 Facility-Wide Underground Storage Tanks, RVAAP-75 George Road Sewer Treatment Plant Mercury Spill, RVAAP-77 Building 1037 Laundry Waste Water Sump, and RVAAP-83 Former Buildings 1031 and 1039* was issued by North Wind Services and MEC^x in August 2014 (Appendix F). Data validation for the CC RVAAP-70 East Classification Yard SI indicates that results are usable for their intended purposes. Three compounds were qualified as rejected in select samples: n-nitrosodiphenylamine, 4-chloroaniline, and 3,3'-dichlorobenzidine. None of these compounds are SRCs.

4.1.2 2018 Data Quality

The quality of 2018 data was assessed in accordance with the Quality Assurance Project Plan (component of the Work Plan, Parsons, 2017) and USEPA's *Implementation of the Uniform Federal Policy for Quality Assurance Project Plans at Federal Waste Hazardous Waste Sites* (USEPA, 2005a).

Parsons performed data validation on 100% of the 2018 laboratory data from CC RVAAP-70 East Classification Yard. The changes to qualifiers that were applied to data based on the validation are discussed in the data validation reports. Results from the CC RVAAP-70 East Classification Yard SI 2018 sampling event are usable for their intended purposes. However, the following instances are where data were rejected (“R” qualified) and are therefore deemed unusable:

- For 8260C, seven non-detect results for acetone and eleven non-detect results for 2-butanone were rejected and flagged “R” because the minimum relative response factor was not met in one or more continuing calibration verifications (CCV).

The rejected (“R” qualified) results are not considered usable and were not used for environmental decisions. However, none of these analytes are SRCs. All remaining data is usable for its intended purposes as qualified by the Parsons data validator. The data qualified as estimated (“J” or “UJ”) were due to QC deficiencies such as minor holding time exceedances (less than 2x the holding time), QA/QC samples (initial calibration verification, CCV, and MS/MSD) exceeding criteria, relative percent difference of field duplicate/parent exceeding criteria. Furthermore, two results for acetone were qualified “B” due to trip blank contamination. Data verification and validation reports are provided in Appendices D and F, respectively.

4.2 SITE-RELATED CHEMICALS EVALUATION

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established Background Screening Value (BSV), that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. Note that no chemicals were eliminated through a frequency of detection evaluation because less than 20 samples were collected for any medium in any DU. An SRC may, or may not be, related to the former operations at the AOC. SRCs for surface soil are presented in Tables 4-1a through 4-1f, and SRCs for subsurface soil are presented in Tables 4-2a through 4-2e. SRCs are discussed in the paragraphs below for each DU.

DU01: Former Fuel Oil Spill Area

SRCs identified in surface soil (Table 4-1a and Figure 4-1) include two petroleum hydrocarbons and 10 SVOCs (all PAHs).

- Petroleum hydrocarbons: TPH (C10-C20 and C20-C34)
- SVOCs (PAHs): benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene

SRCs identified in subsurface soil (Table 4-2a and Figure 4-3) include two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 VOCs.

- Inorganics: cadmium and silver
- Explosives: nitrobenzene
- Petroleum hydrocarbon: TPH (C6-C12, C10-C20, and C20-C34)
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): dibenzofuran, 4-nitroaniline, n-nitrosodiphenylamine
- VOCs: acetone, benzene, 2-butanone, carbon disulfide, ethylbenzene, methylene chloride, toluene, xylenes

DU02 Drainage Ditch West of Building 47-40

SRCs identified in drainage ditch surface soil (Table 4-1b and Figure 4-2) include two petroleum hydrocarbons and 13 SVOCs (all PAHs).

- Petroleum hydrocarbon: TPH (C10-C20 and C20-C34)
- SVOCs (PAHs): anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene

DU03 Building 47-40 Round House – Exterior

SRCs identified in surface soil (Table 4-1c and Figure 4-1) include 10 inorganics, 1 PCB, and 18 SVOCs (16 PAHs).

- Inorganics: barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, and zinc
- PCBs: aroclor-1254
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): carbazole and dibenzofuran

SRCs identified in subsurface soil (Table 4-2b and Figure 4-4) include two inorganics, 17 SVOCs, and 5 VOCs.

- Inorganics: cadmium and silver
- SVOCs (PAHs): acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): bis(2-ethylhexyl)phthalate and dibenzofuran
- VOCs: acetone, benzene, 2-butanone, carbon disulfide, and toluene

DU04 Building 47-40 Round House – Interior

SRCs identified in subsurface soil (Table 4-2c and Figure 4-5) include 4 inorganics, 9 SVOCs (7 PAHs), and 4 VOCs.

- Inorganics: cadmium, cobalt, selenium, and silver
- SVOCs (PAHs): acenaphthene, fluoranthene, fluorene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): butyl benzyl phthalate and dibenzofuran
- VOCs: acetone, carbon disulfide, chlorobenzene, and trichloroethene

DU05 Former Herbicide Storage Shed

SRCs identified in surface soil (Table 4-1d and Figure 4-1) include one pesticide and 17 SVOCs (16 PAHs).

- Pesticides: 2,4,5-trichlorophenoxyacetic acid
- SVOCs (PAHs): acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene,

naphthalene, phenanthrene, and pyrene

- SVOCs (other than PAHs): dibenzofuran

SRCs identified in subsurface soil (Table 4-2d and Figure 4-6) include two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs.

- Inorganics: cadmium and silver
- Petroleum Hydrocarbons: TPH (C10-C20)
- Pesticides: 2,4,5-trichlorophenoxyacetic acid
- SVOCs (PAHs): acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): 1,2-dichlorobenzene and 2,4,5-trichlorophenol
- VOCs: acetone, benzene, 2-butanone, carbon disulfide, ethylbenzene, and toluene

DU06 Outdoor Wash Rack Area

SRCs identified in surface soil (Table 4-1e and Figure 4-1) include one explosive, one PCB, and 17 SVOCs (14 PAHs).

- Explosives: 2,6-dinitrotoluene
- PCBs: aroclor-1260
- SVOCs (PAHs): acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): benzoic acid, dibenzofuran and 1,2-dichlorobenzene

SRCs identified in subsurface soil (Table 4-2e and Figure 4-7) include one explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs.

- Explosives: tetryl
- Petroleum Hydrocarbons: TPH (C10-C20)
- PCBs: aroclor-1260
- SVOCs (PAHs): anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): dibenzofuran, 1,2-dichlorobenzene, and isophorone
- VOCs: acetone and trichloroethene

No SRCs were detected in the surface soil sample from the surface water drain.

DU07 Drainage Ditch East of Building 47-40

SRCs identified in drainage ditch surface soil (Table 4-1f and Figure 4-7) include 14 inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC.

- Inorganics: antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead,

- nickel, selenium, silver, thallium, zinc
- Explosives: nitrocellulose
- Petroleum Hydrocarbons: TPH (C10-C20 and C20-C34)
- Pesticides: 4,4-dichlorodiphenyldichloroethylene (4,4-DDE), and 4,4-dichlorodiphenyltrichloroethane (4,4-DDT)
- PCBs: aroclor-1242, aroclor-1248, and aroclor-1260
- SVOCs (PAHs): acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene
- SVOCs (other than PAHs): dibenzofuran
- VOCs: acetone

4.3 POTENTIAL CHEMICAL CONTAMINATION EVALUATION

The maximum detected concentration (MDC) of each SRC identified by the SI at each DU was compared to its most stringent FWCUG (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential RSLs if no FWCUG is established) using the target cancer risk level of 10^{-6} or the target HQ for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the TPH SRCs were compared to Bureau of Underground Storage Tank Regulation (BUSTR) (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of 10^{-6} or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a weight-of-evidence (WOE) approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

DU01 Former Fuel Oil Spill Area

Of the 12 SRCs identified in surface soil at DU01, only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3a). The concentration of benzo(a)pyrene also exceeds the May 2018 USEPA Residential RSL.

Of the 32 SRCs identified in subsurface soil at DU01 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene exceeded the most stringent FWCUGs for the Resident Receptor in one or more subsurface soil sample (Figure 4-3 and Table 4-4a). The concentrations of benzo(b)fluoranthene and dibenz(a,h)anthracene do not exceed their May 2018 USEPA Residential RSLs. The concentrations of benzo(a)anthracene and benzo(a)pyrene exceed the 2010 FWCUG and the May 2018 USEPA Residential RSL.

The concentrations of TPH (C6-C12) (190 milligrams per kilogram [mg/kg] in subsurface soil), TPH (C10-C20) (57 mg/kg in surface soil and 4,000 mg/kg in subsurface soil), and TPH (C20-C34) (540 mg/kg in surface soil and 430 mg/kg in subsurface soil) at DU01 were compared to the BUSTR Soil Class 2 Action Levels of 5,000 mg/kg, 10,000 mg/kg, and 20,000 mg/kg respectively. Because the

maximum concentrations of petroleum hydrocarbons are less than BUSTR Soil Class 2 Action Levels, TPH is not considered a potential contaminant at DU01.

Benzo(a)pyrene is retained as a potential contaminant in surface soil at DU01. Benzo(a)pyrene and benzo(a)anthracene are retained as potential contaminants in subsurface soil at DU01.

DU02 Drainage Ditch West of Building 47-40

Of the 15 SRCs identified in surface soil at DU02 only benzo(a)pyrene and benzo(b)fluoranthene exceeded the most stringent surface soil FWCUG for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3b). The concentration of benzo(b)fluoranthene does not exceed the May 2018 USEPA Residential RSL for soil. The concentration of benzo(a)pyrene exceeds the 2010 surface soil FWCUG and the May 2018 USEPA Residential RSL for soil.

The concentration of TPH (C10-C20) (120 mg/kg) and TPH (C20-C34) (750 mg/kg) in surface soil at DU02 were compared to the BUSTR Soil Class 2 Action Level of 10,000 mg/kg and 20,000 mg/kg, respectively. Because the maximum concentrations are less than BUSTR Soil Class 2 Action Level, TPH is not considered a potential contaminant in surface soil at DU02.

Benzo(a)pyrene is retained as a potential contaminant in surface soil at DU02.

DU03 Building 47-40 Round House

Of the 29 SRCs identified in surface soil at DU03 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene exceeded the most stringent FWCUGs for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3c). The concentration of indeno(1,2,3-cd)pyrene does not exceed the May 2018 USEPA Residential RSL. Concentrations of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceed the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 24 SRCs identified in subsurface soil at DU03 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-4 and Table 4-4b). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene are retained as potential contaminants in surface soil at DU03. No potential contaminants were identified for subsurface soil at DU03.

DU04 Building 47-40 Round House – Interior

None of the 17 SRCs identified in subsurface soil at DU04 exceeded the most stringent FWCUG for the Resident Receptor in any subsurface soil sample (Figure 4-5 and Table 4-4c). No potential contaminants were identified for subsurface soil at DU04.

DU05 Former Herbicide Storage Shed

Of the 18 SRCs identified in surface soil at DU05 only benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene exceeded the most stringent FWCUGs for the Resident Receptor in the surface soil sample (Figure 4-1 and Table 4-3d). The concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene do not exceed the May 2018 USEPA Residential RSL. The concentration of benzo(a)pyrene exceeds the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 27 SRCs identified in subsurface soil at DU05 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-6 and

Table 4-4d). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)pyrene was retained as a potential contaminant in surface soil at DU05. No potential contaminants were identified in subsurface soil at DU05.

DU06 Outdoor Wash Rack Area

Of the 18 SRCs identified in surface soil at DU06 only benzo(a)pyrene and benzo(b)fluoranthene exceeded the most stringent FWCUGs for the Resident Receptor in one or more surface soil samples (Figure 4-1 and Table 4-3e). The concentration of benzo(b)fluoranthene does not exceed the May 2018 USEPA Residential RSL. The detected concentration of benzo(a)pyrene exceeds the 2010 FWCUG and the May 2018 USEPA Residential RSL.

Of the 19 SRCs identified in subsurface soil at DU06 only benzo(a)pyrene exceeded the most stringent FWCUG for the Resident Receptor in one or more subsurface soil sample (Figure 4-7 and Table 4-4e). The concentration of benzo(a)pyrene does not exceed the May 2018 USEPA Residential RSL.

Benzo(a)pyrene was retained as a potential contaminant in surface soil at DU06. No potential contaminants were identified in subsurface soil at DU06.

DU07 Drainage Ditch East of Building 47-40

Of the 39 SRCs identified in surface soil at DU07, arsenic, aroclor-1242, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeded the most stringent surface soil FWCUG for the Resident Receptor in one or more surface soil samples (Figure 4-1 and Table 4-3f).

Arsenic exceeded its BSV (15.4 mg/kg) and therefore its Adult Resident Receptor FWCUG of 0.425 mg/kg (the lowest of the Adult Resident Receptor and Child Resident Receptor FWCUGs). Aroclor-1242 exceeded its May 2018 RSL of 0.23 mg/kg (there are no FWCUGs for Aroclor-1242).

Benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene concentrations in surface soil exceed their surface soil FWCUGs for the Resident Receptor. The detected concentrations of benzo(a)anthracene and benzo(b)fluoranthene do not exceed the May 2018 USEPA Residential RSL for soil. The detected concentration of benzo(a)pyrene exceeds the 2010 surface soil FWCUG and the May 2018 USEPA Residential RSL for soil.

The concentrations of TPH (C10-C20) (42 mg/kg) and TPH (C20-C34) (210 mg/kg) in surface soil at DU07 were compared to the BUSTR Soil Class 2 Action Levels of 10,000 mg/kg and 20,000 mg/kg, respectively. Because the concentrations are less than BUSTR Soil Class 2 Action Levels, TPH is not considered a potential contaminant in surface soil at DU07.

Arsenic, aroclor-1242, and benzo(a)pyrene are retained as potential contaminants in surface soil at DU07.

4.4 WEIGH-OF-EVIDENCE EVALUATION

Potential contaminants were identified in surface soil and subsurface soil at CC RVAAP-70 East Classification Yard. All of the SRCs identified as potential contaminants are consistent with historical operations at the CC RVAAP-70 East Classification Yard.

Potential contaminants in surface soil (Figure 4-8):

- Inorganics: arsenic
- PAHs: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

- PCBs: aroclor-1242

Potential contaminants in subsurface soil (Figure 4-9):

- PAHs: benzo(a)pyrene and benzo(a)anthracene

PAHs were detected in all surface soil ISM samples. The most common potential contaminants are PAHs in surface soil. PAHs are consistent with historical use of chemicals at Building 47-40 Round House (DU03 and DU04), the fuel oil release (DU01), and mixing fuel with herbicides at the Former Herbicide Storage Shed (DU05). PAHs are also created by burning fossil fuels and would be expected to be commonly found on railroad vehicles that were cleaned at the wash rack (DU06). Other potential sources of PAHs include asphalt pavement; decaying asphalt pavement was present in surface soil surrounding the Round House (DU03) and Former Herbicide Storage Shed (DU05) (Appendix H, Photographs). Although there is uncertainty regarding the source of PAHs in surface soil, WOE is insufficient to eliminate them as potential contaminants at the CC RVAAP-70 AOC.

PAHs were identified as potential contaminants in subsurface soil at the Former Fuel Oil Spill (DU01). At least one PAH was detected in eight of the nine subsurface soil samples collected from DU01. PAHs are consistent with a fuel oil release.

PCBs were detected in four of seven surface soil samples but was only detected at a concentration sufficient to be defined as a potential contaminant in one surface soil sample from the ditch east of Building 47-40 (DU07). Many of the detections were J-flagged (estimated concentrations). The presence of PCBs is consistent with historical records of PCB transformers at the AOC. Given that PCBs were historically used at the CC RVAAP-70 AOC and the relatively frequent (though very low concentration) detections, WOE suggests PCBs are present in surface soils.

Arsenic was detected above its background screening level in surface soil samples from DU07 but not at DU03. Arsenic was identified as a potential contaminant in surface soil from the ditch east of Building 47-40 (DU07). Arsenic is naturally present in Camp Ravenna soils. The concentration in sample 070SS-0006M-0001-SO was 29 mg/kg, whereas the BSV for arsenic at Camp Ravenna surface soil is 15.4 mg/kg. Cox and Colvin (1996) documented arsenic concentrations in Ohio soils ranging up to 56 mg/kg. Therefore, the arsenic detected in CC RVAAP-70 surface soil could potentially be naturally occurring minerals. Anthropogenic sources of arsenic include use of pesticides and herbicides. If arsenic is present as a result of application of pesticide or herbicide for intended use, the arsenic at CC RVAAP-70 surface soil would not constitute a release. Arsenic could potentially be present as result of a release of arsenic-containing herbicides stored and mixed at the Former Herbicide Storage Shed (DU05); however, the HRR only mentions that organic herbicides were used and there are no records of any spills from the herbicide stored at the shed. The WOE is inconclusive regarding the source of arsenic in CC RVAAP-70 surface soil.

Table 4-1a Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4744-DU1-SS
Field Sample ID:							070SS-0001M-0001-SO
Lab Sample ID:							240-17230-1
Sample Date:							11/5/2012
Sample Depth:							0-1
Sample Type:							REG
Total Petroleum Hydrocarbons (mg/kg)							
TPH (C10-C20)	68476-34-6	1 / 1	57 J	NB	Yes	Detected Organic	57 J
TPH (C20-C34)	100664-65-1	1 / 1	540 M	NB	Yes	Detected Organic	540 M
Semivolatile Organic Compounds (mg/kg)							
Benzo(a)anthracene	56-55-3	1 / 1	0.097	NB	Yes	Detected Organic	0.097
Benzo(a)pyrene	50-32-8	1 / 1	0.13	NB	Yes	Detected Organic	0.13
Benzo(b)fluoranthene	205-99-2	1 / 1	0.13	NB	Yes	Detected Organic	0.13
Benzo(g,h,i)perylene	191-24-2	1 / 1	0.31	NB	Yes	Detected Organic	0.31
Benzo(k)fluoranthene	207-08-9	1 / 1	0.04	NB	Yes	Detected Organic	0.04
Chrysene	218-01-9	1 / 1	0.15	NB	Yes	Detected Organic	0.15
Fluoranthene	206-44-0	1 / 1	0.13	NB	Yes	Detected Organic	0.13
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 1	0.054	NB	Yes	Detected Organic	0.054
Phenanthrene	85-01-8	1 / 1	0.15	NB	Yes	Detected Organic	0.15
Pyrene	129-00-0	1 / 1	0.21	NB	Yes	Detected Organic	0.21

Notes:
BOLD chemical detected above background, not an essential nutrient.
ID = identification
J = Estimated value less than reporting limits.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
SRC = Site-related chemical

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Table 4-1b Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch West of Building 47-40 (DU02)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-DD-DU2-SS
Field Sample ID:							070SS-0002M-0001-SO
Lab Sample ID:							240-17230-2
Sample Date:							11/5/2012
Sample Depth:							0-1
Sample Type:							REG
Total Petroleum Hydrocarbons (mg/kg)							
TPH (C10-C20)	68476-34-6	1 / 1	120 J	NB	Yes	Detected Organic	120 J
TPH (C20-C34)	100664-65-1	1 / 1	750 M	NB	Yes	Detected Organic	750 M
Semivolatile Organic Compounds (mg/kg)							
2-Methylnaphthalene	91-57-6	1 / 1	0.042 J	NB	Yes	Detected Organic	0.042 J
Anthracene	120-12-7	1 / 1	0.03 J	NB	Yes	Detected Organic	0.03 J
Benzo(a)anthracene	56-55-3	1 / 1	0.18	NB	Yes	Detected Organic	0.18
Benzo(a)pyrene	50-32-8	1 / 1	0.22	NB	Yes	Detected Organic	0.22
Benzo(b)fluoranthene	205-99-2	1 / 1	0.27	NB	Yes	Detected Organic	0.27
Benzo(g,h,i)perylene	191-24-2	1 / 1	0.4	NB	Yes	Detected Organic	0.4
Benzo(k)fluoranthene	207-08-9	1 / 1	0.12	NB	Yes	Detected Organic	0.12
Chrysene	218-01-9	1 / 1	0.23	NB	Yes	Detected Organic	0.23
Fluoranthene	206-44-0	1 / 1	0.3	NB	Yes	Detected Organic	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 1	0.17	NB	Yes	Detected Organic	0.17
Naphthalene	91-20-3	1 / 1	0.035 J	NB	Yes	Detected Organic	0.035 J
Phenanthrene	85-01-8	1 / 1	0.12	NB	Yes	Detected Organic	0.12
Pyrene	129-00-0	1 / 1	0.28	NB	Yes	Detected Organic	0.28

Notes:
BOLD chemical detected above background, not an essential nutrient.
ID = identification
J = Estimated value less than reporting limits.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
SRC = Site-related chemical

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Table 4-1c Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4740-DU3-SS
Field Sample ID:							070SS-0003M-0001-SO
Lab Sample ID:							240-17230-3
Sample Date:							11/5/2012
Sample Depth:							0-1
Sample Type:							REG
TAL Metals (mg/kg)							
Aluminum	7429-90-5	1 / 1	9,000	17,700	No	Below Background	9,000
Antimony	7440-36-0	1 / 1	0.41	0.96	No	Below Background	0.41
Arsenic	7440-38-2	1 / 1	11	15.4	No	Below Background	11
Barium	7440-39-3	1 / 1	93	88.4	Yes	Exceeds Background	93
Beryllium	7440-41-7	1 / 1	0.91	0.88	Yes	Exceeds Background	0.91
Cadmium	7440-43-9	1 / 1	0.26	0	Yes	Exceeds Background	0.26
Calcium	7440-70-2	1 / 1	33,000	15,800	No	Essential Nutrient	33,000
Chromium	7440-47-3	1 / 1	26	17.4	Yes	Exceeds Background	26
Cobalt	7440-48-4	1 / 1	7.4	10.4	No	Below Background	7.4
Copper	7440-50-8	1 / 1	21	17.7	Yes	Exceeds Background	21
Iron	7439-89-6	1 / 1	19,000	23,100	No	Essential Nutrient	19,000
Lead	7439-92-1	1 / 1	45	26.1	Yes	Exceeds Background	45
Magnesium	7439-95-4	1 / 1	4,300	3,030	No	Essential Nutrient	4,300
Manganese	7439-96-5	1 / 1	960	1,450	No	Below Background	960
Nickel	7440-02-0	1 / 1	29	21.1	Yes	Exceeds Background	29
Potassium	7440-09-7	1 / 1	740	NB	No	Essential Nutrient	740
Selenium	7782-49-2	1 / 1	0.65	1.4	No	Below Background	0.65
Silver	7440-22-4	1 / 1	0.035 J	0	Yes	Exceeds Background	0.035 J
Sodium	7440-23-5	1 / 1	130	NB	No	Essential Nutrient	130
Thallium	7440-28-0	1 / 1	0.17 J	0	Yes	Exceeds Background	0.17 J
Vanadium	7440-62-2	1 / 1	12	31.1	No	Below Background	12
Zinc	7440-66-6	1 / 1	76	61.8	Yes	Exceeds Background	76
Polychlorinated Biphenyls (PCBs) (mg/kg)							
Aroclor-1254	11097-69-1	1 / 1	0.047 J	NB	Yes	Detected Organic	0.047 J
Semivolatile Organic Compounds (mg/kg)							
2-Methylnaphthalene	91-57-6	1 / 1	0.69	NB	Yes	Detected Organic	0.54
Acenaphthene	83-32-9	1 / 1	0.55	NB	Yes	Detected Organic	0.55
Acenaphthylene	208-96-8	1 / 1	0.066	NB	Yes	Detected Organic	0.047 J
Anthracene	120-12-7	1 / 1	2.5	NB	Yes	Detected Organic	2.5
Benzo(a)anthracene	56-55-3	1 / 1	3.2	NB	Yes	Detected Organic	3.2
Benzo(a)pyrene	50-32-8	1 / 1	1.9	NB	Yes	Detected Organic	1.9
Benzo(b)fluoranthene	205-99-2	1 / 1	3.1	NB	Yes	Detected Organic	3.1
Benzo(g,h,i)perylene	191-24-2	1 / 1	1.1	NB	Yes	Detected Organic	1.1
Benzo(k)fluoranthene	207-08-9	1 / 1	0.98	NB	Yes	Detected Organic	0.98
Carbazole	86-74-8	1 / 1	0.34 J	NB	Yes	Detected Organic	0.34 J
Chrysene	218-01-9	1 / 1	3.3	NB	Yes	Detected Organic	3.3
Dibenzofuran	132-64-9	1 / 1	0.42 J	NB	Yes	Detected Organic	0.42 J
Fluoranthene	206-44-0	1 / 1	8.4	NB	Yes	Detected Organic	8.4
Fluorene	86-73-7	1 / 1	0.71	NB	Yes	Detected Organic	0.71
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 1	1	NB	Yes	Detected Organic	1
Naphthalene	91-20-3	1 / 1	0.49	NB	Yes	Detected Organic	0.48
Phenanthrene	85-01-8	1 / 1	5.9	NB	Yes	Detected Organic	5.9
Pyrene	129-00-0	1 / 1	5.7	NB	Yes	Detected Organic	5.7

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
SRC = Site-related chemical

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Table 4-1d Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4760-DU5-SS
Field Sample ID:							070SS-0004M-0001-SO
Lab Sample ID:							240-17230-4
Sample Date:							11/5/2012
Sample Depth:							0-1
Sample Type:							REG
Organochlorine Pesticides (mg/kg)							
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	1 / 1	0.01 J	NB	Yes	Detected Organic	0.01 J
Semivolatile Organic Compounds (mg/kg)							
2-Methylnaphthalene	91-57-6	1 / 1	0.42	NB	Yes	Detected Organic	0.42
Acenaphthene	83-32-9	1 / 1	0.14	NB	Yes	Detected Organic	0.14
Acenaphthylene	208-96-8	1 / 1	0.065	NB	Yes	Detected Organic	0.065
Anthracene	120-12-7	1 / 1	0.42	NB	Yes	Detected Organic	0.42
Benzo(a)anthracene	56-55-3	1 / 1	0.75	NB	Yes	Detected Organic	0.75
Benzo(a)pyrene	50-32-8	1 / 1	0.46	NB	Yes	Detected Organic	0.46
Benzo(b)fluoranthene	205-99-2	1 / 1	0.95	NB	Yes	Detected Organic	0.95
Benzo(g,h,i)perylene	191-24-2	1 / 1	0.31	NB	Yes	Detected Organic	0.31
Benzo(k)fluoranthene	207-08-9	1 / 1	0.31	NB	Yes	Detected Organic	0.31
Chrysene	218-01-9	1 / 1	1.1	NB	Yes	Detected Organic	1.1
Dibenzofuran	132-64-9	1 / 1	0.17 J	NB	Yes	Detected Organic	0.17 J
Fluoranthene	206-44-0	1 / 1	1.8	NB	Yes	Detected Organic	1.8
Fluorene	86-73-7	1 / 1	0.16	NB	Yes	Detected Organic	0.16
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 1	0.28	NB	Yes	Detected Organic	0.28
Naphthalene	91-20-3	1 / 1	0.27	NB	Yes	Detected Organic	0.27
Phenanthrene	85-01-8	1 / 1	1.2	NB	Yes	Detected Organic	1.2
Pyrene	129-00-0	1 / 1	1.3	NB	Yes	Detected Organic	1.3

Notes:
BOLD chemical detected above background, not an essential nutrient.
ID = identification
J = Estimated value less than reporting limits.
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-1e Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4759-DU6-SS	70-4740-SB107		70-4740-SS108
Field Sample ID:							070SS-0005M-0001-SO	070SS-107-0075-S0	070SS-107-9075-S0	070SS-108-0081-SO
Lab Sample ID:							240-17230-5	160-26639-4	160-26639-10	160-26663-5
Sample Date:							11/5/2012	2/5/2018	2/5/2018	2/6/2018
Sample Depth:							0-1	0-1	0-1	0-0.5
Sample Type:							REG	REG	FD	REG
Explosives / Propellants (mg/kg)										
2,6-Dinitrotoluene	606-20-2	1 / 4	0.05 J	NB	Yes	Detected Organic	0.05 J	0.016 UJ	0.016 UJ	0.015 U
Polychlorinated Biphenyls (PCBs) (mg/kg)										
Aroclor-1260	11096-82-5	1 / 4	0.07 J	NB	Yes	Detected Organic	0.07 J	0.012 U	0.011 U	0.013 U
Semivolatile Organic Compounds (mg/kg)										
1,2-Dichlorobenzene	95-50-1	1 / 4	0.081 J	NB	Yes	Detected Organic	0.081 J	2.3 U	0.11 U	3.2 U
2-Methylnaphthalene	91-57-6	1 / 4	0.69	NB	Yes	Detected Organic	0.69	2.3 U	0.11 U	3.2 U
Acenaphthylene	208-96-8	1 / 4	0.066	NB	Yes	Detected Organic	0.066	2.3 U	0.11 U	3.2 U
Anthracene	120-12-7	1 / 4	0.08	NB	Yes	Detected Organic	0.08	2.3 U	0.11 U	3.2 U
Benzo(a)anthracene	56-55-3	1 / 4	0.21	NB	Yes	Detected Organic	0.21	2.3 U	0.11 U	3.2 U
Benzo(a)pyrene	50-32-8	1 / 4	0.21	NB	Yes	Detected Organic	0.21	2.3 U	0.11 U	3.2 U
Benzo(b)fluoranthene	205-99-2	1 / 4	0.36	NB	Yes	Detected Organic	0.36	2.3 U	0.11 U	3.2 U
Benzo(g,h,i)perylene	191-24-2	1 / 4	0.38	NB	Yes	Detected Organic	0.38	2.3 U	0.11 U	3.2 U
Benzo(k)fluoranthene	207-08-9	1 / 4	0.19	NB	Yes	Detected Organic	0.19	2.3 U	0.11 U	3.2 U
Benzoic acid	65-85-0	1 / 4	12 J	NB	Yes	Detected Organic	1.3 U	12 J	0.75 UJ	21 U
Chrysene	218-01-9	1 / 4	0.32	NB	Yes	Detected Organic	0.32	2.3 U	0.11 U	3.2 U
Dibenzofuran	132-64-9	1 / 4	0.16 J	NB	Yes	Detected Organic	0.16 J	2.3 U	0.11 U	3.2 U
Fluoranthene	206-44-0	1 / 4	0.41	NB	Yes	Detected Organic	0.41	2.3 U	0.11 U	3.2 U
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 4	0.17	NB	Yes	Detected Organic	0.17	2.3 U	0.11 U	3.2 U
Naphthalene	91-20-3	1 / 4	0.49	NB	Yes	Detected Organic	0.49	2.3 U	0.11 U	3.2 U
Phenanthrene	85-01-8	1 / 4	0.32	NB	Yes	Detected Organic	0.32	2.3 U	0.11 U	3.2 U
Pyrene	129-00-0	1 / 4	0.33	NB	Yes	Detected Organic	0.33	2.3 U	0.11 U	3.2 U

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-1f Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-CDD-DU7-SS	
Field Sample ID:							070SS-0006M-0001-SO	070SS-0007M-0001-SO
Lab Sample ID:							240-17230-6	240-17230-7
Sample Date:							11/5/2012	11/5/2012
Sample Depth:							0-1	0-1
Sample Type:							REG	FD
TAL Metals (mg/kg)								
Aluminum	7429-90-5	2 / 2	15,000 J	17,700	No	Below Background	15,000 J	14,000
Antimony	7440-36-0	2 / 2	2.1 J -	0.96	Yes	Exceeds Background	2.1 J -	1.5
Arsenic	7440-38-2	2 / 2	29	15.4	Yes	Exceeds Background	29	27
Barium	7440-39-3	2 / 2	110	88.4	Yes	Exceeds Background	110	94
Beryllium	7440-41-7	2 / 2	1.1	0.88	Yes	Exceeds Background	1.1	1
Cadmium	7440-43-9	2 / 2	0.47 J	0	Yes	Exceeds Background	0.47 J	0.44
Calcium	7440-70-2	2 / 2	9,400 J	15,800	No	Essential Nutrient	9,400 J	6,300
Chromium	7440-47-3	2 / 2	83 J -	17.4	Yes	Exceeds Background	83 J -	30 J
Cobalt	7440-48-4	2 / 2	14	10.4	Yes	Exceeds Background	14	12
Copper	7440-50-8	2 / 2	43 J-	17.7	Yes	Exceeds Background	43 J-	31
Iron	7439-89-6	2 / 2	37,000 J	23,100	No	Essential Nutrient	37,000 J	31,000
Lead	7439-92-1	2 / 2	270 J	26.1	Yes	Exceeds Background	270 J	59 J
Magnesium	7439-95-4	2 / 2	4,200	3,030	No	Essential Nutrient	4,200	3,400
Manganese	7439-96-5	2 / 2	780 J	1,450	No	Below Background	780 J	610
Nickel	7440-02-0	2 / 2	49 J	21.1	Yes	Exceeds Background	49 J	38
Potassium	7440-09-7	2 / 2	1,400	NB	No	Essential Nutrient	1,400 J+	1,400
Selenium	7782-49-2	2 / 2	1.7	1.4	Yes	Exceeds Background	1.4 J-	1.7
Silver	7440-22-4	2 / 2	0.054 J	0	Yes	Exceeds Background	0.054 J	0.052 J
Sodium	7440-23-5	1 / 2	69 J	NB	No	Essential Nutrient	150 U	69 J
Thallium	7440-28-0	2 / 2	0.35	0	Yes	Exceeds Background	0.35	0.27
Vanadium	7440-62-2	2 / 2	23	31.1	No	Below Background	23 J+	23
Zinc	7440-66-6	2 / 2	160	61.8	Yes	Exceeds Background	160	150
Explosives / Propellants (mg/kg)								
Nitrocellulose	9004-70-0	2 / 2	1.6 J	NB	Yes	Detected Organic	1.6 J	1.3 J
Total Petroleum Hydrocarbons (mg/kg)								
TPH (C10-C20)	68476-34-6	2 / 2	42	NB	Yes	Detected Organic	36	42
TPH (C20-C34)	100664-65-1	2 / 2	210 M	NB	Yes	Detected Organic	170 M	210 M
Organochlorine Pesticides (mg/kg)								
4,4'-DDE	72-55-9	1 / 1	0.014 J	NB	Yes	Detected Organic	0.014 J	-
4,4'-DDT	50-29-3	1 / 1	0.037 J	NB	Yes	Detected Organic	0.037 J	-
Polychlorinated Biphenyls (PCBs) (mg/kg)								
Aroclor-1242	53469-21-9	1 / 2	0.59 J	NB	Yes	Detected Organic	0.59 J	0.035 U
Aroclor-1248	12672-29-6	1 / 2	0.17	NB	Yes	Detected Organic	0.19 U	0.17
Aroclor-1260	11096-82-5	1 / 2	0.061 J	NB	Yes	Detected Organic	0.19 U	0.061 J

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Table 4-1f Site-Related Chemicals in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07) Cont.

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-CDD-DU7-SS	
Field Sample ID:							070SS-0006M-0001-SO	070SS-0007M-0001-SO
Lab Sample ID:							240-17230-6	240-17230-7
Sample Date:							11/5/2012	11/5/2012
Sample Depth:							0-1	0-1
Sample Type:							REG	FD
Semivolatile Organic Compounds (mg/kg)								
2-Methylnaphthalene	91-57-6	2 / 2	0.44	NB	Yes	Detected Organic	0.44	0.37
Acenaphthene	83-32-9	2 / 2	0.096 J	NB	Yes	Detected Organic	0.063 J	0.096 J
Anthracene	120-12-7	2 / 2	0.15	NB	Yes	Detected Organic	0.12	0.15
Benzo(a)anthracene	56-55-3	2 / 2	0.32	NB	Yes	Detected Organic	0.25	0.32
Benzo(a)pyrene	50-32-8	2 / 2	0.27	NB	Yes	Detected Organic	0.2	0.27
Benzo(b)fluoranthene	205-99-2	2 / 2	0.42	NB	Yes	Detected Organic	0.31	0.42
Benzo(g,h,i)perylene	191-24-2	2 / 2	0.27	NB	Yes	Detected Organic	0.2	0.27
Benzo(k)fluoranthene	207-08-9	2 / 2	0.17	NB	Yes	Detected Organic	0.14	0.17
Chrysene	218-01-9	2 / 2	0.38	NB	Yes	Detected Organic	0.31	0.38
Dibenzofuran	132-64-9	2 / 2	0.14 J	NB	Yes	Detected Organic	0.14 J	0.14 J
Fluoranthene	206-44-0	2 / 2	0.86	NB	Yes	Detected Organic	0.58 J	0.86
Fluorene	86-73-7	2 / 2	0.11 J	NB	Yes	Detected Organic	0.059	0.11 J
Indeno(1,2,3-cd)pyrene	193-39-5	2 / 2	0.15	NB	Yes	Detected Organic	0.14	0.15
Naphthalene	91-20-3	2 / 2	0.34	NB	Yes	Detected Organic	0.34	0.31
Phenanthrene	85-01-8	2 / 2	0.92	NB	Yes	Detected Organic	0.66 J	0.92
Pyrene	129-00-0	2 / 2	0.68 J	NB	Yes	Detected Organic	0.44	0.68 J
Volatile Organic Compounds (mg/kg)								
Acetone	67-64-1	1 / 2	0.028 J	NB	Yes	Detected Organic	0.011 UJ	0.028 J

Notes:
BOLD chemical detected above background, not an essential nutrient.
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-2a Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-4744-DU1-SB		70-4744-DU1-SB1	70-4744-DU1-SB2	70-4744-DU1-SB3	70-4744-DU1-SB4	70-4744-DU1-SB5	70-4744-DU1-SB6		
							070SB-0011M-0001-SO	070SB-0012M-0001-SO	070SB-0013M-0001-SO	070SB-0014M-0001-SO	070SB-0015M-0001-SO	070SB-0016M-0001-SO	070SB-0017M-0001-SO	070SB-0042M-0001-SO		070SB-0043M-0001-SO
							240-17768-1	240-17768-2	240-17768-3	240-17768-4	240-17768-5	240-17768-6	240-17768-7	240-18581-1	240-18735-1	240-18581-2
							11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	11/14/2012	12/7/2012	12/12/2012	12/7/2012
							1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	FD	
TAL Metals (mg/kg)																
Aluminum	7429-90-5	1 / 1	15,000	19,500	No	Below Background	-	-	-	-	-	-	-	15,000	-	-
Antimony	7440-36-0	1 / 1	0.12 U	0.96	No	Below Background	-	-	-	-	-	-	-	0.12 U	-	-
Arsenic	7440-38-2	1 / 1	12	19.8	No	Below Background	-	-	-	-	-	-	-	12	-	-
Barium	7440-39-3	1 / 1	110	124	No	Below Background	-	-	-	-	-	-	-	110	-	-
Beryllium	7440-41-7	1 / 1	0.85	0.88	No	Below Background	-	-	-	-	-	-	-	0.85	-	-
Cadmium	7440-43-9	1 / 1	0.26	0	Yes	Exceeds Background	-	-	-	-	-	-	-	0.26	-	-
Calcium	7440-70-2	1 / 1	8,600	35,500	No	Essential Nutrient	-	-	-	-	-	-	-	8,600	-	-
Chromium	7440-47-3	1 / 1	21	27.2	No	Below Background	-	-	-	-	-	-	-	21	-	-
Cobalt	7440-48-4	1 / 1	16	23.2	No	Below Background	-	-	-	-	-	-	-	16	-	-
Copper	7440-50-8	1 / 1	23	32.3	No	Below Background	-	-	-	-	-	-	-	23	-	-
Iron	7439-89-6	1 / 1	33,000	35,200	No	Essential Nutrient	-	-	-	-	-	-	-	33,000	-	-
Lead	7439-92-1	1 / 1	17	19.1	No	Below Background	-	-	-	-	-	-	-	17	-	-
Magnesium	7439-95-4	1 / 1	5,100	8,790	No	Essential Nutrient	-	-	-	-	-	-	-	5,100	-	-
Manganese	7439-96-5	1 / 1	630	3,030	No	Below Background	-	-	-	-	-	-	-	630	-	-
Mercury	7439-97-6	1 / 1	0.022 J	0.044	No	Below Background	-	-	-	-	-	-	-	0.022 J	-	-
Nickel	7440-02-0	1 / 1	32	60.7	No	Below Background	-	-	-	-	-	-	-	32	-	-
Potassium	7440-09-7	1 / 1	1,400	NB	No	Essential Nutrient	-	-	-	-	-	-	-	1,400	-	-
Selenium	7782-49-2	1 / 1	0.67	1.5	No	Below Background	-	-	-	-	-	-	-	0.67	-	-
Silver	7440-22-4	1 / 1	0.041 J	0	Yes	Exceeds Background	-	-	-	-	-	-	-	0.041 J	-	-
Sodium	7440-23-5	1 / 1	74	NB	No	Essential Nutrient	-	-	-	-	-	-	-	74	-	-
Thallium	7440-28-0	1 / 1	0.2	0.91	No	Below Background	-	-	-	-	-	-	-	0.2	-	-
Vanadium	7440-62-2	1 / 1	23	37.6	No	Below Background	-	-	-	-	-	-	-	23	-	-
Zinc	7440-66-6	1 / 1	70	93.3	No	Below Background	-	-	-	-	-	-	-	70	-	-
Explosives / Propellants (mg/kg)																
Nitrobenzene	98-95-3	1 / 1	0.096 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	0.096 J	-	-
Total Petroleum Hydrocarbons (mg/kg)																
TPH (C6-C12)	68439-45-2	4 / 9	190	NB	Yes	Detected Organic	0.053 U	160	0.14	190	0.051 U	0.055 U	0.058 U	-	0.049 U	0.98
TPH (C10-C20)	68476-34-6	9 / 9	4,000	NB	Yes	Detected Organic	34	900	46	4,000	34	46	38	370	-	350
TPH (C20-C34)	100664-65-1	2 / 2	430	NB	Yes	Detected Organic	-	-	-	-	-	-	-	430	-	400
Semivolatile Organic Compounds (mg/kg)																
2-Methylnaphthalene	91-57-6	5 / 9	18	NB	Yes	Detected Organic	0.02 J	3.7	0.021 U	18	0.026 J	0.041 U	0.02 U	0.84 J	-	0.83
4-Nitroaniline	100-01-6	1 / 9	0.33 J	NB	Yes	Detected Organic	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 U	-	0.34 U
Acenaphthene	83-32-9	4 / 9	4.6	NB	Yes	Detected Organic	0.015 U	1.1	0.021 U	4.6	0.022 U	0.041 U	0.02 U	0.47	-	0.33
Acenaphthylene	208-96-8	2 / 9	0.098	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 U	0.02 U	0.098	-	0.076 J
Anthracene	120-12-7	1 / 9	0.71	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.71	0.022 U	0.041 U	0.02 U	0.041 U	-	0.041 U
Benzo(a)anthracene	56-55-3	4 / 9	1.7	NB	Yes	Detected Organic	0.015 U	0.44	0.021 U	1.7	0.022 U	0.041 U	0.02 U	0.17	-	0.19
Benzo(a)pyrene	50-32-8	5 / 9	0.88	NB	Yes	Detected Organic	0.015 U	0.4	0.077	0.88	0.022 U	0.041 U	0.02 U	0.051 J	-	0.064 J
Benzo(b)fluoranthene	205-99-2	3 / 9	0.37	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.37	0.022 U	0.041 U	0.02 U	0.042 J	-	0.041 J
Benzo(g,h,i)perylene	191-24-2	4 / 9	0.7	NB	Yes	Detected Organic	0.015 U	0.17	0.056	0.7	0.022 U	0.041 U	0.02 U	0.07 J	-	0.041 UJ
Chrysene	218-01-9	4 / 9	1.9	NB	Yes	Detected Organic	0.015 U	0.38	0.021 U	1.9	0.022 U	0.041 U	0.02 U	0.23 J	-	0.12 J
Dibenz(a,h)anthracene	53-70-3	1 / 9	0.041 J	NB	Yes	Detected Organic	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 J	0.02 U	0.041 UJ	-	0.041 U
Dibenzofuran	132-64-9	4 / 9	2.8	NB	Yes	Detected Organic	0.015 U	0.58 J	0.021 U	2.8	0.022 U	0.041 U	0.02 U	0.31 J	-	0.23 J
Fluoranthene	206-44-0	6 / 9	1.8	NB	Yes	Detected Organic	0.017 J	0.47	0.022 J	1.8	0.022 U	0.041 U	0.02 U	0.21 J	-	0.15 J
Fluorene	86-73-7	3 / 9	7.6	NB	Yes	Detected Organic	0.015 U	1.7	0.021 U	7.6	0.022 U	0.041 U	0.02 U	0.8 J	-	0.63
Naphthalene	91-20-3	4 / 9	1	NB	Yes	Detected Organic	0.015 U	0.22	0.021 U	1	0.022 U	0.041 U	0.02 U	0.062 J	-	0.064 J
n-Nitrosodiphenylamine	86-30-6	1 / 9	0.33 J	NB	Yes	Detected Organic	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 UJ	-	0.34 UJ
Phenanthrene	85-01-8	6 / 9	12	NB	Yes	Detected Organic	0.033	3	0.044	12	0.022 U	0.041 U	0.02 U	1.2	-	1
Pyrene	129-00-0	6 / 9	11	NB	Yes	Detected Organic	0.03 J	2.7	0.035 J	11	0.022 U	0.041 U	0.02 U	1.2	-	0.91
Volatile Organic Compounds (mg/kg)																
2-Butanone (MEK)	78-93-3	2 / 9	0.0062 J	NB	Yes	Detected Organic	0.0022 UJ	0.19 UJ	0.0021 UJ	0.093 UJ	0.002 U	0.0022 U	0.0024 U	0.0062 J	-	0.0055 J
Acetone	67-64-1	1 / 9	0.024	NB	Yes	Detected Organic	0.0068 UJ	0.39 UJ	0.0065 UJ	0.19 UJ	0.0065 U	0.0071 U	0.0077 U	0.024	-	0.0068 U
Benzene	71-43-2	2 / 9	0.00084 J	NB	Yes	Detected Organic	0.00054 UJ	0.048 UJ	0.00052 UJ	0.023 UJ	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.00073 J	-	0.00084 J
Carbon disulfide	75-15-0	3 / 9	0.0036 J	NB	Yes	Detected Organic	0.00054 UJ	0.048 UJ	0.0031 J	0.023 UJ	0.00051 UJ	0.0036 J	0.0036 J	0.00045 U	-	0.00054 U
Ethylbenzene	100-41-4	3 / 9	0.79 J	NB	Yes	Detected Organic	0.00054 UJ	0.79 J	0.00052 UJ	0.35 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0047	-	0.0047 J
Methylene chloride	75-09-2	3 / 9	0.0025 J	NB	Yes	Detected Organic	0.00091 J	0.19 UJ	0.0022 J	0.093 UJ	0.0025 J	0.0011 UJ	0.0012 UJ	0.00089 U	-	0.0011 U
Toluene	108-88-3	4 / 9	0.063 J	NB	Yes	Detected Organic	0.00054 UJ	0.063 J	0.00052 UJ	0.026 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0027 J	-	0.0019 J
Xylenes, Total	1330-20-7	4 / 9	2.6 J	NB	Yes	Detected Organic	0.0016 UJ	2.6 J	0.0016 UJ	1.2 J	0.0015 UJ	0.0017 UJ	0.0018 UJ	0.02	-	0.02

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
R = Rejected.
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-2b Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-4740-DU3-SB		70-4740-DU3-SB1		70-4740-DU3-SB2	70-4740-DU3-SB3	70-4740-DU3-SB4	70-4740-DU3-SB5	70-4740-DU3-SB6	
							070SB-0019M-0001-SO	070SB-0020M-0001-SO	070SB-0021M-0001-SO	070SB-0026-0001-SO	070SB-0022M-0001-SO	070SB-0023M-0001-SO	070SB-0024M-0001-SO	070SB-0025M-0001-SO	070SB-0046M-0001-SO	070SB-0047M-0001-SO
							240-17669-1	240-17669-2	240-17669-3	240-17669-8	240-17669-4	240-17669-5	240-17669-6	240-17669-7	240-18581-5	240-18581-6
							11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
							1-4	4-7	1-7	7-13	1-13	1-7	1-7	1-7	1-7	1-7
							REG	REG	REG	REG	REG	REG	REG	REG	REG	FD
TAL Metals (mg/kg)																
Aluminum	7429-90-5	10 / 10	13,000	19,500	No	Below Background	10,000	10,000	12,000	990	8,300	9,000	13,000	13,000	7,800	9,900
Antimony	7440-36-0	7 / 10	0.1 J	0.96	No	Below Background	0.093 J	0.071 J	0.076 J	0.086 U	0.1 J	0.071 J	0.077 J	0.063 J	0.11 U	0.1 U
Arsenic	7440-38-2	10 / 10	13	19.8	No	Below Background	12	10	9.3	0.39	13	9.5	11	9.5	8.9	8.2
Barium	7440-39-3	10 / 10	75	124	No	Below Background	65	66	70	6.3	50	61	75	68	44	56
Beryllium	7440-41-7	10 / 10	0.73	0.88	No	Below Background	0.57	0.59	0.61	0.056 J	0.51	0.49	0.72	0.73	0.4	0.5
Cadmium	7440-43-9	10 / 10	0.21	0	Yes	Exceeds Background	0.19	0.18	0.16	0.024 J	0.17	0.18	0.21	0.21	0.17	0.17
Calcium	7440-70-2	10 / 10	11,000	35,500	No	Essential Nutrient	2,800	8,400	4,100	1,700	1,100	1,100	8,500	11,000	1,800	1,500
Chromium	7440-47-3	10 / 10	20	27.2	No	Below Background	20	17	18	2.9	16	15	20	20	11	14
Cobalt	7440-48-4	10 / 10	12	23.2	Yes	Exceeds Background	11	10	8.1	0.36	8.9	9.1	11	12	6.3	7.7
Copper	7440-50-8	10 / 10	19	32.3	No	Below Background	18	17	14	1.6	17	16	19	18	16	16
Iron	7439-89-6	10 / 10	27,000	35,200	No	Essential Nutrient	24,000	23,000	22,000	960	27,000	21,000	27,000	27,000	18,000	20,000
Lead	7439-92-1	10 / 10	16	19.1	No	Below Background	16	12	13	3.9	16	11	13	12	14	14
Magnesium	7439-95-4	10 / 10	5,100	8,790	No	Essential Nutrient	2,900	4,000	3,100	110	2,000	2,200	4,500	5,100	1,900	2,500
Manganese	7439-96-5	10 / 10	420	3,030	No	Below Background	420	280	270	9	430	310	310	330	250	270
Mercury	7439-97-6	8 / 10	0.037 J	0.044	No	Below Background	0.028 J	0.019 J	0.024 J	0.039 U	0.037 J	0.032 J	0.033 J	0.033 U	0.02 J	0.021 J
Nickel	7440-02-0	10 / 10	31	60.7	No	Below Background	23	25	19	1.2	18	19	29	31	14	17
Potassium	7440-09-7	10 / 10	2,100	NB	No	Essential Nutrient	1,000	1,500	1,200	210	750	810	1,800	2,100	720	860
Selenium	7782-49-2	10 / 10	0.57	1.5	No	Below Background	0.57	0.42 J	0.5	0.066 J	0.47	0.43 J	0.51	0.48	0.35 J	0.41 J
Silver	7440-22-4	9 / 10	0.039 J	0	Yes	Exceeds Background	0.032 J	0.026 J	0.039 J	0.026 U	0.021 J	0.03 J	0.032 J	0.029 J	0.03 J	0.029 J
Sodium	7440-23-5	10 / 10	92	NB	No	Essential Nutrient	59	70	57	9.6	46	41	86	86	78	92
Thallium	7440-28-0	19 / 26	0.18	0.91	No	Below Background	0.16	0.14	0.16	0.018 J	0.13	0.14	0.18	0.18	0.11	0.13
Vanadium	7440-62-2	10 / 10	22	37.6	No	Below Background	18	16	22	1.6	15	16	20	20	14	16
Zinc	7440-66-6	10 / 10	64	93.3	No	Below Background	55	54	46	3.2	64	49	56	58	42	46
Semivolatile Organic Compounds (mg/kg)																
2-Methylnaphthalene	91-57-6	4 / 10	0.035 J	NB	Yes	Detected Organic	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0044 J	0.0054 J	0.0034 U	0.0044 J	0.037 U	0.035 J
Acenaphthene	83-32-9	1 / 10	0.0047 J	NB	Yes	Detected Organic	0.016 U	0.0047 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Anthracene	120-12-7	2 / 10	0.019 J	NB	Yes	Detected Organic	0.019 J	0.0049 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Benzo(a)anthracene	56-55-3	4 / 10	0.09	NB	Yes	Detected Organic	0.09	0.0063 J	0.031 J	0.0037 U	0.0033 U	0.0034 U	0.0084	0.0034 U	0.037 U	0.034 U
Benzo(a)pyrene	50-32-8	3 / 10	0.09	NB	Yes	Detected Organic	0.09	0.0043 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0069	0.0034 U	0.037 U	0.034 U
Benzo(b)fluoranthene	205-99-2	3 / 10	0.13	NB	Yes	Detected Organic	0.13	0.0063 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.013	0.0034 U	0.037 U	0.034 U
Benzo(g,h,i)perylene	191-24-2	3 / 10	0.055	NB	Yes	Detected Organic	0.055	0.0052 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0055 J	0.0034 U	0.037 UJ	0.034 UJ
Benzo(k)fluoranthene	207-08-9	3 / 10	0.062	NB	Yes	Detected Organic	0.062	0.0043 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.008	0.0034 U	0.037 U	0.034 U
Bis(2-ethylhexyl)phthalate	117-81-7	3 / 10	0.029 J	NB	Yes	Detected Organic	0.13 U	0.027 J	0.13 U	0.029 J	0.027 U	0.019 J	0.028 U	0.028 U	0.31 U	0.27 U
Chrysene	218-01-9	3 / 10	0.029 J	NB	Yes	Detected Organic	0.11	0.0058 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.021	0.0034 U	0.037 U	0.034 U
Dibenzofuran	132-64-9	1 / 10	0.0054 J	NB	Yes	Detected Organic	0.016 U	0.0054 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Fluoranthene	206-44-0	4 / 10	0.22	NB	Yes	Detected Organic	0.22	0.0049 J	0.043	0.0037 U	0.0033 U	0.0034 U	0.016	0.0034 U	0.037 UJ	0.034 UJ
Fluorene	86-73-7	1 / 10	0.0044 J	NB	Yes	Detected Organic	0.016 U	0.0044 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U
Indeno(1,2,3-cd)pyrene	193-39-5	3 / 10	0.053	NB	Yes	Detected Organic	0.053	0.0049 J	0.016 U	0.0037 U	0.0033 U	0.0034 U	0.0052 J	0.0034 U	0.037 U	0.034 U
Naphthalene	91-20-3	4 / 10	0.0056 J	NB	Yes	Detected Organic	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0048 J	0.0044 J	0.0052 J	0.0056 J	0.037 U	0.034 U
Phenanthrene	85-01-8	5 / 10	0.1	NB	Yes	Detected Organic	0.1	0.0069	0.017 J	0.0037 U	0.0033 U	0.0043 J	0.0058 J	0.0034 U	0.037 U	0.034 U
Pyrene	129-00-0	4 / 10	0.16	NB	Yes	Detected Organic	0.16	0.0048 J	0.034	0.0037 U	0.0033 U	0.0034 U	0.012	0.0034 U	0.037 U	0.034 U
Volatile Organic Compounds (mg/kg)																
2-Butanone (MEK)	78-93-3	1 / 1	0.0046 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0046 J	-
Acetone	67-64-1	1 / 1	0.019 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.019 J	-
Benzene	71-43-2	1 / 1	0.0004 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0004 J	-
Carbon disulfide	75-15-0	1 / 1	0.00063 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.00063 J	-
Toluene	108-88-3	1 / 1	0.0025 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-	-	0.0025 J	-

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
R = Rejected.
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-2c Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04)

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4740-DU4-SB		70-4740-DU4-SB1	70-4740-DU4-SB2	70-4740-DU4-SB3	70-4740-DU4-SB4	70-4740-DU4-SB5
Field Sample ID:							070SS-0048M-0001-SO	070SB-0049M-0001-SO	070SB-0050M-0001-SO	070SB-0051M-0001-SO	070SB-0052M-0001-SO	070SB-0053M-0001-SO	070SB-0054M-0001-SO
Lab Sample ID:							240-18581-17	240-18581-18	240-18581-19	240-18581-20	240-18581-21	240-18581-22	240-18581-23
Sample Date:							12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012	12/7/2012
Sample Depth:							0-1	0-1	0-1	0-1.25	0-4	0-3.75	0-2.8
Sample Type:							REG	REG	REG	REG	REG	REG	REG
TAL Metals (mg/kg)													
Aluminum	7429-90-5	14 / 14	15,000	19,500	No	Below Background	9,800	5,900	8,200	3,900	7,800	7,400	10,000
Arsenic	7440-38-2	14 / 14	17	19.8	No	Below Background	9	5.9	5.9	1.8	8.1	6.6	11
Barium	7440-39-3	14 / 14	71	124	No	Below Background	65	31	71	33	44	38	51
Beryllium	7440-41-7	14 / 14	0.76	0.88	No	Below Background	0.58	0.32	0.53	0.34	0.43	0.38	0.56
Cadmium	7440-43-9	8 / 14	0.17	0	Yes	Exceeds Background	0.17	0.099 J	0.13	0.12	0.13	0.11	0.16
Calcium	7440-70-2	14 / 14	16,000	35,500	No	Essential Nutrient	15,000	6,900	6,300	13,000	5,200	11,000	16,000
Chromium	7440-47-3	14 / 14	22	27.2	No	Below Background	14	9.2	12	6.1	12	12	16
Cobalt	7440-48-4	14 / 14	50	23.2	Yes	Exceeds Background	50	7.3	28	32	14	8.7	12
Copper	7440-50-8	14 / 14	27	32.3	No	Below Background	16	10	12	4.7	13	13	18
Iron	7439-89-6	14 / 14	35,000	35,200	No	Essential Nutrient	21,000	14,000	17,000	5,200	18,000	17,000	25,000
Lead	7439-92-1	14 / 14	14	19.1	No	Below Background	12	6.6	8.3	9.2	9.1	7.7	11
Magnesium	7439-95-4	14 / 14	6,300	8,790	No	Essential Nutrient	4,400	2,700	3,300	1,800	3,200	3,400	5,500
Manganese	7439-96-5	14 / 14	460	3,030	No	Below Background	390	200	280	260	270	220	310
Mercury	7439-97-6	3 / 14	0.024 J	0.044	No	Below Background	0.032 U	0.03 U	0.032 U	0.037 U	0.033 U	0.031 U	0.034 U
Nickel	7440-02-0	14 / 14	34	60.7	No	Below Background	23	15	22	5.8	20	19	26
Potassium	7440-09-7	14 / 14	1,900	NB	No	Essential Nutrient	1,300	930	1,200	530	1,100	1,100	1,400
Selenium	7782-49-2	14 / 14	1.8	1.5	Yes	Exceeds Background	0.35 J	0.24 J	0.33 J	0.26 J	0.27 J	0.24 J	0.43 J
Silver	7440-22-4	7 / 14	0.03 J	0	Yes	Exceeds Background	0.03 J	0.015 J	0.018 J	0.017 J	0.02 J	0.017 J	0.027 J
Sodium	7440-23-5	14 / 14	190	NB	No	Essential Nutrient	150	75	110	77	110	87	160
Thallium	7440-28-0	7 / 14	0.13	0.91	No	Below Background	0.11	0.076 J	0.075 J	0.03 J	0.098 J	0.092 J	0.13
Vanadium	7440-62-2	14 / 14	22	37.6	No	Below Background	13	8.8	11	4.7	11	11	15
Zinc	7440-66-6	14 / 14	70	93.3	No	Below Background	47	27	34	18	38	34	52
Semivolatile Organic Compounds (mg/kg)													
2-Methylnaphthalene	91-57-6	1 / 14	0.0053 J	NB	Yes	Detected Organic	0.0034 U	0.0033 U	0.0053 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Acenaphthene	83-32-9	1 / 14	0.012	NB	Yes	Detected Organic	0.012	0.0033 U	0.0033 U	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Butyl benzyl phthalate	85-68-7	1 / 14	0.016 J	NB	Yes	Detected Organic	0.016 J	0.027 U	0.027 U	0.27 UJ	0.27 UJ	0.11 U	0.11 U
Dibenzofuran	132-64-9	1 / 14	0.0039 J	NB	Yes	Detected Organic	0.0034 U	0.0033 U	0.0039 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Fluoranthene	206-44-0	2 / 14	0.008 J	NB	Yes	Detected Organic	0.0078 J	0.0033 UJ	0.008 J	0.033 UJ	0.033 UJ	0.013 UJ	0.013 UJ
Fluorene	86-73-7	2 / 14	0.0034 J	NB	Yes	Detected Organic	0.019	0.0033 U	0.0034 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Naphthalene	91-20-3	2 / 14	0.0057 J	NB	Yes	Detected Organic	0.0034 U	0.0039 J	0.0057 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Phenanthrene	85-01-8	2 / 14	0.039	NB	Yes	Detected Organic	0.039	0.0033 U	0.014	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Pyrene	129-00-0	2 / 14	0.0089	NB	Yes	Detected Organic	0.0089	0.0033 U	0.0043 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U
Volatile Organic Compounds (mg/kg)													
Acetone	67-64-1	3 / 8	0.041 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-
Carbon disulfide	75-15-0	1 / 10	0.0036 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-
Chlorobenzene	108-90-7	2 / 10	0.003 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-
Trichloroethene (TCE)	79-01-6	2 / 10	0.00054 J	NB	Yes	Detected Organic	-	-	-	-	-	-	-

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Table 4-2c Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04) Cont.

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-4740-SB101			70-4740-SB102				70-4740-SB103		70-4740-SB104
							070SB-101-0062-SO	070SB-101-0063-SO	070SB-101-0064-SO	070SB-102-0065-SO	070SB-102-0066-SO	070SB-102-9066-SO	070SB-102-0067-SO	070SB-103-0069-SO	070SB-103-0070-SO	070SB-104-0072-SO
							160-26618-1	160-26618-2	160-26618-3	160-26618-4	160-26618-5	160-26618-6	160-26618-7	160-26663-2	160-26663-3	160-26639-1
							2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/2/2018	2/6/2018	2/6/2018	2/5/2018
							2-4	4-6	6-7	2-4	4-6	4-6	6-8	2-4	4-7	2-4
REG	REG	REG	REG	REG	FD	REG	REG	REG	REG	REG						
TAL Metals (mg/kg)																
Aluminum	7429-90-5	14 / 14	15,000	19,500	No	Below Background	14,000	15,000	13,000	11,000	13,000	13,000	13,000	-	-	-
Arsenic	7440-38-2	14 / 14	17	19.8	No	Below Background	14	15	17	12	15	12	14	-	-	-
Barium	7440-39-3	14 / 14	71	124	No	Below Background	64	65	62	57 J	62	62	62	-	-	-
Beryllium	7440-41-7	14 / 14	0.76	0.88	No	Below Background	0.67	0.79	0.76	0.65	0.73	0.68	0.74	-	-	-
Cadmium	7440-43-9	8 / 14	0.17	0	Yes	Exceeds Background	0.12 U	0.13 U	0.13 U	0.089 J	0.14 U	0.13 U	0.13 U	-	-	-
Calcium	7440-70-2	14 / 14	16,000	35,500	No	Essential Nutrient	1,300	2,800	4,600	8,500	15,000 J	2,200 J	15,000	-	-	-
Chromium	7440-47-3	14 / 14	22	27.2	No	Below Background	18	22	20	15	20	20	20	-	-	-
Cobalt	7440-48-4	14 / 14	50	23.2	Yes	Exceeds Background	8.7	11	14	8.9	14	12	13	-	-	-
Copper	7440-50-8	14 / 14	27	32.3	No	Below Background	27	23	24	22	23	23	23	-	-	-
Iron	7439-89-6	14 / 14	35,000	35,200	No	Essential Nutrient	30,000	35,000	33,000	26,000	34,000	30,000	32,000	-	-	-
Lead	7439-92-1	14 / 14	14	19.1	No	Below Background	13	12	14	13	13	13	13	-	-	-
Magnesium	7439-95-4	14 / 14	6,300	8,790	No	Essential Nutrient	3,400	5,100	5,100	3,200 J	6,100	4,600	6,300	-	-	-
Manganese	7439-96-5	14 / 14	460	3,030	No	Below Background	190	190	310	460	280	300	350	-	-	-
Mercury	7439-97-6	3 / 14	0.024 J	0.044	No	Below Background	0.019 J	0.039 U	0.041 U	0.024 J	0.013 J	0.036 U	0.036 U	-	-	-
Nickel	7440-02-0	14 / 14	34	60.7	No	Below Background	25	32	34	24	33	33	33	-	-	-
Potassium	7440-09-7	14 / 14	1,900	NB	No	Essential Nutrient	1,100	1,600	1,600	940 J	1,900	1,700	1,900	-	-	-
Selenium	7782-49-2	14 / 14	1.8	1.5	Yes	Exceeds Background	1.3	1.8	1.8	1.4	1.4	1.5	1.3	-	-	-
Silver	7440-22-4	7 / 14	0.03 J	0	Yes	Exceeds Background	0.38 U	0.41 U	0.4 U	0.41 U	0.43 U	0.39 U	0.39 U	-	-	-
Sodium	7440-23-5	14 / 14	190	NB	No	Essential Nutrient	100	190	140	100	110	98	110	-	-	-
Thallium	7440-28-0	7 / 14	0.13	0.91	No	Below Background	1 U	1.1 U	1.1 U	1.1 U	1.1 U	1 U	1 U	-	-	-
Vanadium	7440-62-2	14 / 14	22	37.6	No	Below Background	19	22	20	18	20	19	20	-	-	-
Zinc	7440-66-6	14 / 14	70	93.3	No	Below Background	59	70	67	64	66	66	64	-	-	-
Semivolatile Organic Compounds (mg/kg)																
2-Methylnaphthalene	91-57-6	1 / 14	0.0053 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Acenaphthene	83-32-9	1 / 14	0.012	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Butyl benzyl phthalate	85-68-7	1 / 14	0.016 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Dibenzofuran	132-64-9	1 / 14	0.0039 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Fluoranthene	206-44-0	2 / 14	0.008 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Fluorene	86-73-7	2 / 14	0.0034 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Naphthalene	91-20-3	2 / 14	0.0057 J	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Phenanthrene	85-01-8	2 / 14	0.039	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Pyrene	129-00-0	2 / 14	0.0089	NB	Yes	Detected Organic	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-
Volatile Organic Compounds (mg/kg)																
Acetone	67-64-1	3 / 8	0.041 J	NB	Yes	Detected Organic	0.015 J	0.01 U	0.014 J	0.0092 U	0.0099 U	0.011 U	0.011 U	-	0.023 J	-
Carbon disulfide	75-15-0	1 / 10	0.0036 J	NB	Yes	Detected Organic	0.0012 J	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Chlorobenzene	108-90-7	2 / 10	0.003 J	NB	Yes	Detected Organic	0.001 J	0.001 U	0.003 J	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U
Trichloroethene (TCE)	79-01-6	2 / 10	0.00054 J	NB	Yes	Detected Organic	0.00095 U	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00041 J	0.00075 U	0.00054 J

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = Identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
R = Rejected.
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-2d Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-4760-DU5-SB		70-4760-DU5-SB1	70-4760-DU5-SB2	70-4760-DU5-SB3	70-4760-DU5-SB4	70-4760-DU5-SB5	70-4760-DU5-SB6		
							070SB-0027M-0001-SO	070SB-0028M-0001-SO	070SB-0029M-0001-SO	070SB-0030M-0001-SO	070SB-0031M-0001-SO	070SB-0032M-0001-SO	070SB-0033M-0001-SO	070SB-0044M-0001-SO	070SB-0045M-0001-SO	
							240-17669-9	240-17669-10	240-17669-11	240-17669-12	240-17669-13	240-17669-14	240-17669-15	240-18581-3	240-18581-4	
							11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012	
							1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7	
REG	REG	REG	REG	REG	REG	REG	REG	REG	FD							
TAL Metals (mg/kg)																
Aluminum	7429-90-5	1 / 1	13,000	19,500	No	Below Background	-	-	-	-	-	-	-	13,000	-	
Arsenic	7440-38-2	1 / 1	9.6	19.8	No	Below Background	-	-	-	-	-	-	-	9.6	-	
Barium	7440-39-3	1 / 1	80 J	124	No	Below Background	-	-	-	-	-	-	-	80 J	-	
Beryllium	7440-41-7	1 / 1	0.85	0.88	No	Below Background	-	-	-	-	-	-	-	0.85	-	
Cadmium	7440-43-9	1 / 1	0.24	0	Yes	Exceeds Background	-	-	-	-	-	-	-	0.24	-	
Calcium	7440-70-2	1 / 1	8,800	35,500	No	Essential Nutrient	-	-	-	-	-	-	-	8,800	-	
Chromium	7440-47-3	1 / 1	18	27.2	No	Below Background	-	-	-	-	-	-	-	18	-	
Cobalt	7440-48-4	1 / 1	10	23.2	No	Below Background	-	-	-	-	-	-	-	10	-	
Copper	7440-50-8	1 / 1	19	32.3	No	Below Background	-	-	-	-	-	-	-	19	-	
Iron	7439-89-6	1 / 1	25,000	35,200	No	Essential Nutrient	-	-	-	-	-	-	-	25,000	-	
Lead	7439-92-1	1 / 1	15	19.1	No	Below Background	-	-	-	-	-	-	-	15	-	
Magnesium	7439-95-4	1 / 1	4,300	8,790	No	Essential Nutrient	-	-	-	-	-	-	-	4,300	-	
Manganese	7439-96-5	1 / 1	430	3,030	No	Below Background	-	-	-	-	-	-	-	430	-	
Mercury	7439-97-6	1 / 1	0.021 J	0.044	No	Below Background	-	-	-	-	-	-	-	0.021 J	-	
Nickel	7440-02-0	1 / 1	24	60.7	No	Below Background	-	-	-	-	-	-	-	24	-	
Potassium	7440-09-7	1 / 1	1,000	NB	No	Essential Nutrient	-	-	-	-	-	-	-	1,000	-	
Selenium	7782-49-2	1 / 1	0.59 J+	1.5	No	Below Background	-	-	-	-	-	-	-	0.59 J+	-	
Silver	7440-22-4	1 / 1	0.029 J	0	Yes	Exceeds Background	-	-	-	-	-	-	-	0.029 J	-	
Sodium	7440-23-5	1 / 1	110	NB	No	Essential Nutrient	-	-	-	-	-	-	-	110	-	
Thallium	7440-28-0	1 / 1	0.16	0.91	No	Below Background	-	-	-	-	-	-	-	0.16	-	
Vanadium	7440-62-2	1 / 1	18	37.6	No	Below Background	-	-	-	-	-	-	-	18	-	
Zinc	7440-66-6	1 / 1	55	93.3	No	Below Background	-	-	-	-	-	-	-	55	-	
Total Petroleum Hydrocarbons (mg/kg)																
TPH (C10-C20)	68476-34-6	1 / 1	39	NB	Yes	Detected Organic	-	-	-	39	-	-	-	-	-	-
Organochlorine Pesticides (mg/kg)																
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	2 / 9	0.086	NB	Yes	Detected Organic	0.0085 U	0.049	0.0086 U	0.086	0.0086 U	0.0085 U	0.0084 U	0.01 U	0.0084 U	
Semivolatile Organic Compounds (mg/kg)																
1,2-Dichlorobenzene	95-50-1	1 / 9	0.029 J	NB	Yes	Detected Organic	0.029 J	0.13 U	0.13 U	0.03 U	0.028 U	0.14 U	0.13 U	0.34 UJ	0.27 U	
2,4,5-Trichlorophenol	95-95-4	1 / 9	0.14 J	NB	Yes	Detected Organic	0.028 U	0.13 U	0.13 U	0.14 J	0.028 U	0.14 U	0.13 U	0.34 U	0.27 U	
2-Methylnaphthalene	91-57-6	6 / 9	0.082	NB	Yes	Detected Organic	0.0034 U	0.036	0.029 J	0.07	0.0055 J	0.057	0.016 U	0.041 U	0.082	
Acenaphthylene	208-96-8	1 / 9	0.017 J	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.017 J	0.016 U	0.041 U	0.034 U	
Anthracene	120-12-7	1 / 9	0.019 J	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.0034 U	0.0037 U	0.0034 U	0.019 J	0.016 U	0.041 U	0.034 U	
Benzo(a)anthracene	56-55-3	3 / 9	0.053	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.032 J	0.004 J	0.0034 U	0.053	0.016 U	0.041 U	0.034 U	
Benzo(a)pyrene	50-32-8	2 / 9	0.059	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.034	0.0037 U	0.0034 U	0.059	0.016 U	0.041 U	0.034 U	
Benzo(b)fluoranthene	205-99-2	4 / 9	0.1	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.052	0.0089	0.0052 J	0.1	0.016 U	0.041 U	0.034 U	
Benzo(g,h,i)perylene	191-24-2	2 / 9	0.051	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.031 J	0.0037 U	0.0034 U	0.051	0.016 U	0.041 UJ	0.034 UJ	
Benzo(k)fluoranthene	207-08-9	1 / 9	0.04	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.04	0.016 U	0.041 U	0.034 U	
Chrysene	218-01-9	4 / 9	0.097	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.04	0.009	0.0054 J	0.097	0.016 U	0.041 U	0.034 U	
Fluoranthene	206-44-0	5 / 9	0.12	NB	Yes	Detected Organic	0.0082	0.016 U	0.065	0.008	0.0045 J	0.12	0.016 U	0.041 U	0.034 UJ	
Fluorene	86-73-7	1 / 9	0.018	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.018	0.0034 U	0.017 U	0.016 U	0.041 U	0.034 U	
Indeno(1,2,3-cd)pyrene	193-39-5	1 / 9	0.043	NB	Yes	Detected Organic	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.043	0.016 U	0.041 U	0.034 U	
Naphthalene	91-20-3	6 / 9	0.07	NB	Yes	Detected Organic	0.0034 U	0.022 J	0.017 J	0.021	0.0063 J	0.05	0.016 U	0.041 U	0.07	
Phenanthrene	85-01-8	5 / 9	0.07	NB	Yes	Detected Organic	0.0034 U	0.061	0.036	0.07	0.0043 J	0.056	0.016 U	0.041 U	0.046 J	
Pyrene	129-00-0	3 / 9	0.089	NB	Yes	Detected Organic	0.0057 J	0.016 U	0.051	0.0078	0.0034 U	0.089	0.016 U	0.041 U	0.034 U	
Volatile Organic Compounds (mg/kg)																
2-Butanone (MEK)	78-93-3	1 / 2	0.012 J	NB	Yes	Detected Organic	-	-	-	0.0017 U	-	-	-	0.012 J	-	
Acetone	67-64-1	1 / 2	0.041 J	NB	Yes	Detected Organic	-	-	-	0.0055 U	-	-	-	0.041 J	-	
Benzene	71-43-2	1 / 2	0.0013 J	NB	Yes	Detected Organic	-	-	-	0.00044 U	-	-	-	0.0013 J	-	
Carbon disulfide	75-15-0	1 / 2	0.0027 J	NB	Yes	Detected Organic	-	-	-	0.0027 J	-	-	-	0.00057 UJ	-	
Ethylbenzene	100-41-4	1 / 2	0.0018 J	NB	Yes	Detected Organic	-	-	-	0.00044 U	-	-	-	0.0018 J	-	
Toluene	108-88-3	1 / 2	0.0033 J	NB	Yes	Detected Organic	-	-	-	0.00044 U	-	-	-	0.0033 J	-	

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
R = Rejected.
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-2e Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID: Field Sample ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC- Yes/No	SRC Justification	70-4759-DU6-SB		70-4759-DU6-SB1	70-4759-DU6-SB2	70-4759-DU6-SB3	70-4759-DU6-SB4	70-4759-DU6-SB5
Lab Sample ID:							070SB-0034M-0001-SO	070SB-0035M-0001-SO	070SB-0036M-0001-SO	070SB-0037M-0001-SO	070SB-0038M-0001-SO	070SB-0039M-0001-SO	070SB-0040M-0001-SO
Sample Date:							240-17669-16	240-17669-17	240-17669-18	240-17669-19	240-17669-20	240-17669-21	240-17669-22
Sample Depth:							11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012
Sample Type:							1-4	4-7	1-7	1-7	1-7	1-7	1-7
							REG	REG	REG	REG	REG	REG	REG
TAL Metals (mg/kg)													
Explosives / Propellants (mg/kg)													
Tetryl	479-45-8	1 / 12	0.021 J	NB	Yes	Detected Organic	0.05 U	0.05 U	0.051 U	0.051 U	0.05 U	0.021 J	0.058 U
Total Petroleum Hydrocarbons (mg/kg)													
TPH (C10-C20)	68476-34-6	1 / 1	83	NB	Yes	Detected Organic	-	-	-	-	-	-	83
Polychlorinated Biphenyls (PCBs) (mg/kg)													
Aroclor-1260	11096-82-5	1 / 12	0.018 J	NB	Yes	Detected Organic	0.025 U	0.025 U	0.025 U	0.026 U	0.025 U	0.018 J	0.029 U
Semivolatile Organic Compounds (mg/kg)													
1,2-Dichlorobenzene	95-50-1	2 / 12	0.2 J	NB	Yes	Detected Organic	0.052 J	0.13 U	0.13 U	0.14 U	0.14 U	0.2 J	0.15 U
2-Methylnaphthalene	91-57-6	2 / 12	0.19	NB	Yes	Detected Organic	0.091	0.016 U	0.016 U	0.017 U	0.017 U	0.19	0.019 U
Anthracene	120-12-7	1 / 12	0.022 J	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.022 J	0.019 U
Benzo(a)anthracene	56-55-3	1 / 12	0.045	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.045	0.019 U
Benzo(a)pyrene	50-32-8	2 / 12	0.071	NB	Yes	Detected Organic	0.059	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(b)fluoranthene	205-99-2	2 / 12	0.071	NB	Yes	Detected Organic	0.04	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U
Benzo(g,h,i)perylene	191-24-2	2 / 12	0.059	NB	Yes	Detected Organic	0.041	0.016 U	0.016 U	0.017 U	0.017 U	0.059	0.019 U
Chrysene	218-01-9	1 / 12	0.056	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.056	0.019 U
Dibenzofuran	132-64-9	2 / 12	0.052 J	NB	Yes	Detected Organic	0.028 J	0.016 U	0.016 U	0.017 U	0.017 U	0.052 J	0.019 U
Fluoranthene	206-44-0	3 / 12	0.069	NB	Yes	Detected Organic	0.04	0.016 U	0.016 U	0.018 J	0.017 U	0.069	0.019 U
Isophorone	78-59-1	1 / 12	0.068 J	NB	Yes	Detected Organic	0.068 J	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.15 U
Naphthalene	91-20-3	2 / 12	0.13	NB	Yes	Detected Organic	0.066	0.016 U	0.016 U	0.017 U	0.017 U	0.13	0.019 U
Phenanthrene	85-01-8	1 / 12	0.12	NB	Yes	Detected Organic	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.12	0.019 U
Pyrene	129-00-0	3 / 12	0.11	NB	Yes	Detected Organic	0.046	0.016 U	0.016 U	0.017 J	0.017 U	0.11	0.019 U
Volatile Organic Compounds (mg/kg)													
Acetone	67-64-1	1 / 4	0.031 J	NB	Yes	Detected Organic	-	-	-	-	-	-	0.0055 U
Trichloroethene (TCE)	79-01-6	1 / 8	0.00032 J	NB	Yes	Detected Organic	-	-	-	-	-	-	0.00043 U

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Table 4-2e Site-Related Chemicals in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06) Cont.

Location ID:	CAS Number	Frequency of Detection	Max Detect Concentration	Background Screening Value	SRC-Yes/No	SRC Justification	70-4740-SB105	70-4740-SB106	70-4740-SB107				
Field Sample ID:							070SB-105-0073-S0	070SB-106-0074-S0	070SB-107-0076-S0	070SB-107-0077-S0	070SB-107-0078-S0	070SB-107-0079-S0	070SB-107-0080-S0
Lab Sample ID:							160-26639-2	160-26639-3	160-26639-5	160-26639-6	160-26639-7	160-26639-8	160-26639-9
Sample Date:							2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018	2/5/2018
Sample Depth:							6-7	6-7	1-3	3-5	5-7	7-9	9-10
Sample Type:							REG	REG	REG	REG	REG	REG	REG
TAL Metals (mg/kg)													
Explosives / Propellants (mg/kg)													
Tetryl	479-45-8	1 / 12	0.021 J	NB	Yes	Detected Organic	-	-	0.016 UJ	0.016 UJ	0.015 UJ	0.015 UJ	0.016 UJ
Total Petroleum Hydrocarbons (mg/kg)													
TPH (C10-C20)	68476-34-6	1 / 1	83	NB	Yes	Detected Organic	-	-	-	-	-	-	-
Polychlorinated Biphenyls (PCBs) (mg/kg)													
Aroclor-1260	11096-82-5	1 / 12	0.018 J	NB	Yes	Detected Organic	-	-	0.012 U	0.012 U	0.011 U	0.011 U	0.011 U
Semivolatile Organic Compounds (mg/kg)													
1,2-Dichlorobenzene	95-50-1	2 / 12	0.2 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
2-Methylnaphthalene	91-57-6	2 / 12	0.19	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Anthracene	120-12-7	1 / 12	0.022 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)anthracene	56-55-3	1 / 12	0.045	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(a)pyrene	50-32-8	2 / 12	0.071	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(b)fluoranthene	205-99-2	2 / 12	0.071	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Benzo(g,h,i)perylene	191-24-2	2 / 12	0.059	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Chrysene	218-01-9	1 / 12	0.056	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Dibenzofuran	132-64-9	2 / 12	0.052 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Fluoranthene	206-44-0	3 / 12	0.069	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Isophorone	78-59-1	1 / 12	0.068 J	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Naphthalene	91-20-3	2 / 12	0.13	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Phenanthrene	85-01-8	1 / 12	0.12	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Pyrene	129-00-0	3 / 12	0.11	NB	Yes	Detected Organic	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U
Volatile Organic Compounds (mg/kg)													
Acetone	67-64-1	1 / 4	0.031 J	NB	Yes	Detected Organic	-	-	0.022 B	-	0.031 J	0.011 B	-
Trichloroethene (TCE)	79-01-6	1 / 8	0.00032 J	NB	Yes	Detected Organic	0.043 U	0.00032 J	0.00097 U	0.00085 U	0.00087 U	0.00088 U	0.0011 U

Notes:
BOLD chemical detected above background, not an essential nutrient.
FD = Field Duplicate
ID = identification
J = Estimated value less than reporting limits.
J- = Estimated value with a low bias.
M = manually integrated compound
mg/kg = milligrams per kilogram
NB = No background
R = Rejected.
REG = Regular
TPH = Total Petroleum Hydrocarbons
U = Not detected.
UJ = Not detected and the reported limit is estimated.
SRC = Site-related chemical

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Table 4-3a Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4744-DU1-SS
Field Sample ID:										070SS-0001M-0001-SO
Lab Sample ID:										240-17230-1
Sample Date:										11/5/2012
Sample Depth:										0-1
Sample Type:										REG
Total Petroleum Hydrocarbons (mg/kg)										
TPH (C10-C20)	68476-34-6	57 J	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	57 J
TPH (C20-C34)	100664-65-1	540 M	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	540 M
Semivolatile Organic Compounds (mg/kg)										
Benzo(a)anthracene	56-55-3	0.097	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.097
Benzo(a)pyrene	50-32-8	0.13	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Exceeds Risk Screening Level	0.13
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.13
Benzo(g,h,i)perylene	191-24-2	0.31	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.31
Benzo(k)fluoranthene	207-08-9	0.04	2.21	6.5	11	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.04
Chrysene	218-01-9	0.15	22.1	65	110	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.15
Fluoranthene	206-44-0	0.13	276	163	-	163	RC	No	Below Risk Screening Criteria	0.13
Indeno(1,2,3-cd)pyrene	193-39-5	0.054	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.054
Phenanthrene	85-01-8	0.15	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.15
Pyrene	129-00-0	0.21	207	122	-	122	RC	No	Below Risk Screening Criteria	0.21

Notes:

- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
- g. See main text for discussion about TPH.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility-Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
M = manually integrated compound
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG. RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level
TPH = Total Petroleum Hydrocarbons

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Table 4-3b Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch West of Building 47-40 (DU02)

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-DD-DU2-SS
Field Sample ID:			FWCUG Resident Receptor Adult ^(a)	FWCUG Resident Receptor Child ^(b)	Resident RSL ^(c)					070SS-0002M-0001-SO
Lab Sample ID:										240-17230-2
Sample Date:										11/5/2012
Sample Depth:										0-1
Sample Type:										REG
Total Petroleum Hydrocarbons (mg/kg)										
TPH (C10-C20)	68476-34-6	120 J	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	120 J
TPH (C20-C34)	100664-65-1	750 M	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	750 M
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	0.042 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.042 J
Anthracene	120-12-7	0.03 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.03 J
Benzo(a)anthracene	56-55-3	0.18	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.18
Benzo(a)pyrene	50-32-8	0.22	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Exceeds Risk Screening Level	0.22
Benzo(b)fluoranthene	205-99-2	0.27	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.27
Benzo(g,h,i)perylene	191-24-2	0.4	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.4
Benzo(k)fluoranthene	207-08-9	0.12	2.21	6.5	11	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.12
Chrysene	218-01-9	0.23	22.1	65	110	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.23
Fluoranthene	206-44-0	0.3	276	163	-	163	RC	No	Below Risk Screening Criteria	0.3
Indeno(1,2,3-cd)pyrene	193-39-5	0.17	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.17
Naphthalene	91-20-3	0.035 J	368	122	-	122	RC		Below Risk Screening Criteria	0.035 J
Phenanthrene	85-01-8	0.12	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.12
Pyrene	129-00-0	0.28	207	122	-	122	RC	No	Below Risk Screening Criteria	0.28

Notes:

- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
- g. See main text for discussion about TPH.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
M = manually integrated compound
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG. RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level
TPH = Total Petroleum Hydrocarbons

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Table 4-3c Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-DU3-SS
Field Sample ID:										070SS-0003M-0001-SO
Lab Sample ID:										240-17230-3
Sample Date:										11/5/2012
Sample Depth:										0-1
Sample Type:										REG
TAL Metals (mg/kg)										
Barium	7440-39-3	93	8,966	1,413	-	1,413	RC	No	Below Risk Screening Criteria	93
Beryllium	7440-41-7	0.91	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	0.91
Cadmium	7440-43-9	0.26	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.26
Chromium	7440-47-3	26	19,694	8,147	-	8,147	RC	No	Below Risk Screening Criteria	26
Copper	7440-50-8	21	2,714	311	-	311	RC	No	Below Risk Screening Criteria	21
Lead	7439-92-1	45	NG	NG	400	400	RRSL	No	Below Risk Screening Criteria	45
Nickel	7440-02-0	29	1,346	155	-	155	RC	No	Below Risk Screening Criteria	29
Silver	7440-22-4	0.035 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.035 J
Thallium	7440-28-0	0.17 J	4.76	0.612	-	0.612	RC	No	Below Risk Screening Criteria	0.17 J
Zinc	7440-66-6	76	19,659	2,321	-	2,321	RC	No	Below Risk Screening Criteria	76
Polychlorinated Biphenyls (PCBs) (mg/kg)										
Aroclor-1254	11097-69-1	0.047 J	0.203	0.12	-		RC	No	Below Risk Screening Criteria	0.047 J
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	0.69	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.54
Acenaphthene	83-32-9	0.55	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.55
Acenaphthylene	208-96-8	0.066	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.047 J
Anthracene	120-12-7	2.5	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	2.5
Benzo(a)anthracene	56-55-3	3.2	0.221	0.65	1.1	1.1	RRSL ^(f)	Yes	Exceeds Risk Screening Level	3.2
Benzo(a)pyrene	50-32-8	1.9	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Exceeds Risk Screening Level	1.9
Benzo(b)fluoranthene	205-99-2	3.1	0.221	0.65	1.1	1.1	RRSL ^(f)	Yes	Exceeds Risk Screening Level	3.1
Benzo(g,h,i)perylene	191-24-2	1.1	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	1.1
Benzo(k)fluoranthene	207-08-9	0.98	2.21	11	-	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.98
Carbazole	86-74-8	0.34 J	69.4	44.6	-	44.6	RC	No	Below Risk Screening Criteria	0.34 J
Chrysene	218-01-9	3.3	22.1	110	-	110	RRSL ^(f)	No	Below Risk Screening Criteria	3.3
Dibenzofuran	132-64-9	0.42 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.42 J
Fluoranthene	206-44-0	8.4	276	163	-	163	RC	No	Below Risk Screening Criteria	8.4
Fluorene	86-73-7	0.71	737	243	-	243	RC	No	Below Risk Screening Criteria	0.71
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	1
Naphthalene	91-20-3	0.49	368	122	-	122	RC	No	Below Risk Screening Criteria	0.48
Phenanthrene	85-01-8	5.9	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	5.9
Pyrene	129-00-0	5.7	207	122	-	122	RC	No	Below Risk Screening Criteria	5.7

Notes:

- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

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Table 4-3d Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4760-DU5-SS
Field Sample ID:			FWCUG Resident Receptor Adult ^(a)	FWCUG Resident Receptor Child ^(b)	Resident RSL ^(c)					070SS-0004M-0001-SO
Lab Sample ID:										240-17230-4
Sample Date:										11/5/2012
Sample Depth:										0-1
Sample Type:										REG
Organochlorine Pesticides (mg/kg)										
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	0.01 J	NG	NG	63	63	RRS:	No	Below Risk Screening Criteria	0.01 J
Semivolatile Organic Compounds (mg/kg)										
2-Methylnaphthalene	91-57-6	0.42	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.42
Acenaphthene	83-32-9	0.14	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.14
Acenaphthylene	208-96-8	0.065	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.065
Anthracene	120-12-7	0.42	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.42
Benzo(a)anthracene	56-55-3	0.75	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.75
Benzo(a)pyrene	50-32-8	0.46	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Exceeds Risk Screening Level	0.46
Benzo(b)fluoranthene	205-99-2	0.95	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.95
Benzo(g,h,i)perylene	191-24-2	0.31	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.31
Benzo(k)fluoranthene	207-08-9	0.31	2.21	11	-	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.31
Chrysene	218-01-9	1.1	22.1	110	-	110	RRSL ^(f)	No	Below Risk Screening Criteria	1.1
Dibenzofuran	132-64-9	0.17 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.17 J
Fluoranthene	206-44-0	1.8	276	163	-	163	RC	No	Below Risk Screening Criteria	1.8
Fluorene	86-73-7	0.16	737	243	-	243	RC	No	Below Risk Screening Criteria	0.16
Indeno(1,2,3-cd)pyrene	193-39-5	0.28	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.28
Naphthalene	91-20-3	0.27	368	122	-	122	RC	No	Below Risk Screening Criteria	0.27
Phenanthrene	85-01-8	1.2	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	1.2
Pyrene	129-00-0	1.3	207	122	-	122	RC	No	Below Risk Screening Criteria	1.3

Notes:

- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
M = manually integrated compound
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG. RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level

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Table 4-3e Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4759-DU6-SS	70-4740-SB107		70-4740-SS108	
											070SS-0005M-0001-SO	070SS-107-0075-S0	070SS-107-9075-S0	070SS-108-0081-SO
Explosives / Propellants (mg/kg)														
2,6-Dinitrotoluene	606-20-2	0.05 J	0.769	1.1	-	0.769	RC	No	Below Risk Screening Criteria	0.05 J	0.016 UJ	0.016 UJ	0.015 U	
Polychlorinated Biphenyls (PCBs) (mg/kg)														
Aroclor-1260	11096-82-5	0.07 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.07 J	0.012 U	0.011 U	0.013 U	
Semivolatile Organic Compounds (mg/kg)														
1,2-Dichlorobenzene	95-50-1	0.081 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.081 J	2.3 U	0.11 U	3.2 U	
2-Methylnaphthalene	91-57-6	0.69	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.69	2.3 U	0.11 U	3.2 U	
Acenaphthylene	208-96-8	0.066	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.066	2.3 U	0.11 U	3.2 U	
Anthracene	120-12-7	0.08	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.08	2.3 U	0.11 U	3.2 U	
Benzo(a)anthracene	56-55-3	0.21	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.21	2.3 U	0.11 U	3.2 U	
Benzo(a)pyrene	50-32-8	0.21	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Exceeds Risk Screening Level	0.21	2.3 U	0.11 U	3.2 U	
Benzo(b)fluoranthene	205-99-2	0.36	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.36	2.3 U	0.11 U	3.2 U	
Benzo(g,h,i)perylene	191-24-2	0.38	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.38	2.3 U	0.11 U	3.2 U	
Benzo(k)fluoranthene	207-08-9	0.19	2.21	11	-	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.19	2.3 U	0.11 U	3.2 U	
Benzoic acid	65-85-0	12 J	NG	NG	25,000	25,000	RRSL	No	Below Risk Screening Criteria	1.3 U	12 J	0.75 UJ	21 U	
Chrysene	218-01-9	0.32	22.1	110	-	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.32	2.3 U	0.11 U	3.2 U	
Dibenzofuran	132-64-9	0.16 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.16 J	2.3 U	0.11 U	3.2 U	
Fluoranthene	206-44-0	0.41	276	163	-	163	RC	No	Below Risk Screening Criteria	0.41	2.3 U	0.11 U	3.2 U	
Indeno(1,2,3-cd)pyrene	193-39-5	0.17	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.17	2.3 U	0.11 U	3.2 U	
Naphthalene	91-20-3	0.49	368	122	-	122	RC	No	Below Risk Screening Criteria	0.49	2.3 U	0.11 U	3.2 U	
Phenanthrene	85-01-8	0.32	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.32	2.3 U	0.11 U	3.2 U	
Pyrene	129-00-0	0.33	207	122	-	122	RC	No	Below Risk Screening Criteria	0.33	2.3 U	0.11 U	3.2 U	

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
M = manually integrated compound
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG. RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level

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Table 4-3f Site-Related Chemicals Exceeding FWCUGs in Surface Soil for CC RVAAP-70 East Classification Yard, Drainage Ditch East of Building 47-40 (DU07)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-CDD-DU7-SS	
			FWCUG Resident Receptor Adult ^(a)	FWCUG Resident Receptor Child ^(b)	Resident RSL ^(c)					070SS-0006M-0001-SO	070SS-0007M-0001-SO
										240-17230-6	240-17230-7
										11/5/2012	11/5/2012
										0-1	0-1
REG	FD										
TAL Metals (mg/kg)											
Antimony	7440-36-0	2.1 J -	13.6	2.82	-	2.82	RC	No	Below Risk Screening Criteria	2.1 J -	1.5
Arsenic	7440-38-2	29	0.425	0.524	0.68	0.425	RA	Yes	Exceeds Risk Screening Level	29	27
Barium	7440-39-3	110	8,966	1,413	-	1,413	RC	No	Below Risk Screening Criteria	110	94
Beryllium	7440-41-7	1.1	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	1.1	1
Cadmium	7440-43-9	0.47 J	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.47 J	0.44
Chromium	7440-47-3	83 J -	19,694	8,147	-	8,147	RC	No	Below Risk Screening Criteria	83 J -	30 J
Cobalt	7440-48-4	14	803	131	-	131	RC	No	Below Risk Screening Criteria	14	12
Copper	7440-50-8	43 J-	2,714	311	-	311	RC	No	Below Risk Screening Criteria	43 J-	31
Lead	7439-92-1	270 J	NG	NG	400	400	RRSL	No	Below Risk Screening Criteria	270 J	59 J
Nickel	7440-02-0	49 J	1,346	155	-	155	RC	No	Below Risk Screening Criteria	49 J	38
Selenium	7782-49-2	1.7	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	1.4 J-	1.7
Silver	7440-22-4	0.054 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.054 J	0.052 J
Thallium	7440-28-0	0.35	4.76	0.612	-	0.612	RC	No	Below Risk Screening Criteria	0.35	0.27
Zinc	7440-66-6	160	19,659	2,321	-	2,321	RC	No	Below Risk Screening Criteria	160	150
Explosives / Propellants (mg/kg)											
Nitrocellulose	9004-70-0	1.6 J	NG	NG	19,000,000	19,000,000	RRSL	No	Below Risk Screening Criteria	1.6 J	1.3 J
Total Petroleum Hydrocarbons (mg/kg)											
TPH (C10-C20)	68476-34-6	42	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	36	42
TPH (C20-C34)	100664-65-1	210 M	NG	NG	NA	NA	NA ^(g)	No	Below Risk Screening Criteria	170 M	210 M
Organochlorine Pesticides (mg/kg)											
4,4'-DDE	72-55-9	0.014 J	4.08	2.63	-	2.63	RC	No	Below Risk Screening Criteria	0.014 J	-
4,4'-DDT	50-29-3	0.037 J	NG	NG	1.9	1.9	RRSL	No	Below Risk Screening Criteria	0.037 J	-
Polychlorinated Biphenyls (PCBs) (mg/kg)											
Aroclor-1242	53469-21-9	0.59 J	NG	NG	0.23	0.23	RRSL	No	Below Risk Screening Criteria	0.59 J	0.035 U
Aroclor-1248	12672-29-6	0.17	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.19 U	0.17
Aroclor-1260	11096-82-5	0.061 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.19 U	0.061 J
Semivolatile Organic Compounds (mg/kg)											
2-Methylnaphthalene	91-57-6	0.44	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.44	0.37
Acenaphthene	83-32-9	0.096 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.063 J	0.096 J
Anthracene	120-12-7	0.15	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.12	0.15
Benzo(a)anthracene	56-55-3	0.32	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.25	0.32
Benzo(a)pyrene	50-32-8	0.27	0.022	0.065	0.11	0.11	RRSL ^(f)	Yes	Detected Organic	0.2	0.27
Benzo(b)fluoranthene	205-99-2	0.42	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.31	0.42
Benzo(g,h,i)perylene	191-24-2	0.27	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.2	0.27
Benzo(k)fluoranthene	207-08-9	0.17	2.21	11	-	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.14	0.17
Chrysene	218-01-9	0.38	22.1	110	-	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.31	0.38
Dibenzofuran	132-64-9	0.14 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.14 J	0.14 J
Fluoranthene	206-44-0	0.86	276	163	-	163	RC	No	Below Risk Screening Criteria	0.58 J	0.86
Fluorene	86-73-7	0.11 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.059	0.11 J
Indeno(1,2,3-cd)pyrene	193-39-5	0.15	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.14	0.15
Naphthalene	91-20-3	0.34	368	122	-	122	RC	No	Below Risk Screening Criteria	0.34	0.31
Phenanthrene	85-01-8	0.92	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.66 J	0.92
Pyrene	129-00-0	0.68 J	207	122	-	122	RC	No	Below Risk Screening Criteria	0.44	0.68 J
Volatile Organic Compounds (mg/kg)											
Acetone	67-64-1	0.028 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	0.011 UJ	0.028 J

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. PAH toxicity values updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

DDE = dichlorodiphenyldichloroethylene

DDT = dichlorodiphenyldichloroethane

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

M = manually integrated compound

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

TPH = Total Petroleum Hydrocarbons

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Table 4-4a Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Fuel Oil Spill Area (DU01)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4744-DU1-SB		70-4744-DU1-SB1	70-4744-DU1-SB2	70-4744-DU1-SB3	70-4744-DU1-SB4	70-4744-DU1-SB5	70-4744-DU1-SB6		
FWCUG Resident Receptor Adult (a)			FWCUG Resident Receptor Child (b)	Resident RSL (c)	070SB-0011M-0001-SO					070SB-0012M-0001-SO	070SB-0013M-0001-SO	070SB-0014M-0001-SO	070SB-0015M-0001-SO	070SB-0016M-0001-SO	070SB-0017M-0001-SO	070SB-0042M-0001-SO	070SB-0043M-0001-SO		
240-17768-1			240-17768-2	240-17768-3	240-17768-4					240-17768-5	240-17768-6	240-17768-7	240-18581-1	240-18735-1	240-18581-2				
11/14/2012			11/14/2012	11/14/2012	11/14/2012					11/14/2012	11/14/2012	11/14/2012	12/7/2012	12/12/2012	12/7/2012				
1-4			4-7	1-7	1-7					1-7	1-7	1-7	1-7	1-7	1-7				
REG	REG	REG	REG	REG	REG	REG	REG	REG	FD										
TAL Metals (mg/kg)																			
Cadmium	7440-43-9	0.26	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.26	-	
Silver	7440-22-4	0.041 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.041 J	-	
Explosives / Propellants (mg/kg)																			
Nitrobenzene	98-95-3	0.096 J	NG	NG	5.1	5.1	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.096 J	-	
Total Petroleum Hydrocarbons (mg/kg)																			
TPH (C6-C12)	68439-45-2	190	NG	NG	NA	NA	NA (g)	No	Below Risk Screening Criteria	0.053 U	160	0.14	190	0.051 U	0.055 U	0.058 U	-	0.049 U	0.98
TPH (C10-C20)	68476-34-6	4,000	NG	NG	NA	NA	NA (g)	No	Below Risk Screening Criteria	34	900	46	4,000	34	46	38	370	-	350
TPH (C20-C34)	100664-65-1	430	NG	NG	NA	NA	NA (g)	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	430	-	400
Semivolatile Organic Compounds (mg/kg)																			
2-Methylnaphthalene	91-57-6	18	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.02 J	3.7	0.021 U	18	0.026 J	0.041 U	0.02 U	0.84 J	-	0.83
4-Nitroaniline	100-01-6	0.33 J	NG	NG	25	25	RRSL	No	Below Risk Screening Criteria	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 U	-	0.34 U
Acenaphthene	83-32-9	4.6	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.015 U	1.1	0.021 U	4.6	0.022 U	0.041 U	0.02 U	0.47	-	0.33
Acenaphthylene	208-96-8	0.098	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 U	0.02 U	0.098	-	0.076 J
Anthracene	120-12-7	0.71	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.71	0.022 U	0.041 U	0.02 U	0.041 U	-	0.041 U
Benzo(a)anthracene	56-55-3	1.7	0.221	0.65	1.1	1.1	RRSL (f)	Yes	Exceeds Risk Screening Level	0.015 U	0.44	0.021 U	1.7	0.022 U	0.041 U	0.02 U	0.17	-	0.19
Benzo(a)pyrene	50-32-8	0.88	0.022	0.065	0.11	0.11	RRSL (f)	Yes	Exceeds Risk Screening Level	0.015 U	0.4	0.077	0.88	0.022 U	0.041 U	0.02 U	0.051 J	-	0.064 J
Benzo(b)fluoranthene	205-99-2	0.37	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.37	0.022 U	0.041 U	0.02 U	0.042 J	-	0.041 J
Benzo(g,h,i)perylene	191-24-2	0.7	207 (d)	-	122 (d)	122 (d)	RC	No	Below Risk Screening Criteria	0.015 U	0.17	0.056	0.7	0.022 U	0.041 U	0.02 U	0.07 J	-	0.041 UJ
Chrysene	218-01-9	1.9	22.1	65	110	110	RRSL (f)	No	Below Risk Screening Criteria	0.015 U	0.38	0.021 U	1.9	0.022 U	0.041 U	0.02 U	0.23 J	-	0.12 J
Dibenz(a,h)anthracene	53-70-3	0.041 J	0.022	0.065	0.11	0.11	RRSL (f)	No	Below Risk Screening Criteria	0.015 U	0.081 U	0.021 U	0.078 U	0.022 U	0.041 J	0.02 U	0.041 UJ	-	0.041 U
Dibenzofuran	132-64-9	2.8	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.015 U	0.58 J	0.021 U	2.8	0.022 U	0.041 U	0.02 U	0.31 J	-	0.23 J
Fluoranthene	206-44-0	1.8	276	163	-	163	RC	No	Below Risk Screening Criteria	0.017 J	0.47	0.022 J	1.8	0.022 U	0.041 U	0.02 U	0.21 J	-	0.15 J
Fluorene	86-73-7	7.6	737	243	-	243	RC	No	Below Risk Screening Criteria	0.015 U	1.7	0.021 U	7.6	0.022 U	0.041 U	0.02 U	0.8 J	-	0.63
Naphthalene	91-20-3	1	368	122	-	122	RC	No	Below Risk Screening Criteria	0.015 U	0.22	0.021 U	1	0.022 U	0.041 U	0.02 U	0.062 J	-	0.064 J
n-Nitrosodiphenylamine	86-30-6	0.33 J	NG	NG	110	110	RRSL	No	Below Risk Screening Criteria	0.13 U	0.67 U	0.17 U	0.65 U	0.18 U	0.33 J	0.16 U	0.33 UJ	-	0.34 UJ
Phenanthrene	85-01-8	12	NG	NG	1,800 (e)	1,800 (e)	RRSL	No	Below Risk Screening Criteria	0.033	3	0.044	12	0.022 U	0.041 U	0.02 U	1.2	-	1
Pyrene	129-00-0	11	207	122	-	122	RC	No	Below Risk Screening Criteria	0.03 J	2.7	0.035 J	11	0.022 U	0.041 U	0.02 U	1.2	-	0.91
Volatile Organic Compounds (mg/kg)																			
2-Butanone (MEK)	78-93-3	0.0062 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	0.0022 UJ	0.19 UJ	0.0021 UJ	0.093 UJ	0.002 U	0.0022 U	0.0024 U	0.0062 J	-	0.0055 J
Acetone	67-64-1	0.024	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	0.0068 UJ	0.39 UJ	0.0065 UJ	0.19 UJ	0.0065 U	0.0071 U	0.0077 U	0.024	-	0.0068 U
Benzene	71-43-2	0.00084 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.048 UJ	0.00052 UJ	0.023 UJ	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.00073 J	-	0.00084 J
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.048 UJ	0.0031 J	0.023 UJ	0.00051 UJ	0.0036 J	0.0036 J	0.00045 U	-	0.00054 U
Ethylbenzene	100-41-4	0.79 J	NG	NG	5.8	5.8	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.79 J	0.00052 UJ	0.35 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0047	-	0.0047 J
Methylene chloride	75-09-2	0.0025 J	NG	NG	35	35	RRSL	No	Below Risk Screening Criteria	0.00091 J	0.19 UJ	0.0022 J	0.093 UJ	0.0025 J	0.0011 UJ	0.0012 UJ	0.00089 U	-	0.0011 U
Toluene	108-88-3	0.063 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	0.00054 UJ	0.063 J	0.00052 UJ	0.026 J	0.00051 UJ	0.00056 UJ	0.00061 UJ	0.0027 J	-	0.0019 J
Xylenes, Total	1330-20-7	2.6 J	NG	NG	58	58	RRSL	No	Below Risk Screening Criteria	0.0016 UJ	2.6 J	0.0016 UJ	1.2 J	0.0015 UJ	0.0017 UJ	0.0018 UJ	0.02	-	0.02

- Notes:
- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
- g. See main text for discussion about TPH.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

TPH = Total Petroleum Hydrocarbons

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Table 4-4b Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03)

Location ID: Field Sample ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-DU3-SB		70-4740-DU3-SB1		70-4740-DU3-SB2	
Lab Sample ID:			FWCUG Resident Receptor Adult ^(a)	FWCUG Resident Receptor Child ^(b)	Resident RSL ^(c)					070SB-0019M-0001-SO	070SB-0020M-0001-SO	070SB-0021M-0001-SO	070SB-0026-0001-SO	070SB-0022M-0001-SO	
Sample Date:										240-17669-1	240-17669-2	240-17669-3	240-17669-8	240-17669-4	
Sample Depth:										11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	
Sample Type:										1-4	4-7	1-7	7-13	1-13	
										REG	REG	REG	REG	REG	
TAL Metals (mg/kg)															
Cadmium	7440-43-9	0.21	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.19	0.18	0.16	0.024 J	0.17	
Silver	7440-22-4	0.039 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.032 J	0.026 J	0.039 J	0.026 U	0.021 J	
Semivolatile Organic Compounds (mg/kg)															
2-Methylnaphthalene	91-57-6	0.035 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0044 J	
Acenaphthene	83-32-9	0.0047 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.016 U	0.0047 J	0.016 U	0.0037 U	0.0033 U	
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.019 J	0.0049 J	0.016 U	0.0037 U	0.0033 U	
Benzo(a)anthracene	56-55-3	0.09	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.09	0.0063 J	0.031 J	0.0037 U	0.0033 U	
Benzo(a)pyrene	50-32-8	0.09	0.022	0.065	0.11	0.11	RRSL ^(f)	No	Below Risk Screening Criteria	0.09	0.0043 J	0.016 U	0.0037 U	0.0033 U	
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.13	0.0063 J	0.016 U	0.0037 U	0.0033 U	
Benzo(g,h,i)perylene	191-24-2	0.055	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.055	0.0052 J	0.016 U	0.0037 U	0.0033 U	
Benzo(k)fluoranthene	207-08-9	0.062	2.21	6.5	11	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.062	0.0043 J	0.016 U	0.0037 U	0.0033 U	
Bis(2-ethylhexyl)phthalate	117-81-7	0.029 J	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.13 U	0.027 J	0.13 U	0.029 J	0.027 U	
Chrysene	218-01-9	0.029 J	22.1	65	110	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.11	0.0058 J	0.016 U	0.0037 U	0.0033 U	
Dibenzofuran	132-64-9	0.0054 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.016 U	0.0054 J	0.016 U	0.0037 U	0.0033 U	
Fluoranthene	206-44-0	0.22	276	163	-	163	RC	No	Below Risk Screening Criteria	0.22	0.0049 J	0.043	0.0037 U	0.0033 U	
Fluorene	86-73-7	0.0044 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.016 U	0.0044 J	0.016 U	0.0037 U	0.0033 U	
Indeno(1,2,3-cd)pyrene	193-39-5	0.053	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.053	0.0049 J	0.016 U	0.0037 U	0.0033 U	
Naphthalene	91-20-3	0.0056 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.016 U	0.0034 U	0.016 U	0.0037 U	0.0048 J	
Phenanthrene	85-01-8	0.1	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.1	0.0069	0.017 J	0.0037 U	0.0033 U	
Pyrene	129-00-0	0.16	207	122	-	122	RC	No	Below Risk Screening Criteria	0.16	0.0048 J	0.034	0.0037 U	0.0033 U	
Volatile Organic Compounds (mg/kg)															
2-Butanone (MEK)	78-93-3	0.0046 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	
Acetone	67-64-1	0.019 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	
Benzene	71-43-2	0.0004 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	
Carbon disulfide	75-15-0	0.00063 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	
Toluene	108-88-3	0.0025 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	

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Table 4-4b Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Exterior (DU03) Cont.

Location ID: Field Sample ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-DU3-SB3	70-4740-DU3-SB4	70-4740-DU3-SB5	70-4740-DU3-SB6		
Lab Sample ID:			FWCUG Resident Receptor	FWCUG Resident Receptor	Resident RSL ^(c)					070SB-0023M-0001-SO	070SB-0024M-0001-SO	070SB-0025M-0001-SO	070SB-0046M-0001-SO	070SB-0047M-0001-SO	
Sample Date:			Adult ^(a)	Child ^(b)						240-17669-5	240-17669-6	240-17669-7	240-18581-5	240-18581-6	
Sample Depth:										11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012	
Sample Type:											1-7	1-7	1-7	1-7	1-7
											REG	REG	REG	REG	FD
TAL Metals (mg/kg)															
Cadmium	7440-43-9	0.21	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.18	0.21	0.21	0.17	0.17	
Silver	7440-22-4	0.039 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.03 J	0.032 J	0.029 J	0.03 J	0.029 J	
Semivolatile Organic Compounds (mg/kg)															
2-Methylnaphthalene	91-57-6	0.035 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0054 J	0.0034 U	0.0044 J	0.037 U	0.035 J	
Acenaphthene	83-32-9	0.0047 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U	
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U	
Benzo(a)anthracene	56-55-3	0.09	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.0084	0.0034 U	0.037 U	0.034 U	
Benzo(a)pyrene	50-32-8	0.09	0.022	0.065	0.11	0.11	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.0069	0.0034 U	0.037 U	0.034 U	
Benzo(b)fluoranthene	205-99-2	0.13	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.013	0.0034 U	0.037 U	0.034 U	
Benzo(g,h,i)perylene	191-24-2	0.055	207 ^(d)	122 ^(d)	-	122 ^(d)	RC	No	Below Risk Screening Criteria	0.0034 U	0.0055 J	0.0034 U	0.037 UJ	0.034 UJ	
Benzo(k)fluoranthene	207-08-9	0.062	2.21	6.5	11	11	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.008	0.0034 U	0.037 U	0.034 U	
Bis(2-ethylhexyl)phthalate	117-81-7	0.029 J	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.019 J	0.028 U	0.028 U	0.31 U	0.27 U	
Chrysene	218-01-9	0.029 J	22.1	65	110	110	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.021	0.0034 U	0.037 U	0.034 U	
Dibenzofuran	132-64-9	0.0054 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U	
Fluoranthene	206-44-0	0.22	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0034 U	0.016	0.0034 U	0.037 UJ	0.034 UJ	
Fluorene	86-73-7	0.0044 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.0034 U	0.0034 U	0.0034 U	0.037 U	0.034 U	
Indeno(1,2,3-cd)pyrene	193-39-5	0.053	0.221	0.65	1.1	1.1	RRSL ^(f)	No	Below Risk Screening Criteria	0.0034 U	0.0052 J	0.0034 U	0.037 U	0.034 U	
Naphthalene	91-20-3	0.0056 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0044 J	0.0052 J	0.0056 J	0.037 U	0.034 U	
Phenanthrene	85-01-8	0.1	NG	NG	1,800 ^(e)	1,800 ^(e)	RRSL	No	Below Risk Screening Criteria	0.0043 J	0.0058 J	0.0034 U	0.037 U	0.034 U	
Pyrene	129-00-0	0.16	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.012	0.0034 U	0.037 U	0.034 U	
Volatile Organic Compounds (mg/kg)															
2-Butanone (MEK)	78-93-3	0.0046 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0046 J	-	
Acetone	67-64-1	0.019 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	0.019 J	-	
Benzene	71-43-2	0.0004 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0004 J	-	
Carbon disulfide	75-15-0	0.00063 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00063 J	-	
Toluene	108-88-3	0.0025 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0025 J	-	

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

d. Pyrene was used as a surrogate.

e. Anthracene was used as a surrogate.

f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

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Table 4-4c Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04)

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)				Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-DU4-SB		70-4740-DU4-SB1	70-4740-DU4-SB2	70-4740-DU4-SB3	70-4740-DU4-SB4	70-4740-DU4-SB5
Field Sample ID:			FWCUG Resident Receptor Adult ^(a)	FWCUG Resident Receptor Child ^(b)	Resident RSL ^(c)	070SS-0048M-0001-SO					070SB-0049M-0001-SO	070SB-0050M-0001-SO	070SB-0051M-0001-SO	070SB-0052M-0001-SO	070SB-0053M-0001-SO	070SB-0054M-0001-SO	070SB-0054M-0001-SO
Lab Sample ID:																	
Sample Date:																	
Sample Depth:																	
Sample Type:																	
TAL Metals (mg/kg)																	
Cadmium	7440-43-9	0.17	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.17	0.099 J	0.13	0.12	0.13	0.11	0.16	
Cobalt	7440-48-4	50	803	131	-	131	RC	No	Below Risk Screening Criteria	50	7.3	28	32	14	8.7	12	
Selenium	7782-49-2	1.8	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	0.35 J	0.24 J	0.33 J	0.26 J	0.27 J	0.24 J	0.43 J	
Silver	7440-22-4	0.03 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.03 J	0.015 J	0.018 J	0.017 J	0.02 J	0.017 J	0.027 J	
Semivolatile Organic Compounds (mg/kg)																	
2-Methylnaphthalene	91-57-6	0.0053 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0034 U	0.0033 U	0.0053 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Acenaphthene	83-32-9	0.012	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.012	0.0033 U	0.0033 U	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Butyl benzyl phthalate	85-68-7	0.016 J	NG	NG	290	290	RRSL	No	Below Risk Screening Criteria	0.016 J	0.027 U	0.027 U	0.27 UJ	0.27 UJ	0.11 U	0.11 U	
Dibenzofuran	132-64-9	0.0039 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.0034 U	0.0033 U	0.0039 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Fluoranthene	206-44-0	0.008 J	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0078 J	0.0033 UJ	0.008 J	0.033 UJ	0.033 UJ	0.013 UJ	0.013 UJ	
Fluorene	86-73-7	0.0034 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.019	0.0033 U	0.0034 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Naphthalene	91-20-3	0.0057 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.0039 J	0.0057 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Phenanthrene	85-01-8	0.039	NG	NG	1,800 ^(d)	1,800 ^(d)	RRSL	No	Below Risk Screening Criteria	0.039	0.0033 U	0.014	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Pyrene	129-00-0	0.0089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0089	0.0033 U	0.0043 J	0.033 UJ	0.033 UJ	0.013 U	0.013 U	
Volatile Organic Compounds (mg/kg)																	
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	
Chlorobenzene	108-90-7	0.003 J	NG	NG	28	28	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	
Trichloroethene (TCE)	79-01-6	0.00054 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	

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Table 4-4c Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Building 47-40 Round House – Interior (DU04) Cont.

Location ID:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)				Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-SB101			70-4740-SB102				70-4740-SB103		70-4740-SB104
Field Sample ID:			070SB-101-0062-SO	070SB-101-0063-SO	070SB-101-0064-SO	070SB-102-0065-SO					070SB-102-0066-SO	070SB-102-9066-SO	070SB-102-0067-SO	070SB-103-0069-SO	070SB-103-0070-SO	070SB-104-0072-SO				
Lab Sample ID:			160-26618-1	160-26618-2	160-26618-3	160-26618-4					160-26618-5	160-26618-6	160-26618-7	160-26663-2	160-26663-3	160-26639-1				
Sample Date:			2/2/2018	2/2/2018	2/2/2018	2/2/2018					2/2/2018	2/2/2018	2/2/2018	2/6/2018	2/6/2018	2/5/2018				
Sample Depth:			2-4	4-6	6-7	2-4					4-6	4-6	6-8	2-4	4-7	2-4				
Sample Type:			REG	REG	REG	REG					REG	FD	REG	REG	REG	REG				
TAL Metals (mg/kg)																				
Cadmium	7440-43-9	0.17	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	0.12 U	0.13 U	0.13 U	0.089 J	0.14 U	0.13 U	0.13 U	-	-	-	
Cobalt	7440-48-4	50	803	131	-	131	RC	No	Below Risk Screening Criteria	8.7	11	14	8.9	14	12	13	-	-	-	
Selenium	7782-49-2	1.8	NG	NG	39	39	RRSL	No	Below Risk Screening Criteria	1.3	1.8	1.8	1.4	1.4	1.5	1.3	-	-	-	
Silver	7440-22-4	0.03 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	0.38 U	0.41 U	0.4 U	0.41 U	0.43 U	0.39 U	0.39 U	-	-	-	
Semivolatile Organic Compounds (mg/kg)																				
2-Methylnaphthalene	91-57-6	0.0053 J	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Acenaphthene	83-32-9	0.012	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Butyl benzyl phthalate	85-68-7	0.016 J	NG	NG	290	290	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Dibenzofuran	132-64-9	0.0039 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Fluoranthene	206-44-0	0.008 J	276	163	-	163	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Fluorene	86-73-7	0.0034 J	737	243	-	243	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Naphthalene	91-20-3	0.0057 J	368	122	-	122	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Phenanthrene	85-01-8	0.039	NG	NG	1,800 ^(a)	1,800 ^(a)	RRSL	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Pyrene	129-00-0	0.0089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.12 U	0.11 U	-	-	-	
Volatile Organic Compounds (mg/kg)																				
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	0.015 J	0.01 U	0.014 J	0.0092 U	0.0099 U	0.011 U	0.011 U	-	0.023 J	-	
Carbon disulfide	75-15-0	0.0036 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	0.0012 J	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U	
Chlorobenzene	108-90-7	0.003 J	NG	NG	28	28	RRSL	No	Below Risk Screening Criteria	0.001 J	0.001 U	0.003 J	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00085 U	0.00075 U	0.001 U	
Trichloroethene (TCE)	79-01-6	0.00054 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	0.00095 U	0.001 U	0.00095 U	0.00092 U	0.00099 U	0.0011 U	0.0011 U	0.00041 J	0.00075 U	0.00054 J	

Notes:

a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.

c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.

e. Anthracene was used as a surrogate.

f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.

Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk

FWCUG = Facility Wide Cleanup Goal

HQ = Hazard Quotient

ID = identification

J = Estimated value

mg/kg = milligrams per kilogram

NA = not available

NG = No FWCUG. RSL used if available.

RA = Resident Receptor Adult

RC = Resident Receptor Child

RRSL = Residential Regional Screening Level

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Table 4-4d Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Former Herbicide Storage Shed (DU05)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4760-DU5-SB		70-4760-DU5-SB1	70-4760-DU5-SB2	70-4760-DU5-SB3	70-4760-DU5-SB4	70-4760-DU5-SB5	70-4760-DU5-SB6	
			FWCUG Resident Receptor Adult (a)	FWCUG Resident Receptor Child (b)	Resident RSL (c)					070SB-0027M-0001-SO	070SB-0028M-0001-SO	070SB-0029M-0001-SO	070SB-0030M-0001-SO	070SB-0031M-0001-SO	070SB-0032M-0001-SO	070SB-0033M-0001-SO	070SB-0044M-0001-SO	070SB-0045M-0001-SO
										240-17669-9	240-17669-10	240-17669-11	240-17669-12	240-17669-13	240-17669-14	240-17669-15	240-18581-3	240-18581-4
										11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	11/13/2012	12/7/2012	12/7/2012
										1-4	4-7	1-7	1-7	1-7	1-7	1-7	1-7	1-7
REG	REG	REG	REG	REG	REG	REG	REG	REG	FD									
TAL Metals (mg/kg)																		
Cadmium	7440-43-9	0.24	22.3	6.41	-	6.41	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.24	-
Silver	7440-22-4	0.029 J	324	38.6	-	38.6	RC	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	0.029 J	-
Total Petroleum Hydrocarbons (mg/kg)																		
TPH (C10-C20)	68476-34-6	39	NG	NG	NA	NA	NA (g)	No	Below Risk Screening Criteria	-	-	-	39	-	-	-	-	-
Organochlorine Pesticides (mg/kg)																		
2,4,5-T (Trichlorophenoxyacetic Acid)	93-76-5	0.086	NG	NG	63	63	RRSL	No	Below Risk Screening Criteria	0.0085 U	0.049	0.0086 U	0.086	0.0086 U	0.0085 U	0.0084 U	0.01 U	0.0084 U
Semivolatile Organic Compounds (mg/kg)																		
1,2-Dichlorobenzene	95-50-1	0.029 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.029 J	0.13 U	0.13 U	0.03 U	0.028 U	0.14 U	0.13 U	0.34 UJ	0.27 U
2,4,5-Trichlorophenol	95-95-4	0.14 J	NG	NG	630	630	RRSL	No	Below Risk Screening Criteria	0.028 U	0.13 U	0.13 U	0.14 J	0.028 U	0.14 U	0.13 U	0.34 U	0.27 U
2-Methylnaphthalene	91-57-6	0.082	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.0034 U	0.036	0.029 J	0.07	0.0055 J	0.057	0.016 U	0.041 U	0.082
Acenaphthylene	208-96-8	0.017 J	NG	NG	360	360	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.017 J	0.016 U	0.041 U	0.034 U
Anthracene	120-12-7	0.019 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.019 J	0.016 U	0.041 U	0.034 U
Benzo(a)anthracene	56-55-3	0.053	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.032 J	0.004 J	0.0034 U	0.053	0.016 U	0.041 U	0.034 U
Benzo(a)pyrene	50-32-8	0.059	0.022	0.065	0.11	0.11	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.034	0.0037 U	0.0034 U	0.059	0.016 U	0.041 U	0.034 U
Benzo(b)fluoranthene	205-99-2	0.1	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.052	0.0089	0.0052 J	0.1	0.016 U	0.041 U	0.034 U
Benzo(g,h,i)perylene	191-24-2	0.051	207 (d)	122 (d)	-	122 (d)	RC	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.031 J	0.0037 U	0.0034 U	0.051	0.016 U	0.041 UJ	0.034 UJ
Benzo(k)fluoranthene	207-08-9	0.04	2.21	6.5	11	11	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.04	0.016 U	0.041 U	0.034 U
Chrysene	218-01-9	0.097	22.1	65	110	110	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.04	0.009	0.0054 J	0.097	0.016 U	0.041 U	0.034 U
Fluoranthene	206-44-0	0.12	276	163	-	163	RC	No	Below Risk Screening Criteria	0.0082	0.016 U	0.065	0.008	0.0045 J	0.12	0.016 U	0.041 U	0.034 UJ
Fluorene	86-73-7	0.018	737	243	-	243	RC	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.018	0.0034 U	0.017 U	0.016 U	0.041 U	0.034 U
Indeno(1,2,3-cd)pyrene	193-39-5	0.043	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	0.0034 U	0.016 U	0.016 U	0.0037 U	0.0034 U	0.043	0.016 U	0.041 U	0.034 U
Naphthalene	91-20-3	0.07	368	122	-	122	RC	No	Below Risk Screening Criteria	0.0034 U	0.022 J	0.017 J	0.021	0.0063 J	0.05	0.016 U	0.041 U	0.07
Phenanthrene	85-01-8	0.07	NG	NG	1,800 (e)	1,800 (e)	RRSL	No	Below Risk Screening Criteria	0.0034 U	0.061	0.036	0.07	0.0043 J	0.056	0.016 U	0.041 U	0.046 J
Pyrene	129-00-0	0.089	207	122	-	122	RC	No	Below Risk Screening Criteria	0.0057 J	0.016 U	0.051	0.0078	0.0034 U	0.089	0.016 U	0.041 U	0.034 U
Volatile Organic Compounds (mg/kg)																		
2-Butanone (MEK)	78-93-3	0.012 J	NG	NG	2,700	2,700	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0017 U	-	-	-	0.012 J	-
Acetone	67-64-1	0.041 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0055 U	-	-	-	0.041 J	-
Benzene	71-43-2	0.0013 J	NG	NG	1.2	1.2	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00044 U	-	-	-	0.0013 J	-
Carbon disulfide	75-15-0	0.0027 J	NG	NG	77	77	RRSL	No	Below Risk Screening Criteria	-	-	-	0.0027 J	-	-	-	0.00057 UJ	-
Ethylbenzene	100-41-4	0.0018 J	NG	NG	5.8	5.8	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00044 U	-	-	-	0.0018 J	-
Toluene	108-88-3	0.0033 J	NG	NG	490	490	RRSL	No	Below Risk Screening Criteria	-	-	-	0.00044 U	-	-	-	0.0033 J	-

Notes:
a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
d. Pyrene was used as a surrogate.
e. Anthracene was used as a surrogate.
f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
g. See main text for discussion about TPH.
Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL
ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG, RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level
TPH = Total Petroleum Hydrocarbons

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Table 4-4e Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06)

Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4759-DU6-SB		70-4759-DU6-SB1	70-4759-DU6-SB2	70-4759-DU6-SB3	70-4759-DU6-SB4	70-4759-DU6-SB5						
FWCUG Resident Receptor Adult (^a)			FWCUG Resident Receptor Child (^b)	Resident RSL (^c)	070SB-0034M-0001-SO					070SB-0035M-0001-SO	070SB-0036M-0001-SO	070SB-0037M-0001-SO	070SB-0038M-0001-SO	070SB-0040M-0001-SO								
240-17669-16			240-17669-17	240-17669-18	240-17669-19					240-17669-20	240-17669-21	240-17669-22										
11/13/2012			11/13/2012	11/13/2012	11/13/2012					11/13/2012	11/13/2012	11/13/2012										
1-4			4-7	1-7	1-7					1-7	1-7	1-7										
REG			REG	REG	REG					REG	REG	REG										
TAL Metals (mg/kg)																						
Explosives / Propellants (mg/kg)																						
Tetryl	479-45-8	0.021 J	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	0.05 U	0.05 U	0.051 U	0.051 U	0.05 U	0.021 J	0.058 U						
Total Petroleum Hydrocarbons (mg/kg)																						
TPH (C10-C20)	68476-34-6	83	NG	NG	NA	NA	NA (^d)	No	Below Risk Screening Criteria	-	-	-	-	-	-	83						
Polychlorinated Biphenyls (PCBs) (mg/kg)																						
Aroclor-1260	11096-82-5	0.018 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	0.025 U	0.025 U	0.025 U	0.026 U	0.025 U	0.018 J	0.029 U						
Semivolatile Organic Compounds (mg/kg)																						
1,2-Dichlorobenzene	95-50-1	0.2 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	0.052 J	0.13 U	0.13 U	0.14 U	0.14 U	0.2 J	0.15 U						
2-Methylnaphthalene	91-57-6	0.19	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	0.091	0.016 U	0.016 U	0.017 U	0.017 U	0.19	0.019 U						
Anthracene	120-12-7	0.022 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.022 J	0.019 U						
Benzo(a)anthracene	56-55-3	0.045	0.221	0.65	1.1	1.1	RRSL (^f)	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.045	0.019 U						
Benzo(a)pyrene	50-32-8	0.071	0.022	0.065	0.11	0.11	RRSL (^f)	No	Below Risk Screening Criteria	0.059	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U						
Benzo(b)fluoranthene	205-99-2	0.071	0.221	0.65	1.1	1.1	RRSL (^f)	No	Below Risk Screening Criteria	0.04	0.016 U	0.016 U	0.017 U	0.017 U	0.071	0.019 U						
Benzo(g,h,i)perylene	191-24-2	0.059	207 (^d)	122 (^d)	-	122 (^d)	RC	No	Below Risk Screening Criteria	0.041	0.016 U	0.016 U	0.017 U	0.017 U	0.059	0.019 U						
Chrysene	218-01-9	0.056	22.1	65	110	110	RRSL (^f)	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.056	0.019 U						
Dibenzofuran	132-64-9	0.052 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	0.028 J	0.016 U	0.016 U	0.017 U	0.017 U	0.052 J	0.019 U						
Fluoranthene	206-44-0	0.069	276	163	-	163	RC	No	Below Risk Screening Criteria	0.04	0.016 U	0.016 U	0.018 J	0.017 U	0.069	0.019 U						
Isophorone	78-59-1	0.068 J	NG	NG	570	570	RRSL	No	Below Risk Screening Criteria	0.068 J	0.13 U	0.13 U	0.14 U	0.14 U	0.14 U	0.15 U						
Naphthalene	91-20-3	0.13	368	122	-	122	RC	No	Below Risk Screening Criteria	0.066	0.016 U	0.016 U	0.017 U	0.017 U	0.13	0.019 U						
Phenanthrene	85-01-8	0.12	NG	NG	1,800 (^e)	1,800 (^e)	RRSL	No	Below Risk Screening Criteria	0.016 U	0.016 U	0.016 U	0.017 U	0.017 U	0.12	0.019 U						
Pyrene	129-00-0	0.11	207	122	-	122	RC	No	Below Risk Screening Criteria	0.046	0.016 U	0.016 U	0.017 J	0.017 U	0.11	0.019 U						
Volatile Organic Compounds (mg/kg)																						
Acetone	67-64-1	0.031 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	0.0055 U						
Trichloroethene (TCE)	79-01-6	0.00032 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	-	-	-	-	-	-	0.00043 U						

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Table 4-4e Site-Related Chemicals Exceeding FWCUGs in Subsurface Soil for CC RVAAP-70 East Classification Yard, Outdoor Wash Rack Area (DU06) Cont.

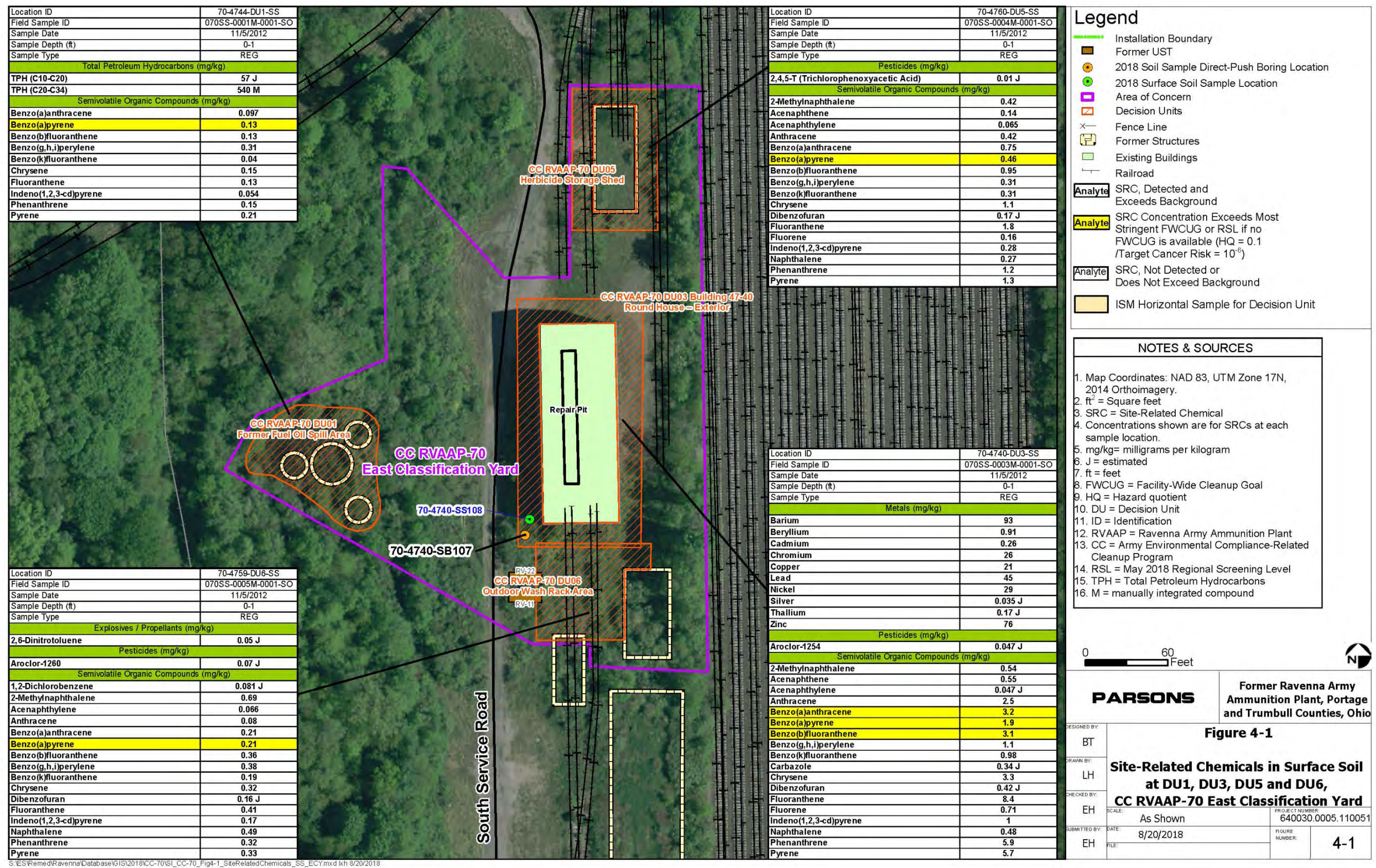
Location ID: Field Sample ID: Lab Sample ID: Sample Date: Sample Depth: Sample Type:	CAS Number	Max Detect Concentration	Screening Level (HQ = 0.1 or Risk = 10 ⁻⁶)			Risk Screening Level	Screening Level Source	Exceed? Yes/No	Exceedance Justification	70-4740-SB105	70-4740-SB106	70-4740-SB107					
070SB-105-0073-S0			070SB-106-0074-S0	070SB-107-0076-S0	070SB-107-0077-S0					070SB-107-0078-S0	070SB-107-0079-S0	070SB-107-0080-S0					
160-26639-2			160-26639-3	160-26639-5	160-26639-6					160-26639-7	160-26639-8	160-26639-9					
2/5/2018			2/5/2018	2/5/2018	2/5/2018					2/5/2018	2/5/2018	2/5/2018					
6-7			6-7	1-3	3-5					5-7	7-9	9-10					
REG			REG	REG	REG					REG	REG	REG					
TAL Metals (mg/kg)																	
Explosives / Propellants (mg/kg)																	
Tetryl	479-45-8	0.021 J	NG	NG	16	16	RRSL	No	Below Risk Screening Criteria	-	-	0.016 UJ	0.016 UJ	0.015 UJ	0.015 UJ	0.016 UJ	
Total Petroleum Hydrocarbons (mg/kg)																	
TPH (C10-C20)	68476-34-6	83	NG	NG	NA	NA	NA (g)	No	Below Risk Screening Criteria	-	-	-	-	-	-	-	
Polychlorinated Biphenyls (PCBs) (mg/kg)																	
Aroclor-1260	11096-82-5	0.018 J	0.203	0.349	-	0.203	RA	No	Below Risk Screening Criteria	-	-	0.012 U	0.012 U	0.011 U	0.011 U	0.011 U	
Semivolatile Organic Compounds (mg/kg)																	
1,2-Dichlorobenzene	95-50-1	0.2 J	NG	NG	180	180	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
2-Methylnaphthalene	91-57-6	0.19	238	30.6	-	30.6	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Anthracene	120-12-7	0.022 J	NG	NG	1,800	1,800	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Benzo(a)anthracene	56-55-3	0.045	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Benzo(a)pyrene	50-32-8	0.071	0.022	0.065	0.11	0.11	RRSL (f)	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Benzo(b)fluoranthene	205-99-2	0.071	0.221	0.65	1.1	1.1	RRSL (f)	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Benzo(g,h,i)perylene	191-24-2	0.059	207 (d)	122 (d)	-	122 (d)	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Chrysene	218-01-9	0.056	22.1	65	110	110	RRSL (f)	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Dibenzofuran	132-64-9	0.052 J	119	15.3	-	15.3	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Fluoranthene	206-44-0	0.069	276	163	-	163	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Isophorone	78-59-1	0.068 J	NG	NG	570	570	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Naphthalene	91-20-3	0.13	368	122	-	122	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Phenanthrene	85-01-8	0.12	NG	NG	1,800 (e)	1,800 (e)	RRSL	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Pyrene	129-00-0	0.11	207	122	-	122	RC	No	Below Risk Screening Criteria	-	-	0.12 U	0.11 U	0.11 U	0.11 U	0.11 U	
Volatile Organic Compounds (mg/kg)																	
Acetone	67-64-1	0.031 J	NG	NG	6,100	6,100	RRSL	No	Below Risk Screening Criteria	-	-	0.022 B	-	0.031 J	0.011 B	-	
Trichloroethene (TCE)	79-01-6	0.00032 J	NG	NG	0.41	0.41	RRSL	No	Below Risk Screening Criteria	0.043 U	0.00032 J	0.00097 U	0.00085 U	0.00087 U	0.00088 U	0.0011 U	

- Notes:
- a. FWCUG Resident Receptor Adult, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- b. FWCUG Resident Receptor Child, Lower of HQ=0.1 and ELCR=1 x 10⁻⁶.
- c. May 2018, Residential RSL, lower of HQ=0.1 and ELCR=1 x 10⁻⁶. Only shown if there is no Residential FWCUG or if max detect concentration exceeds any FWCUG.
- d. Pyrene was used as a surrogate.
- e. Anthracene was used as a surrogate.
- f. Toxicity updated in 2017; analyte was compared to the May 2018 USEPA Residential RSL.
- g. See main text for discussion about TPH.

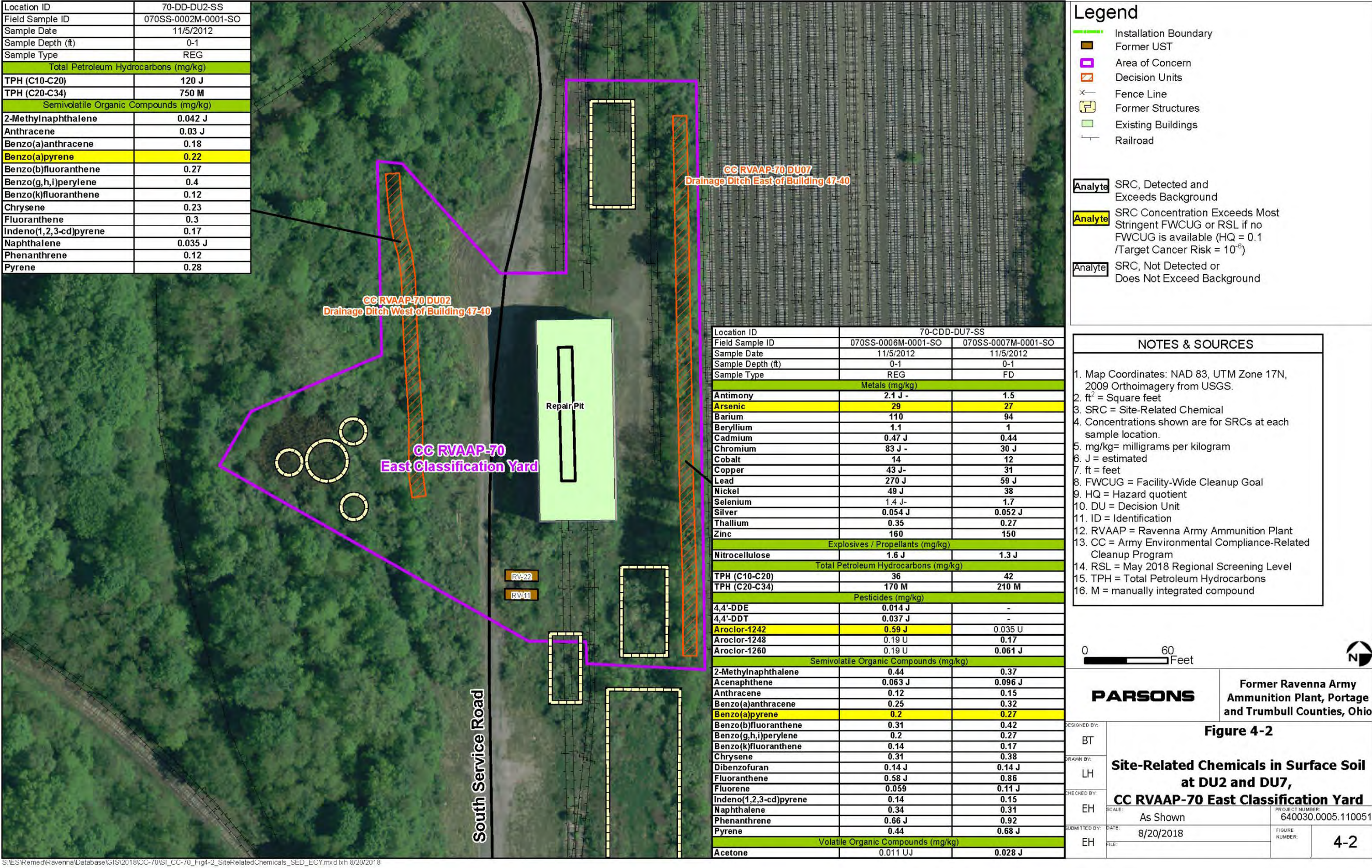
Yellow indicates SRC maximum concentration is greater than the lowest FWCUG or RSL.

ELCR = Excess Lifetime Cancer Risk
FWCUG = Facility Wide Cleanup Goal
HQ = Hazard Quotient
ID = identification
J = Estimated value
mg/kg = milligrams per kilogram
NA = not available
NG = No FWCUG. RSL used if available.
RA = Resident Receptor Adult
RC = Resident Receptor Child
RRSL = Residential Regional Screening Level
TPH = Total Petroleum Hydrocarbons

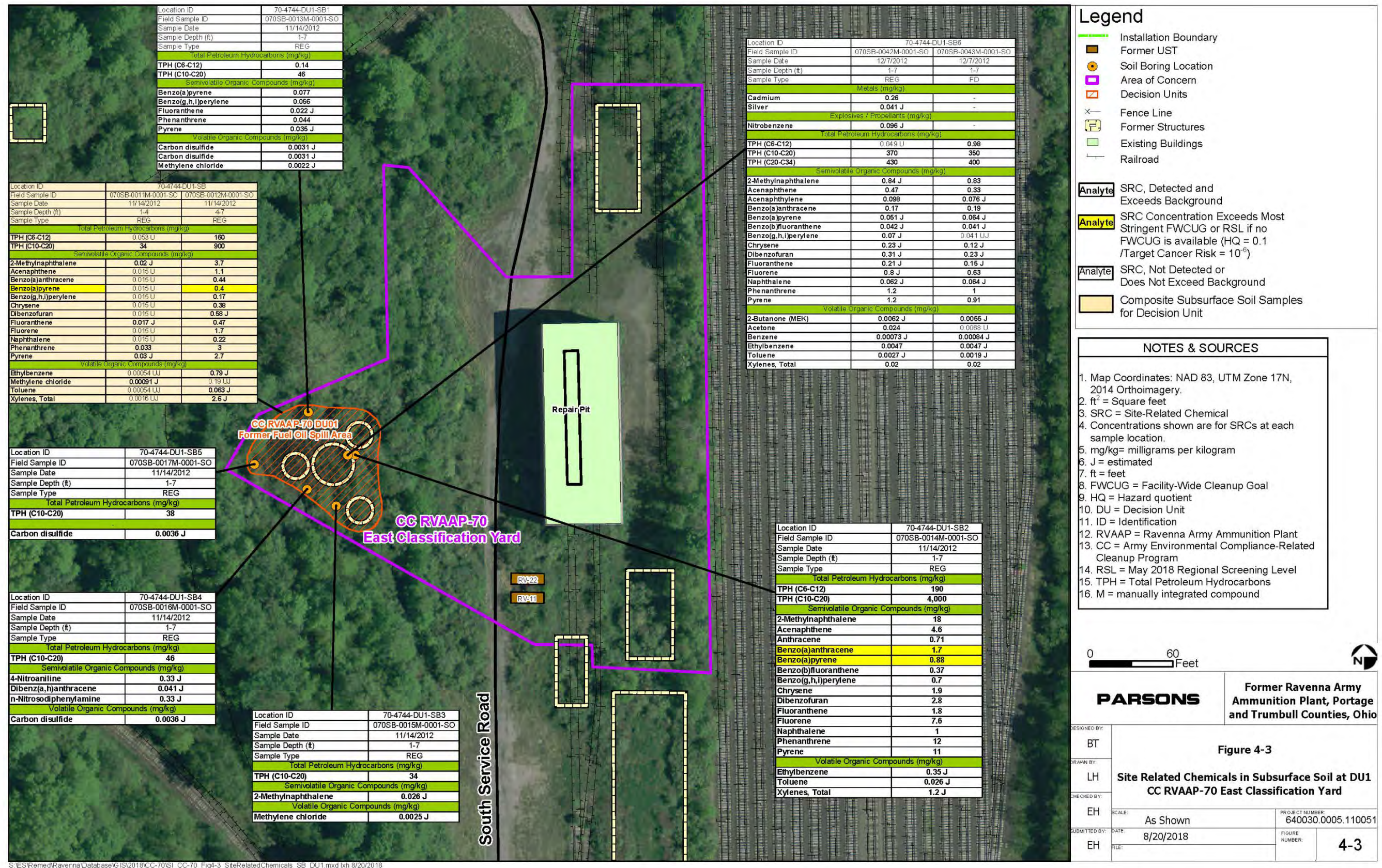
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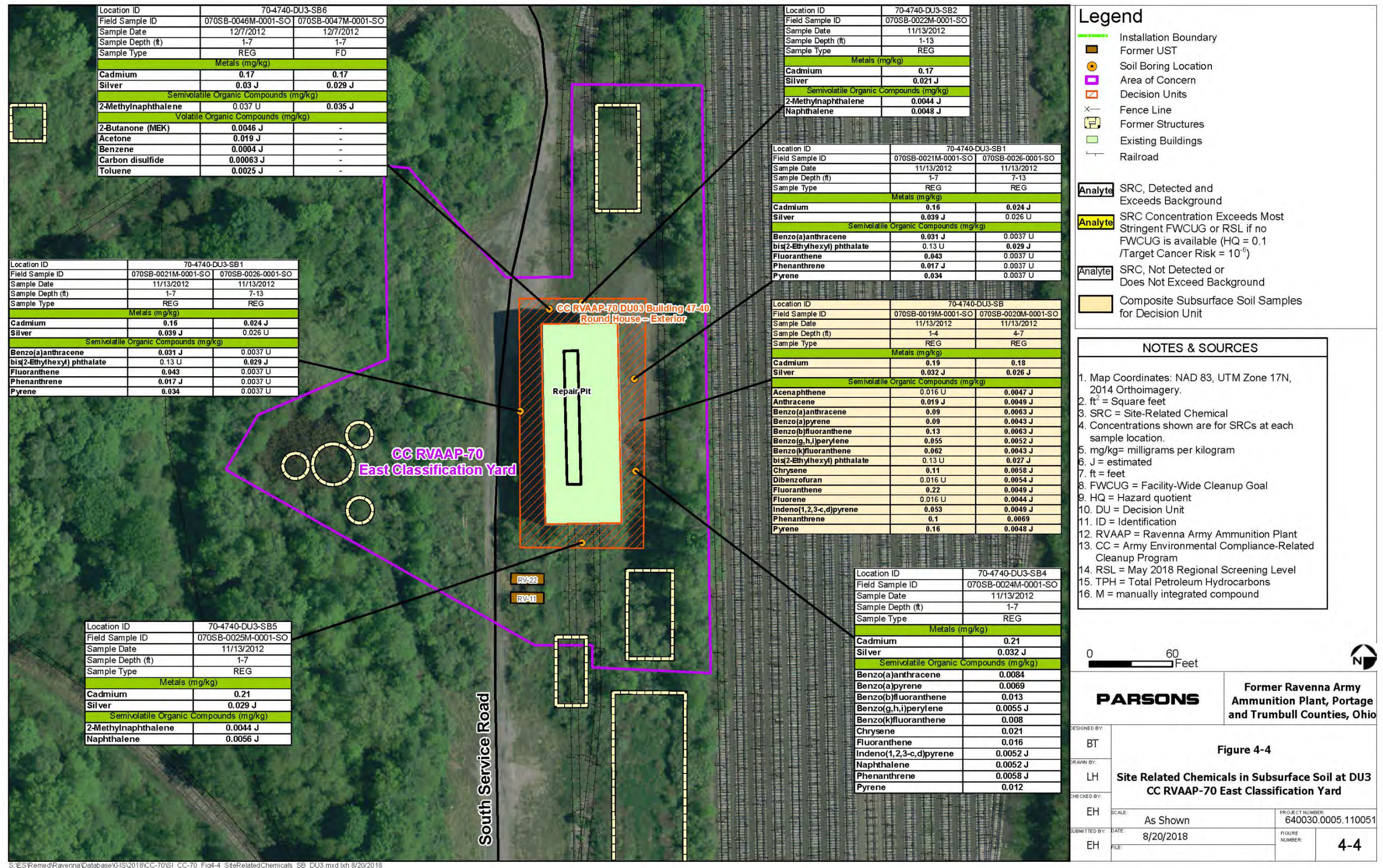
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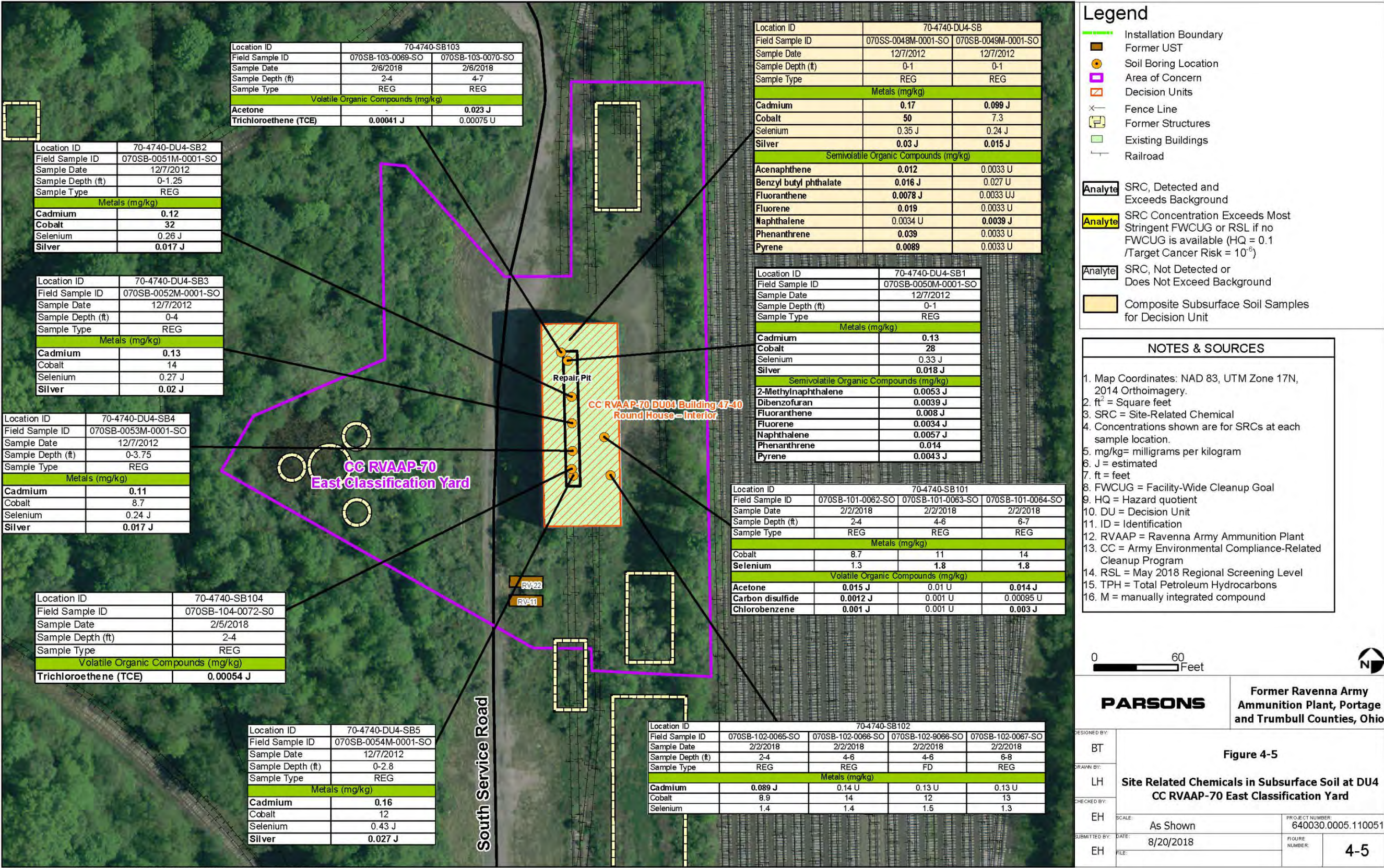


Figure 4-5 Site-Related Chemicals in Subsurface Soil at DU4

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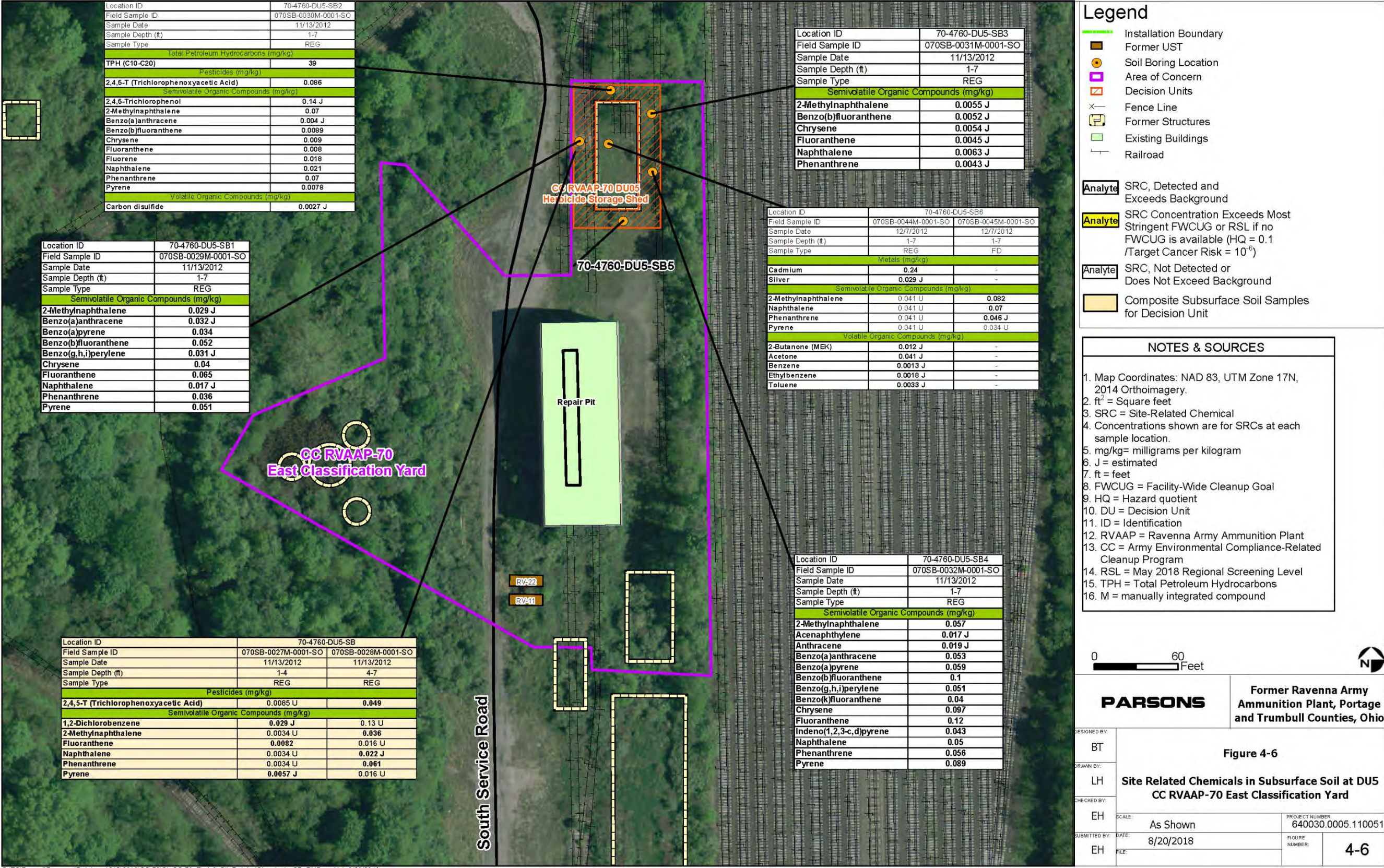


Figure 4-6 Site-Related Chemicals in Subsurface Soil at DU5

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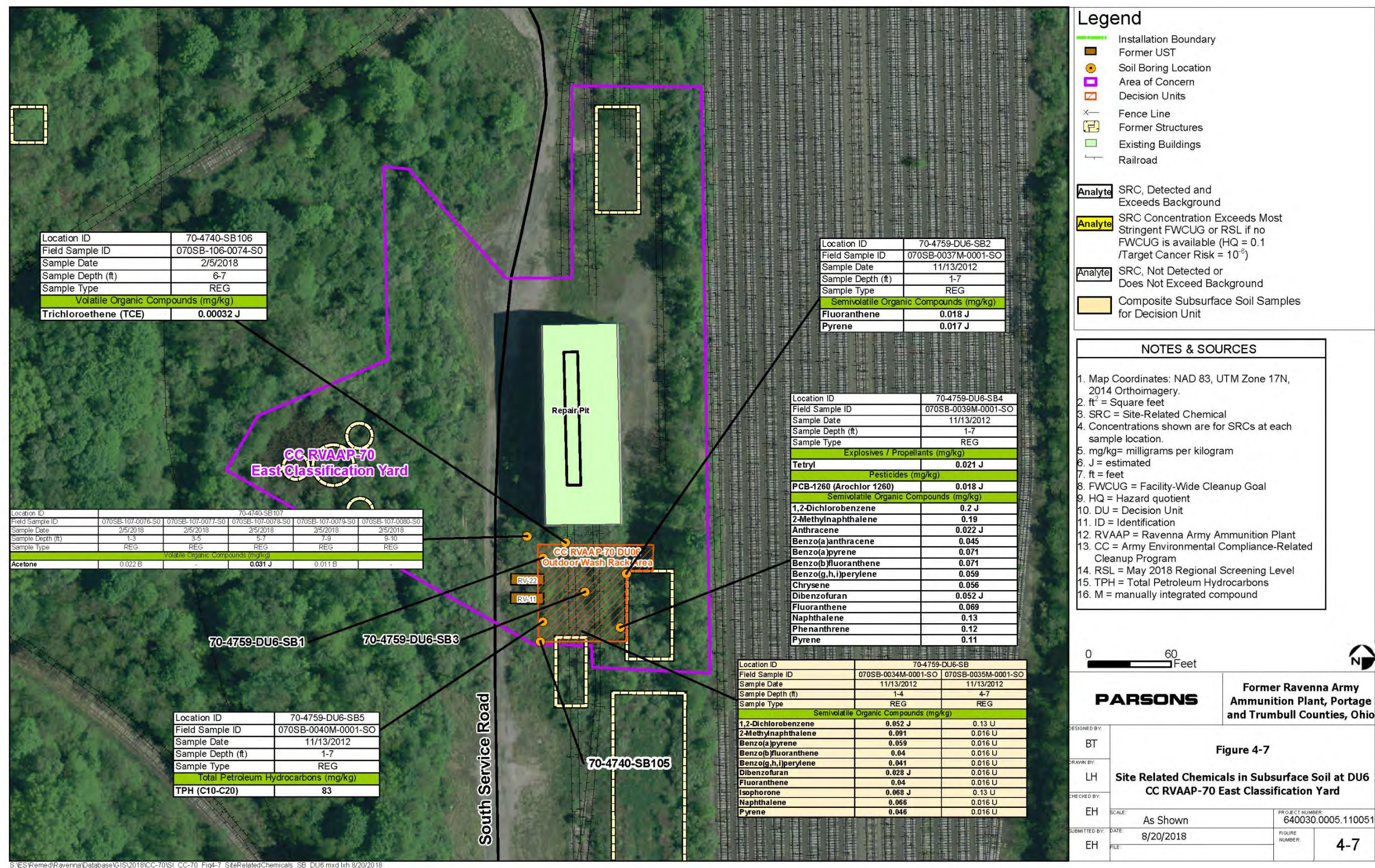


Figure 4-7 Site-Related Chemicals in Subsurface Soil at DU6

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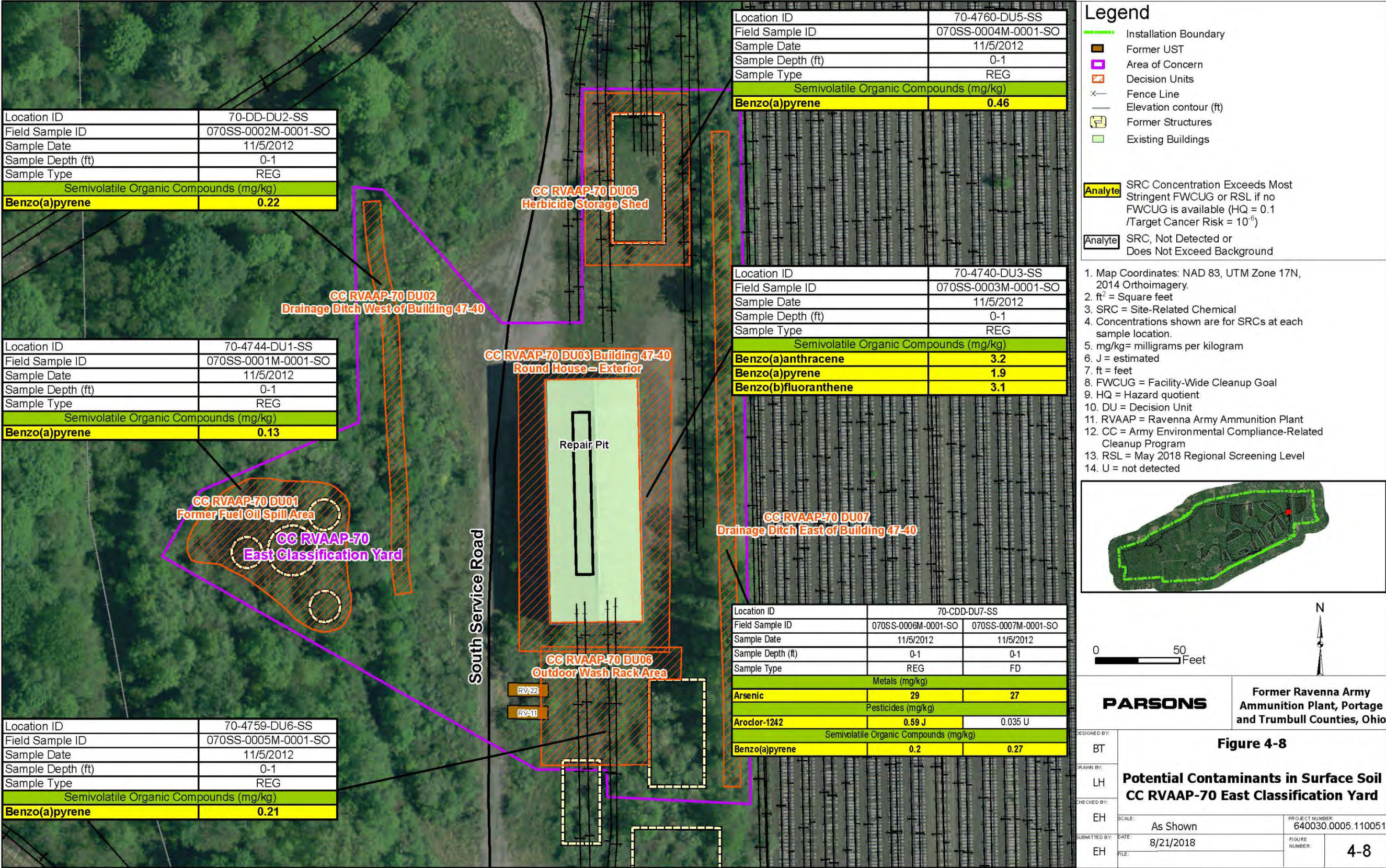


Figure 4-8 Potential Contaminants in Surface Soil

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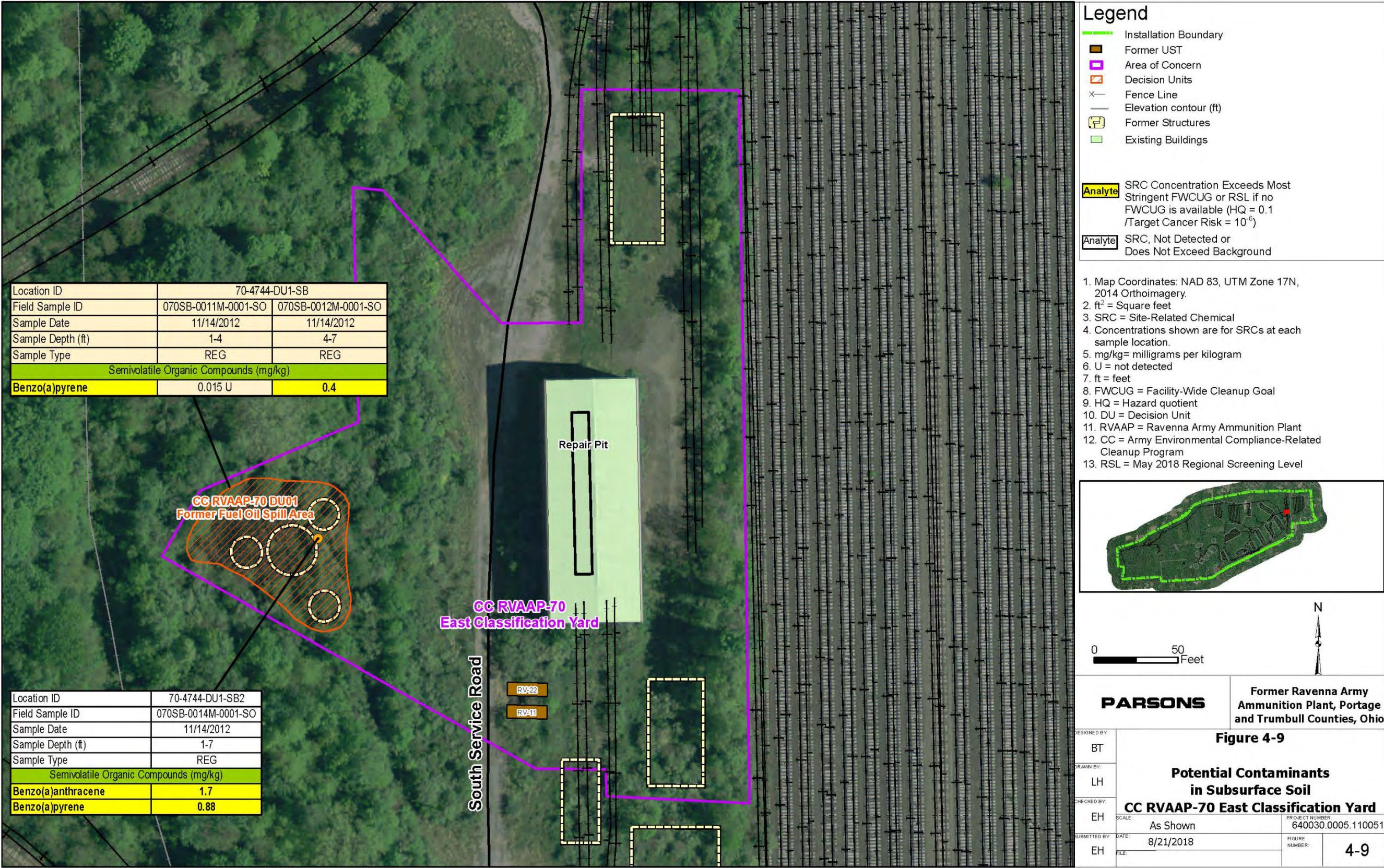


Figure 4-9 Potential Contaminants in Subsurface Soil

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5. EXPOSURE PATHWAYS

5.1 SOIL EXPOSURE AND AIR PATHWAYS

5.1.1 Physical Conditions

The surficial soil unit at CC RVAAP-70 East Classification Yard is mapped as Mahoning silt loam or Fitchville silt loam (Figure 2-2). These soils are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 ft bgs.

5.1.2 Soil and Air Targets

Current and future human and ecological (animal and plant) receptors may come into direct contact with potential contaminants in the surface or subsurface soil at this AOC.

Airborne contamination (e.g., windblown dust) and soil vapor are not considered viable migration or exposure pathways at this AOC. The former RVAAP facility is located in a humid climate, and soil moisture content is typically high, which reduces the potential for dust generation. None of the potential contaminants identified for this AOC are volatile.

5.1.3 Soil Exposure and Air Pathway Conclusion

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs and/or May 2018 USEPA RSLs. PAHs were also detected in subsurface soil at concentrations above May 2018 USEPA RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

5.2 SURFACE WATER AND SEDIMENT EXPOSURE PATHWAY

5.2.1 Hydrological Setting

Surface water in the form of runoff may be a potential migration pathway for potential contaminants to leave the AOC, flowing overland or through natural/manmade conveyances. Ditches are located on the east and west sides of Building 47-40 (DU02 and DU07) and receive intermittent storm water runoff. There are no perennial surface water or wetland features at CC RVAAP-70 East Classification Yard. The closest perennial feature to receive drainage from the CC RVAAP-70 East Classification Yard is a tributary to the west branch of the Mahoning River and associated wetlands, located approximately 2,000 feet northeast of the AOC (Figure 2-5).

5.2.2 Surface Water Targets

Surface water targets include human receptors that use surface water for potable water supply or recreation, as well as environmental (e.g., streams, wetlands, and sensitive aquatic environments) and physical targets (e.g., public or private water distribution system intakes) that may be affected by potential surface water contamination on or adjacent to the AOC. No perennial streams are located at the AOC. There are no observed springs or groundwater discharge points to a surface water body in the immediate vicinity of the AOC. Intermittent surface water collects in ditches on the east and west sides of Building 47-40 (DU02 and DU07), but it is unclear if storm water runoff in the ditches reaches the wetlands or river tributary to the northeast. There does not appear to be a direct exposure pathway for human receptors or ecological targets to surface water at this AOC.

5.2.3 Sediment Targets

There is no sediment at CC RVAAP-70 East Classification Yard. However, surface soil in the ditches east and west of Building 47-40 (DU02 and DU07) contain potential contaminants, and this surface soil may be transported to surface water bodies by water flowing in the ditches during storm events. Current and future human and ecological (animal and plant) receptors may come into direct contact with potential contaminants in sediment if surface soil from the ditches reaches perennial surface water bodies.

5.2.4 Surface Water Sediment Pathway Conclusions

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs and/or May 2018 Residential RSLs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport by intermittent surface water flow may be a migration pathway for potential contaminants related to this AOC.

5.3 GROUNDWATER EXPOSURE PATHWAY

5.3.1 Hydrogeology

The overburden soils at CC RVAAP-70 East Classification Yard are Hiram Till glacial deposits (Figure 2-3). The bedrock underlying the AOC is Sharon Sandstone. The elevation of bedrock at CC RVAAP-70 East Classification Yard is approximately 950 ft amsl (Figure 2-4) or less than 10 ft bgs. Groundwater flow across Camp Ravenna is generally to the east. Soil borings reached bedrock at CC RVAAP-70 without encountering saturated conditions. Groundwater is not present in the unconsolidated soils at CC RVAAP-70 East Classification Yard.

No monitoring wells are present at the CC RVAAP-70 East Classification Yard AOC. The nearest facility monitoring well is SCFmw-005, located upgradient completed in the Sharon conglomerate and approximately 2,300 feet west of the CC RVAAP-70 East Classification Yard. No monitoring wells completed in the unconsolidated surficial aquifer exist in the vicinity of the CC RVAAP-70 East Classification Yard.

5.3.2 Groundwater Targets

Groundwater targets include human receptors that use groundwater for potable water supply, as well as environmental receptors (e.g., livestock or fish farms) and physical targets (e.g., springs) that may be affected by potential groundwater contamination on or adjacent to the AOC. There are no public, livestock, or commercial groundwater supply wells within the facility. Groundwater in the vicinity of Building 47-40 at CC RVAAP-70 East Classification Yard is currently not used for on-site activities.

5.3.3 Groundwater Pathway Conclusion

PAHs have been detected at concentrations above May 2018 Resident RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soils at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

6. SUMMARY AND CONCLUSIONS

6.1 SUMMARY OF THE SITE INVESTIGATION ACTIVITIES

Surface and subsurface soil were sampled at CC RVAAP-70 East Classification Yard to determine the presence of SRCs and identify potential contaminants within the AOC. Surface water and sediment were not present at this AOC during the SI field work in 2012 and 2018, but surface water was observed in drainage ditches in April 2015. Groundwater is being evaluated on a facility-wide basis (RVAAP-66 Facility-Wide Groundwater). Therefore, samples were not collected from surface water, sediment (i.e., from a perennial surface water body), or groundwater during the SI.

The following DUs were investigated:

- Former Fuel Oil Spill Area – DU01
- Drainage Ditch West of Building 47-40 – DU02
- Building 47-40 (Round House)
 - Building 47-40 Round House – Exterior – DU03
 - Building 47-40 Round House – Interior – DU04
- Former Herbicide Storage Shed – DU05
- Outdoor Wash Rack Area – DU06
- Drainage Ditch East of Building 47-40 – DU07

6.2 SUMMARY AND CONCLUSIONS OF THE SITE RELATED CHEMICALS EVALUATION

Data generated during the CC RVAAP-70 East Classification Yard SI were screened to identify SRCs. A chemical detected at a concentration greater than the established BSV, that is not an essential nutrient, and has not been screened out through a frequency of detection evaluation is identified as an SRC. An SRC may, or may not be, related to the former operations at the AOC.

6.2.1 DU01: Former Fuel Oil Spill Area

Two petroleum hydrocarbons and 10 SVOCs (all PAHs) were identified as SRCs in surface soil. Two inorganics, one explosive, three petroleum hydrocarbons, 18 SVOCs (15 PAHs) and 8 VOCs were identified as SRCs in subsurface soil.

6.2.2 DU02 Drainage Ditch West of Building 47-40

Two petroleum hydrocarbons and 13 SVOCs (all PAHs) were identified as SRCs in surface soil.

6.2.3 DU03 Building 47-40 Round House – Exterior

Ten inorganics, 1 PCB, and 18 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, 17 SVOCs, and 5 VOCs were identified as SRCs in subsurface soil.

6.2.4 DU04 Building 47-40 Round House – Interior

Four inorganics, 9 SVOCs (7 PAHs), and 4 VOCs were identified as SRCs in subsurface soil.

6.2.5 DU05 Former Herbicide Storage Shed

One pesticide and 17 SVOCs (16 PAHs) were identified as SRCs in surface soil. Two inorganics, one petroleum hydrocarbon, one pesticide, 17 SVOCs, and 6 VOCs were identified as SRCs in subsurface soil.

6.2.6 DU06 Outdoor Wash Rack Area

One explosive, one PCB, and 16 SVOCs (14 PAHs) were identified as SRCs in surface soil. One explosive, one petroleum hydrocarbon, one PCB, 14 SVOCs (11 PAHs), and two VOCs were identified as SRCs in subsurface soil.

6.2.7 DU07 Drainage Ditch East of Building 47-40

Fourteen inorganics, one explosive, two petroleum hydrocarbons, two pesticides, three PCBs, 16 SVOCs (15 PAHs), and one VOC were identified as SRCs in surface soil.

6.3 SUMMARY AND CONCLUSIONS OF THE POTENTIAL CHEMICAL CONTAMINATION EVALUATION

The MDC of each SRC identified by the SI at each DU was compared to its most stringent FWCUG (SAIC, 2010) for the Resident Receptor (or May 2018 USEPA Residential RSLs if no FWCUG is established) using the target cancer risk level of 10^{-6} or the target HQ for non-carcinogenic risks of 0.1 to determine the presence of potential contaminants. Because FWCUGs have not yet been updated with 2017 toxicity values for PAHs, PAH concentrations were also compared to May 2018 RSLs.

The MDC of the TPH SRCs were compared to BUSTR (Ohio Department of Commerce, 2017) Soil Class 2 criteria because FWCUGs have not been established for petroleum hydrocarbons.

The SRCs that exceeded the most stringent value FWCUG for the Resident Receptor (or RSLs or BUSTR if no FWCUG is established), using a target cancer risk level of 10^{-6} or the target HQ = 0.1 for non-carcinogenic risks, were then evaluated using a WOE approach. The WOE evaluation considers the SRCs that exceed their FWCUGs (or RSL or BUSTR) criteria, as described above, to determine if the chemical should be identified as a potential contaminant.

Potential contaminants were identified in surface and subsurface soil at CC RVAAP-70 East Classification Yard.

DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

DU02 Drainage Ditch West of Building 47-40

- Surface soil: benzo(a)pyrene

DU03 Building 47-40 Round House

- Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene
- Subsurface soil: none

DU04 Building 47-40 Round House – Interior

- Subsurface soil: none

DU05 Former Herbicide Storage Shed

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: none

DU07 Drainage Ditch East of Building 47-40

- Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

6.4 SUMMARY AND CONCLUSIONS OF THE EXPOSURE PATHWAYS

PAHs, arsenic, and aroclor-1242 were detected in surface soil at concentrations above FWCUGs and/or May 2018 RSLs. PAHs were detected in subsurface soil at concentrations above May 2018 RSLs. The exposure pathway for soil is considered complete at this AOC. The exposure pathway for air is incomplete.

There are no perennial surface water streams or wetlands in the immediate vicinity of the CC RVAAP-70 East Classification Yard AOC. Benzo(a)pyrene, arsenic, and aroclor-1242 were detected in surface soil in drainage ditches at concentrations above FWCUGs. The exposure pathway for surface water is incomplete because surface water is only intermittently present at the AOC. Soil transport in intermittent surface water flow in the ditches may be a migration pathway for potential contaminants related to this AOC.

PAHs have been detected at concentrations above May 2018 RSLs in subsurface soils, indicating a potential for vertical migration of contaminants to groundwater. However, PAHs have low solubility and rarely impact groundwater. Groundwater is not present in unconsolidated soil at CC RVAAP-70 East Classification Yard. The groundwater exposure pathway is not complete because no groundwater production wells are completed at or near the CC RVAAP-70 East Classification Yard.

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7. RECOMMENDATIONS

Further evaluation in a Remedial Investigation (RI) is recommended for CC RVAAP-70 East Classification Yard due to potential contaminants in surface soil and subsurface soil.

DU01 Former Fuel Oil Spill Area

- Surface soil: benzo(a)pyrene
- Subsurface soil: benzo(a)pyrene and benzo(a)anthracene

DU02 Drainage Ditch West of Building 47-40

- Surface soil: benzo(a)pyrene

DU03 Building 47-40 Round House

- Surface soil: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene

DU05 Former Herbicide Storage Shed

- Surface soil: benzo(a)pyrene

DU06 Outdoor Wash Rack Area

- Surface soil: benzo(a)pyrene

DU07 Drainage Ditch East of Building 47-40

- Surface soil: arsenic, aroclor-1242, and benzo(a)pyrene.

No further investigation is recommended for subsurface soil at DU03 Building 47-40 Round House, DU04 Building 47-40 Round House – Interior, DU05 Former Herbicide Storage Shed, and DU06 Outdoor Wash Rack Area as no potential contaminants were identified.

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APPENDICES

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APPENDIX A

HISTORICAL AERIAL PHOTOGRAPHS

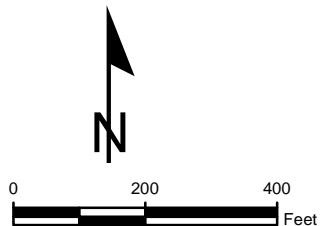
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-1
CC RVAAP-70
East Classification Yard
1940 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

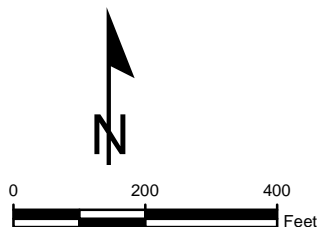
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-2
CC RVAAP-70
East Classification Yard
1952 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

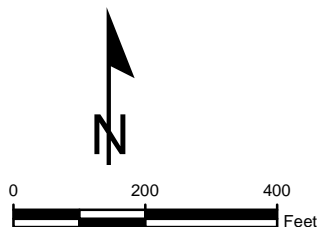
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-3
CC RVAAP-70
East Classification Yard
1966 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

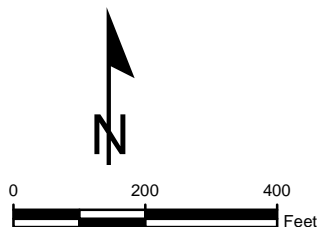
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-4
CC RVAAP-70
East Classification Yard
1985 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

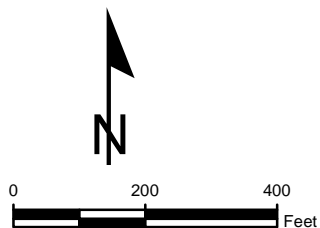
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

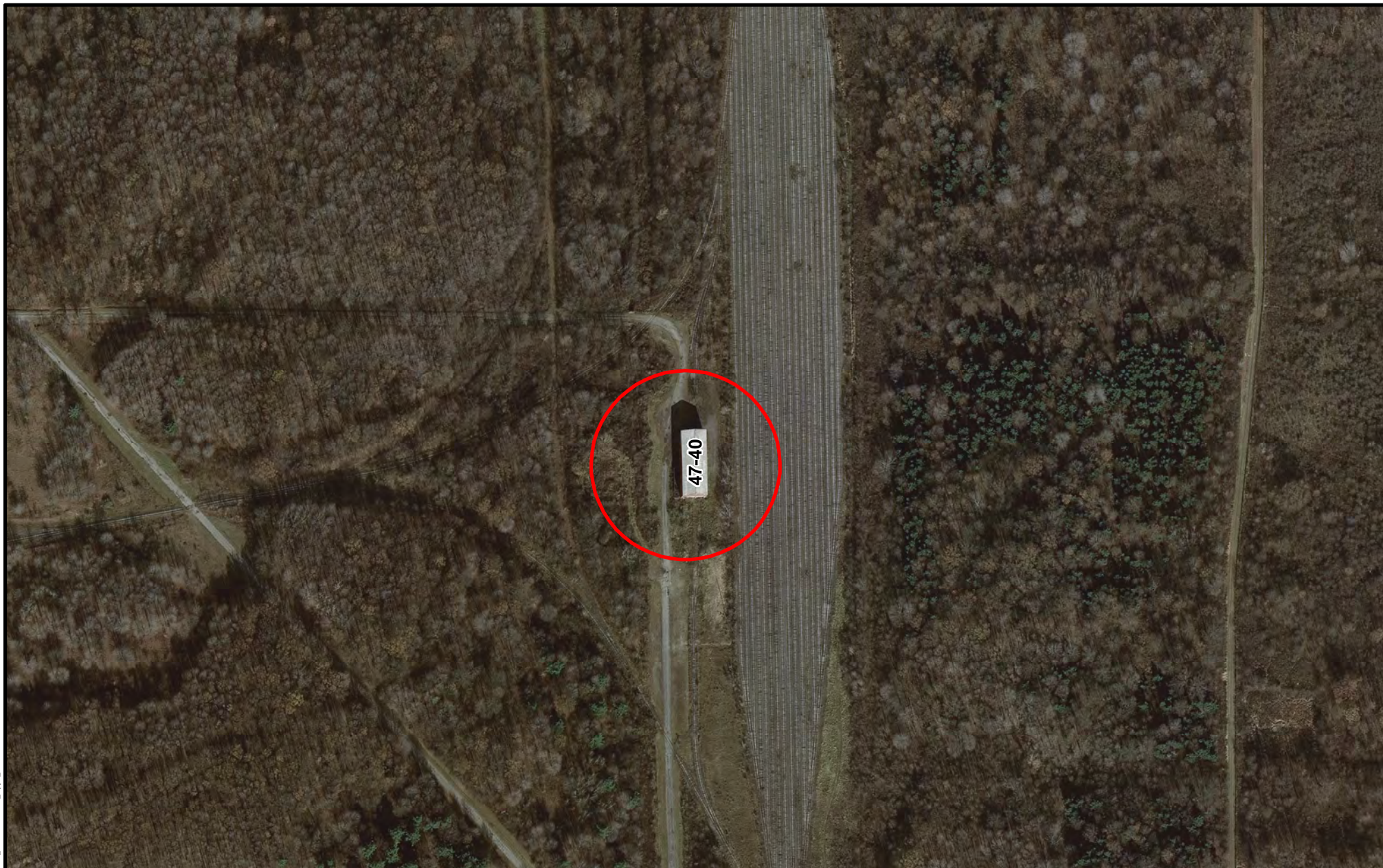
 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-5
CC RVAAP-70
East Classification Yard
1997 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

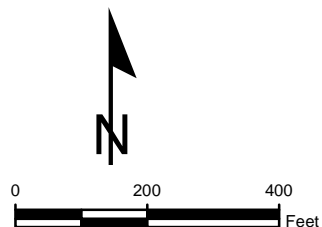
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NOTES & SOURCES

Map Coordinates: WGS 84, UTM Zone 17N in Meters
Base map data and Aerial Photographs from SAIC

 Site Location



U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

Figure A-6
CC RVAAP-70
East Classification Yard
2009 Historical Aerial Photograph
RVAAP/CAMP RAVENNA
RAVENNA, OHIO

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APPENDIX B

Field Activity Forms

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APPENDIX B.1

Surface Soil Sampling Summary Forms

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FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS HARD

Decision Unit: DU 01 Building No. FORMER FUEL AREA

Sample Date: 11-5-12 Time: 1600 Weather: MTL CLOUD -40°

Sample ID: 070SS-0001M-0001-50

Duplicate Sample ID: _____

Field Sampler: JD, JK

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

- ☒ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS
- ☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
- ☐ MS/MSD Sample Collected

RECORDED BY: Jeff Donnan DATE: 11-5-12
(Signature)



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS. FO

Decision Unit: DU 02 Building No. DRAINAGE DITCH NEXT TO FORMER FUEL AREA

Sample Date: 11-5-12 Time: _____ Weather: CLOUDY -40'S
11-7-12 TPH/GAO RESAMPLED DUE TO LAB BREAKING VOA UPON RECEIPT

Sample ID: 07055-0002M-0001-S0

Duplicate Sample ID: _____

Field Sampler: AM, TH

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

- ^{MTDE}
☒ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS
☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 11-5-12
11-7-12



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS RD

Decision Unit: DV03 Building No. 47-40 (AROUND BLD)

Sample Date: 11-5-12 Time: 1515 Weather: CLOUDY - 40'S

Sample ID: 07055-0003M-0001-50

Duplicate Sample ID: _____

Field Sampler: Th, AM

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS
- ☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
- ☐ MS/MSD Sample Collected

RECORDED BY: Jeff D. Mann DATE: 11-5-12
(Signature)



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS. RD

Decision Unit: DV 04 Building No. 47-40 MAINTENANCE PIT

Sample Date: 12-7-12 Time: 1022 Weather: PTLY CLOUDY 40'S

Sample ID: 070 SS-0048M-0001-50

Duplicate Sample ID: _____

Field Sampler: RW, AM

Depth of Sample: 0-1 FT BELOW CONC. FLOOR

Material: _____

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS
- ☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
- ☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS 110

Decision Unit: DU 05 Building No. HERB. STORAGE SHED

Sample Date: 11-5-12 Time: 1200 Weather: PTLY. CLOUDY - 40'S

Sample ID: 07055-0004m-0001-50

Duplicate Sample ID: _____

Field Sampler: TH, AM

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS
☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) ☒ HERBICIDES
☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 11-5-12
(Signature)



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS, HAND

Decision Unit: DV06 Building No. WASH RACK AREA

Sample Date: 11-5-12 Time: 1430 Weather: PTLY, CLOUDY -40'S

Sample ID: 07055-0005M-0001-50

Duplicate Sample ID: _____

Field Sampler: TH, AM

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS
- ☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
- ☐ MS/MSD Sample Collected

RECORDED BY: Jeff Dorn DATE: 11-5-12
(Signature)



FIELD LOG FORM

SURFACE SOIL ISM SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP- CR Site Name: E. CLAY. ROAD

Decision Unit: DV07 Building No. COMMON DRAINAGE DITCH

Sample Date: 11-5-12 Time: 1330 Weather: PTLY. CLOUDY - 40'S

Sample ID: 07055-0006M-0001-50

Duplicate Sample ID: 07055-0007M-0001-50

Field Sampler: TH, AM, PC

Depth of Sample: 0-1 FT

Material: _____

Remarks: _____

Laboratory Analysis:

☒ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☒ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) ☒ HERBICIDES

☒ MS/MSD Sample Collected 07055-0006M-0002-50 MS/MSD

RECORDED BY: [Signature] DATE: 11-5-12
(Signature)

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APPENDIX B.2

Subsurface Soil Sampling Summary Forms

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FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC70 East CLASS Yards

Decision Unit: Ø1 Building No. FFA Vertical Geoprobe No. SB-1

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 14 NOV 12 Time: 11:00 am Weather: 30s PC

Subsurface Sample ID: 0705B-0013m-0001-50

Duplicate Sample ID: _____

Tube A Time 11:00 am Interval Drilled (ft bgs) : 1-4' 0705B-0011m-0001-50 Recovery (ft/in): 36"

Tube B Time 11:00 am Interval Drilled (ft bgs) : 4-7' 0705B-0012m-0001-50 Recovery (ft/in): 40"

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DL

Subcontractor (Name/Company): PERCUT

Remarks: 5' ODEU.

Laboratory Analysis:

☒ ^{MTBk} VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 14 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: 0070 EAST CLASS YARD

Decision Unit: Ø 1 Building No. FOUR FA Vertical Geoprobe No. SB-2

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 14 NOV 12 Time: 9:35 AM Weather: 30s PC

Subsurface Sample ID: 070SB-00140-0001-50

Duplicate Sample ID: _____

Tube A Time 9:35 AM Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 84"

Tube B Time 9:35 AM Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 34"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TIT, DC

Subcontractor (Name/Company): PRUDENT

Remarks: 5' ODR. STAIN

Laboratory Analysis:

☒ ^{MTBE} VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 14 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: 01 Building No. FFA Vertical Geoprobe No. SB-3

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 14 NOV 12 Time: 13:00 Weather: 30's PC

Subsurface Sample ID: 07058-0015M-0001-JC

Duplicate Sample ID: _____

Tube A Time 13:00 Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 36"

Tube B Time 13:00 Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 40"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PERMANT

Remarks: ODOR AT 6.5'

Laboratory Analysis:

☒ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 14 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: D 1 Building No. FFA Vertical Geoprobe No. SB-4

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 14 NOV 12 Time: 11:50 am Weather: 30s PL

Subsurface Sample ID: 0745B-00/6M-0001-50

Duplicate Sample ID: _____

Tube A Time 11:50 am Interval Drilled (ft bgs) : 1-4' Recovery (ft/in): 40"

Tube B Time 11:50 am Interval Drilled (ft bgs) : 4-7' Recovery (ft/in): 10"

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DL

Subcontractor (Name/Company): PERVINT

Remarks: _____

Laboratory Analysis:

☒ ^{MTB/L} VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 14 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: Ø1 Building No. FFA Vertical Geoprobe No. SB-5

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 14 NOV 12 Time: 12:10 p Weather: 30s PC

Subsurface Sample ID: 0705B-0017M-0001-50

Duplicate Sample ID: _____

Tube A Time 12:10 p Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 48"

Tube B Time 12:10 p Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 48"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PERUENT

Remarks: NO ODR

Laboratory Analysis:

☒ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 14 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS. YARD

Decision Unit: DU01 Building No. — Vertical Geoprobe No. SB06

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1145 Weather: PTLY CLOUDY -40°

Subsurface Sample ID: 0705B-~~42~~⁰⁰⁴²M-0001-50

Duplicate Sample ID: 0705B-0043M-0001-50 (SITE COC'S ONLY)

Tube A Time 1130 Interval Drilled (ft bgs): 0-6' Recovery (ft/in): 42"

Tube B Time 1135 Interval Drilled (ft bgs): 6-7' Recovery (ft/in): 48 12"

Tube C Time — Interval Drilled (ft bgs): — Recovery (ft/in): —

Field Samplers: AM, TH, RLW

Subcontractor (Name/Company): FRMT2

Remarks: GRD FALCON OF 0042M COLL. ON 12-12-12 DUE TO
MISSED COLL. ON 12-7-12
GRD FALCON MS/MSD OF 0042M-0002 COLL. ON 12-12-12
DUE TO MISSED COLL. ON 12-7-12

Laboratory Analysis: DOE TO MISSED COLL. ON 12-7-12

BTEX, MTBE

☒ VOC ☐ TAL METALS ☐ SVOCs ☐ EXPLOSIVES ☒ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☒ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☒ MS/MSD Sample Collected 0705B-0042-0002-50 MS/MSD (SITE COC'S ONLY)

RECORDED BY: [Signature] DATE: 12-7-12

(Signature)

USE BORING LOG FOR DU01 SB02
FOR SOIL DESCRIPTION - BORING LOG NOT COMPLETED.
SB02 APPROX 10 FT FROM SB06.



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARDS

Decision Unit: 03 Building No. 47-40 Vertical Geoprobe No. SB-01

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 9:15 AM Weather: 30's PC

Subsurface Sample ID: 07050-0021M-0401-50

Duplicate Sample ID: _____

Tube A Time 9:15 AM Interval Drilled (ft bgs): 1-4' 07050-0019M-0001-50
Recovery (ft/in): 40"

Tube B Time 9:15 AM Interval Drilled (ft bgs): 4-7' 07050-0026M-0001-50
Recovery (ft/in): 43"

Tube C Time 9:23 AM Interval Drilled (ft bgs): 7-13' 07050-0026M-1001-50 SB
Recovery (ft/in): 4"

Field Samplers: FR AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC-70 EAST CLASS YARD

Decision Unit: U3 Building No. 47-40 Vertical Geoprobe No. SB-02

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 9:35 AM Weather: 30s PC

Subsurface Sample ID: 0705B-0022M-0001-50

Duplicate Sample ID: _____

Tube A Time 9:40 AM Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 30"

Tube B Time 9:40 AM Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 38"

Tube C Time 9:50 AM Interval Drilled (ft bgs): 7'-13' Recovery (ft/in): 16"

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARDS

Decision Unit: 43 Building No. 47-40 Vertical Geoprobe No. SB-03

Subsurface Sample Type: ☒ Horizontal ISM ☐ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 9:58 AM Weather: 30's PC

Subsurface Sample ID: 07058-0023m-000150

Duplicate Sample ID: _____

Tube A Time 10:59 AM Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 40"

Tube B Time 10:58 AM Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 30" 32"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: 03 Building No. 47-40 Vertical Geoprobe No. SB-PA

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 11:22 AM Weather: 30s PC

Subsurface Sample ID: 070508-0024M-0001-50

Duplicate Sample ID: _____

Tube A Time 11:22 AM Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 30"

Tube B Time 11:22 AM Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 28"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DL

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS
- ☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)
- ☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC-70 EAST CLASS YARD

Decision Unit: 43 Building No. 4710 Vertical Geoprobe No. SB-05

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 12:28 pm Weather: 30's PC

Subsurface Sample ID: 07050-002511-000150

Duplicate Sample ID: _____

Tube A Time 12:28 pm 1-4' Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 36"

Tube B Time 12:28 pm 4-7' Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 42"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS FARM

Decision Unit: DV03 Building No. 47-40 Vertical Geoprobe No. SB06

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1050 Weather: PTLY CLOUDY - 40'S

Subsurface Sample ID: 0705B-0046M-0001-50

Duplicate Sample ID: 0705B-0047M-0001-50 (SITE COC'S ONLY)

Tube A Time 1035 Interval Drilled (ft bgs): 1-6' Recovery (ft/in): 51"

Tube B Time 1040 Interval Drilled (ft bgs): 6-7' Recovery (ft/in): ~~8~~ 12"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: JH, AM, RW

Subcontractor (Name/Company): FRONT 2

Remarks: USE BORING LOG FOR DV03 SB02 FOR SOIL DESCRIPTION
BORING LOG FOR SB06 NOT COMPLETED, SB02 APPROX. 15 FT

Laboratory Analysis: DVA WEST OF SB06
EAST

☐ VOC ☐ TAL METALS ☐ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☒ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP- CR Site Name: E. CLASS. HARD

MAINTENANCE PIT
Decision Unit: DV04 Building No. 47-40 Vertical Geoprobe No. SB01

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: ⁰⁹²⁵1022 Weather: PTLY CLOUDY 41'S

Subsurface Sample ID: 0705B-0050M-0001-50

Duplicate Sample ID: _____

Tube A Time 1022 Interval Drilled (ft bgs): 0-1 Recovery (ft/in): 12" ^{0705B-0049-0001-50}

Tube B Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, RW

Subcontractor (Name/Company): _____

Remarks: REFUSAL AT 12" BELOW CONCL. FLOOR

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS. FARD

MAINTENANCE PIT

Decision Unit: DU04 Building No. 47-40 Vertical Geoprobe No. SB02

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 0945 Weather: PTLY-CLOUDY-40'S

Subsurface Sample ID: 07058-0051M-0001-S0

Duplicate Sample ID: _____

Tube A Time _____ Interval Drilled (ft bgs) : 0-15" Recovery (ft/in): 15"

Tube B Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: _____

Subcontractor (Name/Company): _____

Remarks: REFUSAL AT 15" BELOW CONC. FLOOR

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: Jeff Dm

(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS, HARD

Decision Unit: 2004 ^{MAINTENANCE PIT} Building No. 47-40 Vertical Geoprobe No. 5803

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1000 Weather: PTLY. CLOUDY -40-5

Subsurface Sample ID: 07058-00⁵²58N-0001-50

Duplicate Sample ID: _____

Tube A Time 1000 Interval Drilled (ft bgs) 0-4 FT Recovery (ft/in): 4 FT

Tube B Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: _____

Subcontractor (Name/Company): _____

Remarks: REFUSAL AT 4 FT BELOW CORREL. FLWR

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 12-7-12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP- CR Site Name: E. CLAST, LAND

Decision Unit: DU04 Building No. 47-40 Vertical Geoprobe No. 5804
MAINTENANCE PIT

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1018 Weather: PTLY. CLOUDY - 40S

Subsurface Sample ID: 0705B-0053M-0001-50

Duplicate Sample ID: _____

Tube A Time 1018 Interval Drilled (ft bgs) : 0-46" Recovery (ft/in): 46"

Tube B Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: _____

Subcontractor (Name/Company): _____

Remarks: REPAIR AT 46" BELOW CONC. FLOOR

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP- CR Site Name: E. CLASS. LAND

Decision Unit: DU04 ^{MAINTENANCE PIT} Building No. 47-40 Vertical Geoprobe No. 5805

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1025 Weather: PTLY. CLOUDY -40'S

Subsurface Sample ID: 07058-0054M-0001-50

Duplicate Sample ID: _____

Tube A Time 1025 Interval Drilled (ft bgs) : 0-34" Recovery (ft/in): 34"

Tube B Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: AM, RW

Subcontractor (Name/Company): _____

Remarks: REVERSAL AT 34"

Laboratory Analysis:

☐ VOC ☒ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-14 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: 45 Building No. FORMER HELD Vertical Geoprobe No. SB-1

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 17:42 pm Weather: 30s PC

Subsurface Sample ID: 07058-0029M-0001-50

Duplicate Sample ID: _____

Tube A Time 17:42 pm Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 32" 07058-0029M-0001-50

Tube B Time 17:42 pm Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 10" 07058-0028M-0001-50

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, FR, DL, TH

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) HERBICIDES

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-74 CR Site Name: CC 74 EAST GLASS YARD

Decision Unit: 05 Building No. FORMER HERD Vertical Geoprobe No. SB-2

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 17:22 Weather: 30'S PC

Subsurface Sample ID: 07058-0030m-000150

Duplicate Sample ID: _____

Tube A Time 17:22 Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 44"

Tube B Time 17:22 Interval Drilled (ft bgs): 4-7 Recovery (ft/in): 121"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, FR, DC, TH

Subcontractor (Name/Company): PRUDENT

Remarks: 7554 ppm PID AIR TEMP < 32°F

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS
☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) HERBICIDES

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-74 CR Site Name: CC-74 EAST CLASS YARD

Decision Unit: 15 Building No. FELMER HERB Vertical Geoprobe No. SB-03

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 17:04pm Weather: 30'S PC

Subsurface Sample ID: 0705B-0031M-000150

Duplicate Sample ID: _____

Tube A Time 17:04pm Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 37"

Tube B Time 17:04pm Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 38"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, FR, DC, TH

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) ☒ HERBICIDES

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-76 CR Site Name: CC 76 EAST CLASS YARD

Decision Unit: 05 Building No. FORMER HCLB Vertical Geoprobe No. SB-09

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 16.25 PM Weather: 30.5 PC

Subsurface Sample ID: 07058-0032M-0001-50

Duplicate Sample ID: _____

Tube A Time 16.25 Interval Drilled (ft bgs): 1-9' Recovery (ft/in): 38"

Tube B Time 16.25 Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 3"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, FR, DC, TH

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS
☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) ~~HERBICIDES~~
☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-74 CR Site Name: CC-74 EAST CLASS YARD

Decision Unit: 05 Building No. HERB STORAGE Vertical Geoprobe No. SB-05

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 16:00 Weather: 30SPC

Subsurface Sample ID: 070SB-0033M-0001-50

Duplicate Sample ID: _____

Tube A Time 16:15:27 Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 38"

Tube B Time 16:15:41 Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 32"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: AM, FR, DC, TH

Subcontractor (Name/Company): PERUENT

Remarks: _____

Laboratory Analysis:

- ☐ VOC ☐ TAL METALS ☒ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS
☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides) HERBICIDES
☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: E. CLASS. FARD

HEAD SHED

Decision Unit: DU05 Building No. _____ Vertical Geoprobe No. SB06

Subsurface Sample Type: ☐ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 12-7-12 Time: 1115 Weather: PTLY. CLOUDY 40'S

Subsurface Sample ID: 0705B-0044M-0001-S0

Duplicate Sample ID: 0705B-0045M-0001-S0 (SITE COC'S ONLY)

Tube A Time 1105 Interval Drilled (ft bgs): 1-6' Recovery (ft/in): 51"

Tube B Time 1110 Interval Drilled (ft bgs): 6-7' Recovery (ft/in): 12"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: TH, AM, ALV

Subcontractor (Name/Company): FRONTZ

Remarks: USE BORING LOG FOR DU05 SB01 FOR SOIL DESCRIPTION
BORING LOG FOR SB06 WAS NOT COMPLETED. SB06 IS APPROX.

Laboratory Analysis: 15 FT DUE WEST OF SB01.

☐ VOC ☐ TAL METALS ☐ SVOCs ☐ EXPLOSIVES ☐ TPH GRO/DRO ☐ PCBs ☐ PROPELLANTS

☒ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☒ HEROICIDES

☒ MS/MSD Sample Collected 0705B-0044M-0002-S0 (SITE COC'S ONLY)

RECORDED BY: [Signature]
(Signature)

DATE: 12-7-12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: 06 Building No. WASH RACK Vertical Geoprobe No. SB-01

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 Nov 12 Time: 2:20 PM Weather: 36'S PC

Subsurface Sample ID: 07058-0036m-0001-50

Duplicate Sample ID: _____

Tube A Time 2:20 PM Interval Drilled (ft bgs): 1-4' 07058-0034m-0001-50 Recovery (ft/in): 38"

Tube B Time 2:20 PM Interval Drilled (ft bgs): 4-7' 07058-0035m-0001-50 Recovery (ft/in): 32"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FK, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: STRONG ODOR 4-7 @ 5 SEAM PID 11.5 ppm L then 1 min gas

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-76 CR Site Name: C76 EAST CLASS YARD

Decision Unit: 06 Building No. WASH RACK Vertical Geoprobe No. SB-02

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 3:10pm Weather: 30's PC

Subsurface Sample ID: 07050-0037M-0001-50

Duplicate Sample ID: _____

Tube A Time 3:10pm Interval Drilled (ft bgs) : 1-4' Recovery (ft/in): 19"

Tube B Time 3:10pm Interval Drilled (ft bgs) : 4-7' Recovery (ft/in): 34"

Tube C Time _____ Interval Drilled (ft bgs) : _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: LAST 6" LT ORN - CLAY

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 NOV 12
(Signature)



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-74 CR Site Name: CC 74 EAST CLASS YARD

Decision Unit: 06 Building No. WASH BAK Vertical Geoprobe No. SB-03

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 Nov 12 Time: 2:43 pm Weather: 30s PC

Subsurface Sample ID: 07058-0038M-0001-50

Duplicate Sample ID: _____

Tube A Time 2:43 pm Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 38"

Tube B Time 2:43 pm Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 35"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FK, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 Nov 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-76 CR Site Name: EC 76 EAST CLASS YINNO

Decision Unit: 06 Building No. WASH RACK Vertical Geoprobe No. SB-04

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 NOV 12 Time: 3:43 pm Weather: 365 PL

Subsurface Sample ID: 07058-0039m-0001-50

Duplicate Sample ID: _____

Tube A Time 3:43 pm Interval Drilled (ft bgs): 1-9' Recovery (ft/in): 30"

Tube B Time 3:43 pm Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 27"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PRUDENT

Remarks: _____

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature]
(Signature)

DATE: 13 NOV 12



FIELD LOG FORM

SUBSURFACE SOIL SAMPLING

2011 PBA ENVIRONMENTAL INVESTIGATION AND REMEDIATION AT 14 CR SITES

USACE Contract No. W91QR-04-D-0039

Ravenna Army Ammunition Plant, Ravenna, Ohio

CR Site No. CC-RVAAP-70 CR Site Name: CC 70 EAST CLASS YARD

Decision Unit: 06 Building No. WASH RACK Vertical Geoprobe No. SB-05

Subsurface Sample Type: ☒ Horizontal ISM ☒ Vertical ISM ☐ Discrete ☐ Composite

Sample Date: 13 Nov 12 Time: 2:00 pm Weather: 30's PC

Subsurface Sample ID: 0705B-0040M-0001-50

Duplicate Sample ID: _____

Tube A Time 2:00 pm Interval Drilled (ft bgs): 1-4' Recovery (ft/in): 32"

Tube B Time 2:00 pm Interval Drilled (ft bgs): 4-7' Recovery (ft/in): 30"

Tube C Time _____ Interval Drilled (ft bgs): _____ Recovery (ft/in): _____

Field Samplers: FR, AM, TH, DC

Subcontractor (Name/Company): PERWENT

Remarks: STRONG ODOR 4-7 @ 55EAM PID 40 ppm < than 1 min open

Laboratory Analysis:

☐ VOC ☐ TAL METALS ☒ SVOCs ☒ EXPLOSIVES ☐ TPH GRO/DRO ☒ PCBs ☐ PROPELLANTS

☐ FULL SUITE (VOCs, SVOCs, TAL Metals, Explosives, Propellants, PCBs, Pesticides)

☐ MS/MSD Sample Collected

RECORDED BY: [Signature] DATE: 13 Nov 12
(Signature)

APPENDIX B.3

Daily Health and Safety Forms

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Vision
Integrity
Results

ECC

DAILY SAFETY MEETING SIGN-IN SHEET

Date: 11-5-12 Project Name/Location: Ravenna AAP, Ravenna, OH
Company: ECC Person Conducting Briefing: JEFF DONOVAN

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

TICKS, TRIPS & FALLS, THORN BUSHES
WHAFF PROTECTION IN DRUSE AREAS
LEVEL D DPE

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

BEGIN 15 SURFACE SOIL SAMPLES AT RATTI CROSS, TO
LEVEL D DPE - USE CAR WHEN WITH MACHINERY'S
BE AWARE OF PEOPLE IN CLOSE PROXIMITY
GREENISTON (GEOGRAPHICAL) WILL BE AT GEORGE HARRIS TREATMENT PLANT, THEN
BLDG 1020 USFS.

4. ATTENDEES (Print Name):

1. <u>JEFF DONOVAN</u>	2.
3. <u>AL EASTERDAY</u>	4.
5. <u>Fred Roche</u>	6.
7. <u>Amanda Miller</u>	8.
9. <u>Jackie Kiker</u>	10.
11. <u>Tommy Henderson Jr</u>	12.
13. <u>David Campey</u>	14.
15. <u>Ian Tenchin</u>	16.
17. <u>Nathan Maier</u>	18.
19. <u>Joe Teter</u>	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.



Vision
Integrity
Results

ECC

DAILY SAFETY MEETING SIGN-IN SHEET

Date:

Company:

720
11-6-12
ECC

Project Name/Location:

Person Conducting Briefing:

Ravenna AAP, Ravenna, OH

JEFF DONOVAN

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

- Level D
- Dress warm
- check for ticks
- watch your footing on uneven surfaces

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

- Be aware of snakes
- Be aware of heavy vehicle traffic on base due to Training exercises

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

Continue 15 sampling

4. ATTENDEES (Print Name):

1. JEFF DONOVAN	2. ALEXANDER EASTMAN
3. [Signature]	4. [Signature]
5. Nathan Miller	6.
7. David Campbell	8.
9. Fred Roche	10.
11. Amanda Miller	12.
13. Jackson Kilen	14.
15. Thomas Hernandez	16.
17.	18.
19.	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.



Vision
Integrity
Results

ECC

DAILY SAFETY MEETING SIGN-IN SHEET

Date: 11-13-12 Project Name/Location: Ravenna AAP, Ravenna, OH
Company: ECC Person Conducting Briefing: JEFF DONOVAN

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

- Dress Warm
- Hydrate

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

- Hearing Protection Around Geoprobe
- Be Aware of your surroundings and what work is being performed around you.

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

CONT. IS SUBSURFACE SOIL SAMPLING

4. ATTENDEES (Print Name):

1. <u>JEFF DONOVAN</u>	2. <u>Fred Roche</u>
3. <u>Joe Teter</u>	4. <u>David Gmeau</u>
5. <u>Thomas [unclear] Jett</u>	6. <u>Amanda Miller</u>
7.	8.
9.	10.
11.	12.
13.	14.
15.	16.
17.	18.
19.	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.



Vision
Integrity
Results

ECC

DAILY SAFETY MEETING SIGN-IN SHEET

Date:
Company:

11-14-12
ECC

Project Name/Location:
Person Conducting Briefing:

Ravenna AAP, Ravenna, OH

JEFF DONOVAN

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

- Level D
- Dress warm
- Defensive Driving
- watch your footing

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

- Lift with your legs, not your back. Ask for help

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

CONT. WITH IS SUBSTRATE SOIL SAMPLING

4. ATTENDEES (Print Name):

1. <u>JEFF DONOVAN</u>	2. <u>David, Comeau</u>
3. <u>Joe Tester</u>	4. <u>Tomas KENNEDY JR.</u>
5. <u>Amanda Miller</u>	6. <u>Fred Roche</u>
7.	8.
9.	10.
11.	12.
13.	14.
15.	16.
17.	18.
19.	20.
21.	22.
23.	24.
25.	26.
27.	28.
29.	30.



Vision
Integrity
Results

ECC

DAILY SAFETY MEETING SIGN-IN SHEET

Date:

12-7-12

Project Name/Location:

Ravenna AAP, Ravenna, OH

Company:

ECC

Person Conducting Briefing:

JEFF DONOVAN

1. AWARENESS (e.g., special EHS concerns, pollution prevention, recent incidents, etc.):

VEHICLE AWARENESS
TRIPS - FALLS
RAINY CONDITIONS

2. OTHER ISSUES (HASP changes, new AHAs, attendee comments, etc.):

Rain Today = Slippery / Muddy conditions.
Wearing Protection in Bld with Geoprobe

3. DISCUSSION OF DAILY ACTIVITIES/TASKS AND SAFETY MEASURES TO BE USED:

CONT. SAMPLING AT VARIOUS
SITES.

4. ATTENDEES (Print Name):

1. JEFF DONOVAN	2. Joe Teter
3. Rickie Shanks	4. AMANDA MILLER
5. David Camen	6. TOMMY HENNINGER
7. Roxann Williams	8.
9.	10.
11.	12.
13.	14.
15.	16.
17.	18.
19.	20.
21.	22.
23.	24.
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27.	28.
29.	30.

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APPENDIX B.4

Field Notes

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①
11-5-12 DAYTONA

0730 RCL (J. DONOVAN, F. ROCKE,
D. COMEAU, J. RINER) AND
PAUDENT (A. MILLER +
T. L. EMMANUEL) AT
BLD 1036

0830 RLS MERTAL.

0900 TEST AMERICA DEL.
SAMPLER CONTAINERS.

0950 AT E. CLASSY HAND-CC70

1200 COLL. HERB SHED
AT E. CLASSY, HAND
FOR SURVIVAL + HERBICIDES
DU #5

1330 COLL. DRAINAGE DITCH
DU #7 - COLL. DUP, MS, MSD
+ FULL SUITE + GOK. QA SAMPLE

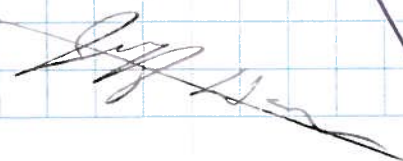
DAYTONA

11-5-12 ②

1630 FINISHED SAMPLING
ALL DU'S IN EAST
CLASSY, HAND FOR 15
SURFACE SOIL SAMPLES
AND 2 DRAINAGE DITCHES

1720 RCL AT BLD 1036
TO DE-CON SAMPLING EQUIP.
ALL DE-CON WILL BE
COMPRISED OF THE FOLLOWING:
WASH/SCUB EQUIP, W/ ALCOHOL
+ POTABLE WATER - RINSE -
SPRAY W/ ISOPROPYL (PEST.
GRADE FROM TEST AMERICA)
RINSE W DI (FROM LAB)
SPRAY W/ 10% NITRIC ACID
RINSE W/ DI, WRAP IN
TIN FOIL

1800 RCL OFF SITE - BLD 1036
LOADED,



③ 11-5-12

EAST CLASSIFIED SAMPLES
IDENTIFIED IN THE FOLLOWING
MANNER:

07055-0001m-0001-50 = DU01 FORMER PEST AREA

-0002m	= DU02 DRAINAGE DITCH
-0003m	= DU03 BLD 47-40
-0004m	= DU04 HARB SHED
-0005m	= DU05 WASH RACK
-0006m	= DU06 COMMON DRAIN DITCH

SAMPLE COLL SUMMARY - CC-RVANA TO EAST YARD CLASSIFIED

SAMPLE	DATE	TIME	ANALYSIS
-0001m	11-5-12	1600	VOL/METALS, SVOL, TAIL GAD DND
-0002m		1610	
-0003m		1515	SVOL, TAIL METALS, PCB
-0004m		1200	HARBOR SHED
-0005m		1430	SVOL, PCB, EXPLOSIVES
-0006m		1930	VOL, SVOL, HARB, TAIL METALS +
-			PCB, EXPLOSIVES - PROMILLARY
-			PESTICIDES

NOTE - FULL SUITE ANALYSIS COLL AT 0006m
DUP + MS/MSO " " " ANALYSIS

ROVANA

11-6-12 ④

~~1026 DUE TO CHANGE TRACKING,
WE CANNOT CONT. SAMPLING
IN DEPOT AREA. WILL
MOVE TO ELEC. SUBSTATIONS~~

~~1035 AT ELEC. SUBSTATION~~

JD.

*NOTE EAST. CLASS VAND
QA/QC SAMPLES

DUPLICATE COLL AT 0006m Common
DRAIN. DITCH WILL BE IDENTIFIED AS
07055-0007m-0001-50 (DUP)

SAR
NOTE * 07055-0008m-0001-50 = MS
PG 2, 07055-0009m-0001-50 = MS
11-7-12 07055-00010 -0001-50 = TAIL BLANK

② 11-7-12 ARIANA

11-5-12
* NOTE FOR PG 3⁺⁴ EAST CLIFF
KAND. DID NOT COLL. TPH VAN/GAD
SAMPLES A DUOT COMMON
DRAINAGE DITCH (FULL SUITA
LOCATION). COLL TODAY, KAPT
SAME SAMPLER ID, BUT W/
TODAYS DATE + TIME ON COLL.

0850 COLL 07055-0006M-0001-50
11-7-12 0910 FOR TPH

LAB BROK METHANOL/VOL CONTAINER
FOR E. CLASS. TO SAMPLE

07055-0002M-0001-50,
Rii-SAMPLED TODAY, KAPT
SAME SAMPLER ID. BUT W/
TODAYS DATE + TIME

0910 COLL V
FOR TPH/GAD

THE MS/MSD FOR THIS SAMPLER
WILL BE LABLED

07055-0006M-0002-50 (MS/MSD)

③ 11-7-12

SAMPLES COLL AT CL-AVAA 75

Observation on staking out sand creek
coal Tipple. One side has a 25'
decline, the other side is the creek.
There is an access point from the
road corner, would need to clear
trees for Geoprobe. * Ask Geoprobe
operator to tell us how he/she would
access location. (might have to clear
for access). — David Compu.

1600 AL PARTNOR + JACKSON KIRK
(PCC) LV. FOR AIRPORT

1630 TEST AMERICA AT BLD 1036
TO PICK UP SAMPLES

RAINY - 40's

①

12-7-12

0730 FEL + PAUDINS +
MILLER AT BLD 1036

HAS MARTINE

CAL PID - CAL OK

WILL START IN BLD 47-40
MANT. PIT - LAST 15M
SAMPLING TO DO,

0930 WENT AT ANTELA'S (VISTA)
OFFICE TO CHECK IN, NO ONE
THERE, BLD 1037 DARK,
PROBABLY OFF FOR DAY.

0937 AT GEO, TALKAT PLANT
TO CHECK ON BACKFILL / SITE
RESTORATION AT PIPE.

1200
0900 AT BLD 47-40, BEGIN
DRILLING IN PIT, GREEN
MATERIAL LIKE PAINT COMING
UP FROM BURNHOLE, POSSIBLY
FROM DRILLING INTO THE CONC.

② 12-7-12

MIXED W/ SLAB WHEN
POURED.

D. CONRAD AT BLO
U-6 CLEANING BRUSH
FOR UST SAMPLING.

0915 AT BLO 42-46 DUOY,
GRINT REFUSAL AT 1-4 FT
W. PLW COLLS FOR 1-4 FT
4-7 INTERVAL. WILL COLL.
0-1' DIRECTLY BELOW
FLOOD AS SURFACE SOIL
SAMPLER WILL COLL.
0-4' (REFUSAL) AS VERT.
ISM AT RALTY BORING.
NEED TO USE 0-1 FT
MATERIAL IN 1-4 FT SAMPLES
DUE TO LACK OF SAMPLER
MATERIAL. 0-1 FT WILL
COVER ANY POSITIVE DATA
FAP IN THIS INTERVAL.

1100 WILL COLL 5006 BORING

③

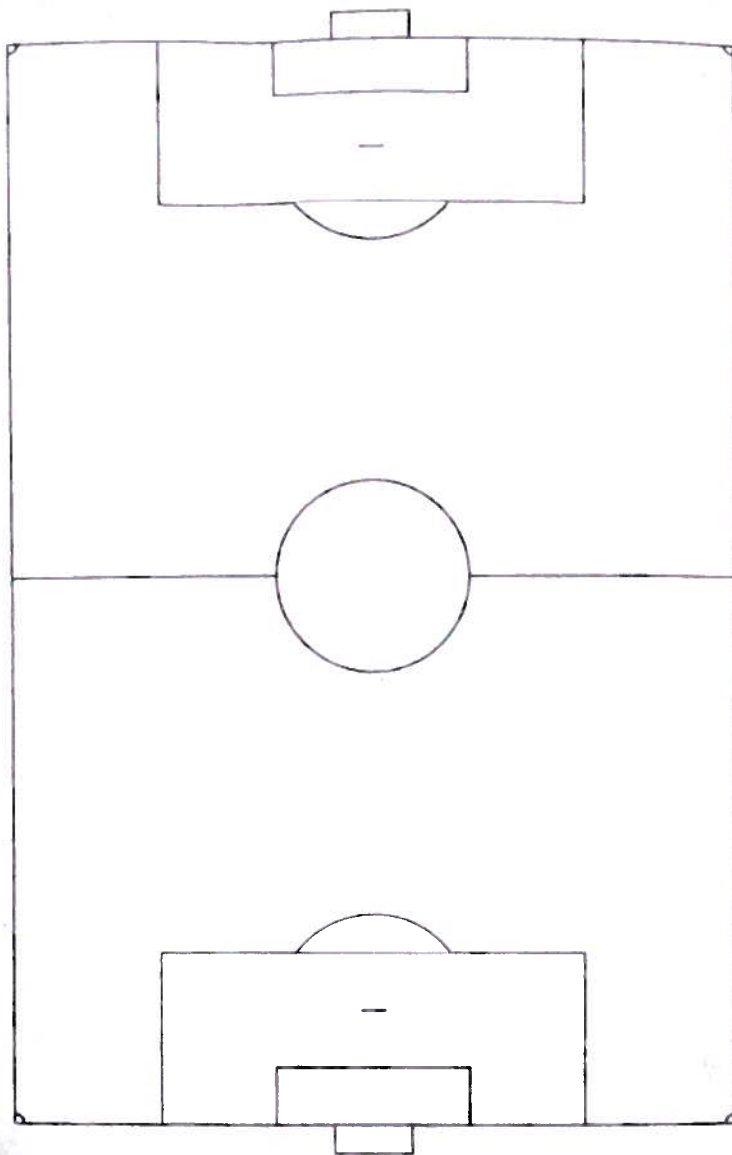
12-7-12

AT DU3, DU1, DU3, + DU5

1300 BLOW DP BORINGS AT
CC 72 RV 88

1410 AT CC 72 72-08 TO
CONDUCT ISM SAMPLING.

1515 FINISH AT 72-08.



Date 13 NOV 12 (8)

PC LESS THAN (364F)

7:26 AM LEFT AT 6:20 PM
DRIVING VERY SLOW

11 HRS

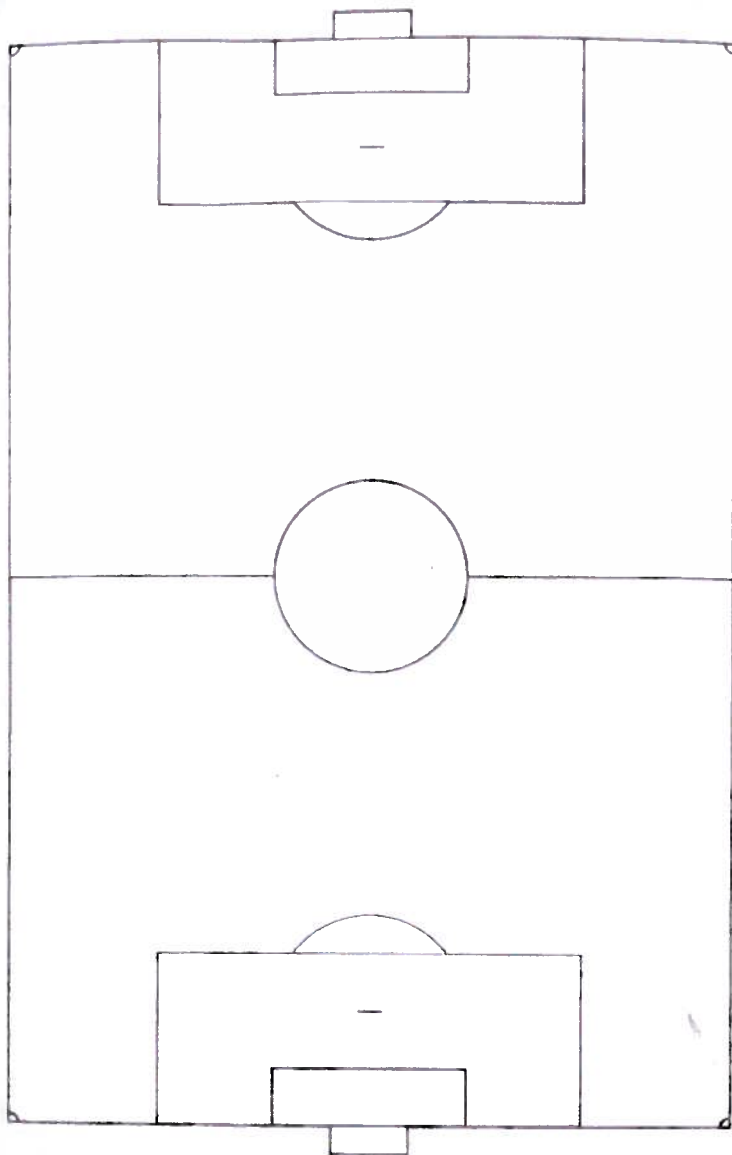
- CORING - NO GO

- MAY HAVE HIT UST AT CC 70
NEAR FORMER HERB STORAGE

AT SB-4 -

DU 5 - HAD ODORS AT SS / CLAY
INTERFACE, MAY BE SOME ISSUES,

	HERB		SB-2
COLLECTED	DU 5	4-7'	VOL VERY HOT
EXTRA	DU 6	4-7'	VOL HOT
	WASH		SB-5



Date 13 NOV 2012 ⁹

CC 70
DU-3 Bich 1740 — STARTED 8.56 AM

SB-1 @ 9.15 AM

0-4' DK BRN CLAY 12" 40"
TRANS INTO BRN SILTY CLAY 43"

4-7' SS @ 6.8

7-13' @ 9.23 AM 4"
SS ONLY 4"

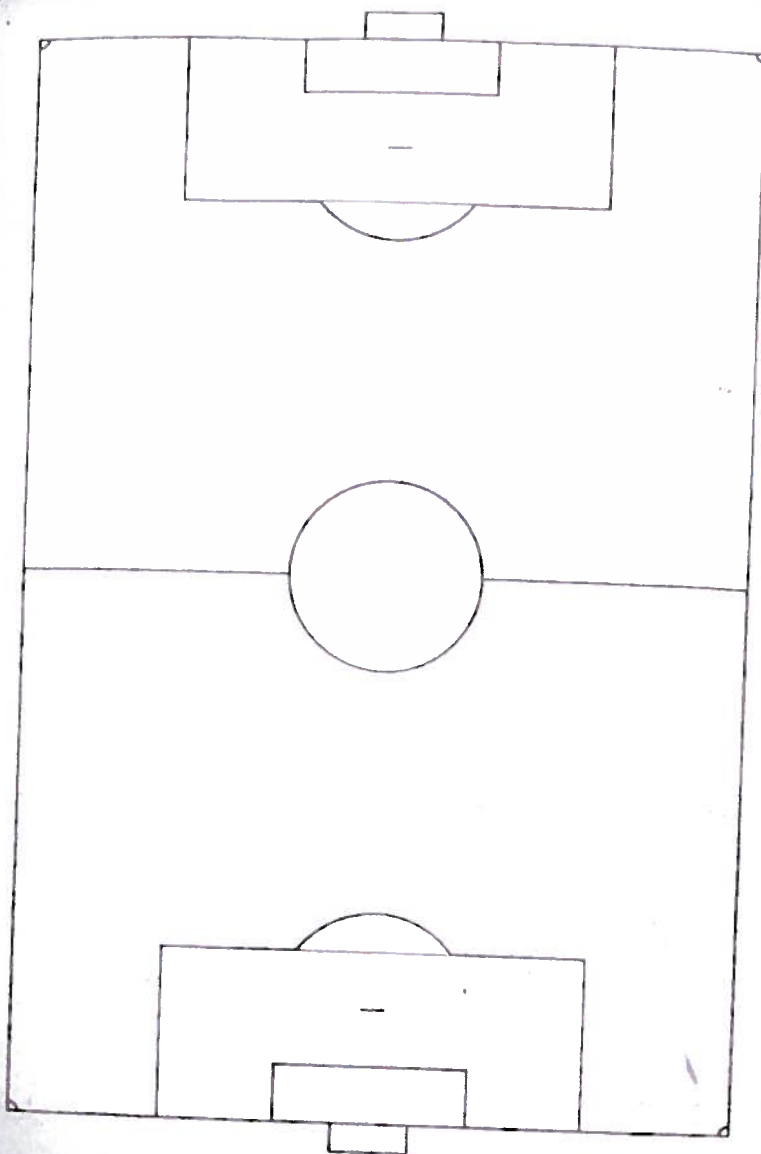
SB-2 @ 9.40 AM STARTED @ 9.35 AM

0-4' BLK CLAY 18" 30"
4-7' TRANS DK CLAY INTER BEDDED SS/CLAY 38"
SS @ 6.8'

7-13' @ 9.50 AM LESS 16" SS

SB-3 STARTED @ 9.58 AM

0-4' BL CLAY 40"
4-7' TRANS TO DK CLAY 32"



Date 13 NOV 2012 ⁽¹⁰⁾

SB-4 STARTED 11:15 AM

D-4' @ 11:22 AM DK BRN SILTY CLAY
TRANS TO BRN SILTY CLAY

4-7' w/ GRAVEL @ 5.5' - 5.7'

SB-5 STARTED 12:10

1-4' @ 12:28 PM 36'

4-7' BLK CLAY 42"
TRANS TO BRN SILTY CLAY

LUNCH - DRILLER 12:40 PM

DU 6

WASH RACK STARTED @ 1:40 PM

SB-5 @ 2:00 PM

1-4' 32" BRN CLAY - SILTY CLAY

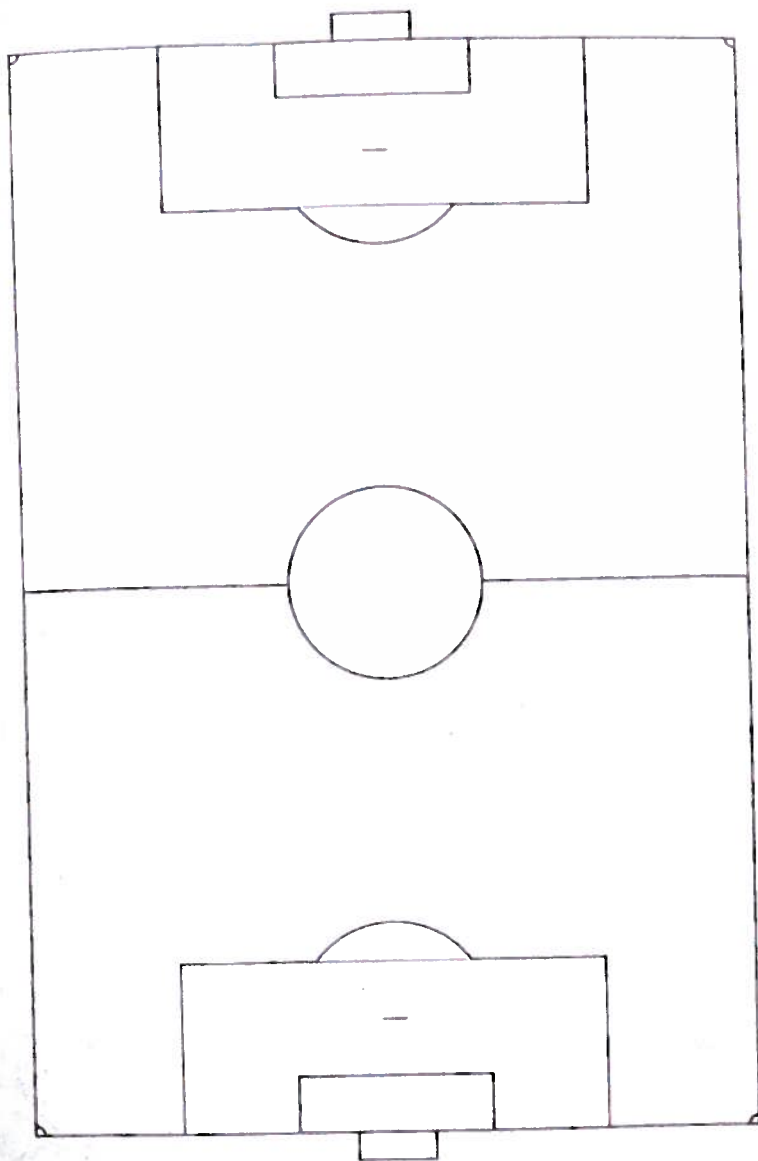
4-7' 30" LAST 19" GRASS

STRONG - ORZOR

* HOT *

COLLECTED VEG

PD
40 ppm
4' thin open



Date 13 Nov 2012

(11)

WASH RACK @ 2:20 pm

SB-φ1

1-4' 38" SAME AS φ5
4-7' 32" PLD 11.5 ppm

WASH RACK @ 2:43 pm

SB-φ3

1-4' 38" SAME AS φ5
4-7' 35" LT OR DR @ SANDSMT

WASH RACK @ 3:10 pm

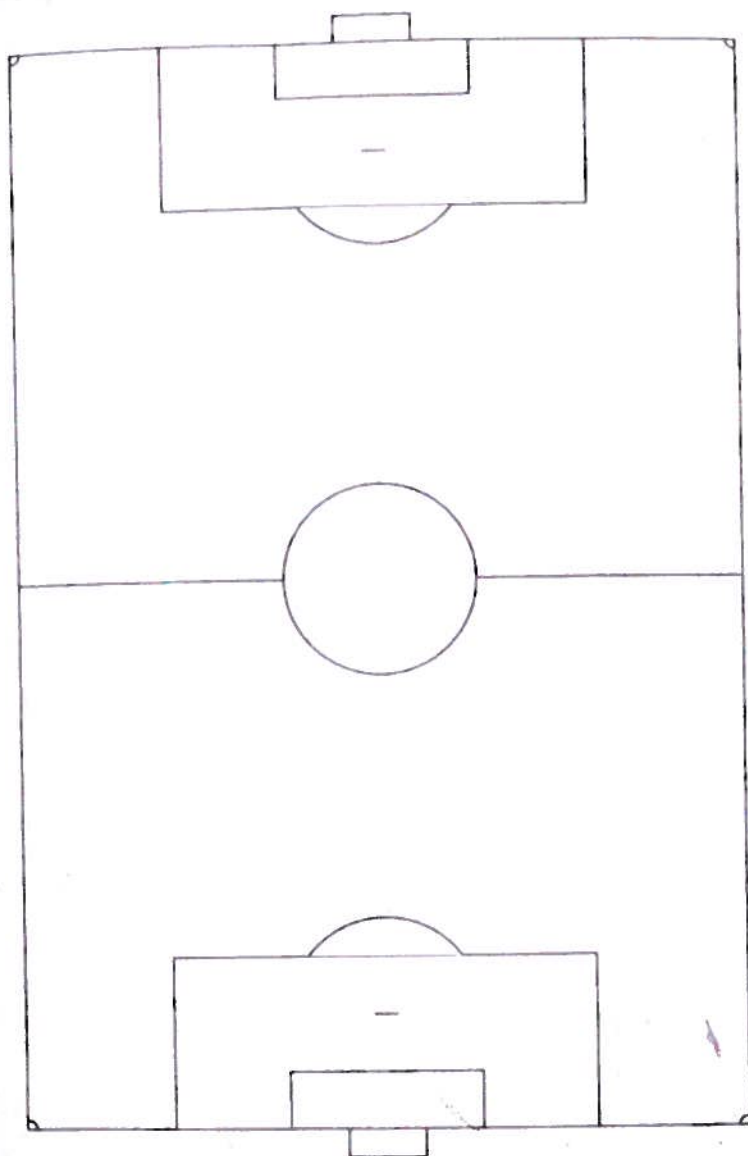
SB-φ2

1-4' 19" LT OR SILTY CLAY ENDY/GRAVEL
4-7' 39" LT GRAY-BEN
BLK CLAY TRANS TAN/LT BEN
LAST 6" LT OR DR (CLAY)

WASH RACK @ 3:43 pm

SB-φ4

1-4' 30" GRAVEL/CLAY TRANS BEN CLAY
4-7' 27" BEN CLAY TRANS DK-LT GRAY CLAY
LT OR DR SS @ 10"



Date 13 NOV 2012 (12)

FORMER HERBICIDE STORAGE SHED

DV-05 SB-5 STARTED 16:00
@ 4:15pm

1-4' 38" DK GRAY CLAY TRANS LT BRN
4-7' 32" 1" TO SS 24" SS

SB-04

@ 4:25pm

1-4' 38" DK GRAY CLAY MAY HAVE #7+
4-7' 3" GRAVEL / SLAG TANK??

SB-03

@ 5:04pm

1-4' 37" GRAY BRN SILTY CLAY
4-7' 38" TRANS LT BRN THE LAST 18" SS

SB-02

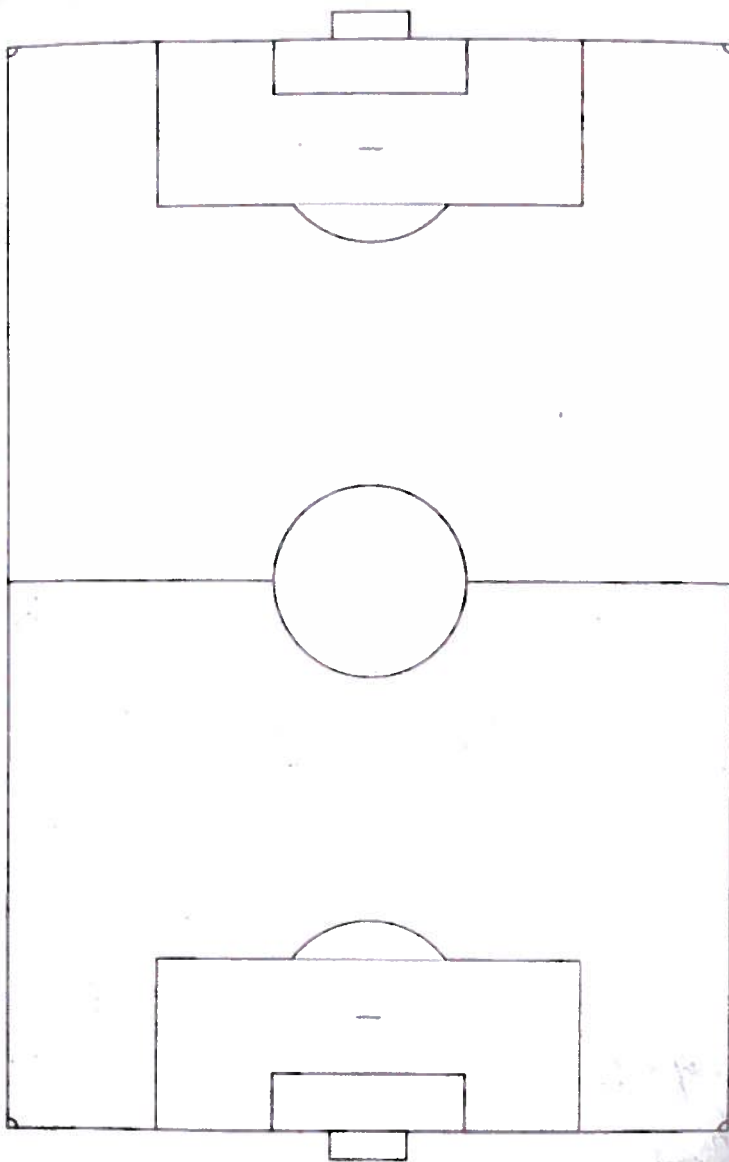
@ 5:12pm SAME AS 03

1-4' 5:22pm 44" AIR TEMP 32
42" 4-7' STRONG ODOR PH 7.5 PPM
COLLECTED VOC SAMPLE

SB-01

@ 5:42pm

1-4' 32" LT BRN SILTY CLAY
4-7' 10" TO 7'



Date 14 NOV 2012 ⁽¹³⁾

STARTED AT 7:28AM

- STARTY MEETING

DRAW TO CC 76

ECY DU-1 SB-2

strong petroleum smell ~ 2' from bottom (VOC + TPH taken)

ECY DU-1 SB-1

strong petroleum smell ~ 2' from end (TPH + sample there)

ECY DU-1 SB-4

NO ODOOR

ECY DU-1 SB-5

NO ODOOR

ECY DU1 - SB-3

36" 40"

(41)
Date 7 DEC 12

STARTED 7:35am

CL 70 EAST CLASS YARD @ 8:40am

Building 47-40 (Rand House) DU-4

SB-1 @ 9:06am

0-4' x 1' REFUSE SS white/buff tan

4-7' SURFACE SOILS P10 3.5 ppm

7-13'

SB-2 9:28 am

0-4' x 15" REFUSE SS white/buff tan

SB-3 @ 9:45am

0-4' x 48" REFUSE SS 0-36" DEBRIS/CLAY
36-48" Buff Tan SS

SB-4 @ 10:00am

0-4' x 46" REFUSE SS 0-30" " "
30-46" " "

SB-5 @ 10:20am

0-4' x 36" REFUSE SS 0-30" DEBRIS/CLAY
30-36" 2" SS 0-34 DEBRIS/CLAY
2" SS

CL 70 EAST CLASS YD BUILDING-4740

DU-3 SB-06

42

Former Fuel Spill

Horrid She!

same - as others

@6' $\Delta H =$

Rainy House

Sante - As Others

Linett

CC72-08(RVBG) UST SITE

65-12 13:00

1-4' BKN SILTY CLAY (FILL)

~~4-7' " " DRY — SAMPLED @ 6~~

58-2 @ 1313

1-4 BEN ELMY SMOO BK CLAY (Fill) TRANS TO OR BENCE
4-7' LT BEN SILTY CLAY w/ BEN GRAVEL MARG @ 7

SB-3@ 13.22

SB-3 @ 13.22
1-4' BEN CLAY SAND / BIKEL (FILL) TIGARS D LT BENCE
4-7' LT BEN SILTY CLAY W DEN GRABEL MIXED @ 7'

DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 1	Date: January 29, 2018	
W912QR-12-D-0002, TO 0003		Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:	Weather: Cloudy
	DAY	From: 7:30 AM	Temp 30s F
		To: 4:00 PM	Rain/Snow;

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8.5			
Cheryl Huey		4.5			
Paul Zahrt		4.5			
Contractors					
Underground Detective	7.5			1	7.5
Visitors					

HEALTH AND SAFETY TASKS PERFORMED/PPE: Kevin Sedlack conducted a brief safety meeting at 9:00 AM. He discussed 1) Roll of Range Control, 2) what to do in the event of an emergency, 3) driving on the base.

EQUIPMENT ON SITE: Utility location equipment provided by the Underground Detective.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Cleared Area 69 (Former Firehouse) and Area 74 (Maintenance) of underground utilities.
2. Filled borings in the concrete trench of Area 72 (Railroad Maintenance) with bentonite. Hydrated the bentonite.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:

1. Underground Detective discovered an anomaly using the GPR east of the Automotive Maintenance building. The anomaly has the shape of a tank pit. A metal detector was used, and no metal was detected. Plan to move 74-1034-WP2 closer to the building to avoid the anomaly and the sewer line.

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Clean debris in Area 72 (Railroad Maintenance Building)
2. Cut brush in Area 72

Joseph D. Peterlin

Date: 29 January 2018

CONTENTS

[illegible]

Location Camp Ravenala Date 1-29-2018 ³
Project / Client _____

Paul Zante (Parsons) 30°F / cloudy
Cheryl Huey (Parsons)
Joe Peterlin (Parsons)

- Arrived at 7:30 AM to conduct Safety Meeting with Kevin Sedlock and to have Underground Detective Clear proposed boring location.
- Security did not have persons info for clearance. Kevin Sedlock sent info to security.
- 8:45 AM: Cleared security. Matt Peterbaugh with Underground Detective arrives and clears security.
- Safety meeting with Kevin Sedlock in Building 1036.
- Need to check in daily with Range Control. 614-336-6041.

10

4 Location Camp Ravenna Date 1-29-2018
Project / Client _____

- Mobilized To Area 69 (Former Fire station). Layed out Proposed borings. Underground Detective started clearing area with GPR.

- Paul, Kevin, and Joe mobilized To Area 74 (Automotive Maintenance). Marked proposed borings.

- Paul, Kevin, and Joe Mobilized To Area 70 (Railroad Maintenance). Filled in former borings with bentonite. Hydrated bentonite with distilled water.

- Bentonite is Haskplug® 3/8" Coarse grade sodium bentonite from Wyoming Baroid Industrial Drilling Products P.O. Box 1675, Houston, TX 77251 877-379-7912

JD?

5 Location Camp Ravenna Date 1-29-2018
Project / Client _____

12:00 noon: Paul and Cheryl leave site. Underground Detective leaves site to get gasoline.

1:10 pm: Underground Detective Returns.


2:30 pm: Cleared Area 69 and marked ut.l.ties. Moved To Area 74

Found an anomaly behind building that is the shape of a vest p.t.

There is a sewer line between anomaly and building.

Took photographs of utility markings.

4:00 pm: Leave Site.


1-29-2018

DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 2	Date: January 30, 2018	
W912QR-12-D-0002, TO 0003		Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:		Weather: Cloudy
	DAY	From: 7:30 AM	To: 4:15 PM	Temp 10s F
				Snow

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8.75			
Contractors					
American Waste				1	7.5
- Steve Kilper		8.75			
- Todd		8.75			
Sunbelt Rental (drop off equipment)					
Roll-off delivery driver					
Visitors					

HEALTH AND SAFETY TASKS PERFORMED/PPE: Kevin Sedlack conducted a brief safety meeting at 7:45 AM. He discussed 1) Roll of Range Control, 2) what to do in the event of an emergency, 3) driving on the base.

American Waste conducted safety briefs before cleanup of waste and again before brush hogging. American Waste topics covered in included with the Tailgate Safety Meeting Log.

EQUIPMENT ON SITE: Mini-excavator, Bobcat with brush hog attachment, and roll-off box.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Brush hogged area around Area 70 (Railroad Maintenance).
2. Moved debris, and started to clean the area above the trench.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:

1. Oily residue is present in the old drum rack. Steve is checking with the facility waste management people to determine what to do about the oily residue.
2. The east tracks inside the building are covered with wood. We can not determine if they contain oily sludges. Steve said this side was not used to work on the train engines, and therefore, should not contain the same amount of oily materials that the pit contains. We will take no action to remove wood or sample the materials below the wood.

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Clean debris in Area 70 (Railroad Maintenance Building)
2. Characterize waste in roll-off.

Joseph D. Peterlin

Date: 30 January 2018

Location Comp Ravenna Date 1-30-2018
 Project / Client _____

- Arrived at 7:35 Am. Heavy snow.
 Temperatures in 20°F

- Steve Kilper with American Landfill Management already onsite.

- Todd with American Landfill Management arrived at 7:45 Am.

~~7:45~~
~~8:00 Am~~: Conducted Safety Tailgate with Kevin Sedlock.

- 8:00 Am: Checked in at Range Control.
 Drove to Railroad Maintenance Building.

- 8:30 Am: Reviewed Railroad Maintenance building scope of work with Kevin, Steve, and Todd.

- 9:00 Am: Conducted Safety brief with Steve and Todd.

JDP

Location Comp Ravenna Date 1-30-2018 7
 Project / Client _____

9:50 Am: Sunbelt Rental Arrives on base. I guided the driver to our work location.

11:00 Am: Conducted safety brief on brush hog. Used American Waste's JSA. Then walked area to be cleared looking for obstacles.

11:20 Am: started brush hogging.

12:30 pm: Left Railroad Maintenance area to meet rolloff driver at gate. Kevin arrives onsite.

1:05 pm: Back onsite with rolloff driver. Brush is cleared.

1:20 pm: Discussed the covered tracks on the east side of building with Kevin. We don't know what's below the boards. Kevin said that work on Trains occurred on the west tracks with P.T. Kevin did not want to take

JDP

Location Compi Ravenala Date 1-30-2018

Project / Client _____

boards off to observe conditions around
Tracks. We will not conduct an investigation
~~here~~ on the east Tracks.

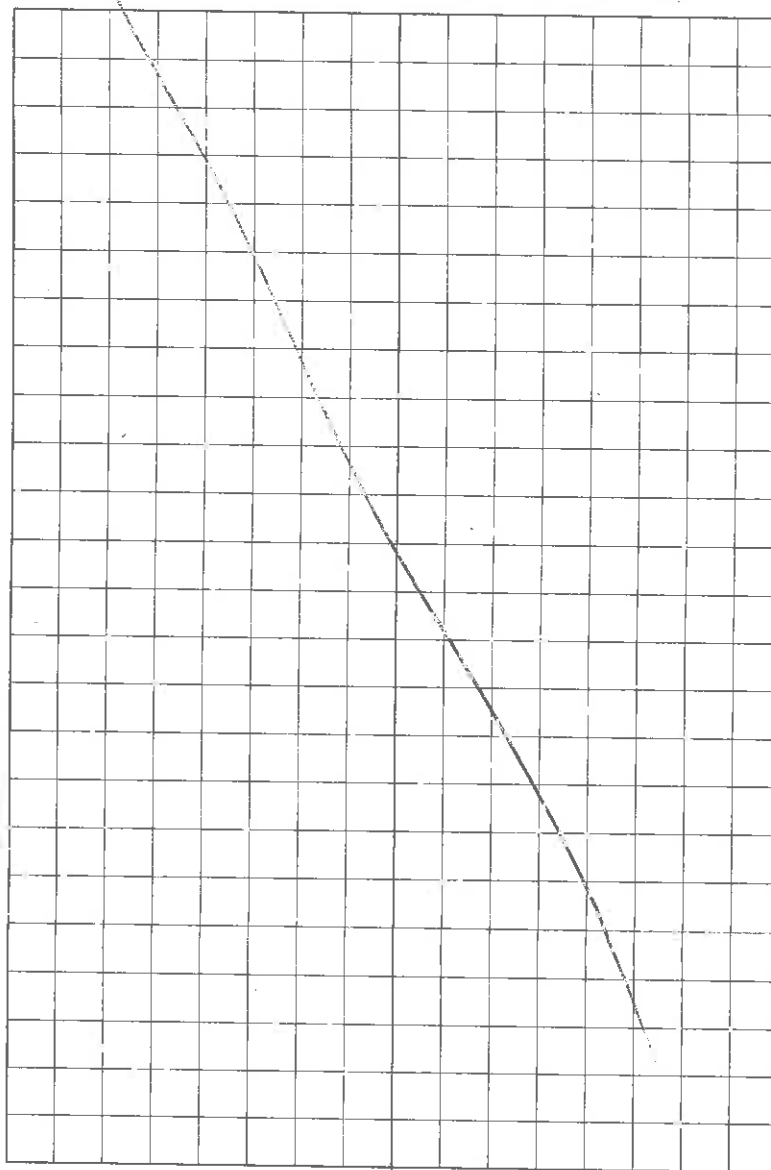
Shaw Davis American Waste finish
for day in Railroad Maintenance
Building.

4:15 pm. Check out with Range
Control. leave Base.

[Signature]
1-30-2018

Location _____ Date _____

Project / Client _____



DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 3	Date: January 31, 2018	
W912QR-12-D-0002, TO 0003			Report No:
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:		Weather: Cloudy
	DAY	From: 7:30 AM	To: 2:45 PM	Temp 10s F to 30s F

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	7:15	7.15			
Contractors					
American Waste					
- Steve Kilper		4			
- Todd		7:15			
- Kevin		7:15			
Visitors					
Burt (Environmental)					

HEALTH AND SAFETY TASKS PERFORMED/PPE:

American Waste conducted safety brief before cleanup of waste. American Waste topics covered in included with the Tailgate Safety Meeting Log.

EQUIPMENT ON SITE: Mini-excavator, Bobcat with brush hog attachment, and roll-off box.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Scrapped oily debris from trench and drum storage area.
2. Placed debris in roll-off box.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Collect waste characterization sample from roll-off
2. Collect the Area 69 (Former Firehose) groundwater grab samples
3. Collect the Area 74 (Automotive Maintenance) groundwater grab samples if time permits

Joseph D. Peterlin

Date: 31 January 2018

Location Camp Ravenna Date 1-31-2013

Project / Client _____

- Arrived at 7:15 AM to continue work on Railroad Maintenance building. Steve already on site in outside parking lot. Todd and Kevin with American Waste arrived at 7:30 AM.

- 7:35 AM: Checked in with Range Control.

- 8:00 AM: Conducted Daily Safety Brief. Steve, Todd, and Kevin with American Waste, Kevin Seaback, and Joe Peterlin. Topics covered are included on the American Waste Tailgate form, which will be printed and included with Daily Tailgate form.

- 11:00 AM: Calibrated the PII to 100 ppm isobutylene in air calibration standard.

- 11:30 AM: Steve leaves site.

JDP

Location Camp Ravenna Date 1-31-2013

Project / Client _____

12:5 PM: Kevin approves clean up. Kevin and I discuss the location of proposed borings.

- No cracks observed in trench. Space 4 borings evenly.
- Oil drum rack had oil staining below. Place one boring here.
- There are cracks south of oil drum rack. No staining. Place one boring through wood near crack.
- Outside catch basin near road where water would flow.
- We found another catch basin near building that connects to known catch basin. Place final boring in this area where surface water will flow. This is in place of the southern most boring.

1:30 PM: Discussed progress with Ed Hays.

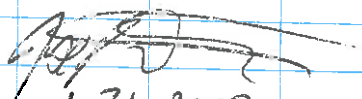
JDP

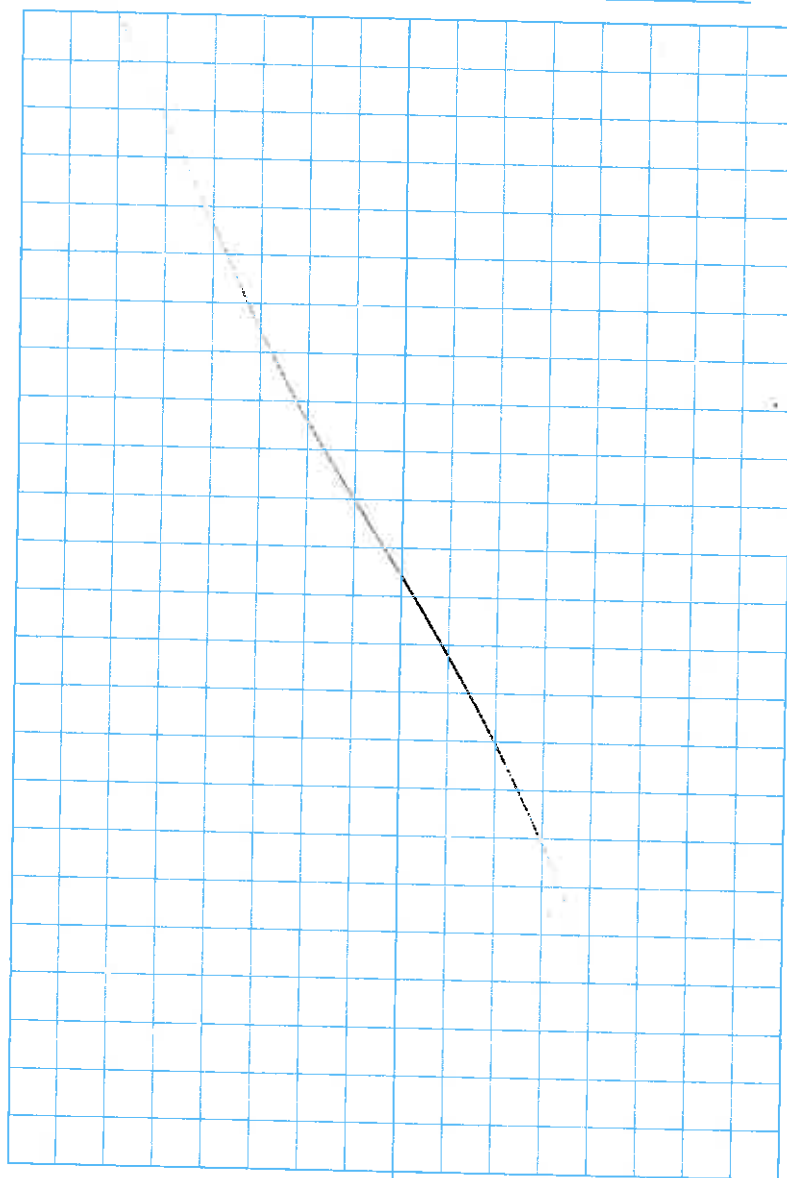
1:45pm: Burt from Environmental
stopped by the site

Walked South side of building.
Locations of proposed buildings in this
area do not change from proposed
building locations.

2:20 pm: American Waste (Rockland County)
lease site.

2:45pm: check out of Base with
Range Control.


1-31-2018



DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 5	Date: February 2, 2018	
W912QR-12-D-0002, TO 0003		Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:		Weather: Cloudy
	DAY	From: 7:30 AM	To: 3:45 PM	Temp 10s F

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8:15			
Contractors					
EnviroCore					
- Tony Creamer		4:15			
- Keith		4:15			
Visitors					

HEALTH AND SAFETY TASKS PERFORMED/PPE:

Conducted safety brief with Kevin Sedlack and Tony Creamer (EnviroCore) and Keith (EnviroCore). Discussed Parsons AHAs and working in cold.

EQUIPMENT ON SITE: Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): N/A

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Collected SB101 and SB102 at Area 72.
2. Completed borings to collect groundwater grab samples from 074-1034-WP1.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Collect groundwater grab samples from the four borings at Building 1034.
2. Complete borings at Area 72 (Railroad Maintenance).
3. Mobilize and start at Area 69 (Former Firehouse) if time permits.

Joseph D. Peterlin

Date: 2 February 2018

Arrived at 7:20 am to complete grab samples at Area 74 and collect soil samples at Area 72.

Tony and Keith Arrive at 7:30 am.

Conducted safety brief with Kevin Sedlock at 7:45 pm.

8:15 am: Sampled the decent water.

8:45 am: Mobilized to Building 1034.

9:15 am: installed PVC well at 204 with 10 ft of screen.

10:00 am: Mobilized to Area 72 (Railroad Maintenance Building). SB102 was moved to drum storage area. will do duplicates on this being because of potential for contamination.

JDP

10:25 AM: started SB102

- 3 inches of concrete

- 10 inches of gravel

- BROWN, moist plastic clay, silt sand with trace gravel.

- Sample volume was not sufficient to collect 3 4-cz jars and 4 temperature vials. I collected sample, MS, and MSD. No. enough sample for three 100 g or 50 g or 25 g bottles. Only have enough for one, which would be critical for screening and percent moisture analysis.

JDP

Location Camp Rowena Date 2-2-2018

Project / Client _____

4-6 ft Brown, moist, hard
slightly plastic clay, silt, sand with
trace gravel.

6-8 ft Same

- Collected duplicate from 4-6 ft

- Calibrated PID to 100 ppm Remythane
in air. Calibration good

2-4 ft 0.2 ppm

4-6 ft 0.1 ppm

6-8 ft 0.1 ppm

Bedrock at 8 ft. Auger Refusal

JDP

Location Camp Rowena Date 2-2-2018

Project / Client _____

10-4740-SB01 started at 11:30 am
East Track near crack in
concrete.

0-4 ft: sand and gravel at top

4 inches of mixed clay and
gravel

Gray, moist, plastic clay, silt
sand with trace gravel grading
into a brown hard clay, silt
sand with trace gravel and
rock at bottom

- 2 ft Recovery could be due
to gravel around tracks.
No concrete under tracks.

JDP

Location Comp Reverse Date 2-2-2018

Project / Client _____

4-7ft: red brown clay with
sand and with fine gravel
Back at 6 ft

Refusal at 7 ft.

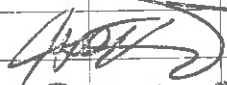
- Measured depth of trench at 3ft 8 in.
This is less than depth that will
require full protection.

- 11:45 am: Drillers leave site.

- 12:25 pm: Finish at ~~12:30~~ Area 70.

- Complete COC and Package Samples.

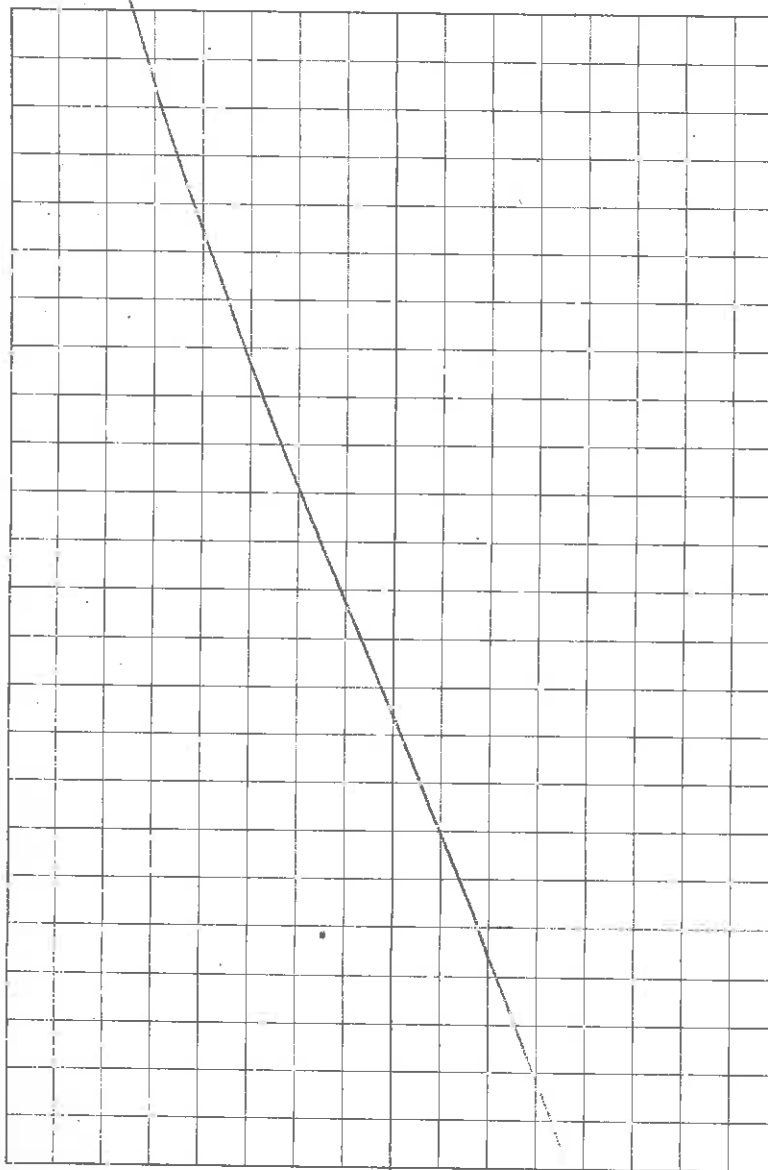
- 3:45: Leave site to take samples to
FedEx.


2-2-2018

Location _____

Date _____

Project / Client _____



DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 6	Date: February 5, 2018	
W912QR-12-D-0002, TO 0003		Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:		Weather: Cloudy
	DAY	From: 7:30 AM	To: 4:30 PM	Temp 10s F

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	9			
Cheryl Huey	8	9			
Contractors					
EnviroCore					
- Tony Creamer		7:30			
- Brandon Creamer		7:30			
Visitors					
Mark Leeper					
Ed D'Amato (Ohio EPA)					
Katie Tait					
Craig Coombs					

HEALTH AND SAFETY TASKS PERFORMED/PPE:

Conducted safety brief with Kevin Sedlack, Cheryl Huey (Parsons), Tony Creamer (EnviroCore) and Brandon Creamer (EnviroCore). Discussed Parsons AHAs and working in cold.

EQUIPMENT ON SITE: Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): PID (see field notes)

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Collected groundwater grab samples from Area 74.
2. Collected soil samples from Area 70 (Railroad Maintenance) SB104, SB105, SB106, and SB107.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN:

The geoprobe concrete bit and concrete core have a 4 foot extension. The concrete bit was used to drill approximately 6 inches through concrete at SB103. After that depth, the geoprobe was used in an attempt to punch through the remaining concrete. However, the concrete is at least 20 inches thick in this area. After approximately 2 hours of work, the drillers decided that they need a concrete core machine to complete this boring.

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL:

1. The monitoring wells are required to be installed by a 6.25-inch inside diameter hollow stem auger unless we can demonstrate that there is a continuous 2 inches of sand pack surrounding the well screen. This doesn't seem possible so the scope of work will be changed to install wells using 6.25 inch augers.
2. SB103 will be moved to a location that Kevin Selleck will mark tomorrow morning.

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Collect SB103 from Area 70 (Railroad Maintenance).
2. Collect roll-off characterization samples.
3. Mobilize and start at Area 69 (Former Firehouse).

Joseph D. Peterlin

Date: 5 February 2018

Location Camp Riverina Date 2-5-2018

Project / Client _____

- Arrived at 7:20 am to continue drilling.

- Cheryl Huey (Person), Kevin Sedlack, Tony Creamer, and Brandon Creamer (Environment) on site.

- 7:45 Am: Safety brief conducted with Cheryl Huey, Tony, Brandon, and Kevin. Safety meeting is documented in daily tailgate form and daily drilling checklist form.

- 8:15 Am: Cheryl starts sampling at Building 1034.

- 8:45 Am: Start geoprobe at Railroad Maintenance Building

TDP

Location Camp Riverina Date 2-5-2018²⁵

Project / Client _____

SB0104 (South end of tracks)

- 8 inches of concrete

- 8 inches of gravel

- Bedrock (Refuse) at 4 ft

- Approximately 18 inch sample recovery. BROWN, stiff, clay, silt, sand with trace gravel. Two inch sandy layer 10 to 12 inches from bottom.

- 11:15 Am: Calibrated PID to 100 ppm is shut down in air calibration standard.

- Drillers were unable to ~~use~~ extract geoprobe from concrete. At least 4 inches of concrete.

JDP

Location Camp Revealing Date 2-5-2018
 Project / Client _____

10:30 AM: Mark Leeper, Katie, Ed D'Amato, Kevin Sedlock at the Railroad Maintenance building. Walked Ed through work complete and work proposed.

12:00 Noon: Start ~~SB106~~ SB107 by catch basin near road.

Top 4 inches: organic sediment

Approximately 8 inches of gravelly sand.

- mottled brown and gray, moist slightly plastic clay, silt, sand with trace gravel.

JDP

Location Camp Revealing Date 2-5-2018²⁷
 Project / Client _____

4-8 ft: Top 18" is a brown, st. ff clay, silt, sand with trace gravel.

Bottom 18" is a weathered sandstone.

SB106 (catch basin by RR tracks)

- Top 4 inches: Top soil

- Remaining sample: Brown, moist slightly plastic clay, silt, sand with trace gravel.

4-8 ft: top 14 inches: Brown, moist slightly plastic clay, silt, sand with trace gravel.

Bottom 14 inches: weathered white sandstone over brown sandstone.

JDP

Location Camp Ravenala Date 2-5-2018
 Project / Client _____

8-10 ft: weathered sandstone.

- Refused at 10 ft

2:00 pm: Mark keeper, Craig,
 and Kevin Sudlock onsite. we discussed

1. Auger diameter - All agreed that 4.25 inch auger is OK to use to install 2-inch monitoring wells.
2. A concrete core machine is required to drill through concrete in trench.

2:05 pm started SB105

0-4 ft: Top soil to 3 inches

Brown moist slightly plastic
 clay, silt, and sand with trace
 gravel.

2 inches gravel layer at
 4 to 6 inches below grade.

JP

Location Camp Ravenala Date 2-5-2018²⁹
 Project / Client _____

4-7 ft: Brown, moist, slightly
 plastic clay, silt, sand
 with trace gravel to 8".

Bottom 14" : weathered sandstone

Refused at 7 ft

P.T.D. Readings

SB104	(0-4)	0.0	ppm
SB107	(0-1)	0.0	ppm
	(1-3)	0.0	ppm
	(3-5)	0.0	ppm
	(5-7)	0.0	ppm
	(7-9)	0.0	ppm
	(9-11)	0.0	ppm
SB106	(0-2)	0.0	ppm
	(2-4)	0.0	ppm
	(4-6)	0.0	ppm
	(6-8)	0.0	ppm
	(8-10)	0.0	ppm

JP

Location Camp River Date 2-5-2013
 Project / Client _____

SB105 (0-2)	0.0 ppm
SB105 (2-4)	0.0 ppm
SB105 (4-6)	0.0 ppm
SB105 (6-7)	14.7 ppm

- Discussed concrete coring in trench with Drillers. They have both a concrete bit and a concrete core for the geop. cor. The problem is both are on a Rod that can not be extended inside the trench, they can use the concrete bit only a few inches in the concrete. They are going to get a concrete coring machine so that we can finish the Railroad Maintenance building tomorrow.

2:30 pm: Drillers leave to get concrete core.

3:00 pm: Met drillers at Building 1036 to discuss concrete coring and 3.25 inch augers. JDR

Location Camp River Date 2-5-2013 31
 Project / Client _____

NOTE ON PID SCREENING IV:
 1. 1st Time at 1st screen
 Immediately using a PID. See Photos. Then soils are placed in Ziplock bags and scanned a second time.

3:15 pm: Spoke with Mr. K. Leape. We are going to move SB103 outside of trench. I called drillers to install core machine.

3:25 pm: Spoke with Mark, Kevin, and Katie.


1. Scope of work for tomorrow:
 - Complete Area 72
 - Move to Area 69
2. Drum Labeling
 - Number drums
 - Use Former RVAAP, 8451
 - SR 5, Reverse, OH 44266
 - For address
 - O-13 IN: Area 69, 72, 74 SI/RI

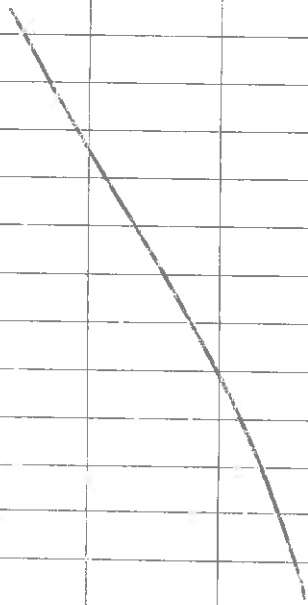
307

Location Cip Rovers Date 2-5-2018
 Project / Client _____

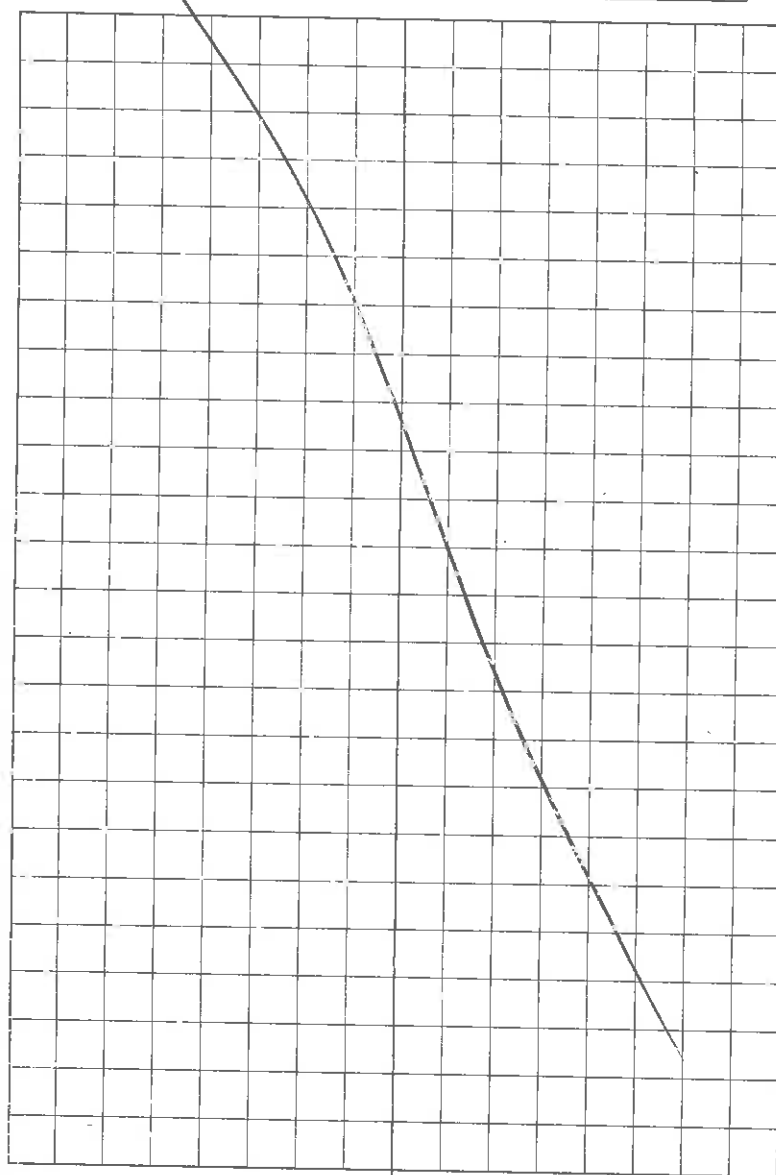
- Checked out of Kew Control
 at 4:20 pm

Left site at 4:30 pm.


 2-5-2018



Location _____ Date _____
 Project / Client _____



DAILY ACTIVITY REPORT

Project No: 640030.0005.110051	Day: 7	Date: February 6, 2018	
W912QR-12-D-0002, TO 0003		Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH			

Work Area	Shift	Hours Worked:		Weather: Cloudy
	DAY	From: 7:30 AM	To: 4:00 PM	Temp 20s F

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS					
Joe Peterlin	8	8.25			
Cheryl Huey	8	8.5			
Contractors					
EnviroCore					
- Tony Creamer	7	7			
- Brandon Creamer	7	7			
Visitors					
Mark Leeper					
Katie Tait					
Craig Coombs					

HEALTH AND SAFETY TASKS PERFORMED/PPE:
 Conducted safety brief with Kevin Sedlack, Cheryl Huey (Parsons), Tony Creamer (EnviroCore) and Brandon Creamer (EnviroCore). Discussed Parsons AHAs, working in cold, and drilling safety checklist.

EQUIPMENT ON SITE: Geoprobe with supporting equipment.

QUALITY CONTROL ACTIVITIES (Including Field Calibrations, may include attachment): PID (see field notes)

SITE WORK COMPETED (Including Sample ID and Analysis, may include attachment):

1. Collected Area 70 (Railroad Maintenance building) samples SB103 and catch basin sediment sample. The catch basin sediment sample appears to be outside of the scope of work listed in the work plan, but I understand it was requested by the Ohio EPA.
2. Collected roll-off box waste characterization sample.
3. Collected soil samples from Area 69 (Former Firehouse) SB110, SB111, SB112, and SB113.

PROBLEMS ENCOUNTERED/CORRECTIVE ACTION TAKEN: None

NOTES/INSTRUCTIONS GIVEN BY GOVERNMENT PERSONNEL: None.

PROPOSED SCOPE OF WORK FOR TOMORROW:

1. Collect seven groundwater grab samples at Area 69.

Joseph D. Peterlin

Date: 6 February 2018

Location Camp Ravenala Date 2-6-2018
 Project / Client _____

- Arrived at 7:30 Am To complete work at Area 70 (Railroad Maintenance) and start borings at Area 69 (Firehouse).

7:35 Am: Safety Tailgate Meeting with Tony, Brandon, Cheryl, Kevin. Separate signed form in Safety Plan.

8:30 Am: Mark keeper, Craig Coombs, Kevin Sedlock at Area 70. Found Sump under North Stairs. Moved boring to sump discharge line.

SB103 located west of North Trench Sump

0-4 ft:

- 8 inches concrete
- 8 inches gravel

SBP

Location Camp Ravenala Date 2-6-2018
 Project / Client _____

- Brown, moist to wet, sandy clay and silt trace gravel
- PID Reading 1.4 ppm at top
- Cheryl Huey calibrated PID at 7:35 Am today.

4-7 ft: 21 inch recovery

- Wet gravelly / sandy clay and silt. Grey. Possible fill material from sump discharge.

- Sampled from wet gravelly / sandy zone.

9:15 Am

- Catch basin by SB107 - Used hand auger to collect sediment sample. This sample appears to be outside scope.

- 9:30 Am: Sampled Rolloff

SBP

Location Camp Riverdale Date 2-6-2018

Project / Client _____

PID Readings

SB103 (2-7) - 0.5

SB103 (2-7) - 0.0

Catch basin - 0.0

10:00 AM: Moved to Area 69

SB110

0-4 ft: Brown moist, slightly plastic, clay, silt, sand trace gravel.

4-8 ft: Brown, moist, slightly plastic clay, silt, sand trace gravel. Wet 2 inch sandy layer at 5 ft.

PID - 0.0 ppm

TAF

Location Camp Riverdale Date 2-1-2018 37

Project / Client _____

8-12 ft: PID - 0.0

Wet Brown silty sand with some clay.

- Collected 10-15 ft sample from wet zone at approximately 11 to 12 ft.

12-16 ft: Brown grading to gray slightly plastic clay, silt, sand with thin some wet sandy layers
PID - 0.2 ppm

16-20 ft: Gray wet clay, silt sand. Sandy layer in middle.

Lower 12 inches is a weathered sandstone.

- Sample (15-20 ft) collected above sandstone.

PID - 0.1 ppm

TAF

Location Camp Riverway Date 2-6-2018
 Project / Client _____

20-24 ft:

Top 12 inches: Gray wet clay silt
 sand

Bottom 18 inches: Brown weathered
 sandstone.

Collected sample from top of
 Brown weathered sandstone at
 22 ft

PID - 0.0 ppm

Refused at 28 ft

24-28 ft: Brown, wet weathered
 sandstone.

PID - 0.0 ppm.

JSP

Location Camp Riverway Date 2-6-2018³⁹
 Project / Client _____

11:55 Am: Updated PID on Project
 Status. ~~Ann~~ moved to SB III

SB III

0-4 ft: Topsoil to 4 inches
 Brown, moist, slightly Plastic
 clay, silt, sand trace gravel.

PID - 0.0 ppm

4-8 ft: Brown wet clay, silt,
 sand trace gravel

PID - 0.2 ppm

8-12: Gray moist clay, silt
 sand

PID - 0.0 ppm

JSP

Location: Camp Ravenala Date: 2-6-2015

Project / Client: _____

12-10 ft: Gray, clay, silt sand
Wet. Sample 6 ft.

PID: 0.0 ppm

16-20 ft: Gray, wet clay, silt
Sand. PID: 0.0 ppmBottom 4" is a gray weathered
sandstone. Sample 4" is sandstone.

Refusal at 23 ft

20-23 ft: Brown wet sandstone
Sample collected from bottom.

PID: 0.0 ppm

1:45 pm: Left site to get batteries
and dig drillers machine

1:45 pm: batteries back onsite

T.M.

Location: Camp Ravenala Date: 2-6-2015

Project / Client: _____

SB 112

0-4 ft: Top soil for 4 ft

Middle 12 inches: Brown moist
clay, silt, sand trace gravelBottom 12 inches: wet sand
with gravel, silt clay.

PID: 0.0 ppm

4-8 ft: Brown moist,
clay, silt, sand trace
gravel

PID: 0.0 ppm

JDF

46 Location Long River Date 2-6-2018
Project / Client _____

8-12 ft: Brown wet clay,
silt, sand with trace gravel.

PID - 0.0 ppm

- Refusal at 14 ft

- collected 10 to 15 ft sample
from 12-14 ft interval.

12-14 ft: Brown, wet clay, silt,
sand trace gravel on top.

Stiff brown moist clay, sand
silt with trace gravel on bottom.

- no observable bedrock. Driller is
report about stop of geoprobe. They
believe they are on rock.

TDT

43 Location Long River Date 2-6-2018
Project / Client _____

SB113

0-4 ft: 4 inch Top Soil

Brown, moist, slightly plastic
clay, silt, sand trace gravel

PID - 0.0 ppm

4-8 ft: Brown, moist slightly
plastic clay, silt, sand trace
gravel.

PID - 0.0 ppm

8-12 ft: Brown, moist, slightly
plastic clay silt sand trace
gravel. wet layer at 11 ft

- Sampled 10-11 ft above more
impermeable layer.

- PID - 0.0 ppm

STOP

Location Camp Raverano Date 2-6-2015
 Project / Client _____

12-16 ft: top 12 inches brown
 moist clay, silt, sand trace
 gravel

Bottom 36 inches wet brown
 sand with clay and silt.

PID - 0.0 ppm

12-16 ft: Gray moist clay, silt
 sand slightly plastic.

- Sample collected from 17-18 ft
 interval.

- PID - 0.0 ppm

16-20 ft: Gray moist clay, silt
 sand, slightly plastic.

- PID - 0.0 ppm

JDF

Location Camp Raverano Date 2-6-2018⁴⁵
 Project / Client _____

20-24 ft Bottom 8" is a
 brown weathered sandstone

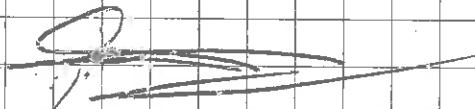
Top is a gray clay, silt, sand
 with trace gravel st. ff

collected sample from above
 sandstone.

2:20 pm: Drillers leave site.

- Checked logs with logging
 and service.

- Left site at 3:45 pm to go
 to the office. Cheryl is
 taking samples to FedEx.



2-6-2018

DAILY ACTIVITY REPORT

Project No:	640030.0005.110051	Day:	Monday	Date:	3-5-2018
W912QR-12-D-0002, TO 0003				Report No:	
Project Title: Additional Sampling at CC-69, CC-70 and CC-74, Camp Ravenna OH					

Work Area	Shift	Hours Worked:		Weather:	Sunny
		From:	To:	Temp	29-37
	DAY	10:00	16:30	Rain/Snow;	none

Contractor Manpower	Number of Workers	Total Onsite Hours	Major Equipment	Number on Site	Total Hours
PARSONS	1				
Cheryl Huey		7			
Contractors					
Visitors					

SAFETY: Cold stress in a.m., Slips-trips-falls, muscle strains, pinch points

SITE WORK COMPETED: Sampled 4 wells at 069 (MW001, 002, 003, 004). Sampled roll-off at 070 for TCLP Vocs.

PROPOSED SCOPE OF WORK FOR TOMORROW: Sample one well at 069 and 3 wells at 074. Also sample IDW water and complete waste inspection.

Cheryl Huey

Date: 3-5-2018

106

Location PORTAGE + TRUMBULL COUNTIES Date 3/5/18Project / Client CAMP RAVENNA OTD, O69C. HueyWELL SAMPLING

0955	ONSITE, SUNNY 29°F		
	FORECAST: SUNNY HIGH 30°s		
1000	TAILGATE BRIEFING. CHECK W/RANGE CONTROL.		
1005	CALIBRATE EQUIPMENT		
	PSI 55.6: COND (11B) 1.423 1.413		
	pH 4.0- 3.92 4.01		
	pH 10.0- 10.11 10.01		
	pH 7.0- 7.36 7.01		
	ORP (240mV) -238.2 240.0		
	DO ₂ (% AIR SAT) - 92.7% / 100.2%		
	TURBIDIMETER HI 98703		
	2.0 NTU B- 0.19 A- 0.10		
	15 NTU B- 14.1 A- 15.0		
	100 NTU B- 104 A- 101		
	750 NTU B- 756 A- 751		
1020	DRIVE TO AOC 070 TO COLLECT TRCP VOC SAMPLE FROM ROLL-OFF		
1030	COLLECT 070SC-0002-LP		
1043	BACK TO AOC 069		
1058	BACK @ 069. CHECKED IN WITH RANGE CONTROL		
1100	SET UP C 069MW-003		
1139	START PURGING MW003		
1240	SAMPLED 069MW-003-0001-GW		
1255	START PURGING 069MW-001		

Location PORTAGE + TRUMBULL COUNTIES Date 3/5/18

107

Project / Client CAMP RAVENNA 069C. HueyWELL SAMPLING

14:01	SAMPLED 069MW-001-0001-GW		
14:07	SAMPLED 069MW-001-0001-GW	THROW OUT NO DUP.	
14:20	START PURGING 069MW-002		
	DTW @ 8.77		
15:06	SAMPLED 069MW-002-0001-GW		
15:21	START PURGING 069MW-004	DTW @ 8.97	
16:15	SAMPLED 069MW-004-0001-GW		
16:20	CLEANED UP.		
16:25	CHECKED OUT @ RANGE CONTROL		
16:26	WENT OUTSIDE THE GATE TO PACK THE COOLER.		
17:06	LEFT THE SITE FOR FEDEX		

3/5/18

C. Huey

106

Location POITACE + TRUMBULL COUNTIES Date 3/5/18Project / Client CAMP RAVENNA 070, 069C. HueyWELL SAMPLING

0955	ONSITE, SUNNY 29°F		
	FORECAST: SUNNY, HIGH 30's		
1000	TAILGATE BRIEFING. CHECK W/RANGE CONTROL.		
1005	CALIBRATE EQUIPMENT		
	PSI 55.6: COND (11B) 1.423 1.413		
	pH 4.0- 3.92 4.01		
	pH 10.0- 10.11 10.01		
	pH 7.0- 7.36 7.01		
	ORP (240mV) -238.2 240.0		
	DO ₂ (76 AIR SAT) - 92.7% / 100.2%		
	TURBIDIMETER HI 98703		
	2.0 NTU B- 0.19 A- 0.10		
	15 NTU B- 14.1 A- 15.0		
	100 NTU B- 104 A- 101		
	750 NTU B- 756 A- 751		
1020	DRIVE TO AOC 070 TO COLLECT TRCP VOC SAMPLE FROM ROLL-OFF		
1030	COLLECT 070SC-0002-LP		
1043	BACK TO AOC 069		
1058	BACK @ 069. CHECKED IN WITH RANGE CONTROL		
1100	SET UP C 069MW-003		
1139	START PURGING MW003		
1240	SAMPLED 069MW-003-0001-GW		
1255	START PURGING 069MW-001		

Location POITACE + TRUMBULL COUNTIES Date 3/5/18

107

Project / Client CAMP RAVENNA 069C. HueyWELL SAMPLING

14:01	SAMPLED 069MW-001-0001-GW		
14:07	SAMPLED 069MW-001-0001-GW	THROW OUT NO DUP.	
14:20	START PURGING 069MW-002		
	DTW @ 8.77		
15:06	SAMPLED 069MW-002-0001-GW		
15:21	START PURGING 069MW-004	DTW @ 8.97	
16:15	SAMPLED 069MW-004-0001-GW		
16:20	CLEANED UP.		
16:25	CHECKED OUT @ RANGE CONTROL		
16:26	WENT OUTSIDE THE GATE TO PACK THE COOLER.		
17:06	LEFT THE SITE FOR FEDEX		

3/5/18

C. Huey

APPENDIX B.5

Photoionization Detector Calibration Forms

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Project/Site Name RAVENNA, 0410 Calibrated By T. Donovan

[illegible]

INSTRUMENT CALIBRATION LOG

Project/Site Name Ravenna, Ohio Calibrated By David Lemcev

Instrument/Serial Number	Pre-calibration Reading	Post-calibration Reading	Calibration Gas/Concentration	Date
MiniRae 3000 PID 11805	0.0/99.2	0.0 / 110.3	Isobutylene / 100ppm	12-3-12
MiniRae 3000 PID 10399	0.0/102	0.0 / 102	Isobutylene / 100ppm	12-3-12
MiniRae 3000 PID 11805	0.0 / 100	0.0 / 103	Isobutylene / 100ppm	12-4-12
MiniRae 3000 PID 10899	0.0 / 100	0.0 / 101	Isobutylene / 100ppm	12-4-12
MiniRae 3000 PID 11805	0.0 / 100	0.0 / 107	Isobutylene / 100ppm	12-5-12
MiniRae 3000 PID 11805	0.0/99.4	0.0/101	Isobutylene / 100ppm	12/6/12
MiniRae 3000 PID 11805	0.0/99.7	0.0/101	Isobutylene / 100ppm	12/7/12
MiniRae 3000 PID 11805	0.0/100	0.0/99.3	Isobutylene / 100ppm	12/10/12
MiniRae 3000 PID 10899	0.0/100	0.0/102	Isobutylene / 100ppm	12/10/12
MiniRae 3000 PID 11805	0.0 / 100	0.0 / 99.9	Isobutylene / 100ppm	12/11/12
MiniRae 3000 PID 10899	0.0 / 100	0.0 / 101	Isobutylene / 100ppm	12/11/12
MiniRae 3000 PID 11805	0.0 / 100	0.0 / 99.7	Isobutylene / 100ppm	12/12/12

APPENDIX B.6

Tailgate Safety Meetings Logs

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TAILGATE SAFETY MEETING LOG

PROJECT NAME:

PROJECT NO:

DATE: 1-24-2018 M Tu W Th F Sa Su TIME: 7:03 AM Mon 1/24/2018 SAT/1/24/2018 # 8: 5:00 AM EST

WEATHER: clear/snowy 120S

JCM's LOCATION

WORKING CONDITIONS: snow




PPE: hard hat

ITEMS DISCUSSED:

Discussed with Kevin: Change Point 1, Driving, Communications
W3 (HBF)

Discussed with Steve & Ted: AWD ISSA (see Attached)

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

Joe Peterin
SITE SAFETY AND HEALTH OFFICER

Pre-Work Hazard Evaluation

Project/Task:

CLEAN BLDG 70

Date:

1-30-18

List Personnel:

JCC / SCDD / ALIVE

Pre-Work Checklist (complete for all tasks before beginning)

1. Read and understand procedures/instructions/SDS/SHA for task?
2. Proper equipment and tools available and serviceable and safe?
3. Required permits (GWP, hot work, confined space, etc.) completed?
4. Proper PPE for project/task discussed and available to all?
5. Energy isolation discussed and identified by all personnel?
6. Have all personnel participated in Show Me of the work area?
7. Have all other work areas and personnel been notified of the work?
8. Have hazards associated with the project/task been identified [below]?
9. HAVE YOU TALKED THROUGH HOW TASK WILL BE PERFORMED?
10. HAVE YOU TALKED THROUGH WHAT TO DO IN AN EMERGENCY?

<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A

CO

METAL

Known or Potential Hazards

Hazardous atmosphere
Stored energy - electrical
Stored energy - liquid/gas
Stored energy - mechanical
Chemical hazards
Hot/Cold hazards
Fall hazards (working at $\geq 4'$)
Pinch point hazards
Excavation hazards
Slip/Trip/Fall hazards
Line of Fire hazards

<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no

Hot work
Confined space
Other work in vicinity
Jacking/cribbing
Traffic/barricading
Overhead hazards
Visibility/Noise issues
Lifting/Ergonomics
Weather factors
Other: _____
Other: _____

<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no
<input checked="" type="checkbox"/>	no

SLIPS

HEAVY LIFT

DE

Note any special hazard controls, special PPE, notifications to other areas, and other considerations on reverse side of this card.

01.30.2018 09:01

Pre-Work Hazard Evaluation

Project/Task:

BRUSH HOG

Date:

1-30-18

List Personnel:

JOE TOPP STOUT

Pre-Work Checklist (complete for all tasks before beginning)

1. Read and understand procedures/instructions/SDS/JHA for task?
2. Proper equipment and tools available and serviceable and safe?
3. Required permits (GWP, hot work, confined space, etc.) completed?
4. Proper PPE for project/task discussed and available to all?
5. Energy isolation discussed and identified by all personnel?
6. Have all personnel participated in Show Me of the work area?
7. Have all other work areas and personnel been notified of the work?
8. Have hazards associated with the project/task been identified (below)?
9. HAVE YOU TALKED THROUGH HOW TASK WILL BE PERFORMED?
10. HAVE YOU TALKED THROUGH WHAT TO DO IN AN EMERGENCY?

<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A
<input checked="" type="checkbox"/>	no	will	N/A

KNOWN or Potential Hazards

Hazardous atmosphere

Stored energy - electrical

Stored energy - liquid/gas

Stored energy - mechanical

Chemical hazards

Hot/Cold hazards

Fall hazards (working at $\geq 4'$)

Pinch point hazards

Excavation hazards

Slip/Trip/Fall hazards

Line of Fire hazards

yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>

Hot work

Confined space

Other work in vicinity

Jacking/cribbing

Traffic/barricading

Overhead hazards

Visibility/Noise issues

Lifting/Ergonomics

Weather factors

Other: VISIBILITY

Other: ~~~~

yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>
yes	<input checked="" type="checkbox"/>

SLIPPERY

STAY WECC AWAY
OF LINE OF FIRE

JCC

Note any special hazard controls, special PPE, notifications to other areas, and other considerations on reverse side of this card.

- Turn Right on Ohio Routes 44 and 14 (North and West)
- Hospital is approximately 2 miles east of

01.30.2018 11:03

PROJECT NO:

WEATHER:

PPE: Level D with DUST MASKS when sweeping

ITEMS DISCUSSED: See Attached

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

SITE SAFETY AND HEALTH OFFICER

Emergency - 911

Camp Ravenna Range Control (Emergency): 614-336-6041

Safety Manager - Steve Kuper: 330-618-0259

Pre-Work Hazard Evaluation

Project/Task:

Date:

List Personnel:

Work Description:

1. Read and understand procedures/instructions/SOS/JHA for task?
2. Proper equipment and tools available and serviceable and safe?
3. Required permits (GWP, hot work, confined space, etc.) completed?
4. Proper ROP for project discussed and available to all?
5. Energy isolation discussed and identified by all personnel?
6. Have all personnel participated in show me of the work area?
7. Have all other work areas and personnel been notified of the work?
8. Have hazards associated with the project/task been identified (below)?
9. HAVE YOU TALKED THROUGH HOW TASK WILL BE PERFORMED?
10. HAVE YOU TALKED THROUGH WHAT TO DO IN AN EMERGENCY?

yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A
yes	no	will	N/A

Known or Potential Hazards

Hazards-atmosphere
Stored energy - electrical
Stored energy - liquid/gas
Stored energy - mechanical
Chemical hazards
Hot/Cold hazards
Fall hazards (working at 2' or more)
Pinch point hazards
Excavation hazards
Slip/Trip/Fall hazards
Line of Fire hazards

yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no

Hot work
Confined space
Other work in vicinity
Jacking/crushing
Traffic/particulate
Overhead hazards
Visibility/Noise issues
Lifting/Ergonomics
Weather factors
Other: _____
Other: _____

yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no
yes	no

Note any special hazard controls, special PPE, notifications to other areas, and other considerations on reverse side of this card.

ONLY WAS SLIP

SLIPS

Co. D

- Turn Right on Ohio Routes 44 and 14 (North and West)
- Hospital is approximately 2 miles on left
- Follow signs to Emergency Entrance

01.31.2018 08:18

TAILGATE SAFETY MEETING LOG

PROJECT NAME:

PROJECT NO:

DATE: 2-2-2018 MTu WTh Sa Su TIME: 8:00 AM

WEATHER: 81°F SNOW

WORKING CONDITIONS: SNOW on Ad COM


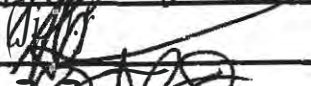
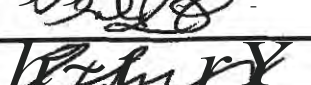
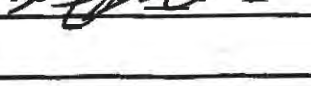
PPE: Level D

ITEMS DISCUSSED: Waste Management

Prep work

All As in Safety Meeting

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG

PROJECT NAME:

PROJECT NO:

DATE:

Mon With 8:30 Su

TIME:

7:30 am

2-5-2018

WEATHER:

clear qrtz

WORKING CONDITIONS:

cold, snow

PPE:

level 1 D

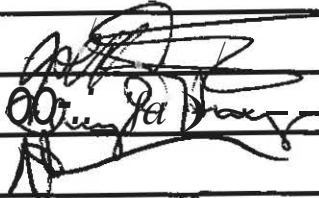
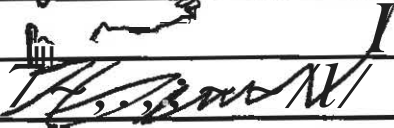
ITEMS DISCUSSED:

Working in cold

MPK Required

Daily Safety Inspection / Checklist

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

SITE SAFETY AND HEALTH OFFICER

TAILGATE SAFETY MEETING LOG

PROJECT NAME:

PROJECT NO:

DATE:

MWTHS SaSu

TIME:

7:35 PM

R-6-2018

WEATHER:

19°F, SNOW

WORKING CONDITIONS:

cold, snow, ice

PPB:

Level 10

ITEMS DISCUSSED:

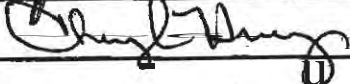
AAA Drilling

Steps, Trips, Falls

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)







SITE SAFETY AND HEALTH OFFICER

PROJECT NAME: CHMP RAVE/2A **PROJECT NO:** 114M31, 03000

WEATHER: SLANDY HIGH 20¹³ To HIGH 30¹⁹

WORKING CONDITIONS: Ground Soft, Some Frost on Streets, Mud

WAX:JS6 ASP: HACT

PPE: LEVEL 1b

ITEMS DISCUSSED: CORD STRESS IN A.#M.

SILIPS: TRIPSAFEALS, MUSCLE STRAINS, PINCH POINTS

THE FOLLOWING INDIVIDUALS ATTENDED THE DAILY TAILGATE SAFETY MEETING (SIGNATURES)

Alfred Huey

Cheng J. Huang
SITE SAFETY AND HEALTH OFFICER

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APPENDIX B.7

Daily Safety Inspections

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PROJECT: <u>Ravenna</u> <u>1-30-2018</u>			DAILY SAFETY INSPECTION	Page 1 of 2
N	Y	NA	Item	
	✓		Daily safety briefing conducted	
	✓		Emergency numbers and route to hospital posted	
	✓		FWSHP and project-specific Addenda on-site, available to employees, and complete	
	✓		Required exposure monitoring conducted and documented	
	✓		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented	
	✓		First aid kit available and inspected weekly	
	✓		Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)	
	✓		Personnel using buddy system (maintain visual or verbal contact and able to render aid)	
	✓		If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed	
	✓		If temperature <40°F: cold stress training conducted, controls in SSHP implemented	
	✓		Personnel using appropriate biological hazard controls (See SSHP)	
	✓		Drill rig operating manual on-site	
	✓		Drill rigs inspected weekly and documented	
	✓		Personnel near drill rig or other overhead hazards wearing hardhats	
	✓		Each of two drill rig emergency shutdown devices tested daily	
	✓		Employees excluded from under lifted loads	
	✓		Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment	
	✓		Radius of exclusion zone around drill rig at least equal to mast height	
	✓		Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment	
	✓		Containers of flammable liquids closed and labeled properly	
	✓		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly	
	✓		Personnel exiting potentially contaminated areas washing hands before eating	
	✓		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit	

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		<input checked="" type="checkbox"/>	Portable electrical equipment plugged to a GFCI
		<input checked="" type="checkbox"/>	Electrical wiring covered by insulation or enclosure
		<input checked="" type="checkbox"/>	Three wire, UL approved, extension cords used
	<input checked="" type="checkbox"/>		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
	<input checked="" type="checkbox"/>		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		<input checked="" type="checkbox"/>	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		<input checked="" type="checkbox"/>	Moving (rotating) machinery guarded to prevent employee contact
		<input checked="" type="checkbox"/>	Fall protection provided for work at elevations greater than 4 ft
		<input checked="" type="checkbox"/>	All containers of hazardous material labeled to indicate contents and hazards
	<input checked="" type="checkbox"/>		MSDSs for hazardous materials on-site
	<input checked="" type="checkbox"/>		All vehicles equipped with two-way radios and cellular phones
		<input checked="" type="checkbox"/>	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		<input checked="" type="checkbox"/>	Potable and non-potable water labeled
		<input checked="" type="checkbox"/>	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
	<input checked="" type="checkbox"/>		Visitor access controlled
	<input checked="" type="checkbox"/>		Site hazards and controls consistent with SSHP
	<input checked="" type="checkbox"/>		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Joe Peterlin  1-30-2018
 Name Signature Date

DAILY SAFETY INSPECTION

PROJECT: Reverna Arsenal 1-31-2018

Page 1 of 2

N	Y	NA	Item
	✓		Daily safety briefing conducted
	✓		Emergency numbers and route to hospital posted <i>In Safety Plan</i>
	✓		FWSHP and project-specific Addenda on-site, available to employees, and complete
		✓	Required exposure monitoring conducted and documented
		✓	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	✓		First aid kit available and inspected weekly
		✓	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		✓	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
		✓	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
	✓		If temperature <40°F: cold stress training conducted, controls in SSHP implemented
		✓	Personnel using appropriate biological hazard controls (See SSHP)
		✓	Drill rig operating manual on-site
		✓	Drill rigs inspected weekly and documented
		✓	Personnel near drill rig or other overhead hazards wearing hardhats
		✓	Each of two drill rig emergency shutdown devices tested daily
		✓	Employees excluded from under lifted loads
		✓	Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
		✓	Radius of exclusion zone around drill rig at least equal to mast height
		✓	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
		✓	Containers of flammable liquids closed and labeled properly
	✓		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
	✓		Personnel exiting potentially contaminated areas washing hands before eating
		✓	Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		<input checked="" type="checkbox"/>	Portable electrical equipment plugged to a GFCI
		<input checked="" type="checkbox"/>	Electrical wiring covered by insulation or enclosure
		<input checked="" type="checkbox"/>	Three wire, UL approved, extension cords used
	<input checked="" type="checkbox"/>		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
	<input checked="" type="checkbox"/>		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		<input checked="" type="checkbox"/>	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		<input checked="" type="checkbox"/>	Moving (rotating) machinery guarded to prevent employee contact
		<input checked="" type="checkbox"/>	Fall protection provided for work at elevations greater than 4 ft
		<input checked="" type="checkbox"/>	All containers of hazardous material labeled to indicate contents and hazards
	<input checked="" type="checkbox"/>		MSDSs for hazardous materials on-site
	<input checked="" type="checkbox"/>		All vehicles equipped with two-way radios and cellular phones
		<input checked="" type="checkbox"/>	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		<input checked="" type="checkbox"/>	Potable and non-potable water labeled
		<input checked="" type="checkbox"/>	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
	<input checked="" type="checkbox"/>		Visitor access controlled
	<input checked="" type="checkbox"/>		Site hazards and controls consistent with SSHP
	<input checked="" type="checkbox"/>		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Joe Peterlin  1-31-2018

Name

Signature

Date

PROJECT: <u>Camp Raven</u> <u>2-2-2018</u>			DAILY SAFETY INSPECTION	Page 1 of 2
N	Y	NA	Item	
	✓		Daily safety briefing conducted	
	✓		Emergency numbers and route to hospital posted	
	✓		FWSHP and project-specific Addenda on-site, available to employees, and complete	
		✓	Required exposure monitoring conducted and documented	
	✓		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented	
	✓		First aid kit available and inspected weekly	
	✓		Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)	
		✓	Personnel using buddy system (maintain visual or verbal contact and able to render aid)	
		✓	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed	
	✓		If temperature <40°F: cold stress training conducted, controls in SSHP implemented	
		✓	Personnel using appropriate biological hazard controls (See SSHP)	
	✓		Drill rig operating manual on-site	
	✓		Drill rigs inspected weekly and documented	
	✓		Personnel near drill rig or other overhead hazards wearing hardhats	
	✓		Each of two drill rig emergency shutdown devices tested daily	
		✓	Employees excluded from under lifted loads	
	✓		Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment	
	✓		Radius of exclusion zone around drill rig at least equal to mast height	
		✓	Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment	
		✓	Containers of flammable liquids closed and labeled properly	
	✓		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly	
	✓		Personnel exiting potentially contaminated areas washing hands before eating	
	✓		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit	

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		<input checked="" type="checkbox"/>	Portable electrical equipment plugged to a GFCI
		<input checked="" type="checkbox"/>	Electrical wiring covered by insulation or enclosure
		<input checked="" type="checkbox"/>	Three wire, UL approved, extension cords used
	<input checked="" type="checkbox"/>		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
	<input checked="" type="checkbox"/>		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		<input checked="" type="checkbox"/>	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		<input checked="" type="checkbox"/>	Moving (rotating) machinery guarded to prevent employee contact
		<input checked="" type="checkbox"/>	Fall protection provided for work at elevations greater than 4 ft
	<input checked="" type="checkbox"/>		All containers of hazardous material labeled to indicate contents and hazards
		<input checked="" type="checkbox"/>	MSDSs for hazardous materials on-site
	<input checked="" type="checkbox"/>		All vehicles equipped with two-way radios and cellular phones
		<input checked="" type="checkbox"/>	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		<input checked="" type="checkbox"/>	Potable and non-potable water labeled
		<input checked="" type="checkbox"/>	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
		<input checked="" type="checkbox"/>	Visitor access controlled
	<input checked="" type="checkbox"/>		Site hazards and controls consistent with SSHP
	<input checked="" type="checkbox"/>		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Name Joe Peterlin Signature [Signature] Date 2-2-2018

PROJECT: <u>Camp Beverne</u>			DAILY SAFETY INSPECTION		2-5-2018		Page 1 of 2
N	Y	NA	Item				
	✓		Daily safety briefing conducted				
	✓		Emergency numbers and route to hospital posted				
	✓		FWSHP and project-specific Addenda on-site, available to employees, and complete				
	✓		Required exposure monitoring conducted and documented				
	✓		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented				
	✓		First aid kit available and inspected weekly				
	✓		Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)				
	✓		Personnel using buddy system (maintain visual or verbal contact and able to render aid)				
	✓		If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed				
	✓		If temperature <40°F: cold stress training conducted, controls in SSHP implemented				
	✓		Personnel using appropriate biological hazard controls (See SSHP)				
	✓		Drill rig operating manual on-site				
	✓		Drill rigs inspected weekly and documented				
	✓		Personnel near drill rig or other overhead hazards wearing hardhats				
	✓		Each of two drill rig emergency shutdown devices tested daily				
	✓		Employees excluded from under lifted loads				
	✓		Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment				
	✓		Radius of exclusion zone around drill rig at least equal to mast height				
	✓		Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment				
	✓		Containers of flammable liquids closed and labeled properly				
	✓		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly				
	✓		Personnel exiting potentially contaminated areas washing hands before eating				
	✓		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit				

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		<input checked="" type="checkbox"/>	Portable electrical equipment plugged to a GFCI
		<input checked="" type="checkbox"/>	Electrical wiring covered by insulation or enclosure
		<input checked="" type="checkbox"/>	Three wire, UL approved, extension cords used
		<input checked="" type="checkbox"/>	Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
		<input checked="" type="checkbox"/>	Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		<input checked="" type="checkbox"/>	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		<input checked="" type="checkbox"/>	Moving (rotating) machinery guarded to prevent employee contact
		<input checked="" type="checkbox"/>	Fall protection provided for work at elevations greater than 4 ft
		<input checked="" type="checkbox"/>	All containers of hazardous material labeled to indicate contents and hazards
		<input checked="" type="checkbox"/>	MSDSs for hazardous materials on-site
		<input checked="" type="checkbox"/>	All vehicles equipped with two-way radios and cellular phones
		<input checked="" type="checkbox"/>	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		<input checked="" type="checkbox"/>	Potable and non-potable water labeled
		<input checked="" type="checkbox"/>	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
		<input checked="" type="checkbox"/>	Visitor access controlled
		<input checked="" type="checkbox"/>	Site hazards and controls consistent with SSHP
		<input checked="" type="checkbox"/>	Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Name Joe Peterlin Signature [Signature] Date 2-5-2018

DAILY SAFETY INSPECTION

PROJECT: Camp Ravenna

2-6-2018

Page 1 of 2

N	Y	NA	Item
	✓		Daily safety briefing conducted
	✓		Emergency numbers and route to hospital posted
	✓		FWSHP and project-specific Addenda on-site, available to employees, and complete
		✓	Required exposure monitoring conducted and documented
	✓		Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	✓		First aid kit available and inspected weekly
	✓		Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		✓	Personnel using buddy system (maintain visual or verbal contact and able to render aid)
		✓	If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
	✓		If temperature <40°F: cold stress training conducted, controls in SSHP implemented
		✓	Personnel using appropriate biological hazard controls (See SSHP)
	✓		Drill rig operating manual on-site
	✓		Drill rigs inspected weekly and documented
	✓		Personnel near drill rig or other overhead hazards wearing hardhats
	✓		Each of two drill rig emergency shutdown devices tested daily
		✓	Employees excluded from under lifted loads
	✓		Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
	✓		Radius of exclusion zone around drill rig at least equal to mast height
	✓		Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
		✓	Containers of flammable liquids closed and labeled properly
	✓		Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
	✓		Personnel exiting potentially contaminated areas washing hands before eating
	✓		Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranex or rainsuit

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		<input checked="" type="checkbox"/>	Portable electrical equipment plugged to a GFCI
		<input checked="" type="checkbox"/>	Electrical wiring covered by insulation or enclosure
		<input checked="" type="checkbox"/>	Three wire, UL approved, extension cords used
	<input checked="" type="checkbox"/>		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
	<input checked="" type="checkbox"/>		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		<input checked="" type="checkbox"/>	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
	<input checked="" type="checkbox"/>		Moving (rotating) machinery guarded to prevent employee contact
		<input checked="" type="checkbox"/>	Fall protection provided for work at elevations greater than 4 ft
		<input checked="" type="checkbox"/>	All containers of hazardous material labeled to indicate contents and hazards
		<input checked="" type="checkbox"/>	MSDSs for hazardous materials on-site
	<input checked="" type="checkbox"/>		All vehicles equipped with two-way radios and cellular phones
		<input checked="" type="checkbox"/>	15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		<input checked="" type="checkbox"/>	Potable and non-potable water labeled
		<input checked="" type="checkbox"/>	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
	<input checked="" type="checkbox"/>		Visitor access controlled
	<input checked="" type="checkbox"/>		Site hazards and controls consistent with SSHP
	<input checked="" type="checkbox"/>		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

Joe Peterlin

Name



Signature

Date

2-6-2018

DAILY SAFETY INSPECTION		
PROJECT: <u>CAMP RAVENNA</u>		<u>3/5/2018</u>
		Page 1 of 2
N	Y	NA
Item		
	✓	Daily safety briefing conducted
	✓	Emergency numbers and route to hospital posted
	✓	FW SHP and project-specific Addenda on-site, available to employees, and complete
		✓ Required exposure monitoring conducted and documented
	✓	Monitoring instruments (PID, OVA, CGI) calibrated daily against known standard and documented
	✓	First aid kit available and inspected weekly
	✓	Personnel wearing PPE required by SSHP for fieldwork (at least safety shoes or boots, safety glasses with side shields, and nitrile or similar gloves to handle potentially contaminated material)
		✓ Personnel using buddy system (maintain visual or verbal contact and able to render aid)
		✓ If temperature >70°F: heat stress training conducted, cool fluids available, pulse rates of personnel wearing Tyvek® are being monitored, work/rest cycle in SSHP being followed
	✓	If temperature <40°F: cold stress training conducted, controls in SSHP implemented
		✓ Personnel using appropriate biological hazard controls (See SSHP)
		✓ Drill rig operating manual on-site
		✓ Drill rigs inspected weekly and documented
		✓ Personnel near drill rig or other overhead hazards wearing hardhats
		✓ Each of two drill rig emergency shutdown devices tested daily
		✓ Employees excluded from under lifted loads
		✓ Unnecessary personnel excluded from hazardous areas, specifically near heavy equipment
		✓ Radius of exclusion zone around drill rig at least equal to mast height
		✓ Personnel wearing hearing protection when within 25 ft of drill rigs, generators, or other noisy equipment
		✓ Containers of flammable liquids closed and labeled properly
	✓	Fully charged fire extinguisher available 25 to 50 ft from flammables storage area and inspected monthly
	✓	Personnel exiting potentially contaminated areas washing hands before eating
		✓ Personnel using steam washer wearing faceshield, hearing protection, heavy duty waterproof gloves, Saranax or rainsuit

DAILY SAFETY INSPECTION

PROJECT: _____

Page 2 of 2

N	Y	NA	Item
		✓	Portable electrical equipment plugged to a GFCI
		✓	Electrical wiring covered by insulation or enclosure
		✓	Three wire, UL approved, extension cords used
	✓		Housekeeping adequate (walkways clear of loose, sharp or dangerous objects and trip hazards, work areas clear of objects that might fall on employees)
	✓		Walking/working surfaces safe (not slippery, no unguarded holes, no trip hazards)
		✓	Excavations deeper than 5 ft shored or sloped (if personnel will enter) and in compliance with SSHP
		✓	Moving (rotating) machinery guarded to prevent employee contact
		✓	Fall protection provided for work at elevations greater than 4 ft
		✓	All containers of hazardous material labeled to indicate contents and hazards
		✓	MSDSs for hazardous materials on-site
	✓		All vehicles equipped with two-way radios and cellular phones
	✓		15-min eyewash (accessible and full) within 100 ft of areas where corrosive sample preservatives are poured
		✓	Potable and non-potable water labeled
		✓	Chainsaws have anti kick-back protection, personnel wearing cut resistant gloves, protective chaps
	✓		Visitor access controlled
	✓		Site hazards and controls consistent with SSHP
	✓		Site hazard controls appropriate and sufficient

Actions taken to correct or control any "N" responses

CHERYL HUGHY
Name

Cheryl Hughy
Signature

3/5/2018
Date

APPENDIX C


Boring Logs

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APPENDIX C.1

Typed Boring Logs

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<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING</div><div>Coordinates: X = 499331.064 Y = 4562319.411</div><div>Surface Elevation: 952.101283 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div>										Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP	
														CC-70 DU01	
										Drilling Method:		Direct-Push		Boring No. SB01	
												Geoprobe 6620DT			
										Sampling Method:		2" diameter-5 ft SS sampler		Sheet 1 of 1	
		MacroCore liner													
Water Lev.		NA		Drilling											
Time		NA		Start Finish											
Date		NA		14-Nov-12 14-Nov-12											
Reference		NA													
Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil						
	ISM	60/36		1-4 ft	0.0	NA	0	CL	Brown silty clay						
							1								
							2								
							3								
							4								
			5	CL	Interbedded silty clay										
	ISM	24/22		4-7 ft	0.0	NA	6	CL	Same as above, slight odor at 5'						
	ISM			1-7 ft			7		End of boring at 7 ft bgs						
							8								
							9								
							10								
							11								
							12								
							13								
							14								
							15								
							16								
							17								
							18								
							19								
							20								
							21								
							22								
							23								
	24														

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		ISM = Incremental Sampling Method	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X = 499341.403 Y = 4562310.026
Surface Elevation: 953.909004 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:


Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU01
Drilling Method:	Direct-Push Geoprobe 6620DT			Boring No.	SB02
Sampling Method:	2" diameter-5 ft SS sampler MacroCore liner			Sheet 1 of 1	
				Drilling	
Water Lev.	NA			Start	Finish
Time	NA			14-Nov-12	14-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/34			0.0	NA	0	CL	Brown silty clay
							1		
							2	CL	Transition to gry silty clay
	ISM			1-4 ft			3		
							4		
							5		Strong odor at 5'
		24/20			0.0	NA	6	CL	Interbedded silty clay
	ISM			4-7 ft			7		
	ISM			1-7 ft					End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by: T. Hernandez P.G. - Prudent Tech.
Drilling Contractor: Frontz Drilling
WELL SPECIFICATIONS: Well not installed
Diam. of casing: 2" Screen Interval:
BOH: 7 ft bgs Riser Interval:

Date: 14-Nov-12
Driller: Joe Teter
Sandpack:
Bentonite: 0-7 ft bgs

Notes: NA = Not Applicable
See Sample Summary Sheets for analytical information
ISM = Incremental Sampling Method

<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING</div><div>Coordinates: X = 499337.254 Y = 4562298.838</div><div>Surface Elevation: 953.010065 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP	
									CC-70 DU01					
									Drilling Method: Direct-Push		Boring No. SB03			
									Geoprobe 6620DT					
									Sampling Method: 2" diameter-5 ft SS sampler		Sheet 1 of 1			
									MacroCore liner					
									Water Lev. NA		Drilling			
									Time NA		Start			
									Date NA		14-Nov-12			
									Reference NA		Finish			
											14-Nov-12			
Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil					
	ISM	60/36		1-4 ft	0.0	NA	0	CL	Brn Silty clay					
							1	CL	Transition to gry silty clay					
							2							
							3							
							4							
							5							
	ISM	24/19		4-7 ft	0.0	NA	6	CL	Odor at 6.5					
	ISM		1-7 ft			7	Transition to brown silty clay, sandstone at 7' bgs							
							End of boring at 7 ft bgs							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
							15							
							16							
							17							
							18							
							19							
							20							
							21							
							22							
							23							
							24							

Logged by: T. Hernandez P.G. - Prudent Tech.	Date: 14-Nov-12	Notes: NA = Not Applicable See Sample Summary Sheets for analytical information ISM = Incremental Sampling Method
Drilling Contractor: Frontz Drilling	Driller: Joe Teter	
WELL SPECIFICATIONS: Well not installed	Sandpack:	
Diam. of casing: 2" Screen Interval:	Bentonite: 0- 7 ft bgs	
BOH: 7 ft bgs Riser Interval:		



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499330.844 Y 4562302.465
Surface Elevation: 953.213474 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU01
Drilling Method:	Direct-Push			Boring No. SB04	
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			14-Nov-12	14-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40			0.0	NA	0	CL	Brown silty clay
							1		
							2	CL	Transition to gry silty clay
							3		
							4		
							5		
		24/18			0.0	NA	6	CL	Inter bedded gray silty clay
	ISM			4-7 ft			7		
	ISM			1-7 ft					End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for analytical information
WELL SPECIFICATIONS:	Well not installed	Sandpack:			ISM = Incremental Sampling Method
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH: 7 ft bgs	Riser Interval:				



Environmental Chemical Corporation


LOG OF SOIL BORING

Coordinates: X 499319.18 Y 4562307.983
Surface Elevation: 953.721998 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU01
Drilling Method:	Direct-Push			Boring No. SB05	
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			14-Nov-12	14-Nov-12
Reference	NA				

Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
CC70 #3	ISM	60/48		1-4ft	0.0	NA	0	CL	Brown silty clay
							1		
							2		
							3		
							4		
CC70 #3	ISM	24/20		4-7 ft	0.0	NA	6	CL	Transition to lt brn clay, firm, moist. No odors
	ISM		1-7 ft			7	End of boring at 7 ft bgs		
							8		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for analytical information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		ISM = Incremental Sampling Method	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH:	7 ft bgs	Riser Interval:			

 <div style="text-align: center;"> Environmental Chemical Corporation </div> <div style="text-align: center;"> LOG OF SOIL BORING </div> <div> Coordinates: X 499377.945 Y 4562319.59 Surface Elevation: 950.493691 ft msl Casing Below Surface: _____ Reference Elevation: _____ Reference Description: _____ </div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP CC-70 DU03	
									Drilling Method: Direct-Push Geoprobe 6620DT				Boring No. SB01	
									Sampling Method: 2" diameter-5 ft SS sampler MacroCore liner				Sheet 1 of 1	
									Water Lev. NA				Drilling	
									Time NA				Start 13-Nov-12	
Date NA				Finish 13-Nov-12										
Reference NA														
Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil					
	ISM	60/40		1-4 ft	0.0	NA	0	CL	Dark brown silty clay					
						1								
						2								
						3								
						4								
							5							
	ISM	60/43		4-7 ft	0.0	NA	6	CL	Brown clay silt					
	ISM			1-7 ft			7	CL	Sandstone at 6' 8" bgs, 4 inch layer					
							8	CL	Brown clay silt					
		36/4		7-13 ft	0.0	NA	11							
	Comp.						13		End of boring at 13 ft bgs					
							14							
							15							
							16							
							17							
							18							
							19							
							20							
							21							
							22							
							23							
							24							

Logged by: T. Hernandez P.G. - Prudent Tech.
Drilling Contractor: Frontz Drilling
WELL SPECIFICATIONS: Well not installed
Diam. of casing: 2" Screen Interval:
BOH: 13 ft bgs Riser Interval:

Date: 14-Nov-12
Driller: Joe Teter
Sandpack: _____
Bentonite: 0-13 ft bgs

Notes: NA = Not Applicable
See Sample Summary Sheets for sampling information
ISM = Incremental Sampling Method
Comp. = Composite Sample



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499391.598 Y 4562343.52
Surface Elevation: 949.926113 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU03
Drilling Method:	Direct-Push			Boring No.	SB02
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/30			0.0	NA	0		
							1	CL	Black clay
							2		
	ISM			1-4 ft			3	CL	Transition to dark clay
							4		
		60/38					5	CL	Inter bedded sand stone/clay
		36/27		4-7 ft	0.0	NA	6		
	ISM						7		Sand stone at 6.8 ft bgs
							8		
	ISM			1-7 ft					End of boring at 8 ft bgs
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for analytical information
WELL SPECIFICATIONS:	Well not installed				ISM = Incremental Sampling Method
Diam. of casing: 2"	Screen Interval:	Sandpack:			
BOH: 8 ft bgs	Riser Interval:	Bentonite: 0-8 ft bgs			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 950.326370 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU03
Drilling Method:	Direct-Push			Boring No. SB03	
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40			0.0	NA	0		
							1	CL	Dark brown clay
							2		
	ISM			1-4 ft			3	CL	Transition to brown clay
							4		
							5		
		24/15			0.0	NA	6	CL	Brown clay
	ISM			4-7 ft			7		Sandstone at 6 ft bgs
	ISM			1-7 ft					End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		ISM = Incremental Sampling Method	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH: 7 ft bgs	Riser Interval:				



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.345 Y 4562306.532
Surface Elevation: 950.175454 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU03
Drilling Method:	Direct-Push			Boring No. SB04	
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/30	NA	1-4 ft	0.0	NA	0	CL	Dark brown silty clay
	ISM	24/12		4-7 ft	0.0	NA	6	CL	Transition to brown silty clay with gravel at 5.5 ft bgs
	ISM			1-7 ft			7		Sand stone at 7 ft bgs. End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for analytical information
WELL SPECIFICATIONS:	Well not installed	Sandpack:			ISM = Incremental Sampling Method
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499391.536 Y 4562290.735
Surface Elevation: 949.516013 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU03
Drilling Method:	Direct-Push			Boring No.	SB05
	Geoprobe 6620DT				
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/36	NA	1-4 ft	0.0	NA	0	CL	Black clay
	ISM	24/21		4-7 ft	0.0	NA	6	CL	Transition to brown silty clay
	ISM			1-7 ft			7		End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for analytical information
WELL SPECIFICATIONS:	Well not installed				ISM = Incremental Sampling Method
Diam. of casing: 2"	Screen Interval:	Sandpack:			
BOH: 7 ft bgs	Riser Interval:	Bentonite: 0-7 ft bgs			



Environmental Chemical Corporation


LOG OF SOIL BORING

Coordinates: x 499388.601 Y 4562330.898
Surface Elevation: 947.678765 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:


Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU04
Drilling Method:	Direct-Push Geoprobe 6620DT			Boring No.	SB01
Sampling Method:	2" diameter-5 ft SS sampler MacroCore liner			Sheet 1 of 1	
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			6-Dec-12	6-Dec-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions:
	ISM	12/12		0-1 ft	3.5	NA	0		Soil under concrete floor
							1		Cored through floor to facilitate sampling
							2		
							3		
							4		
							5		
							6		
							7		
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
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							19		
							20		
							21		
							22		
							23		
							24		


Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	6-Dec-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for sampling information
WELL SPECIFICATIONS:	Well not installed	Sandpack:			ISM = Incremental Sampling Method
Diam. of casing: 2"	Screen Interval:	Bentonite:	1 ft to conc. surface		
BOH:	1 ft below floor	Riser Interval:			

<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING</div><div>Coordinates: x 499388.601 Y 4562330.898</div><div>Surface Elevation: 947.757504 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP CC-70 DU04	
									Drilling Method: Direct-Push Geoprobe 6620DT		Boring No. SB02			
									Sampling Method: 2" diameter-5 ft SS sampler MacroCore liner		Sheet 1 of 1			
									Water Lev. NA		Drilling			
									Time NA		Start 7-Dec-12			
									Date NA		Finish 7-Dec-12			
									Reference NA					
Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil under concrete floor Cored through floor to facilitate sampling					
	ISM	15/15		0-1 ft	3.5	NA	0		Sand stone, tan					
							1		Refusal at 1 ft, 3 inches					
							2							
							3							
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
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							18							
							19							
							20							
							21							
							22							
							23							
							24							


Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	7-Dec-12	Notes: NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		
Diam. of casing: 2"	Screen Interval:	Bentonite:	1 ft 3 inches to conc. surface	
BOH: 1 ft 3 inches below floor	Riser Interval:			

<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING</div><div>Coordinates: x 499388.601 Y 4562330.898</div><div>Surface Elevation: 947.878894 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP CC-70 DU04	
									Drilling Method: Direct-Push Geoprobe 6620DT		Boring No. SB03			
									Sampling Method: 2" diameter-5 ft SS sampler MacroCore liner		Sheet 1 of 1			
									Water Lev. NA		Drilling			
									Time NA		Start 7-Dec-12			
									Date NA		Finish 7-Dec-12			
									Reference NA					
Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil under concrete floor Cored through floor to facilitate sampling					
	ISM	48/48		0-1 ft	3.5	NA	0	CL						
							1							
							2		Dark brown silty clay					
							3							
	ISM		0-4 ft			4	Tan sandstone							
							Refusal at 4 ft bgs							
						5								
						6								
							7							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
							15							
							16							
							17							
							18							
							19							
							20							
							21							
							22							
	23													
	24													

Logged by:	T. Hernandez P.G. - Prudent Tech.		Date:	7-Dec-12	Notes: NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling		Driller:	Joe Teter	
WELL SPECIFICATIONS:	Well not installed				
Diam. of casing: 2"	Screen Interval:		Sandpack:		
BOH: 4 ft below floor	Riser Interval:		Bentonite: 4 ft to conc. surface		

<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING<div>Coordinates: x 499388.601 Y 4562330.898</div><div>Surface Elevation: 947.944510 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div></div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP	
		Drilling Method: Direct-Push		CC-70 DU04										
		Geoprobe 6620DT		Boring No. SB04										
		Sampling Method: 2" diameter-5 ft SS sampler		Sheet 1 of 1										
		MacroCore liner		Drilling										
Water Lev. NA				Start Finish										
Time NA				7-Dec-12 7-Dec-12										
Date NA														
Reference NA														
Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil under concrete floor					
CC 70 #1	ISM	48/48		0-1 ft	3.5	NA	0	CL	Cored through floor to facilitate sampling					
							1							
							2		Dark brown silty clay					
							3							
	ISM			0-4 ft			4		Tan sandstone					
								Refusal at 4 ft bgs						
						5								
						6								
						7								
						8								
						9								
						10								
						11								
						12								
						13								
						14								
						15								
						16								
						17								
						18								
						19								
						20								
						21								
						22								
						23								
						24								

Logged by: T. Hernandez P.G. - Prudent Tech.	Date: 7-Dec-12	Notes: NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor: Frontz Drilling	Driller: Joe Teter	
WELL SPECIFICATIONS: Well not installed	Sandpack:	
Diam. of casing: 2"	Bentonite: 4 ft to conc. surface	
BOH: 4 ft below floor		

<div><div>Environmental Chemical Corporation</div><div>LOG OF SOIL BORING</div><div>Coordinates: x 499388.601 Y 4562330.898</div><div>Surface Elevation: 948.013406 ft msl</div><div>Casing Below Surface:</div><div>Reference Elevation:</div><div>Reference Description:</div></div>									Job. No. 5461.004		Client ACOE-Louisville		Location RVAAP CC-70 DU04	
									Drilling Method: Direct-Push Geoprobe 6620DT		Boring No. SB05			
									Sampling Method: 2" diameter-5 ft SS sampler MacroCore liner		Sheet 1 of 1			
									Water Lev. NA		Drilling			
									Time NA		Start 7-Dec-12			
									Date NA		Finish 7-Dec-12			
									Reference NA					
Digital Picture #	Sample Type	In. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil under concrete floor Cored through floor to facilitate sampling					
	ISM	36/36		0-1 ft	3.5	NA	0	CL						
							1		Dark brown silty clay					
	ISM			0-3 ft			2							
							3		Tan sandstone					
									Refusal at 3 ft bgs					
							4							
							5							
							6							
							7							
							8							
							9							
							10							
							11							
							12							
							13							
							14							
							15							
							16							
							17							
							18							
							19							
							20							
							21							
							22							
							23							
							24							

Logged by:	T. Hernandez P.G. - Prudent Tech.		Date:	7-Dec-12	Notes: NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling		Driller:	Joe Teter	
WELL SPECIFICATIONS:	Well not installed				
Diam. of casing: 2"	Screen Interval:		Sandpack:		
BOH: 3 ft below floor	Riser Interval:		Bentonite: 3 ft to conc. surface		



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.841 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU05
Drilling Method:	Direct-Push			Boring No.	SB05
	Geoprobe 6620DT			Herb. Shed	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/40		1-4 ft	0.0	NA	0	CL	Light brown silty clay
	ISM	24/15		4-7 ft	0.0	NA	6	CL	Light brown silty clay
	ISM			1-7 ft			7		End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		
WELL SPECIFICATIONS:	Well not installed	Sandpack:			
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.010770 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU05
Drilling Method:	Direct-Push			Boring No.	SB02
	Geoprobe 6620DT			Herb. Shed	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/40		1-4 ft	0.0	NA	0	CL	Gray brown silty clay
	ISM	24/15		4-7 ft	75.0	NA	6	CL	Transition to light brown silty clay
	ISM			1-7 ft			7		Last 18 inches sandstone, strong odor
							8		End of boring at 7 ft bgs
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		
WELL SPECIFICATIONS:	Well not installed	Sandpack:			
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.191214 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU05
Drilling Method:	Direct-Push	Boring No.	SB03		
	Geoprobe 6620DT	Herb. Shed			
Sampling Method:	2" diameter-5 ft SS sampler	Sheet 1 of 1			
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/40		1-4 ft	0.0	NA	0	CL	Dark gray brown silty clay
	ISM	24/22		4-7 ft	0.0	NA	6	CL	Dark gray brown silty clay
	ISM			1-7 ft			7	CL	Transition to light brown silty clay
									Last 18 inches sandstone
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by: T. Hernandez P.G. - Prudent Tech.
Drilling Contractor: Frontz Drilling
WELL SPECIFICATIONS: Well not installed
Diam. of casing: 2" Screen Interval:
BOH: 7 ft bgs Riser Interval:

Date: 14-Nov-12
Driller: Joe Teter
Sandpack:
Bentonite: 0-7 ft bgs

Notes: NA = Not Applicable
See Sample Summary Sheets for sampling information
ISM = Incremental Sampling Method



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.529136 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU05
Drilling Method:	Direct-Push			Boring No.	SB04
	Geoprobe 6620DT			Herb. Shed	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
	ISM	60/40		1-4 ft	0.0	NA	0	CL	Dark gray clay
	ISM	24/19		4-7 ft	0.0	NA	6	CL	Gravel, slag
	ISM			1-7 ft			7		End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
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							17		
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							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable See Sample Summary Sheets for sampling information ISM = Incremental Sampling Method
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		
WELL SPECIFICATIONS:	Well not installed	Sandpack:			
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs		
BOH: 7 ft bgs	Riser Interval:				



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.670210 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU05
Drilling Method:	Direct-Push			Boring No.	SB05
	Geoprobe 6620DT			Herb. Shed	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Sample Depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40			0.0	NA	0		
							1	CL	Clay, drk clay
							2	CL	Transition to lt brown clay
	ISM			1-4 ft			3		
							4		
							5		
		24/19			0.0	NA	6	CL	Transition to light brown sandstone
	ISM			4-7 ft			7		
	ISM			1-7 ft					End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter		See Sample Summary Sheets for analytical information
WELL SPECIFICATIONS:	Well not installed	Sandpack:			ISM = Incremental Sampling Method
Diam. of casing:	2"	Screen Interval:		Bentonite:	0-7 ft bgs
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 950.017975 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU06
Drilling Method:	Direct-Push Geoprobe 6620DT			Boring No.	SB01
				Wash Rack	
Sampling Method:	2" diameter-5 ft SS sampler MacroCore liner			Sheet 1 of 1	
				Drilling	
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40	NA		0.0	NA	0	CL	Brown silty clay
							1		
							2		
							3		
							4		
							5	CL	Transition to light brown silty clay
		24/15			0.0	NA	6		Bott 19 inches sand seam
					11.5		7		strong odor
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		Grout:	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs	Cover:	
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.634122 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU06
Drilling Method:	Direct-Push			Boring No.	SB02
	Geoprobe 6620DT			Wash Rack	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40	NA		0.0	NA	0	CL	Light orange silty clay
							1		
							2		
							3		
							4		
							5		some gravel
		24/15			0.0	NA	6	CL	Light gray brown to light brown silty clay
							7		Odor last 6 inches
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		Grout:	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs	Cover:	
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical
Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.473362 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU06
Drilling Method:	Direct-Push			Boring No.	SB03
	Geoprobe 6620DT			Wash Rack	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Drilling	
Time	NA			Start	Finish
Date	NA			13-Nov-12	13-Nov-12
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40	NA		0.0	NA	0	CL	
							1		Brown silty clay
							2		
							3		
							4	CL	Transition to light brown silty clay
							5		
		24/22			0.0	NA	6		
							7		Last 19 inches sandstone, slight odor
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		Grout:	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs	Cover:	
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.594752 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU06
Drilling Method:	Direct-Push Geoprobe 6620DT			Boring No.	SB04
				Wash Rack	
Sampling Method:	2" diameter-5 ft SS sampler MacroCore liner			Sheet 1 of 1	
				Drilling	
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40	NA		0.0	NA	0	CL	Gravel/clay
							1		
							2		Transition to brown clay
							3		
							4		
							5		
		24/19			0.0	NA	6	CL	Brown clay transition to dark/light gray clay
							7		Slight odor bottom 10 inches, sandstone
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		Grout:	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs	Cover:	
BOH:	7 ft bgs	Riser Interval:			



Environmental Chemical Corporation

LOG OF SOIL BORING

Coordinates: X 499403.104 Y 4562326.744
Surface Elevation: 949.791600 ft msl
Casing Below Surface:
Reference Elevation:
Reference Description:

Job. No.	5461.004	Client	ACOE-Louisville	Location	RVAAP
				CC-70	DU06
Drilling Method:	Direct-Push			Boring No.	SB05
	Geoprobe 6620DT			Wash Rack	
Sampling Method:	2" diameter-5 ft SS sampler			Sheet 1 of 1	
	MacroCore liner				
Water Lev.	NA			Start	Finish
Time	NA			13-Nov-12	13-Nov-12
Date	NA				
Reference	NA				

Digital Picture #	Sample Type	n. Drvr / In. Recvrd	Dpth. Csg.	Samp. # / Samp. depth	PID (ppm)	Blows per 6 in.	Depth (feet)	USCS Log	Surface Conditions: Soil
		60/40	NA		0.0	NA	0	CL	Brown silty clay
							1		
							2		
							3		
							4		
							5		
		24/19			0.0	NA	6	CL	Transition to light brown silty clay last 19 inches sandstone
					40.0		7	CL	Transition to light brown silty clay last 19 inches, sand seam, strong odor
									End of boring at 7 ft bgs
							8		
							9		
							10		
							11		
							12		
							13		
							14		
							15		
							16		
							17		
							18		
							19		
							20		
							21		
							22		
							23		
							24		

Logged by:	T. Hernandez P.G. - Prudent Tech.	Date:	14-Nov-12	Notes:	NA = Not Applicable
Drilling Contractor:	Frontz Drilling	Driller:	Joe Teter	See Sample Summary Sheets for sampling information	
WELL SPECIFICATIONS:	Well not installed	Sandpack:		Grout:	
Diam. of casing: 2"	Screen Interval:	Bentonite:	0-7 ft bgs	Cover:	
BOH:	7 ft bgs	Riser Interval:			

PARSONS




CC RVAAP-70 70-4740-SB101

Start Date : 2 February 2018
End Date : 2 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566592.27
Easting Coord. : 2379194.53
Total Depth of Boring : 7.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC
0							
1	1	50		0.0	Railroad ties and gravel.	GP	
2							
3	2	100	070SB-101-0062-SO	0.0	Brown, moist, CLAY, silt, sand, trace gravel.	CL	
4							
5	3		070SB-101-0063-SO	0.0			
6	4		070SB-101-0064-SO	0.0			
7					Refusal at 7.0'.		
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring: 70-4740-SB101
Surf. Elev.: 950.23

Hole Plug 3/8"
Sodium Bentonite

PARSONS



CC RVAAP-70 70-4740-SB102

Start Date : 2 February 2018
End Date : 2 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566565.12
Easting Coord. : 2379200.14
Total Depth of Boring : 8.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC
0					Concrete	AR	
1	1			0.0	Gravel	GW	
2		50			Brown, moist, CLAY, silt, sand, trace gravel.		
3	2		070SB-102-0065-SO	0.0			
4							
5	3		070SB-102-0066-SO	0.0		CL	
6		100					
7	4		070SB-102-0067-SO	0.0			
8					Refusal at 8.0'.		
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring: 70-4740-SB102
Surf. Elev.: 950.25

Hole Plug 3/8'
Sodium Bentonite

PARSONS



CC RVAAP-70 70-4740-SB103

Start Date : 6 February 2018
End Date : 6 February 2018
Weather : 20 F/Cloudy
Northing Coord. : 566652.24
Easting Coord. : 2379163.03
Total Depth of Boring : 7.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC
0					Concrete	AR	
1	1			1.4	Gravel	GW	
2		50			Brown, moist, wet, SANDY CLAY and SILT, trace gravel.	CL	
3	2		070SB-103-0069-SO	0.0			
4					Wet, GRAVELLY/SANDY CLAY and SILT (possible fill material from around sump discharge line).	CL	
5	3		070SB-103-0070-SO	0.0			
6	4	75		0.0			
7					Refusal at 7.0'.		
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
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19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring: 70-4740-SB103
Surf. Elev.: 950.23

Hole Plug 3/8"
Sodium Bentonite

PARSONS



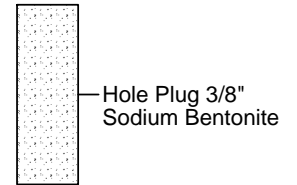
CC RVAAP-70 70-4740-SB104

Start Date : 5 February 2018
End Date : 5 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566568.98
Easting Coord. : 2379171.53
Total Depth of Boring : 4.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC	Boring: 70-4740-SB104 Surf. Elev.: 946.65
0					Concrete	AR		
1	1			0.0	Gravel	GW		
2		50			Brown, stiff, CLAY, silt, sand with trace gravel.	CL		
3	2		04-0072-SO	0.0	Brown, SANDY SILT and CLAY	SM		
4					Brown, stiff, CLAY, silt, sand with trace gravel.	CL		
5					Refusal at 4.0'.			
6								
7								
8								
9								
10								
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PARSONS



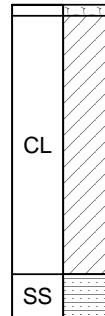
CC RVAAP-70 70-4740-SB105

Start Date : 5 February 2018
End Date : 5 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566443.45
Easting Coord. : 2379151.28
Total Depth of Boring : 7.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC	Boring: 70-4740-SB105 Surf. Elev.: 949.95
0					Topsoil.			
1	1			0.0	Brown, moist, CLAY, silt, sand, trace gravel.			
2		50						
3	2			0.0				
4								
5	3			0.0				
6		100						
7	4		070SB-105-0073-SO	0.0	Weathered SANDSTONE.	SS		
8					End of boring at 7.0'.			
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
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Hole Plug 3/8"
Sodium Bentonite

PARSONS




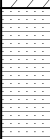


CC RVAAP-70 70-4740-SB106

Start Date : 5 February 2018
End Date : 5 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566514.96
Easting Coord. : 2379167.64
Total Depth of Boring : 10.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC
0					Topsoil		
1	1	75		0.0	Brown, moist, slightly plastic, CLAY, silt, sand, trace gravel.	CL	
2							
3	2	75		0.0		CL	
4							
5	3	75		0.0		CL	
6							
7	4	75	070SB-106-0074SO	0.0	Weathered SANDSTONE.	SS	
8							
9	5	75		0.0			
10					Refusal at 10.0'.		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							

Boring: 70-4740-SB106
Surf. Elev.: 949.28

Hole Plug 3/8"
Sodium Bentonite

PARSONS





CC RVAAP-70 70-4740-SB107

Start Date : 5 February 2018
End Date : 5 February 2018
Weather : 10 F/Cloudy
Northing Coord. : 566519.03
Easting Coord. : 2379140.28
Total Depth of Boring : 10.0'

Drilling Company : Envirocore
Driller : Tony Cramer
Designation of Drill : Geoprobe 7822D
Type of Drill Rig : Direct Push/Auger
Geologist : Joe Peterlin
Oversight Company : Parsons
Borehole Diameter : 2"
PID Model : MiniRAE Lite
Sampling Equipment : 1.5" x 4' long acetate liner
: 2" x 4' dual tube

RVAAP PBA 2018 Remedial Investigation
Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266
Portage County

Depth in feet	Samples	Recovery %	Sample ID	PID (ppm)	DESCRIPTION	USCS	GRAPHIC
Boring: 70-4740-SB107 Surf. Elev.: 949.54							
0	1	100	070SS-107-0075-SO	0.0	Organic sediment	SP	
1					Gravelley SAND		
2	2	100	070SB-107-0076-SO	0.0	Mottled brown and gray, slightly plastic, CLAY, silt, and sand with trace gravel.	CL	
3							
4	3	75	070SB-107-0077-SO	0.0	Brown, stiff, CLAY, slit, sand, trace gravel.	CL	
5							
6	4	100	070SB-107-0078-SO	0.0	Weathered SANDSTONE		
7							
8	5	100	070SB-107-0079-SO	0.0		SS	
9							
10	6		070SB-107-0080-SO	0.0			
10					Refusal at 10.0'.		
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
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APPENDIX C.2

Field Boring Logs

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HTW DRILLING LOG

HOLE NO.
SB-1

1. COMPANY NAME

ECC

2. DRILLING SUBCONTRACTOR

FRANZ DRILLING

3. PROJECT

RAVENNA AAP

4. LOCATION

CC 70 EAST CLASS YARD

5. NAME OF DRILLER

DE JETER

6. MANUFACTURER'S DESIGNATION OF DRILL

ROPMOR 6620 OT

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT

2" DIA
15-5 FT SAMPLE
ROPMOR 6620 OT

8. HOLE LOCATION

DU-01 SB-1

9. SURFACE ELEVATION

10. DATE STARTED

14 NOV 2012

11. DATE COMPLETED

14 NOV 2012

12. OVERBURDEN THICKNESS

—

13. DEPTH DRILLED INTO ROCK

NA

15. DEPTH GROUNDWATER ENCOUNTERED

NA

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED

14. TOTAL DEPTH OF HOLE

101 FT

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES

DISTURBED

UNDISTURBED

19. TOTAL NUMBER OF CORE BOXES

NA

20. SAMPLES FOR CHEMICAL ANALYSIS

SEA SAMPLE
CAMPUS BAKET

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE

BACKFILLED

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR

J. HENNINGER

ELEV.
a

DEPTH
b

DESCRIPTION OF MATERIALS
c

FIELD SCREENING
RESULTS
d

GEOTECH SAMPLE
OR CORE BOX NO.
e

ANALYTICAL
SAMPLE NO.
f

BLOW
COUNTS
g

REMARKS
h

CL
CL

10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95

BEN SILTY CLAY
TRANS GRAY SILTY CLAY
INTERBEDDED SILTY CLAY
5' - 8' 0" -

N/A

0.0
0.0



14 NOV 12

HTW DRILLING LOG

HOLE NO. **SB-2**

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANCO DRILLING		SHEET 1 OF 2 SHEETS	
3. PROJECT RAVENNA AAP		4. LOCATION CC 70 EAST CUNYARD			
5. NAME OF DRILLER JOE TETER		6. MANUFACTURER'S DESIGNATION OF DRILL EDWARDS 6620 48			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	8. HOLE LOCATION DUP1 SB-2				
	9. SURFACE ELEVATION —				
	10. DATE STARTED 14 NOV 2012				
	11. DATE COMPLETED 14 NOV 2012				
12. OVERBURDEN THICKNESS —		13. DEPTH DRILLED INTO ROCK NA			
14. TOTAL DEPTH OF HOLE 109 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA			
16. GEOTECHNICAL SAMPLES NA		DISTURBED		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS Summary Sheet		VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)
22. DISPOSITION OF HOLE		BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %
		X			NA
				23. SIGNATURE OF INSPECTOR T. H. MANDARZ	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	X	BEN SILTY CLAY	N/A				0.0
CL	X	TRANS TO GRAY SILTY CLAY					0.0
	X	INTERBEDDED SILTY (C) CLAY					
	X	5' ODOZ - STRONG					
	10'						
	15'						
	20'						
	25'						
	30'						
	35'						
	40'						
	45'						
	50'						
	55'						
	60'						
	65'						
	70'						
	75'						
	80'						
	85'						
	90'						
	95'						
	100'						
	105'						
	110'						
	115'						
	120'						
	125'						
	130'						
	135'						
	140'						
	145'						
	150'						
	155'						
	160'						
	165'						
	170'						
	175'						
	180'						
	185'						
	190'						
	195'						
	200'						

14 NOV 12

HTW DRILLING LOG

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANCO DRILLING		HOLE NO. SRB-3	
3. PROJECT RAVENNA AAP		4. LOCATION CL 70 EAST CLASS YARD		SHEET 1 OF 2 SHEETS	
5. NAME OF DRILLER JOE TETER		6. MANUFACTURER'S DESIGNATION OF DRILL ROPER 6020 OT			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT SS SAMPLER MAGNETIC CORE		8. HOLE LOCATION DUGI SB-3			
		9. SURFACE ELEVATION —			
12. OVERBURDEN THICKNESS —		10. DATE STARTED 19 NOV 12		11. DATE COMPLETED 19 NOV 12	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA			
14. TOTAL DEPTH OF HOLE 20 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA			
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA			
20. SAMPLES FOR CHEMICAL ANALYSIS SS & SUMMIT SILEX		DISTURBED		UNDISTURBED	
		VOC		METALS	
		OTHER (SPECIFY)		OTHER (SPECIFY)	
		OTHER (SPECIFY)		OTHER (SPECIFY)	
22. DISPOSITION OF HOLE X		BACKFILLED		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR J. HERNANDEZ	
				21. TOTAL CORE RECOVERY %	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	X	BKN SILTY CLAY	N/A				0.0
	X	TRANS GEN SILTY CLAY					
	X	TRANS BKN / SS @					
	10	ON DR AB 0.5'					
	15						
	20						
	25						
	30						
	35						
	40						
	45						

HTW DRILLING LOG

HOLE NO.

SB-4

1. COMPANY NAME

ECC

2. DRILLING SUBCONTRACTOR

FRANZ DRILLING

SHEET 1

OF 2 SHEETS

3. PROJECT

RAVENNA AAP

4. LOCATION

CC70 EAST CLASS VALD

5. NAME OF DRILLER

6. MANUFACTURER'S DESIGNATION OF DRILL

6 RUPA-031L 60200T

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT

2" DIA

4 FT ST

SAMPLER

NO. 800000

8. HOLE LOCATION

DU-01 SB-4

9. SURFACE ELEVATION

10. DATE STARTED

14 NOV 12

11. DATE COMPLETED

19 NOV 12

12. OVERBURDEN THICKNESS

13. DEPTH DRILLED INTO ROCK

NA

15. DEPTH GROUNDWATER ENCOUNTERED

NA

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED

NA

14. TOTAL DEPTH OF HOLE

42.7 FT

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

N

18. GEOTECHNICAL SAMPLES

DISTURBED

UNDISTURBED

19. TOTAL NUMBER OF CORE BOXES

NA

20. SAMPLES FOR CHEMICAL ANALYSIS

SEE SAMPLE SUMMARY SHEET

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE

BACKFILLED

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR

J. HERMANOZ

ELEV.

DEPTH

DESCRIPTION OF MATERIALS

FIELD SCREENING RESULTS

GEOTECH SAMPLE OR CORE BOX NO.

ANALYTICAL SAMPLE NO.

BLOW COUNTS

REMARKS

CL

CL

10

15

20

25

30

35

40

45

DEN SILTY CLAY
TRANS GRAY SILTY CLAY
INTERBEDDED SILTY CLAY
NO OOLITES

N/A

14 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-5

1. COMPANY NAME

ECC

2. DRILLING SUBCONTRACTOR

FRANZ DRILLING

3. PROJECT

RAVENNA AAP

4. LOCATION

CC70 EAST CLASS YARD

5. NAME OF DRILLER

6. MANUFACTURER'S DESIGNATION OF DRILL

FRANZ

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT

2" DIA 5 FT

ST. SAMPLE

MACROCORE

8. HOLE LOCATION

D1 SB-5

9. SURFACE ELEVATION

10. DATE STARTED

19 NOV 12

11. DATE COMPLETED

19 NOV 12

12. OVERBURDEN THICKNESS

13. DEPTH DRILLED INTO ROCK

NA

15. DEPTH GROUNDWATER ENCOUNTERED

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES

DISTURBED

UNDISTURBED

19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS

SIL SAMPLE SUMMARY SHEET

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE

BACKFILLED

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR

J. HERNANDEZ

ELEV.

DEPTH

DESCRIPTION OF MATERIALS

FIELD SCREENING RESULTS

GEOTECH SAMPLE OR CORE BOX NO.

ANALYTICAL SAMPLE NO.

BLOW COUNTS

REMARKS

CL

0

BEN/SILTY CLAY
TRANS LT BEN DCY
NO CORE

N/A

0.0

10

15

20

25

30

35

40

45

[Signature]

19 NOV 12

HTW DRILLING LOG

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING		HOLE NO. SB-01	
3. PROJECT RAVENNA AAP		4. LOCATION CC70 DU-3 BK17-40		SHEET 1 OF 2 SHEETS	
5. NAME OF DRILLER JOE TATAR		6. MANUFACTURER'S DESIGNATION OF DRILL 6" HPM 0020 OT			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DA 5 FT ST. SAMPLER MCKINLEY		8. HOLE LOCATION SB-01		9. SURFACE ELEVATION	
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 2012		11. DATE COMPLETED 13 NOV 2012	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
14. TOTAL DEPTH OF HOLE 13 FT		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA			
18. GEOTECHNICAL SAMPLES NA		DISTURBED		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS SOIL SAMPLE SUMMARY SHEET		VOC		METALS	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
		X		—	
				19. TOTAL NUMBER OF CORE BOXES NA	
				21. TOTAL CORE RECOVERY %	
				23. SIGNATURE OF INSPECTOR T. HANNAH	

ELV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	X	DK BKN SALT CLAY	N/A				0.0
	X	TRANS CLAY SILT					
	X	6.8' SS					
	X	ONLY 4' SS					
		TDC 9:23AM					
	15'	NA					
	20'						
	25'						
	30'						
	35'						
	40'						
	45'						
	50'						
	55'						
	60'						
	65'						

MPX 55 55

PROJECT
RAVENNA AAP

HOLE NO.

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-02
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION 0070 DU-3 B11, A77c	
5. NAME OF DRILLER JOE TATBER		6. MANUFACTURER'S DESIGNATION OF DRILL FROPPAGE 0620 DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" DIA KFT		8. HOLE LOCATION SB02
	ST SAMPLER		
	MALABONG		
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 2012	
13. DEPTH DRILLED INTO ROCK NA		11. DATE COMPLETED 13 NOV 2012	
14. TOTAL DEPTH OF HOLE 138 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA	
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS SAR SAMPLE SUMMARY SARCT		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE BACKFILLED X		23. SIGNATURE OF INSPECTOR T. HERMANA 2	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	X	BUN CLAY 18"	0.0				
CL	X	TRANS DL CLAY	0.0				
	X	INTER BEDDED SS/CLAY					
	X	SS @ 6.0'	0.0				
	X	SS 16" TD @ 81 @ 9:00 AM					
	X	TH					
	15						
	20						
	25						
	30						
	35						
	40						
	45						

MRK 55

PROJECT
RAVENNA AAP

HOLE NO.

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-03
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC70 DV-3 Bldg 17-40	
5. NAME OF DRILLER JOE TRITON		6. MANUFACTURER'S DESIGNATION OF DRILL HOBAS 66200T	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT SS SAMPLER MILANO LOG		8. HOLE LOCATION SB-03	
		9. SURFACE ELEVATION —	
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 2012	
		11. DATE COMPLETED 13 NOV 2012	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA	
14. TOTAL DEPTH OF HOLE 7 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS SEE SAMPLE SUMMARY SHEET		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE BACKFILLED X		23. SIGNATURE OF INSPECTOR J. HERNANDEZ	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	X	DK B/L CLAY	N/A				0.0
	Y	TRANS BRN CLAY					0.0
		@ 6' 55"					
	10'	TD @ 7' 10:56 AM					
	15'	TH					
	20'						
	25'						
	30'						
	35'						
	40'						
	45'						

WORK SHEET 55

PROJECT
RAVENNA AAP

HOLE NO.

HTW DRILLING LOG

HOLE NO.
SB-04
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CCTO D-3 Bldg 47-40	
5. NAME OF DRILLER JOE TETER		6. MANUFACTURER'S DESIGNATION OF DRILL HOPKINS 66700T	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" DIA 5 FT		8. HOLE LOCATION SB-04
	SS SAMPLER		9. SURFACE ELEVATION
	MACROCORE		
12. OVERBURDEN THICKNESS		10. DATE STARTED 13 NOV 12	11. DATE COMPLETED 13 NOV 12
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA	
14. TOTAL DEPTH OF HOLE #2 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
18. GEOTECHNICAL SAMPLES		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS SEE SAMPLE SUMMARY SHEET		21. TOTAL CORE RECOVERY %	
22. DEPOSITION OF HOLE		23. SIGNATURE OF INSPECTOR	
DISTURBED		T. HANAMMEZ	
UNDISTURBED			
VOC			
METALS			
OTHER (SPECIFY)			
OTHER (SPECIFY)			
OTHER (SPECIFY)			
BACKFILLED			
MONITORING WELL			
OTHER (SPECIFY)			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	1	DK BDN SILTY CLAY	NA				+0.0
CL	1	TRANS TO BDN SILTY CLAY w/ GRAVEL @ 5.5'					0.0
	10	SS @ 7'					
	15	TOE 7' 11.22mm					
	20	TH					
	25						
	30						
	35						
	40						
	45						

[Signature] 13 NOV 12

HTW DRILLING LOG										HOLE NO. SB 05	
1. COMPANY NAME ECC					2. DRILLING SUBCONTRACTOR FRANZ DRILLING					SHEET 1 OF 2 SHEETS	
3. PROJECT RAVENNA AAP					4. LOCATION CC70 DW 3 Bldg 47-40						
5. NAME OF DRILLER JOE TETRA					6. MANUFACTURER'S DESIGNATION OF DRILL GROMM 6620 OT						
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT SS SAMPLER MCCO CORE					8. HOLE LOCATION SB 05						
					9. SURFACE ELEVATION						
					10. DATE STARTED 13 NOV 2012						
					11. DATE COMPLETED 13 NOV 2012						
12. OVERBURDEN THICKNESS —					15. DEPTH GROUNDWATER ENCOUNTERED NA						
13. DEPTH DRILLED INTO ROCK NA					16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA						
14. TOTAL DEPTH OF HOLE 7 FT					17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA						
18. GEOTECHNICAL SAMPLES NA		DISTURBED		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES NA					
20. SAMPLES FOR CHEMICAL ANALYSIS FOR SAMPLER SCHEDULE SH 517		VOC		METALS		OTHER (SPECIFY)		OTHER (SPECIFY)		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR J. HARRISON 2			
ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c			FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h		
CL	X	BLK CLAY			N/A				0.0		
CL	X	TRANS TO BLENDED CLAY							0.0		
	10	TD @ 7' 12:35 PM									
	15	TH									
	20										
	25										
	30										
	35										
	40										
	45										

HOLE NO.

HTW DRILLING LOG

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRONTZ DRILLING		HOLE NO. SB-1-5
3. PROJECT RAVENNA AAP		4. LOCATION CE 70 EAST CREEK YARD DU 4		SHEET 1 OF 2 SHEETS
5. NAME OF DRILLER JOE TETRA		6. MANUFACTURER'S DESIGNATION OF DRILL 6201492 6620 DT		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 3 FT JT SAMPLER MCKINLEY		8. HOLE LOCATION SBH-5		
		9. SURFACE ELEVATION —		
12. OVERBURDEN THICKNESS RELIN CONC. FLOOR		10. DATE STARTED 7/6 DEC 12		11. DATE COMPLETED 7/6 DEC 12
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA		
14. TOTAL DEPTH OF HOLE 12" - 48"		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA		
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA		
20. SAMPLES FOR CHEMICAL ANALYSIS SOF A SAMPLER SUMMAR SHEETS		21. TOTAL CORE RECOVERY %		
22. DISPOSITION OF HOLE BACKFILLED		23. SIGNATURE OF INSPECTOR J. H. LANNARD 2		

DEPT	DEPTH	DESCRIPTION OF MATERIALS	FIELD SCREENING RESULTS	GEOTECH SAMPLE OR CORE BOX NO.	ANALYTICAL SAMPLE NO.	BLOW COUNTS	REMARKS
CL	1'	1' SS Tan	15" SS Tan	0-36" DK BENSILYCLAY	0-30" DK BENSILYCLAY	0-34" DK BENSILYCLAY	3.5 p/m
CL	10'	Relin AT 1'	Relin AT 15'	36-48" TAN/SS	30-46" SS	24" SS	
	10'	SB-1	SB-2	SB-3	SB-4	SB-5	
	15'						
	20'	SWAMPY SOILS P10	35 p/m				
	25'						
	30'						
	35'						
	40'						
	45'						

MPK 55

PROJECT **RAVENNA AAP**

HOLE NO.

HTW DRILLING LOG

1. COMPANY NAME <i>ECC</i>		2. DRILLING SUBCONTRACTOR <i>FRENCH DRILLING</i>		HOLE NO <i>SB-01</i>	
3. PROJECT <i>RAVENNA AAP</i>		4. LOCATION <i>CL 70 DV 05 FORMER HERB</i>		SHEET 1 OF 2 SHEETS	
5. NAME OF DRILLER <i>JOE TETER</i>		6. MANUFACTURER'S DESIGNATION OF DRILL <i>GEOPACOR 6620 UT</i>			
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT <i>2" DIA 5 FT SS SAMPLER MAGNETIC</i>		8. HOLE LOCATION <i>SB-1</i>		9. SURFACE ELEVATION	
12. OVERBURDEN THICKNESS		10. DATE STARTED <i>13 NOV 2012</i>		11. DATE COMPLETED <i>13 NOV 2012</i>	
13. DEPTH DRILLED INTO ROCK <i>NA</i>		15. DEPTH GROUNDWATER ENCOUNTERED <i>NA</i>		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED <i>NA</i>	
14. TOTAL DEPTH OF HOLE <i>2 FT</i>		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) <i>NA</i>			
18. GEOTECHNICAL SAMPLES <i>NA</i>		DISTURBED		UNDISTURBED	
20. SAMPLES FOR CHEMICAL ANALYSIS <i>SS SAMPLE SUMMARY SHEET</i>		VOC		METALS	
22. DISPOSITION OF HOLE		BACKFILLED		MONITORING WELL	
		<i>X</i>		<i>—</i>	
				OTHER (SPECIFY)	
				23. SIGNATURE OF INSPECTOR <i>J. HERNANDEZ</i>	
				19. TOTAL NUMBER OF CORE BOXES <i>NA</i>	
				21. TOTAL CORE RECOVERY %	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	0	LT BAN SILTY CLAY	N/A				0.0
CL	10						
	15						
	20						
	25						
	30						
	35						
	40						
	45						

MARK FORM 56

PROJECT
RAVENNA AAP

HOLE NO.

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-2
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC TO DUGS FURROW HILLS	
5. NAME OF DRILLER JOE TETRA		6. MANUFACTURER'S DESIGNATION OF DRILL FREDRIG 6620 BT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	7" DIA 5 FT		8. HOLE LOCATION SB-2
	SS SAMPLER		9. SURFACE ELEVATION —
	MACRO CORER		
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 12	11. DATE COMPLETED 13 NOV 12
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA	
14. TOTAL DEPTH OF HOLE 7 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS S&P SAMPLE SUMMARY SHEET	VOC	METALS	OTHER (SPECIFY)
	—	—	—
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)
	X	—	—
23. SIGNATURE OF INSPECTOR J. HANNAH			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	0	GRAY BENSILTY CLAY	N/A				90.0
	10	TRANS L'DEN TRELAST					
	18	18" SS - VERY STRONG -					
		ODOR					
	20						
	25						
	30						
	35						
	40						
	45						
	50						
	55						
	60						
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	940						
	945						
	950						
	955						
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	965						
	970						
	975						
	980						
	985						
	990						
	995						
	1000						

HTW DRILLING LOG

HOLE NO.
SB-3

1. COMPANY NAME

ECC

2. DRILLING SUBCONTRACTOR

FRANZ DRILLING

SHEET 1
OF 2 SHEETS

3. PROJECT

RAVENNA AAP

4. LOCATION

CTB DU 05 FORMER HELB

5. NAME OF DRILLER

JR JIM

6. MANUFACTURER'S DESIGNATION OF DRILL

GEOPROBE 66200F

7. SIZES AND TYPES OF DRILLING
AND SAMPLING EQUIPMENT

2" DIA 5 FT

SS SAMPLER

MACALCORU

8. HOLE LOCATION

SB-3

9. SURFACE ELEVATION

10. DATE STARTED

13 NOV 2012

11. DATE COMPLETED

13 NOV 2012

12. OVERBURDEN THICKNESS

—

15. DEPTH GROUNDWATER ENCOUNTERED

NA

13. DEPTH DRILLED INTO ROCK

NA

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED

NA

14. TOTAL DEPTH OF HOLE

7 FT

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

NA

18. GEOTECHNICAL SAMPLES

NA

DISTURBED

UNDISTURBED

19. TOTAL NUMBER OF CORE BOXES

NA

20. SAMPLES FOR CHEMICAL ANALYSIS

SOL SAMPLE
SUMMARY SHEET

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE
RECOVERY
%

22. DISPOSITION OF HOLE

BACKFILLED

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR

J. HERNANDEZ

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	0	DK GRAY BRN SILTY CLAY	N/A				0.0
CL	1	TRANS TO LT BRN					
		LAST 18" SS					
	10						
	15						
	20						
	25						
	30						
	35						
	40						
	45						

[Signature]

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-4
SHEET 1
OF 7 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC70 DU45 FORMER HERB	
5. NAME OF DRILLER JOE TETRA		6. MANUFACTURER'S DESIGNATION OF DRILL GEOPHAGE 66200F	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" DIA 5 FT		8. HOLE LOCATION SB-4
	SS SAMPLER		9. SURFACE ELEVATION —
	MAGNOCONE		
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 12	
13. DEPTH DRILLED INTO ROCK NA		11. DATE COMPLETED 13 NOV 12	
14. TOTAL DEPTH OF HOLE 7 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA	
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	
18. GEOTECHNICAL SAMPLES NA	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES NA
20. SAMPLES FOR CHEMICAL ANALYSIS SEL SAMPLE SUMMARY SHEET	VOC	METALS	OTHER (SPECIFY)
	—	—	—
22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)
	X	—	—
23. SIGNATURE OF INSPECTOR J. HERNANDEZ			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	X	DK GRAY CLAY	N/A				→ 0.0
	X	GRAVEL / SLAG					
	10						
	15						
	20						
	25						
	30						
	35						
	40						
	45						

MRK FORM 55

PROJECT
RAVENNA AAP

HOLE NO.

HTW DRILLING LOG

HOLE NO.
SD-5
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC 70 DUES FORMER HERB	
5. NAME OF DRILLER JOE TETRA		6. MANUFACTURER'S DESIGNATION OF DRILL 6.60/140/100 60/40T	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" DIA 5 FT		8. HOLE LOCATION SB-5
	15" SAMPLER		
	MAGNETIC		
9. SURFACE ELEVATION		10. DATE STARTED 13 NOV 12	
11. DATE COMPLETED 13 NOV 12		12. OVERBURDEN THICKNESS —	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA	
14. TOTAL DEPTH OF HOLE 7 FT		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA		18. GEOTECHNICAL SAMPLES NA	
DISTURBED		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES NA		20. SAMPLES FOR CHEMICAL ANALYSIS SPE SAMPLE SUMMARY SHEET	
VOC		METALS	
OTHER (SPECIFY)		OTHER (SPECIFY)	
OTHER (SPECIFY)		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY %		22. DISPOSITION OF HOLE	
BACKFILLED		MONITORING WELL	
OTHER (SPECIFY)		OTHER (SPECIFY)	
23. SIGNATURE OF INSPECTOR T. H. KENNEDY			

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CL	0	DK GRAY CLAY TRANS LT BBN	N/A				0.0
	1.0	TRANS LT BBN SS					
	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						
	5.0						
	5.5						
	6.0						
	6.5						
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	98.0						
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	99.5						
	100.0						

HTW DRILLING LOG

HOLE NO.
SB-01

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING		3. PROJECT RAVENNA AAP		4. LOCATION CC70 DUG WASH ROCK	
5. NAME OF DRILLER JOE TETER		6. MANUFACTURER'S DESIGNATION OF DRILL KOPFHOE 6620 DP		7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT ST SAMPLER MACROCORE		8. HOLE LOCATION SB-01	
9. SURFACE ELEVATION		10. DATE STARTED 13 NOV 12		11. DATE COMPLETED 13 NOV 12		12. OVERBURDEN THICKNESS —	
13. DEPTH DRILLED INTO ROCK NA		14. TOTAL DEPTH OF HOLE 7 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA		18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA		20. SAMPLES FOR CHEMICAL ANALYSIS S&H SAMPLE PHIBAT	
21. TOTAL CORE RECOVERY %		22. DISPOSITION OF HOLE BACKFILLED X		23. SIGNATURE OF INSPECTOR J. HERNANDEZ		24. TOTAL CORE RECOVERY %	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	X	BKN SILTY CLAY	N/A				0.0
CL	X	TRANS LT SILTY CLAY					
	10'	BLAST 19" SAND SEAM (STRONG ODOR)	115 ppm Clex				then (min) (open)
	15'						
	20'						
	25'						
	30'						
	35'						
	40'						
	45'						

MRK FORM 55

PROJECT
RAVENNA AAP

HOLE NO.

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-2
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC 70 DUB WASH RACE	
5. NAME OF DRILLER JOE TETER		6. MANUFACTURER'S DESIGNATION OF DRILL HOPKIN 1620 DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" DIA 5 FT		8. HOLE LOCATION SB-4 2
	ST SAMPLER		9. SURFACE ELEVATION —
	MAGPO CORL		
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 12	
13. DEPTH DRILLED INTO ROCK NA		11. DATE COMPLETED 13 NOV 12	
14. TOTAL DEPTH OF HOLE 7 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA	
10. GEOTECHNICAL SAMPLES NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
DISTURBED		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	
UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS SEE SAMPLE SUMMARY SHEET		VOC	21. TOTAL CORE RECOVERY %
		METALS	
		OTHER (SPECIFY)	
		OTHER (SPECIFY)	
		OTHER (SPECIFY)	
22. DEPOSITION OF HOLE		BACKFILLED	23. SIGNATURE OF INSPECTOR
		MONITORING WELL	
		OTHER (SPECIFY)	
			J. H. HANCOCK

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	X	LT ORG SILTY CLAY TRANS	N/A				0.0
CC	X	END W/ GRAVEL					
		LT GRAY BAN TO LT BAN					
		LAST 6" ODOR					
	10						
	15						
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	985						
	990						
	995						
	1000						

MRK 22 55

PROJECT
RAVENNA AAP

HOLE NO.

HTW DRILLING LOG

HOLE NO.
SB-43
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC70 DUB WASH RACK	
5. NAME OF DRILLER JOE TETOR		6. MANUFACTURER'S DESIGNATION OF DRILL KROPPA002 66200T	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT LT SAMPLER KROPPA002		8. HOLE LOCATION SB-43	
		9. SURFACE ELEVATION —	
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 12	
		11. DATE COMPLETED 13 NOV 12	
13. DEPTH DRILLED INTO ROCK NA		15. DEPTH GROUNDWATER ENCOUNTERED NA	
14. TOTAL DEPTH OF HOLE 7 FT		18. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	
18. GEOTECHNICAL SAMPLES NA		19. TOTAL NUMBER OF CORE BOXES NA	
20. SAMPLES FOR CHEMICAL ANALYSIS 100 SAMPLE SUMMARY SK187		21. TOTAL CORE RECOVERY %	
22. DISPOSITION OF HOLE X		23. SIGNATURE OF INSPECTOR T. HANANADZ	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	0	BWN SILTY CLAY	N/A				0.0
CC	1	TRANS					
	2	LT BAN SILTY CLAY					
	3	LAST 19" SAND					
	4	(LT ODR) SEAM					
	5						
	6						
	7						
	8						
	9						
	10						
	11						
	12						
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	24						
	25						

MPK JUNE 56

PROJECT
RAVENNA AAP

HOLE NO.

HTW DRILLING LOG

HOLE NO.
SB-44
SHEET 1
OF 2 SHEETS

1. COMPANY NAME

ECC

2. DRILLING SUBCONTRACTOR

FRANZ DRILLING

3. PROJECT

RAVENNA AAP

4. LOCATION

CC70 DUG WASH RACK

5. NAME OF DRILLER

JOE TETRA

6. MANUFACTURER'S DESIGNATION OF DRILL

HOOPER 66200T

7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT

2" DIA 5 FT

SS SAMPLER

MACROCORE

8. HOLE LOCATION

SB-43

9. SURFACE ELEVATION

10. DATE STARTED

13 NOV 12

11. DATE COMPLETED

13 NOV 12

12. OVERBURDEN THICKNESS

—

15. DEPTH GROUNDWATER ENCOUNTERED

NA

13. DEPTH DRILLED INTO ROCK

NA

16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED

NA

14. TOTAL DEPTH OF HOLE

7 FT

17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

NA

18. GEOTECHNICAL SAMPLES

NA

DISTURBED

UNDISTURBED

19. TOTAL NUMBER OF CORE BOXES

NA

20. SAMPLES FOR CHEMICAL ANALYSIS

SS SAMPLE
SUMMARY SHEET

VOC

METALS

OTHER (SPECIFY)

OTHER (SPECIFY)

OTHER (SPECIFY)

21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE

BACKFILLED

MONITORING WELL

OTHER (SPECIFY)

23. SIGNATURE OF INSPECTOR

J. HENNINGER

ELEV.
a

DEPTH
b

DESCRIPTION OF MATERIALS
c

FIELD SCREENING
RESULTS
d

GEOTECH SAMPLE
OR CORE BOX NO.
e

ANALYTICAL
SAMPLE NO.
f

BLOW
COUNTS
g

REMARKS
h

CL
CL

10'
15'
20'
25'
30'
35'
40'
45'

GRAVEL/CLAY TRANS BKN CLAY
BKN CLAY TRANS DK-LT GRAY
CLAY LT ORG @ 10" SS

N/A

0.0
0.0

28

13 NOV 12

HTW DRILLING LOG

HOLE NO.
SB-5
SHEET 1
OF 2 SHEETS

1. COMPANY NAME ECC		2. DRILLING SUBCONTRACTOR FRANZ DRILLING	
3. PROJECT RAVENNA AAP		4. LOCATION CC70 DU B Bldg Wash Rack	
5. NAME OF DRILLER JOE TATKEL		6. MANUFACTURER'S DESIGNATION OF DRILL GEOPHONIC 6620 DT	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" DIA 5 FT SS SAMPLER MACHINER		8. HOLE LOCATION SB-5	
12. OVERBURDEN THICKNESS —		10. DATE STARTED 13 NOV 12	
13. DEPTH DRILLED INTO ROCK NA		11. DATE COMPLETED 13 NOV 12	
14. TOTAL DEPTH OF HOLE 7 FT		15. DEPTH GROUNDWATER ENCOUNTERED NA	
18. GEOTECHNICAL SAMPLES NA		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED NA	
20. SAMPLES FOR CHEMICAL ANALYSIS SEA SAMPLES SAMPLER SH 66 T		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) NA	
22. DISPOSITION OF HOLE BACKFILLED X		19. TOTAL NUMBER OF CORE BOXES NA	
23. SIGNATURE OF INSPECTOR T. H. HARRIS JR		21. TOTAL CORE RECOVERY % —	

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
CC	0	BAN SILTY CLAY	N/A				0.0
CC	5	TRANS LT SILTY CLAY					
	10	LAST 19" SAND SEAM (STRONG UDL)	40 rpm	Loss in in (open)			
	15						
	20						
	25						
	30						
	35						
	40						
	45						
	50						
	55						

MRK 55

PROJECT
RAVENNA AAP

HOLE NO.

13 NOV 12

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APPENDIX D

DATA VERIFICATION REPORT

(Note—to be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 1 ANALYTICAL RESULTS

(Note—To be provided on disc only)

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APPENDIX E

**ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS,
AND CHAIN OF CUSTODY FORMS**

**PART 2
LABORATORY ANALYTICAL REPORT
240-22663-1**

(Note—To be provided on disc only)

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APPENDIX E

**ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS,
AND CHAIN OF CUSTODY FORMS**

**PART 3
LABORATORY ANALYTICAL REPORT
240-17230-1**

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 4 LABORATORY ANALYTICAL REPORT 240-17317-1

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 5 LABORATORY ANALYTICAL REPORTS

240-17669-1

240-17669-2

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 6 LABORATORY ANALYTICAL REPORTS

240-17768-1

240-17768-2

(Note—To be provided on disc only)

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APPENDIX E

**ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS,
AND CHAIN OF CUSTODY FORMS**

**PART 7
LABORATORY ANALYTICAL REPORT
240-18581-1**

(Note—To be provided on disc only)

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APPENDIX E

**ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS,
AND CHAIN OF CUSTODY FORMS**

**PART 8
LABORATORY ANALYTICAL REPORTS**

240-18735-1

240-18735-2

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 9 LABORATORY ANALYTICAL REPORTS

240-26618-1

240-26639-1

240-26663-1

(Note—To be provided on disc only)

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APPENDIX E

ANALYTICAL RESULTS, LABORATORY ANALYTICAL REPORTS, AND CHAIN OF CUSTODY FORMS

PART 10 CHAIN OF CUSTODY FORMS

(Note—To be provided on disc only)

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APPENDIX F

Data Validation Report (Note – To be provided on disc only)

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APPENDIX G

IDW DISPOSAL LETTER REPORT

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APPENDIX H

Site Photographs

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1

2 Photo 1 (2012): The view is looking south toward the eastern portion of the exterior perimeter of Building
3 47-40 (DU03). Stakes with pink flagging show the areal extent of the ground surface made of asphalt-
4 containing fill material which consists of fine-grain gravel fill material with asphalt (1-1.5 inches thick).
5 The orange pin-flag in the center of the region demarcated by the stakes with pink flagging is the location
6 shown in Photo 6 and Photo 7.



7

8 Photo 2 (2012): The northeast corner of Building 47-40. The view is looking south along the eastern
9 portion of the exterior perimeter of Building 47-40 (DU03). The region between DU03 and the Former
10 Herbicide Storage Shed (DU05) is also shown. In this region the ground surface is made of gravel fill
11 material (3 to 6 inches thick) consisting of coarse-grain gravel, pieces of concrete, and asphalt.



12

13 Photo 3 (2012): The view is looking south towards the north end of Building 47-40. Railroad tracks and
14 railroad ties adjacent to the west side of the Former Herbicide Storage Shed and within the sampling area
15 of DU05 are shown.



16

17 Photo 4 (2012): The view is looking south towards the north end of Building 47-40. Deteriorating asphalt
18 pavement of the South Service Road is shown in the photo. The western side of the Former Herbicide
19 Storage Shed (DU05), marked by Seibert stakes in the left portion of the photo, and the exterior perimeter
20 of Building 47-40 (DU03) are in close proximity to the South Service Road.



21

22 Photo 5 (2012): A close-up view of the ground surface in between the Former Herbicide Storage Shed
23 (DU05) and Building 47-40. This ground material is made of gravel fill material (3 to 6 inches thick)
24 consisting of coarse-grain gravel, pieces of concrete, and asphalt.



25

26 Photo 6 (2012): A close-up view of the ground surface material in the eastern portion of the exterior
27 perimeter of Building 47-40 (DU03). The photo was taken at the location of the orange pin-flag shown in
28 Photo 1. The surface material, to a depth of 0-2 inches below ground surface, was exposed and turned on
29 its side to present a cross-section view. The pen is pointing towards a black layer of asphalt material.



30

31 Photo 7 (2012): A close-up view of the ground surface material in the eastern portion of the exterior
32 perimeter of Building 47-40 (DU03). The photo was taken at the location of the orange pin-flag shown in
33 Photo 1. A large segment of the surface material, to a depth of 0-2 inches below ground surface, was
34 lifted up to expose a cross-section profile of the asphalt-containing fill material.



35

36 Photo 8 (2012): The photo shows a plan view of a portion of the ground surface of the asphalt-containing
37 fill material obtained from the location shown in Photo 7. The material was obtained from the asphalt-
38 containing fill material along the eastern exterior perimeter of Building 47-40 (DU03).



39

40 Photo 9 (2012): The photo shows a cross-section view of the black asphalt material layer present in the
41 segment of asphalt-containing fill material shown in Photo 8. The material was obtained from the
42 asphalt-containing fill material along the eastern exterior perimeter of Building 47-40 (DU03) at the
43 location shown in Photo 7.



44

45 Photo 10 (2012): The Outdoor Wash Rack Area (DU06). The view is looking north at the southern end of
46 Building 47-40. The photo shows the railroad tracks and railroad ties bisecting the Outdoor Wash Rack
47 Area (DU06).



48

49 Photo 11 (2015): The Drainage Ditch East of Building 47-40 (DU07) containing standing water, as
50 observed in April 2015. The view is looking west towards the eastern side of Building 47-40.



51

52 Photo 12 (2012): The photo shows the multiple railroad tracks and railroad ties of the East Classification
53 Yard located east of Building 47-40. The view is looking north-northwest.



54

55 Photo 13 (2012): The view is looking north from the northwest corner of Building 47-40 towards the
56 Seibert stakes marking the location of the Former Herbicide Storage Shed (DU05). The deteriorating
57 condition of the South Service Road to the west and the extent of the ground material, made of gravel fill
58 material (3 to 6 inches thick) consisting of coarse-grain gravel, concrete, and asphalt, between Building
59 47-40 and the Former Herbicide Storage Shed (DU05) is shown in this view.



60

61 Photo 14 (2012): The view is looking east towards the Seibert stakes marking the location of the Former
62 Herbicide Storage Shed (DU05).



63

64 Photo 15 (2012): The view is looking south towards the Drainage Ditch East of Building 47-40 (DU07).
65 The asphalt-containing fill material present at the exterior perimeter of Building 47-40 (DU03) is to the
66 west.



Photo 16 (2012): Panoramic view looking south towards the location of the Former Herbicide Storage Shed (DU05), marked by Seibert stakes, and a portion of the exterior perimeter of Building 47-40 (DU03) showing the multiple railroad tracks, railroad ties, the South Service Road, and the gravel fill material region between DU05 and DU03.



71

72 Photo 17 (2012): The Former Fuel Oil Spill Area (DU01) with the west side of Building 47-40 in the
73 background. The view is looking east.



74

75 Photo 18 (2012): The earthen berm of the Former Fuel Oil Spill Area (DU01).



76

77 Photo 19 (2012): The view is looking north at the interior repair pit (DU04) within Building 47-40.



Photo 20 (2012): Direct push boring activities at the interior repair pit (DU04) within Building 47-40.

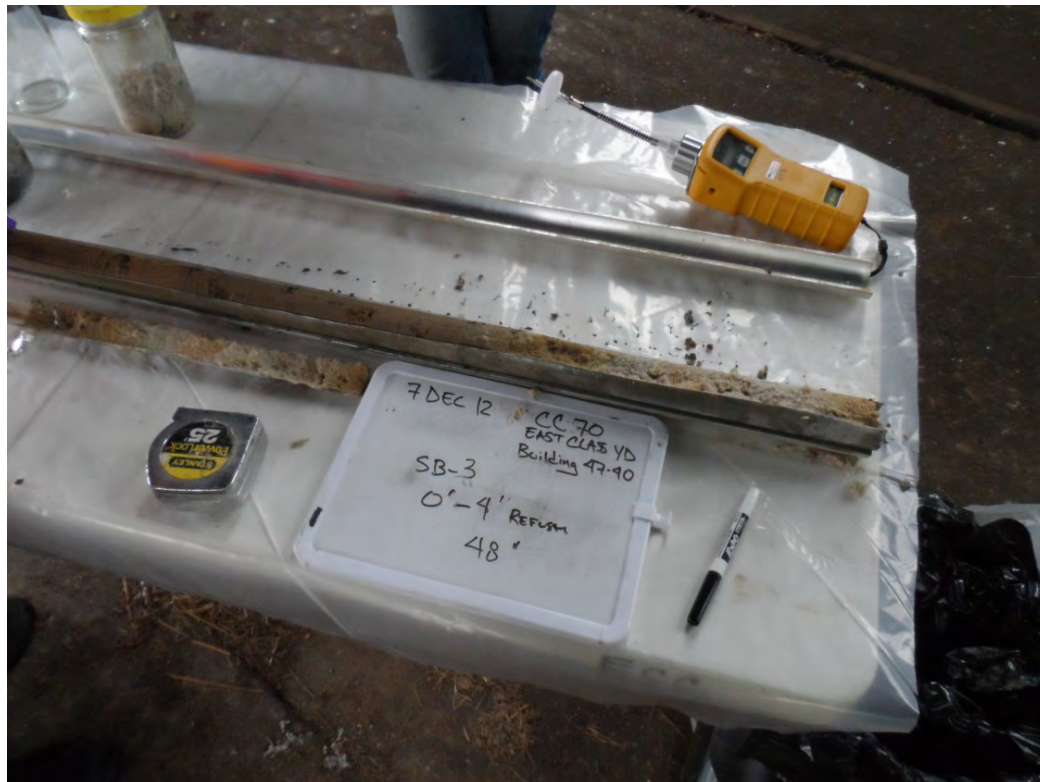


Photo 21 (2012): Soil core from direct push boring location SB03 at DU04 within Building 47-40, with refusal at 4 feet.



84

85 Photo 22 (2012): Direct push boring activities along the eastern exterior perimeter of Building 47-40
86 (DU03). The view is looking south.

87



88

89 Photo 23 (2012): Direct push boring activities along the western exterior perimeter of Building 47-40
90 (DU03). The view is looking south along South Service Road.

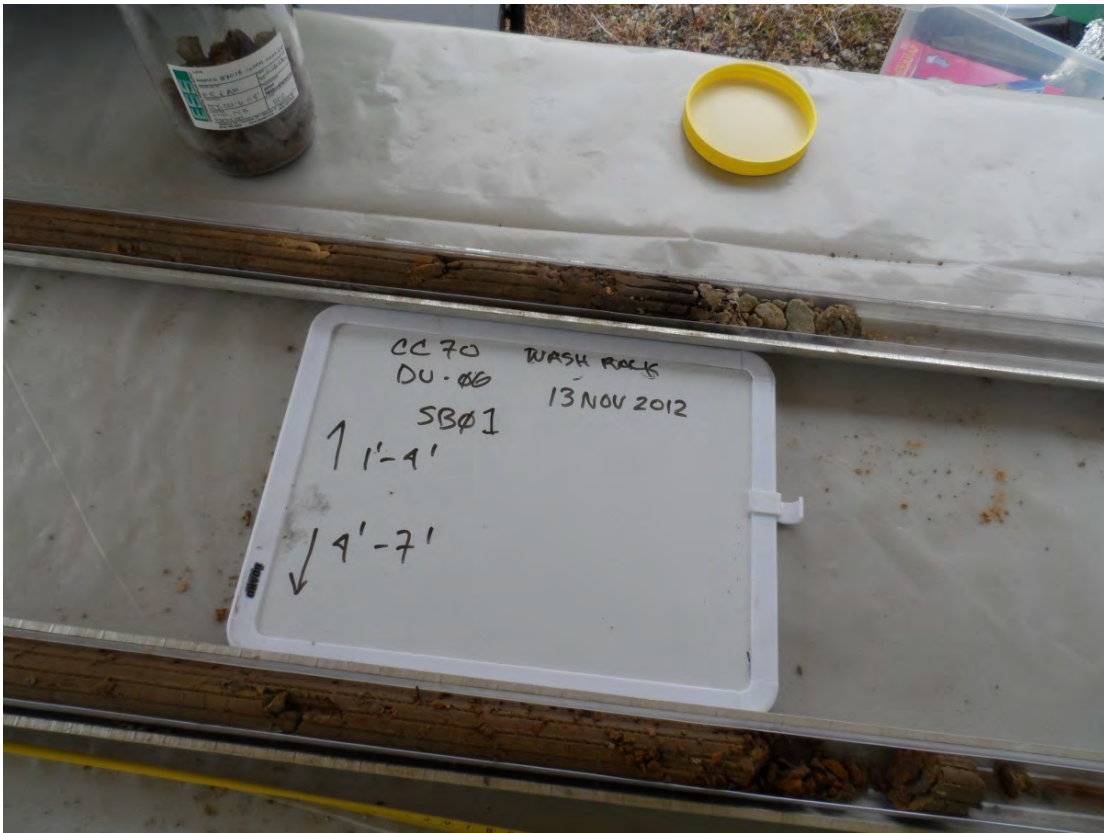


91

92 Photo 24 (2012): Direct push boring activities at Former Herbicide Storage Shed (DU05). The view is
93 looking east.

94

95



96

97 Photo 25 (2012): Soil cores from direct push boring activities at SB01 at the Outdoor Wash Rack Area
98 (DU06).



99

100 Photo 26 (2012): Soil cores (1-4 feet and 4-7 feet) from direct push boring activities at SB05 within the
101 Former Fuel Oil Spill Area (DU01).

102



103

104 Photo 27 (2012): The view is looking south showing the complete length of the interior repair pit inside
105 Building 47-40. The pit is approximately 3.5 feet deep and 4 feet wide. Shown along the top edge of the
106 pit are the rail road tracks, tie plates, and spikes. Stairs are set at both ends of the pit. The bottom of the
107 pit is covered with a black colored grime and debris. There are no visible cracks on the floor of the pit.



108

109 Photo 28 (2012): The view is looking north at Building 47-40 Interior Repair Pit (DU04) showing the
110 bottom rungs of the pit's southern egress stairs. The pit bottom is coated with black grime and debris
111 with no visible cracks on the bottom floor of the pit.



112

113 Photo 29 (2018): View is facing North at the southern end of Building 47-40 Round House. Brush in the
114 Outdoor Wash Rack Area was cut and removed on January 30, 2018.



115

116 Photo 30 (2018): View is facing northwest from inside Building 47-40 Round House, the wooden floor is
117 littered with debris prior to cleanup.



118

119 Photo 31 (2018): Building 47-40 Round House oily residue and debris at the old storage rack and
120 surrounding wooden floor prior to sludge removal.



121

122 Photo 32 (2018): A few boreholes inside the pit were not sealed. Open boreholes were filled with
123 bentonite prior to sludge removal from the pit.



124

125 Photo 33 (2018): Storm drain located at the southwest corner of Building 47-40 Round House. Wash
126 water from the Outdoor Wash Rack Area may have drained into this storm drain.



127

128 Photo 34 (2018): View facing northeast. Storm drain located at the southwest corner of Building 47-40
129 Round House. Wash water from the Outdoor Wash Rack Area may have drained into this storm drain.



130

131 Photo 35 (2018): View facing southwest from within Building 47-40. Small excavator and shovels used
132 to remove sludge from within the pit.



133

134 Photo 36 (2018): View facing south within. Building 47-40 Round House Interior showing floor and
135 pit after removal of sludge or debris.



136

137 Photo 37 (2018): Debris was removed from Building 47-40 Round-House Interior floor and pit and
138 placed inside a roll-off bin lined with plastic.



139

140 Photo 38 (2018): Building 47-40 Round House Interior boring SB101 installed at the East track where the
141 concrete and wood floors meet (view facing south).



142

143 Photo 39 (2018): Soil core (0-4 feet) from boring SB101 near the East track where the concrete and wood
144 floors meet within Building 47-40 Round House Interior (DU04).



145

146 Photo 40 (2018): Soil core (4-7 feet) from boring SB101 near the East track where the concrete and wood
147 floors meet within Building 47-40 Round House Interior (DU04).



148

149 Photo 41 (2018): Building 47-40 Round House oil storage rack was removed, and the floor cleaned of
150 debris and sludge. Staining is present on the floor. Boring SB102 at the oil storage area within Building
151 47-40 Round House Interior (DU04).



152

153 Photo 42 (2018): Soil core (0-4 feet) from boring SB102 near the oil storage area within Building 47-40
154 Round House Interior (DU04).



155

156 Photo 43 (2018): Soil core (4-8 feet) from boring SB102 near the oil storage area within Building 47-40
157 Round House Interior (DU04).



158

159 Photo 44 (2018): Building 47-40 Round House Interior pit boring SB104 installed at the South end of the
160 pit.



161

162 Photo 45 (2018): Building 47-40 Round House Interior pit boring SB104 (orange flag) installed at the
163 South end of the pit (view facing north).



164

165 Photo 46 (2018): Soil core (0-4 feet) from boring SB104 within Building 47-40 Round House Interior
166 (DU04).



167

168 Photo 47 (2018): Boring SB107 drilled adjacent to the storm drain located at the southeast corner of
169 Building 47-40 Round House.



170

171 Photo 48 (2018): Soil core (0-4 feet) from boring SB107 located adjacent to the storm drain on the
172 southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area
173 (DU06).



174

175 Photo 49 (2018): Soil core (4-8 feet) from boring SB107 located adjacent to the storm drain on the
176 southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area
177 (DU06).



178

179 Photo 50 (2018): Soil core (8-11 feet) from boring SB107 located adjacent to the storm drain on the
180 southeast corner of Building 47-40 Round House. SB107 is associated with the Outdoor Wash Rack Area
181 (DU06).



182

183 Photo 51 (2018): Outdoor Wash Rack Area boring SB106 drilled at the South end of Building 47-40
184 Round House.



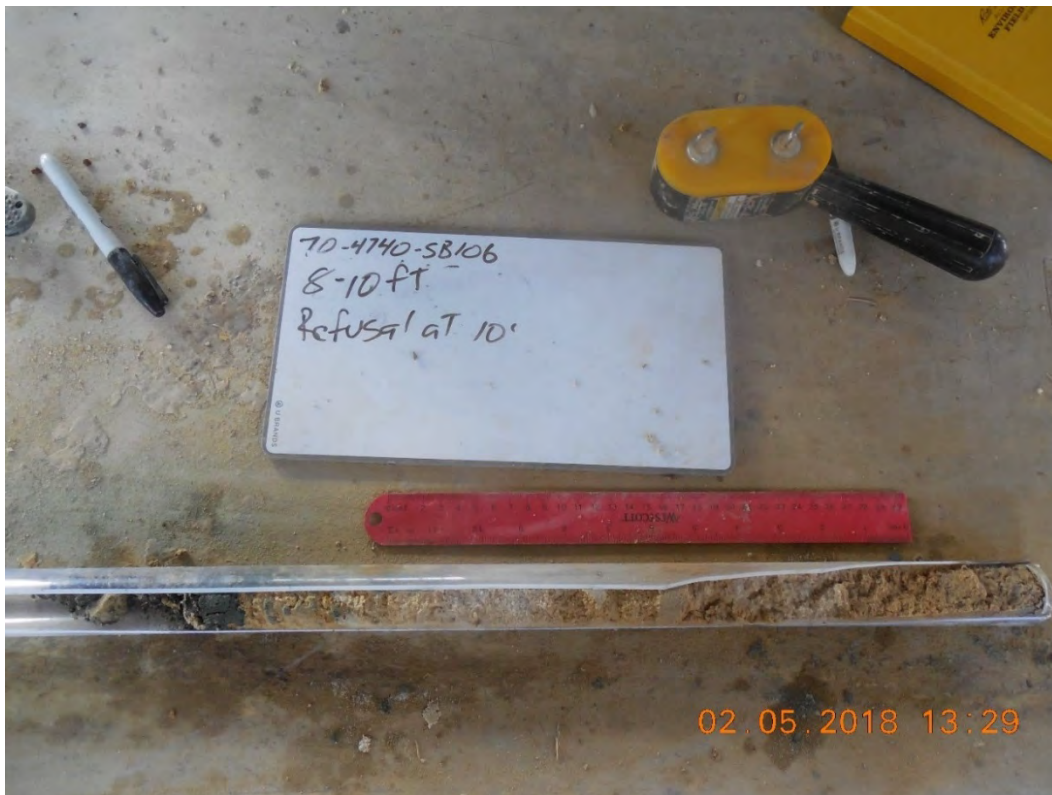
185

186 Photo 52 (2018): Soil core (0-4 feet) from boring SB106 is associated with the Outdoor Wash Rack Area
187 (DU06).



188

189 Photo 53 (2018): Soil core (4-8 feet) from boring SB106 is associated with the Outdoor Wash Rack Area
190 (DU06).



191

192 Photo 54 (2018): Soil core (8-10 feet) from boring SB106 is associated with the Outdoor Wash Rack Area
193 (DU06).



194

195 Photo 55 (2018): Soil core (0-4 feet) from boring SB105 is associated with the Outdoor Wash Rack Area
196 (DU06).



197

198 Photo 56 (2018): Building 47-40 Round House Interior boring SB103 drilled at the North end of the
199 building (view facing northwest).



200

201 Photo 57 (2018): Soil core (0-4 feet) from boring SB103 within Building 47-40 Round House Interior
202 (DU04).



203

204 Photo 58 (2018): Soil core (4-7 feet) from boring SB103 within Building 47-40 Round House Interior
205 (DU04).



206

207 Photo 59 (2018): Dry sediment sample collected with hand auger from SS108 located inside the storm
208 drain on the southeast corner of Building 47-40 Round House. SB108 is associated with the Outdoor
209 Wash Rack Area (DU06).

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APPENDIX I

Survey Data

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2018 RVAAP ENVIRONMENTAL AREAS SURVEY

ENVIRONMENTAL SURVEY REPORT
FOR PARSONS & CAMP RAVENNA JOINT MILITARY TRAINING CENTER

PREPARED BY: WELLERT CORPORATION | 5136 BEACH RD. MEDINA, OH 44256
DATE PREPARED: March 15, 2018

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MB 2338.....	9
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RAV 11.....	15

LEVEL REPORT CC-RVAAP 69

<u>Station</u>	<u>BS(+)</u>	<u>BS Dist</u>	<u>HI</u>	<u>IS(-)</u>	<u>IS Dist</u>	<u>FS(-)</u>	<u>FS Dist</u>	<u>Elev</u>	<u>Desc</u>
1	6.353	49.280	1,030.273					1,023.920	RAV1
2				7.097	48.620			1,023.176	MW-005 TCASING
3				6.512	48.730			1,023.762	MW-005 TCONC
4				6.437	49.440			1,023.836	MW-005 THUB
5				6.660	45.560			1,023.614	WP014 GS
6				6.645	59.710			1,023.628	WP007 GS
7				6.085	42.780			1,024.188	MW-004 PVC
8				5.525	42.463			1,024.748	MW-004 CONC
9				5.485	41.040			1,024.788	MW-004 MAG
10				4.446	65.920			1,025.828	WP-008
11				4.524	41.500			1,025.749	WP-004
12				5.410	63.770			1,024.863	SB-112 GS
13				5.301	34.910			1,024.972	WP-002 GS
14				5.185	67.750			1,025.088	WP-005 GS
TP-1	4.798	64.820	1,030.211			4.860	50.560	1,025.413	T2TP
15				4.940	74.090			1,025.271	WP-003 GS
16				4.279	88.830			1,025.933	SB-113 GS
17				4.231	123.260			1,025.980	WP-009 GS
18				2.927	52.570			1,027.284	MW-003 PVC
19				5.482	50.940			1,024.729	MW-003 HUB

20				2.965	49.610			1,027.246	MW-001	PVC
21				5.517	48.430			1,024.694	MW-001	HUB
22				5.128	33.460			1,025.083	SB-111	GS
23				1.929	94.783			1,028.282	MW-002	PVC
24				5.103	94.150			1,025.108	MW-002	HUB
TP-2	3.150	92.310	1,028.200			5.161	64.730	1,025.050	T2TP	
25				4.578	46.060			1,023.622	WP-017	GS
26				4.828	86.900			1,023.372	WP-015	GS
TP-3	4.845	127.503	1,028.686			4.359	92.130	1,023.841	T2TP	
27				5.128	58.630			1,023.559	WP-011	GS
28				5.873	38.480			1,022.813	WP-012	GS
29				6.375	84.866			1,022.311	WP-013	GS
TP-4	5.600	92.850	1,029.440			4.846	127.560	1,023.840	T2TP	
1						5.522	92.850	1,023.918	RAV1	
Total	24.747	426.763				24.748	427.829			
Check								1,023.920		
								1,023.918		
								0.002		

LEVEL REPORT CC RVAAP-74

<u>Station</u>	<u>BS(+)</u>	<u>BS Dist</u>	<u>HI</u>	<u>IS(-)</u>	<u>IS Dist</u>	<u>FS(-)</u>	<u>FS Dist</u>	<u>Elev</u>	<u>Desc</u>
1	4.574	251.659	1,028.494					1,023.920	RAV1
TP-1	4.668	129.050	1,025.794			7.368	253.203	1,021.126	T2TP
30				3.782	91.613			1,022.012	MW-001 PVC
31				3.338	91.610			1,022.457	MW-001 CONC
32				4.154	66.400			1,021.640	MW-002 PVC
33				3.348	66.183			1,022.447	MW-002 CONC
34				3.374	67.347			1,022.420	SB25
35				3.349	68.283			1,022.446	SB23
36				3.394	64.010			1,022.400	SB24
37				3.790	52.320			1,022.004	WP-002 GS
38				4.559	47.750			1,021.235	WP-003 GS
39				4.983	66.400			1,020.811	MW-003 PVC
40				4.558	66.470			1,021.236	MW-003 CONC
TP-2	7.309	250.959	1,028.436			4.667	129.050	1,021.127	T2TP
1						4.515	253.456	1,023.922	RAV1
Total	16.551	631.669				16.549	635.709		
Check								1,023.920 1,023.922 -0.002	

Level Loops Closure Report

2018 CAMP RAVENNA ENVIRONMENTAL SURVEY								
Level Loop Closure Report (Third Order)								
Loop	BS Total (ft)	BS Dist (ft)	FS Total (ft)	FS Dist (ft)	Loop Dist (ft)	Misclosure Allowable (ft)	Loop Misclosure (ft)	PASSED/FAILED
AREA 69	24.74700'	426.76'	24.74800'	427.83'	854.592'	0.020'	0.001'	LOOP PASSED
AREA 74	16.55100'	631.67'	16.54900'	635.71'	1267.378'	0.024'	-0.002'	LOOP PASSED
			Total Distance		0.40 miles			

Elevation Determination Procedure Notes (CC RVAAP-69 & CC RVAAP-74):

- Elevations collected using Trimble DiNi Digital Level.
- Elevations are tied to NAVD88 Per Ravenna Arsenal Control Monument RAV 1.

CC RVAAP-69 COORDINATE REPORT

CC RVAAP-69				
POINT	NORTHING	EASTING	ELEV	DESCRIPTION
1	551472	2357923	1023.92	RAV 1 DISK (BASIS FOR ELEVATIONS)
2	551478	2357921	1023.18	MW-005 TOP PVC
	---	---	1023.76	MW-005 TOP CONCRETE
	---	---	1023.84	MW-005 HUB (GS)
3	551455	2357922	1023.61	WP-014 GS
4	551419	2357922	1023.63	WP-007 GS
5	551415	2357873	1024.19	MW-004 TOP PVC
	---	---	1024.75	MW-004 TOP CONC
	---	---	1024.79	MW-004 MAGNAIL (GS)
6	551413	2357828	1025.83	WP-008 GS
7	551456	2357835	1025.75	WP-004 GS
8	551472	2357814	1024.86	SB-112 GS
9	551468	2357760	1025.93	SB-113 GS
10	551442	2357738	1025.98	WP-009 GS
11	551517	2357766	1027.28	MW-003 TOP PVC
	---	---	1024.73	MW-003 HUB (GS)
12	551525	2357766	1027.25	MW-001 TOP PVC
	---	---	1024.69	MW-001 HUB (GS)
13	551537	2357718	1028.28	MW-002 TOP PVC
	---	---	1025.11	MW-002 HUB (GS)
14	551532	2357781	1025.08	SB-111 GS
15	551478	2357854	1025.27	WP-003 GS
16	551490	2357863	1024.97	WP-002 GS
17	551525	2357872	1025.09	WP-005 GS
18	551555	2357919	1023.62	WP-017 GS
19	551457	2358004	1023.37	WP-015 GS
20	551349	2358011	1023.56	WP-011 GS
21	551363	2358097	1022.81	WP-012 GS
22	551405	2358118	1022.31	WP-013 GS
NOTES:				
HORIZONTAL DATUM: NAD 83(2011)				
VERTICAL DATUM: NAVD88				

CC RVAAP-74 COORDINATE REPORT

CC RVAAP-74				
POINT	NORTHING	EASTING	ELEV	DESCRIPTION
1	551472	2357923	1023.92	RAV 1 DISK (BASIS FOR ELEVATIONS)
25	551013	2358250	1020.81	MW-003 TOP PVC
			1021.24	MW-003 CONC (GS)
26	551023	2358266	1021.24	WP003 GS
27	551044	2358257	1022.00	WP002 GS
28	551044	2358246	1022.40	SB-24
29	551041	2358241	1022.45	SB-23
30	551037	2358243	1022.42	SB-25
31	551040	2358243	1021.64	MW-002 TOP PVC
			1022.45	MW-002 CONC (GS)
32	551042	2358218	1022.01	MW-001 TOP PVC
			1022.46	MW-001 CONC (GS)
NOTES:				
HORIZONTAL DATUM: NAD 83(2011)				
VERTICAL DATUM: NAVD88				

CC RVAAP-70 COORDINATE REPORT

CC RVAAP-70				
POINT	NORTHING	EASTING	ELEV	DESCRIPTION
36	566652	2379163	950.23	SB-103
37	566592	2379195	950.25	SB-102
38	566565	2379200	950.23	SB-101
39	566569	2379172	946.65	SB-104
40	566519	2379140	949.54	SB-107
41	566515	2379168	949.28	SB-106
42	566443	2379151	949.95	SB-105
NOTES:				
HORIZONTAL DATUM: NAD 83(2011)				
VERTICAL DATUM: NAVD88				

CC-RVAAP-70 Procedure Notes:

-Horizontal & vertical coordinates collected using Spectra Precision Epoch 50 GNSS Receiver & Trimble S5 Robotic Total Station.

HORIZONTAL CONTROL COMPARISON


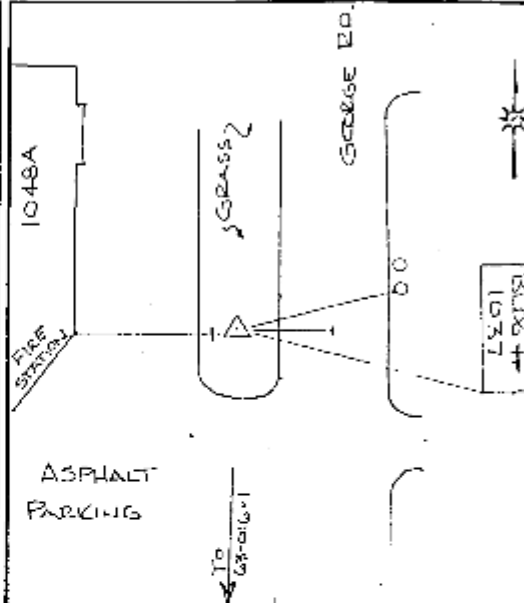
HORIZONTAL CONTROL COMPARISON									
PUBLISHED CONTROL CONVERTED TO NAD83(2011)				PROJECT COORDINATES (OHIO VRS) NAD83(2011)				Δ	
POINT	NORTHING	EASTING	DESC.	POINT	NORTHING	EASTING	DESC.	Δ NORTH	Δ EAST
999	551471.869	2357923.437	RAV1	1	551471.86	2357923.31	RAV1	0.01	0.13
1000	549651.443	2357928.555	PID MB2338	48	549651.54	2357928.58	DISK PORTAGE COUNTY 1977	-0.10	-0.03
1001	558490.199	2357792.745	RAV2	47	558490.31	2357792.59	RAV2	-0.11	0.15
1008	566921.885	2377934.289	RAV9	44	566922.05	2377934.32	RAV9	-0.16	-0.03
1009	555003.805	2367417.913	RAV10	46	555003.84	2367417.83	RAV10	-0.03	0.08
1010	557047.393	2372207.044	RAV11	45	557047.46	2372207.07	RAV11	-0.07	-0.03
1013	548218.769	2354665.465	PID MB2342	50	548218.76	2354665.50	DISK MB2342	0.01	-0.04
1014	551578.086	2367363.874	PID MB2328	49	551578.05	2367363.98	DISK MB2328	0.04	-0.11
PROJECT HORIZONTAL CONTROL PARAMETERS $\pm 1'$									
RAVENNA ARSENAL CONTROL POINTS CONVERTED FROM NAD83(1986) TO NAD83(2011) USING NGS COORDINATE CONVERSION AND TRANSFORMATION TOOL (NCAT). PIDs MB2342, MB2328, & MB2338 CONVERTED FROM NAD83(1995) TO NAD83(2011) USING NCAT.									

Horizontal Coordinates Procedure Notes (all areas):

- Horizontal coordinates collected using Spectra Precision Epoch 50 GNSS Receiver & Trimble S5 Robotic Total Station
- Horizontal coordinates are tied to the Ohio State Plane Coordinate System, Ohio North Zone 3401, NAD83 (2011) per ODOT VRS Network System
- Horizontal coordinates were verified by locating existing NGS & Ravenna Arsenal Control Monuments to confirm coordinates meet project accuracy requirements.

PUBLISHED CONTROL

RAV 1

	<p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</p> <p>CORPS OF ENGINEERS</p> <p>P.O. BOX 59</p> <p>LOUISVILLE, KY 40201</p>
<p>US Army Corps of Engineers</p>	<p>PROJECT: <u>RAVENNA ARSENAL</u></p> <p>DATE: <u>DEC 1997</u></p>
<p>STATION <u>ZAV 1 1997</u></p> <p>GEOGRAPHIC COORDINATES (NAD 83)</p> <p>LATITUDE <u>41° 10' 18.06583" N</u></p> <p>LONGITUDE <u>81° 05' 07.42132" W</u></p> <p>ELEVATION <u>1023.92'</u> DATUM <u>NAVD 88</u></p> <p>STATE PLANE COORDINATES (NAD 83)</p> <p>UNITS (FEET or METERS) <u>FEET</u></p> <p>NORTHING <u>551,472.462</u></p> <p>EASTING <u>2,357,923.326</u></p> <p>STATE <u>OH</u> ZONE <u>3401</u></p> <p>CONV. <u>+</u> <u>0° 55' 45.57115"</u></p> <p>COMB. FACTOR <u>0.999891807</u></p>	 <p style="text-align: center;">SKETCH OF STATION</p>
<p>142.5' from Ref 1, SW Corner of Bldg. 1037</p> <p>55.1' from Ref 2, Face of S end of 2 trans. poles</p> <p>57.5' from Ref 3, Corner of Fire Station</p> <p>30.5' from Ref 4, c/Asphalt Road</p> <p>1.0' East of Carsonite Witness Point</p> <p>The station is a brass Corps. Of Engineers disk stamped "RAV 1 1997" set in a 36" concrete post 12" in diameter and belled to 18" at base, and flush with ground.</p>	
<p>QUAD: <u>WINDHAM, OH</u></p>	

The NGS Data Sheet

See file [ds:data.pdf](#) for more information about the datasheet.

```

PROGRAM = datasheet95, VERSION = 8.12.4
1      National Geodetic Survey, Retrieval Date = MARCH 15, 2018
MB2338 *****
MB2338 DESIGNATION - 63 016 1 P CO
MB2338 PID - MB2338
MB2338 STATE/COUNTY- OH/PORTAGE
MB2338 COUNTRY - US
MB2338 USGS QUAD - WINDHAM (1994)
MB2338
MB2338 *CURRENT SURVEY CONTROL
MB2338
MB2338* NAD 83(1995) POSITION- 41 10 00.07372(N) 081 05 07.73986(W) ADJUSTED
MB2338* NAVD 88 ORTHO HEIGHT - 309.1 (meters) 1014. (feet) VERTCON
MB2338
MB2338 GEOID HEIGHT - -33.712 (meters) GEOID12B
MB2338 LAPLACE CORR - -1.96 (seconds) DEFLEC12B
MB2338 HORZ ORDER - SECOND
MB2338
MB2338.The horizontal coordinates were established by classical geodetic methods
MB2338.and adjusted by the National Geodetic Survey in April 1998.
MB2338.
MB2338.The NAVD 88 height was computed by applying the VERTCON shift value to
MB2338.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2338
MB2338.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2338.GEOID12B height accuracy estimate available here.
MB2338
MB2338.The Laplace correction was computed from DEFLEC12B derived deflections.
MB2338
MB2338. The following values were computed from the NAD 83(1995) position.
MB2338
MB2338; North East Units Scale Factor Converg.
MB2338;SPC OH N - 167,534.086 718,698.045 MT 0.99994063 +0 55 45.4
MB2338;SPC OH N - 549,651.41 2,357,928.50 SFT 0.99994063 +0 55 45.4
MB2338;UTM 17 - 4,557,264.706 492,828.866 MT 0.99960063 -0 03 22.6
MB2338
MB2338! Elev Factor x Scale Factor = Combined Factor
MB2338!SPC OH N - 0.99995680 x 0.99994063 = 0.99989743
MB2338!UTM 17 - 0.99995680 x 0.99960063 = 0.99955745
MB2338
MB2338: Primary Azimuth Mark Grid Az
MB2338:SPC OH N - 63 022 2 P CO 241 23 28.8
MB2338:UTM 17 - 63 022 2 P CO 242 22 36.8
MB2338
MB2338_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9282857264(NAD 83)
MB2338
MB2338|-----|
MB2338| PID Reference Object Distance Geod. Az |
MB2338| dddmmss.s |

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The NGS Data Sheet

See file [ds:data.pdf](#) for more information about the datasheet.

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MB2328 DESIGNATION - 63 018 1 P CO
MB2328 PID - MB2328
MB2328 STATE/COUNTY- OH/PORTAGE
MB2328 COUNTRY - US
MB2328 USGS QUAD - WINDHAM (1994)
MB2328
MB2328 *CURRENT SURVEY CONTROL
MB2328
MB2328* NAD 83(1995) POSITION- 41 10 17.57778(N) 081 03 03.96526(W) ADJUSTED
MB2328* NAVD 88 ORTHO HEIGHT - 299.0 (meters) 981. (feet) VERTCON
MB2328
MB2328 GEOID HEIGHT - -33.739 (meters) GEOID12B
MB2328 LAPLACE CORR - -1.47 (seconds) DEFLEC12B
MB2328 HORZ ORDER - SECOND
MB2328
MB2328.The horizontal coordinates were established by classical geodetic methods
MB2328.and adjusted by the National Geodetic Survey in April 1998.
MB2328.
MB2328.The NAVD 88 height was computed by applying the VERTCON shift value to
MB2328.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2328
MB2328.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2328.GEOID12B height accuracy estimate available here.
MB2328
MB2328.The Laplace correction was computed from DEFLEC12B derived deflections.
MB2328
MB2328. The following values were computed from the NAD 83(1995) position.
MB2328
MB2328; North East Units Scale Factor Converg.
MB2328;SPC OH N - 168,121.327 721,573.937 MT 0.99994078 +0 57 06.7
MB2328;SPC OH N - 551,578.05 2,367,363.82 SFT 0.99994078 +0 57 06.7
MB2328;UTM 17 - 4,557,802.214 495,713.451 MT 0.99960023 -0 02 01.1
MB2328
MB2328! Elev Factor x Scale Factor = Combined Factor
MB2328!SPC OH N - 0.99995839 x 0.99994078 = 0.99989917
MB2328!UTM 17 - 0.99995839 x 0.99960023 = 0.99955864
MB2328
MB2328: Primary Azimuth Mark Grid Az
MB2328:SPC OH N - 63 025 1 P CO 179 04 17.7
MB2328:UTM 17 - 63 025 1 P CO 180 03 25.5
MB2328
MB2328_U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9571357802(NAD 83)
MB2328
MB2328|-----|
MB2328| PID Reference Object Distance Geod. Az |
MB2328| dddmmss.s |

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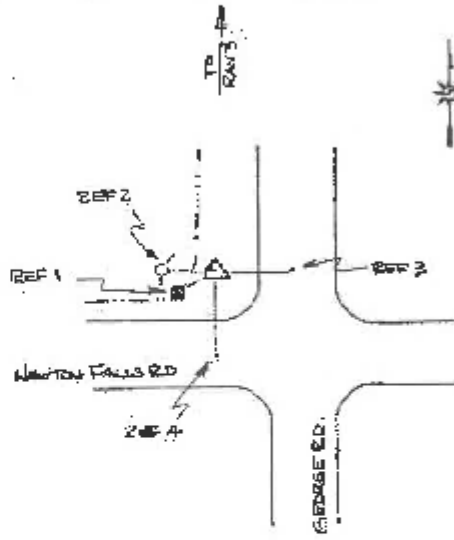
The NGS Data Sheet


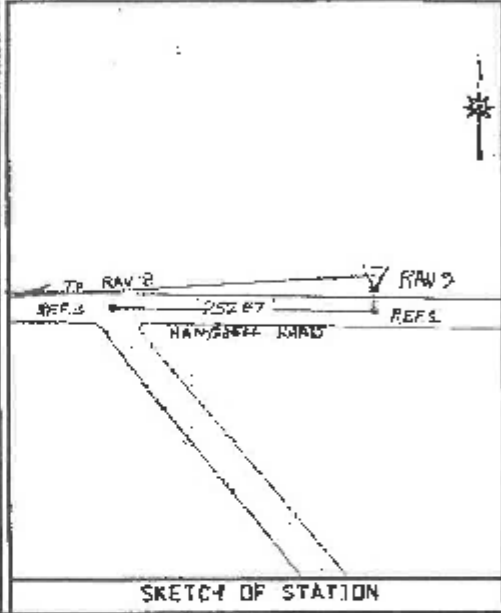
See file [data.pdf](#) for more information about the datasheet.


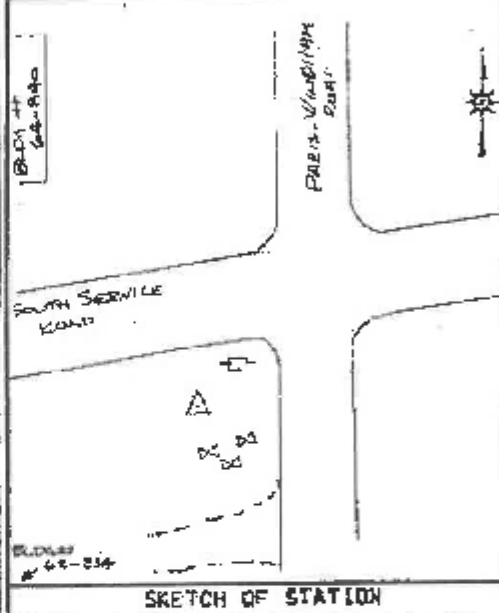
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MB2342 DESIGNATION - 63 022 1 P CO
MB2342 PID - MB2342
MB2342 STATE/COUNTY- OH/PORTAGE
MB2342 COUNTRY - US
MB2342 USGS QUAD - WINDHAM (1994)
MB2342
MB2342 *CURRENT SURVEY CONTROL
MB2342
MB2342* NAD 83(1995) POSITION- 41 09 46.44011(N) 081 05 50.70274(W) ADJUSTED
MB2342* NAVD 88 ORTHO HEIGHT - 324.0 (meters) 1063. (feet) VERTCON
MB2342
MB2342 GEOID HEIGHT - -33.700 (meters) GEOID12B
MB2342 LAPLACE CORR - -1.88 (seconds) DEFLEC12B
MB2342 HORZ ORDER - SECOND
MB2342
MB2342.The horizontal coordinates were established by classical geodetic methods
MB2342.and adjusted by the National Geodetic Survey in April 1998.
MB2342.
MB2342.The NAVD 88 height was computed by applying the VERTCON shift value to
MB2342.the NGVD 29 height (displayed under SUPERSEDED SURVEY CONTROL.)
MB2342
MB2342.Significant digits in the geoid height do not necessarily reflect accuracy.
MB2342.GEOID12B height accuracy estimate available here.
MB2342
MB2342.The Laplace correction was computed from DEFLEC12B derived deflections.
MB2342
MB2342. The following values were computed from the NAD 83(1995) position.
MB2342
MB2342;
MB2342;SPC OH N - North East Units Scale Factor Converg.
MB2342;SPC OH N - 167,097.406 717,703.451 MT 0.99994052 +0 55 17.1
MB2342;SPC OH N - 548,218.74 2,354,665.41 SFT 0.99994052 +0 55 17.1
MB2342;UTM 17 - 4,556,845.340 491,827.249 MT 0.99960082 -0 03 50.8
MB2342
MB2342!
MB2342!SPC OH N - Elev Factor x Scale Factor = Combined Factor
MB2342!SPC OH N - 0.99995446 x 0.99994052 = 0.99989498
MB2342!UTM 17 - 0.99995446 x 0.99960082 = 0.99955530
MB2342
MB2342 U.S. NATIONAL GRID SPATIAL ADDRESS: 17TMF9182756845(NAD 83)
MB2342
MB2342|-----|
MB2342| PID Reference Object Distance Geod. Az |
MB2342| | | | dddmmss.s |
MB2342| MB2340 63 022 2 P CO 384.163 METERS 07618 |
MB2342|-----|
MB2342
MB2342 SUPERSEDED SURVEY CONTROL

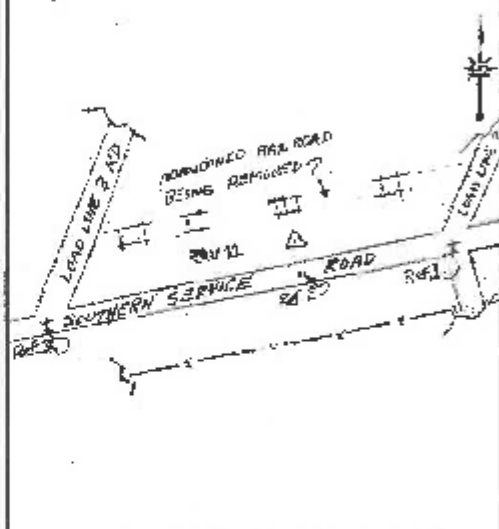
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 <p>US Army Corps of Engineers</p>	<p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</p> <p>CORPS OF ENGINEERS</p> <p>P.O. BOX 58</p> <p>LOUISVILLE, KY 40201</p>
<p>PROJECT: <u>RAVENNA ARSENAL</u> DATE: <u>DEC 1997</u></p>	
<p>STATION <u>RAV 2 1997</u></p> <p>GEOGRAPHIC COORDINATES (NAD 83)</p> <p>LATITUDE <u>41° 11' 27.42499" N</u></p> <p>LONGITUDE <u>81° 05' 07.6412" W</u></p> <p>ELEVATION <u>1061.61'</u> DATUM <u>NAVD 88</u></p> <p>STATE PLANE COORDINATES (NAD 83)</p> <p>UNITS (FEET & METERS) <u>FEET</u></p> <p>NORTHING <u>558,490.787</u></p> <p>EASTING <u>2,357,792.668</u></p> <p>STATE <u>OH</u> ZONE <u>OHION 3401</u></p> <p>CONV. <u>+</u> <u>0° 55' 45.4267"</u></p> <p>CONV. FACTOR <u>0.999890672</u></p>	 <p style="text-align: center;">SKETCH OF STATION</p>
<p>The station is a brass Corps. Of Engineers disk stamped "RAV 2 1997" set in a 36" concrete post 12" in diameter and belled to 18" at base, and flush with ground.</p>	
<p>At the intersection of George & Newton Falls Roads</p> <p>REFERENCES-</p> <ul style="list-style-type: none"> 10.0' from Ref 1, top C/L of concrete basin 21.9' from Ref 2, sewer pole 22.5' from Ref 3, C/L of George Road 46.7' from Ref 4, C/L of Newton Falls Road 1.0' East of curbside witness post 	
<p>QUAD: <u>WINDHAM, OH</u></p>	

	<p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</p> <p>CORPS OF ENGINEERS</p> <p>P.O. BOX 59</p> <p>LOUISVILLE, KY 40201</p>
<p>US Army Corps of Engineers</p>	<p>PROJECT: <u>RAVENNA ARSENAL</u></p>
<p>DATE: <u>DEC. 1997</u></p>	
<p>STATION <u>RAV 9</u></p> <p>GEOGRAPHIC COORDINATES (NAD 83)</p> <p>LATITUDE <u>41° 2' 47.4135E</u> "N"</p> <p>LONGITUDE <u>81° 00' 42.33551</u> "W"</p> <p>ELEVATION <u>961.90</u> DATUM <u>NAVDS83</u></p> <p>STATE PLANE COORDINATES (NAD 83)</p> <p>UNITS (FEET OR METERS) <u>FEET</u></p> <p>NORTHING <u>566,922.433</u></p> <p>EASTING <u>2,377,534.290</u></p> <p>STATE <u>OH</u> ZONE <u>3401</u></p> <p>CONV. <u>4</u> <u>0° 58' 30.71934"</u></p> <p>CONV. FACTOR <u>0.9398096347</u></p>	 <p style="text-align: center;">SKETCH OF STATION</p>
<p>RAV 9 - TO REACH FROM INTERSECTION OF SNOW RD. AND HANSBELL RD. GO EAST ALONG RA SDELL 0.2 MILES PASTING BY RAV 8. AT OLD GRUBBY ON RT. THENCE 0.3 MILES MORE TO STATION ON THE LEFT APPROX. 250 FEET EAST OF RD LEADING SOUTH-EAST.</p> <p>STATION IS: A COPPER COATED COPPER DISK (STAMPED "RAV 9" MM) SET IN A 36 INCH CONCRETE POST 12 INCHES IN DIA. AND REINFORCED TO 15 INCHES AT BASE AND FIVE INCHES AT TOP.</p> <p>REF 1: IS A PAX NAIL W/ CENTERLINE OF HANSBELL RD SOUTH OF STA. 12.05+00</p> <p>REF 2: IS A PAX NAIL IN CORNER OF HANSBELL RD. AND SOUTH-EAST ROAD WEST OF STATION - 252.87 FEET</p> <p>QUAD: WINDHAM OH</p>	

 <p>US Army Corps of Engineers</p>	<p>U.S. ARMY ENGINEER DISTRICT, LOUISVILLE</p> <p>CORPS OF ENGINEERS</p> <p>P.O. BOX 59</p> <p>LOUISVILLE, KY 40201</p> <p style="text-align: right;">#1,009</p>
<p>PROJECT: <u>RAVENHILL AERONAUTICAL</u> DATE: <u>DEC 1997</u></p>	
<p>STATION <u>RAV 10 1997</u></p> <p>GEOGRAPHIC COORDINATES (NAD 83)</p> <p>LATITUDE <u>41° 10' 51.4127" N</u></p> <p>LONGITUDE <u>81° 03' 02.51459" E</u></p> <p>ELEVATION <u>983.84'</u> DATUM <u>NAVD83</u></p> <p>STATE PLANE COORDINATES (NAD 83)</p> <p>UNITS (FEET & METERS) <u>FEET</u></p> <p>NORTHING <u>555,004.363</u></p> <p>EASTING <u>2,367,477.833</u></p> <p>STATE <u>OH</u> ZONE <u>3401</u></p> <p>CONV. <u>0° 57' 07.62867"</u></p> <p>CONV. FACTOR <u>0.949894022</u></p>	 <p style="text-align: center;">SKETCH OF STATION</p>
<p>The station is a brass Corps. Of Engineers disk stamped "RAV 10 1997" set in a 36" concrete post 12" in diameter and bolted to 18" at base, and flush with ground</p>	
<p>REFERENCES:</p> <ul style="list-style-type: none"> 32.5' SSE C/L of South Service Road 51.10' east C/L of Paris-Windham Road 117.47' SW north corner of Hls 62-834 115.6' C/L South Service Road and Paris-Windham Road 11.3' C/L SSE valve 15.6' C/L NE valve 	
<p>QUAD: <u>WINDHAM, OH</u></p>	

	U.S. ARMY ENGINEER DISTRICT, LOUISV L&A CORPS OF ENGINEERS P.O. BOX 59 #1010 LOUISVILLE, KY 40201
US Army Corps of Engineers	PROJECT: <u>RAVENNA ARSENAL</u>
DATE: <u>DEC 1997</u>	

STATION <u>RAV 11 155</u> GEOGRAPHIC COORDINATES (NAD 83) LATITUDE <u>41° 11' 10.81772" N</u> LONGITUDE <u>81° 01' 59.4393" W</u> ELEVATION <u>908.73'</u> DATUM <u>NAVD88</u> STATE PLANE COORDINATES (NAD83) UNITS (FEET OR METERS) <u>FEET</u> NORTHING <u>557,047.939</u> EASTING <u>2,372,206.979</u> STATE <u>OH</u> ZONE <u>3403</u> CONV. \pm <u>0° 57' 49.0661"</u> COMB. FACTOR <u>0.999893507</u>	
SKETCH OF STATION	

RAV 11: To Reach FROM SOUTHERN SERVICE RD AND PARIS-WINDHAM RD. GO EAST-NORTH-EAST ALONG SOUTHERN SERVICE RD. CROSS RIVER TO STATION ON LEFT.

STATION IS: A COPPER COATED C. OF E. DISK (STAMPED "RAV 11 155") SET IN A 36 INCH CONCRETE POST - 12 INCHES IN DIA. AND BOLTED TO 4 INCHES AT BASE EACH WITH GRIND.

REF 1: IS THE CENTERLINE OF SOUTHERN SERVICE RD AND LOAD LINE 2 RD. LENGTH EAST OF STATION - 1086.6 FEET.

REF 2: IS A POINT ON CENTERLINE OF SOUTHERN SERVICE RD. CPE AND S.E. OF STATION - 28.91 FEET.

REF 3: IS THE CENTERLINE OF SOUTHERN SERVICE RD AND LOAD LINE 3 RD. LENGTH WEST OF STATION - 0.25 MILES.

QUAD: WINDHAM, OH

APPENDIX J

Regulatory Correspondence Letter

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John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

October 23, 2018

Mr. David Connolly
Army National Guard Directorate
Environmental Programs Division
ARNG-ILE-CR
111 S. George Mason Dr.
Arlington, VA 22204

Re: **US Army Ravenna Ammunition Plt RVAAP
Remediation Response
Project records
Remedial Response
Portage County
267000859220**

**Subject: Draft Site Inspection Report, CC-RVAAP-70 East Classification Yard,
September 13, 2018, Portage/Trumbull Counties, OHIO EPA ID # 267000859220**

Dear Mr. Connolly:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office has reviewed the Draft Site Inspection Report for CC-RVAAP-70, East Classification Yard dated and received by Ohio EPA on September 13, 2018.

Additional sampling was conducted in accordance with the 2017 Work Plan for Additional Sampling for CC RVAAP-69 Building 1048 Fire Station, CC RVAAP-70 East Classification Yard, and CC RVAAP-74 Building 1034-Motor Pool Hydraulic Lift. Seven decision units (DUs) were defined and investigated. Ohio EPA concurs with the recommendation for further evaluation in a Remedial Investigation (RI) and has no further comments.

If you have any questions or concerns related to this review or would like to schedule a meeting or conference call, please free feel to contact me at (330) 963-1170.

Sincerely,

A handwritten signature in black ink, appearing to read "Edward J. D'Amato", is written over a horizontal line.

Edward J. D'Amato
Project Coordinator
Ohio EPA - Division of Emergency and Remedial Response

ED/nvp

ec: Rebecca Schreffler, Chenega
Kevin Sedlak, ARNG
Angela Schmidt, USACE Louisville
Mark Johnson, Manager, DERR, NEDO
Bob Princic, Supervisor, DERR, NEDO

Katie Tait, OHARNG RTLS
Craig Coombs, USACE Louisville
Gail Harris, Vista Sciences Corporation
Thomas Schneider, Ohio EPA, SWDO, DERR

RECEIVED
26 OCT 2018

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