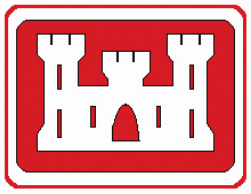
Draft
Proposed Plan
for CC RVAAP-76 Depot Area
Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

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

Prepared for:



United States Army Corps of Engineers
Louisville District
600 Dr. Martin Luther King, Jr. Place
Louisville, Kentucky 40202

Prepared by:

PARSONS

401 Diamond Drive NW
Huntsville, AL 35806
256-837-5200

June 2, 2017

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
06-2-2017	Proposed Plan	April - June 2017

4. TITLE AND SUBTITLE
Draft Proposed Plan
CC RVAAP-76 Deport Area
Ravenna Army Ammunition Plant
Ravenna, Ohio

5a. CONTRACT NUMBER
W912QR-12-D-0002

5b. GRANT NUMBER
N/A

5c. PROGRAM ELEMENT NUMBER
N/A

6. AUTHOR(S)
Heyse, Edward
Click, Jessica

5d. PROJECT NUMBER
Delivery Order 0003

5e. TASK NUMBER
11

5f. WORK UNIT NUMBER
N/A

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Parsons Government Services Inc.
401 Diamond Drive NW
Huntsville, Alabama 35806

8. PERFORMING ORGANIZATION REPORT NUMBER
NA

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Corps of Engineers--Louisville District
600 Martin Luther King Jr. Place
Louisville, Kentucky 40202-0059

10. SPONSOR/MONITOR'S ACRONYM(S)
USACE

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
N/A

12. DISTRIBUTION/AVAILABILITY STATEMENT
Please reference distribution page.

13. SUPPLEMENTARY NOTES
None.

14. ABSTRACT
This PP presents remedial alternatives and the preferred alternative for remedy of surface soil within CC RVAAP-76 Depot Area at Camp Ravenna. The AOC has PAH contamination in surface soils around Building U-4 and Building U-5. The preferred remedial alternative (Alternative 3: Excavation and Off-Site Disposal) involves excavating the contaminated surface soil and permanently disposing in a permitted landfill as non-hazardous waste to attain Unrestricted (Residential) Land Use for soil at CC RVAAP-76.

15. SUBJECT TERMS
PP = Proposed Plan, remedial alternatives, preferred alternative, AOC = Area of Concern, PAH = polycyclic aromatic hydrocarbon

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Edward Heyse
U	U	U	N/A	42	19b. TELEPHONE NUMBER *(Include area code)* (256) 217-2573

Reset

THIS PAGE INTENTIONALLY LEFT BLANK

PLACEHOLDER PAGE FOR:

Documentation of Ohio EPA Concurrence of Final Document

(Documentation to be provided once concurrence is issued)

THIS PAGE INTENTIONALLY LEFT BLANK

DISCLAIMER STATEMENT

This document is a work prepared for the United States Government by Parsons. In no event shall either the United States Government or Parsons have any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on the information contained herein, nor does either warrant or otherwise represent in any way the accuracy, adequacy, efficacy, or applicability of the contents hereof.

THIS PAGE INTENTIONALLY LEFT BLANK

Contractor Statement of Independent Technical Review

Parsons has completed the Draft Proposed Plan for CC RVAAP-76 Depot Area 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.

Independent Technical Reviewer:

Dan Griffiths, CPG	_____	08 April 2017
Technical Director	(Signature)	(Date)

Plan Preparer/Reviewer:

Edward Heyse, Ph.D., P.E.	_____	30 May 2017
Project Manager	(Signature)	(Date)

THIS PAGE INTENTIONALLY LEFT BLANK

Draft
Proposed Plan
for CC RVAAP-76 Depot Area
Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

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

Prepared for:

U.S. Army Corps of Engineers, Louisville District
600 Dr. Martin Luther King Jr. Place
Louisville, Kentucky 40202-2267

Prepared by:

PARSONS
401 Diamond Drive NW
Huntsville, AL 35806
256-837-5200

June 2, 2017

THIS PAGE INTENTIONALLY LEFT BLANK

DOCUMENT DISTRIBUTION

for the
Draft Proposed Plan
for CC RVAAP-76 Depot Area
Ravenna Army Ammunition Plant Restoration Program
Camp Ravenna, Ohio

Name/Organization	Number of Printed Copies	Number of Electronic Copies
Mark Leeper, ARNG	0	1
Kevin Sedlak, ARNG	0	1
Katie Tait, OHARNG	1	0
Ed D'Amato, Ohio EPA-DERR	1	3
Tom Schneider, Ohio EPA-Central Office	1	1
Bob Princic, Ohio EPA-DERR	Transmittal Letter Only	
Rod Beals, Ohio EPA-DERR	Transmittal Letter Only	
Gail Harris, RVAAP Administrative Record	2	2
Patrick Ryan, REIMS	Transmittal Letter Only	
Craig Coombs, USACE – Louisville District	Transmittal Letter Only	
Kevin Mieczkowski, USACE – Louisville District	2	1

ARNG = Army National Guard
OHARNG = Ohio Army National Guard
RVAAP = Ravenna Army Ammunition Plant
USACE = United States Army Corps of Engineers
REIMS = Ravenna Environmental Information Management System

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ATTACHMENTS

LIST OF ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	Below Ground Surface
Camp Ravenna	Camp Ravenna Joint Military Training Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMCOCs	Contaminant Migration Chemicals of Concern
COCs	Chemicals of Concern
COPECs	Chemicals of Potential Ecological Concern
COPCs	Chemicals of Potential Concern
cPAH	Carcinogenic Polyaromatic Hydrocarbon
DU	Decision Unit
EU	Exposure Unit
FS	Feasibility Study
FWCUGs	Facility-wide Cleanup Goals
HQ	Hazard Quotient
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGT	National Guard Trainee
O&M	Operation and Maintenance
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
RAO	Remedial Action Objective
RI	Remedial Investigation

LIST OF ACRONYMS (Continued)

ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SARA	Superfund Amendments and Reauthorization Act
SRCs	Site-related Chemicals
SVOCs	Semi-volatile Organic Compounds
U.S. Army	United States Department of the Army
UST	underground storage tank

1.0 INTRODUCTION

This Proposed Plan presents the preferred Alternative to achieve a remedy for soil and addresses surface water and sediment within the Compliance Restoration site CC (Army Environmental Compliance-Related Cleanup Program) RVAAP-76 Depot Area, area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP). The former RVAAP is now known as Camp Ravenna Joint Military Training Center (Camp Ravenna) and is located in Portage and Trumbull Counties, Ohio (Figure 1). The U.S. Department of the Army (U.S. Army), in coordination with the Ohio Environmental Protection Agency (Ohio EPA), issues this Proposed Plan to provide the public with information to comment upon the selection of an appropriate response action. The remedy will be selected for the CC RVAAP-76 Depot Area after all comments submitted during the 30-day public comment period are considered. Therefore, the public is encouraged to review and comment on all Alternatives presented in this Proposed Plan.

The Army is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations 300). Selection and implementation of a remedy will also be consistent with the requirements of the Ohio EPA Director's Final Findings and Orders, dated June 10, 2004.

This Proposed Plan presents the cleanup Alternatives developed in the Remedial Investigation/Feasibility Study (RI/FS) CC RVAAP-76 Depot Area (USACE 2016), and identifies the preferred Alternative. No Chemicals of Concern (COCs) were identified for six of the areas investigated at CC RVAAP-76 Depot Area (Building A-2, Building A-3, Building U-10, Building U-20, Bolton Barn, or the Paint Can Area). No COCs were identified for sediment; therefore, this media requires no further action. Surface water is not present at the AOC. COCs in soil requiring remediation were only identified at Building U-4 and Building U-5, as discussed in this Proposed Plan.

The Army's preferred Alternative at CC RVAAP-76 Depot Area is excavation with off-

Public Comment Period:

Public Meeting:
The Army will hold an open house and public meeting to present the conclusions and additional details presented in the *Remedial Investigation/Feasibility Study CC RVAAP-76 Depot Area* (USACE 2016). Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for at the Ravenna High School Community Room, 6589 North Chestnut Street, Ravenna, Ohio 44266.

Information Repositories:
Information used in selecting the remedy is available for public review at the following locations:

Reed Memorial Library
167 East Main Street
Ravenna, Ohio 44266
(330) 296-2827

Hours of operation:
9 AM-9 PM Monday-Thursday
9 AM-6 PM Friday
9 AM-5 PM Saturday
1 PM-5 PM Sunday

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282

Hours of operation:
10 AM-8 PM Monday-Thursday
9 AM-5 PM Friday and Saturday

Online
http://www.rvaap.org/

The **Administrative Record File**, containing information used in selecting the remedy, is available for public review at the following location:

Camp Ravenna Joint Military Training Center (former Ravenna Army Ammunition Plant)
Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but an appointment to review the Administrative Record File can be scheduled.

site disposal of surface soil above Facility-Wide Cleanup Goals (FWCUGs, SAIC 2010) surrounding Building U-4 and Building U-5. The Army encourages the public to review the site background documents to gain a more comprehensive understanding of the AOC, activities that have been conducted to date, and the rationale for the preferred Alternative.

2.0 RVAAP DESCRIPTION AND BACKGROUND

The former RVAAP, now known as Camp Ravenna, located in northeastern Ohio within Portage and Trumbull counties, is approximately three (3) miles east/northeast of the City of Ravenna and one (1) mile north/northwest of the Village of Newton Falls. The facility is federally owned, approximately 11 miles long and 3.5 miles wide. The facility 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, the facility is surrounded by the communities of Windham, Garrettsville, Charlestown, and Wayland.

As of September 2013, administrative accountability for the entire 21,683-acre facility has been transferred to the United States Property and Fiscal Officer for Ohio and the property subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site, Camp Ravenna.

3.0 CC RVAAP-76 DEPOT AREA DESCRIPTION AND BACKGROUND

CC RVAAP-76 Depot Area is located in the western portion of the facility mainly along Route 80, south of Newton Falls Road, and north of South Patrol Road (Figure 2). Based on the Final Historical Records Review (SAIC 2011) and the RI/FS report, some of the historical operations conducted at the AOC included fueling operations, locomotive repair, petroleum, oil and lubricant storage, solid waste incinerator activities, and vehicle repair and maintenance. Munitions demilitarization activities occurred in Building U-10.

CC RVAAP-76 Depot Area was constructed as part of the original RVAAP facility. Prior to the purchase of the property in August 1940, CC RVAAP-76 Depot Area consisted of the Bolton Farm. The U.S. Army continued to use some of the buildings from the Bolton Farm. The Depot Administration Area Telephone Building is the last remaining building of the former Bolton Farm that existed prior to construction of RVAAP. Operations at CC RVAAP-76 Depot Area began during World War II (circa 1941) and continued through the Vietnam War era. The area is currently used by the OHARNG for storage and military training purposes.

Historical records indicate demilitarization activities were conducted at Building U-10. Numerous operations and facilities involving hazardous, toxic, or radioactive waste also existed within CC RVAAP-76 Depot Area in support of military missions. The following activities occurred at the AOC:

- The demilitarization activities at Building U-10 reportedly consisted of reconditioning fin assemblies, the AN-M106A1 track vehicle, and the F/250-lb bomb. Building U-10 was also used for debanding of 8-inch high explosive projectiles, and storing M103 tank maintenance parts assemblies (SAIC 2011).
- A spill report was found documenting the discovery of 12 “paint cans” (estimated 5-gallon cans) during the search for an underground storage tank (UST) near the former Bolton Mansion (EE102). The cans were removed in June 1991. A log book entry documented that the paint cans contained a dry silicone-type substance, but the results were below regulatory levels. No documentation of soil sampling from the excavation area was found (SAIC 2011).
- Various maintenance activities occurred at multiple locations and buildings throughout CC RVAAP-76 Depot Area; however, no documentation on any specific spills or releases was found during

the historical records review (SAIC 2011).
- Eleven USTs were known to have been located within the site boundaries, but are being evaluated separately as part of CC RVAAP-72 (SAIC 2011).
- Building U-5, the equipment repair shop, was a facility used to repair locomotives, and 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 (SAIC 2011).

The following environmental investigations have been completed for the CC RVAAP-76 Depot Area:

- *Preliminary Assessment for the Characterization of Areas of Contamination (USACE 1996).*
- *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 2011).*
- *Remedial Investigation/Feasibility Study for CC RVAAP-76 Depot Area (USACE 2016).*

4.0 AREA OF CONCERN CHARACTERISTICS

The AOC characteristics, nature and extent of contamination, and conceptual site model are based on the investigations conducted from 1996 through 2016.

The CC RVAAP-76 Depot Area AOC is an approximately 170-acre area of the RVAAP property that consists primarily of mowed grass, shrubland and forest edge habitats. The mowed grassy areas tend to occur around buildings and are routinely mowed.

The topography of the AOC is generally sloping from west to east toward Hinkley Creek, which lies along the east boundary of CC RVAAP-76 Depot Area. The western side of CC RVAAP-76 Depot Area is topographically high at an elevation of approximately 1130 feet, relative to the east side at an elevation of 1100 feet. Overall surface water drainage patterns are toward Hinkley Creek along constructed ditches, natural conveyances, and through the existing storm sewer network. Wetland areas are present to the east of CC RVAAP-76 Depot Area adjacent to the Hinkley Creek floodplain, to the west of Building U-7, and south of CC RVAAP-76 Depot Area. Railroad tracks (spurs) formerly serviced CC RVAAP-76 Depot Area from the north, terminating south of Building U-10, Building 1W-1, and Building U-14.

Various support buildings have existed at CC RVAAP-76 Depot Area. Those buildings associated with this AOC include the following (Figure 3), and are referred to in reports as the areas of interest and Exposure Units (EU):

- Building A-2 – Motor Repair Building
- Building A-3 – Service Garage/Tool Crib
- Building U-4 – Material Handling Equipment Repair Shop
- Building U-5 – Equipment Repair Building
- Building U-10 – Box Repair Shop
- Building U-20 – Incinerator
- Building EE-102 – Bolton Barn

Footers and slabs for multiple former buildings and some staging areas exist north of the Telephone Exchange Building. Potable water, hydrant water supply, and sanitary sewer utility systems, remain intact but are inactive. A storm sewer system remains intact and functional with several outlets to conveyances draining to Hinkley Creek.

The soil type present at CC RVAAP-76 Depot Area consists of Wadsworth silt loams, occurring at 0 to 2 percent (0-2%) slopes on the eastern portion of the site, and 2 to 6% slopes in the western portion of the site. Wadsworth silt loams are poorly drained with rapid surface runoff and low to high permeability (USDA 2010).

No monitoring wells are associated with CC

RVAAP-76 Depot Area. There are two facility-wide wells located within the CC RVAAP-76 Depot Area boundary: FWGmw-008 located to the southeast and FWGmw-009 located to the east. Well gauging data collected at these wells during the September 2016 facility-wide sampling event indicated groundwater elevations of 1103 and 1098 feet above mean sea level (TEC-Weston, 2017). Based on site-wide groundwater information, groundwater flow is west to east at approximately 10 to 20 feet below ground surface (bgs).

Surface water at CC RVAAP-76 Depot Area occurs intermittently as storm water runoff within ditches or conveyances and in several wetlands areas on the AOC.

RI data were used to determine site-related chemicals (SRCs) and chemicals of potential concern (COPCs) in accordance with the Final FWCUG report (SAIC, 2010). The final list of COPCs includes those SRCs where sample results from any depth within the decision unit (DU) exceeded the target cancer risk level of 1 X 10^{-6} or non-carcinogenic target hazard quotient (HQ) of 0.1 for any applicable or representative receptor. The COPCs identified for each EU are presented below:

Building A-2 – Motor Repair Building

- Surface soil – chromium, manganese, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene and dibenz(a,h)anthracene
- Subsurface soil – chromium and benzo(a)pyrene
- Wet Sediment – none

Building A-3 – Service Garage/Tool Crib

- Surface soil – chromium, manganese, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene
- Subsurface soil – benzo(a)pyrene
- Wet Sediment – none

Building U-4 – Material Handling Equipment Repair Shop

- Surface soil – chromium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene
- Subsurface soil – arsenic, chromium, benzo(a)pyrene, and dibenz(a,h)anthracene
- Wet Sediment – none

Building U-5 – Equipment Repair Building

- Surface soil – chromium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-c,d)pyrene
- Subsurface soil – benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene
- Wet Sediment – none

Building U-10 – Box Repair Shop

- Surface soil – none
- Subsurface soil – none
- Wet Sediment – none

Building U-20 – Incinerator

- Surface soil – chromium and benzo(a)pyrene
- Subsurface soil – none
- Wet Sediment – chromium, arochlor 1260, and benzo(a)pyrene

Building EE-102 – Bolton Barn

- Surface soil – chromium and benzo(a)pyrene
- Subsurface soil – none
- Wet Sediment – none

The potential for soil contaminants to impact groundwater was evaluated in a fate and transport evaluation presented in the RI/FS Report (USACE 2016). The fate and transport evaluation included modeling and comparing the model results to FWCUGs, background concentrations, and maximum contaminant levels/US EPA Regional Screening levels. Modeling evaluated the potential for contaminants to leach from soil to groundwater

beneath the AOC and eventually impact Hinckley Creek.

The conclusions of the fate and transport modeling were that all SRCs in soil were currently eliminated as potential risks to groundwater. Final contaminant migration chemicals of concern (CMCOCs) were not identified for CC RVAAP-76 Depot Area.

5.0 SCOPE AND ROLE OF RESPONSE ACTION

CC RVAAP-76 Depot Area is in the central portion of the facility and is currently used for military training purposes. The OHARNG projected future Land Use for CC RVAAP-76 Depot Area is Military Training Land Use. The Representative Receptor is the National Guard Trainee (NGT). This use in conjunction with the evaluation of residential receptors, form the basis for identifying COCs. Unrestricted (Residential) Land Use is included to evaluate COCs for Land Use at CC RVAAP-76 Depot Area, and also to address baseline conditions as required by the CERCLA process.

An evaluation using Resident Receptor (Adult and Child) FWCUGs was used to provide an Unrestricted (Residential) Land Use evaluation. Unrestricted (Residential) Land Use is considered protective for all categories of Land Use at Camp Ravenna, such as Military Training Land Use. The response action evaluated Alternatives to attain Unrestricted (Residential) Land Use for soil, sediment, and surface water.

Groundwater is addressed under the Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater. However, the selected remedy for soil at CC RVAAP-76 Depot Area must also be protective of groundwater.

6.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

6.1 Human Health Risk Assessment

The human health risk assessment was an evaluation to determine if there was potential risk posed to the NGT or Resident Receptors. The risks were determined through the identification of the COCs and then further evaluation of these chemicals through a sum of ratios analysis if required. The environmental media of concern for potential receptor exposure include surface and subsurface soil, sediment, and surface water.

No COCs were identified for six of the areas investigated at CC RVAAP-76 Depot Area (Building A-2, Building A-3, Building U-10, Building U-20; Bolton Barn, or the Paint Can Area). No COCs were identified in surface or subsurface soils for Military Training Land Use.

The risk evaluation process identified risks to the Resident Receptor from carcinogenic polyaromatic hydrocarbons (cPAH) in surface soils at Building U-4 and Building U-5. The COCs for these two buildings include dibenzo(a,h)anthracene, benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene (Table 1). The total risk range from the cPAHs in surface soils is 2 X 10-4 at Building U-4 and 3 X 10-4 at Building U-5. Therefore, surface soils around these two buildings were addressed during the FS to develop and screen remedial action Alternatives to address cPAHs and obtain Unrestricted (Residential) Land Use. The preferred Alternative is discussed in Section 10 of this Proposed Plan. No other COCs were identified in any of the media at the other EUs assessed for this AOC.

6.2 Ecological Risk Assessment

The purpose of the Ecological Risk Assessment was to evaluate the potential for chemical constituents detected in surface soil, sediment and surface water in CC RVAAP-76 Depot Area.

For the Ecological Risk Assessment, maximum concentrations of analytes detected in surface soil, sediment, and surface water were compared to site-specific background screening values and to conservative ecological screening benchmarks for generic receptors. Analytes retained for further evaluation were subsequently assessed using more realistic assumptions in a refining step. Considering site-specific factors, and

Table 1. COCs and FWCUGs in Surface Soil (0-1 foot bgs) for Unrestricted (Residential) Land Use at Building U-4 and Building U-5

COC	Maximum Detected Concentration (mg/kg)	Resident Receptor Adult FWCUG (HQ=1.0, TR=10^{-5}) (mg/kg)
Benzo(a)pyrene	Bldg U-4: 29 Bldg U-5: 51	0.221
Benzo(a)anthracene	Bldg U-4: 34 Bldg U-5: 58	2.21
Benzo(b)fluoranthene	Bldg U-4: 43 Bldg U-5: 80	2.21
Dibenzo(a,h)anthracene	Bldg U-4: 5.2 Bldg U-5: 7.2	0.221

bgs = below ground surface. Bldg = building. COC = chemical of concern. FWCUG = facility-wide cleanup goal. HQ = Hazard Quotient. mg/kg = milligrams per kilogram. TR = Target Risk.

considering mitigating uncertainties, it is unlikely that exposure to surface soil, sediment, or surface water would adversely affect communities or populations of common ecological receptors or individuals of State-listed species in CC RVAAP-76 Depot Area.

No chemicals of potential ecological concern (COPECs) were identified. No further investigation (e.g., Level III Baseline Ecological Risk Assessment) or removal action is considered necessary at CC RVAAP-76 Depot Area for the protection of ecological receptors.

7.0 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAO) consist of goals for protecting human health and the environment, and can be achieved by reducing exposure as well as by reducing contaminant levels. The RAO for CC RVAAP-76 Depot Area is to prevent exposure to the Resident Receptor by chemicals requiring remediation in soil. Four cPAHs, dibenzo(a,h)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were identified as COCs in surface soil for the Resident Receptor. The FWCUGs at 10−5 cancer risk for the Resident Receptor exposed to soil are the remedial action cleanup goals. Table 1 presents the COCs and FWCUGs for soil under this remedy.

8.0 SUMMARY OF FEASIBILITY STUDY ALTERNATIVES

The following remedial Alternatives for the unrestricted Land Use scenario—Resident Receptor were considered in the FS for remediating contaminated soil at CC RVAAP-76 Depot Area:

1. No Action
2. Land Use Controls
3. Excavation and Off-Site Disposal

Costs were estimated for each Alternative.

8.1 Alternative 1—No Action

Cost: $0

Consideration of the No Action Alternative is required under the NCP and is included only as a point of comparison with other Alternatives. Under this Alternative, no action is taken to clean up existing soil contamination, prevent Land Use or restrict access, or limit contaminant movement. No action would be taken to reduce the hazards present at CC RVAAP-76 Depot Area to potential human

receptors. There would be no measured reduction in toxicity, mobility, or volume of the contaminated media. However, certain COCs may naturally attenuate with time.

8.2 Alternative 2—Land Use Controls

Estimated Cost: $69,410 ($16,500 in capital cost, while the total annual operation and maintenance (O&M) cost is $52,910. A cost summary is provided in Attachment 1*).*

Land Use Controls include access and land-use restrictions, with long-term monitoring, to reduce the potential for exposure to contaminated soil at CC RVAAP-76 Depot Area. Under this Alternative, contaminated soil would remain in place.

Land use controls would include the prohibition of residential use of the property and invasive (digging) activities. These restrictions would be incorporated into the Property Management Plan and subsequent facility Master Plan. Restrictions would be incorporated into any real property documents should the property be transferred. Land Use Controls would need to be properly managed, including compliance documentation through inspections and an annual reporting to the Ohio EPA.

Administrative policies would include restricting future property use within the two areas of the AOC that may result in any risks if exposure occurs as defined in the Resident Receptor Exposure Scenario. It is important to note that, although Semi-volatile Organic Compounds (SVOCs) in the surface soil at Building U-4 and Building U-5 are greater than Resident Receptor criteria but less than the risk criteria for the NGT Receptor. In addition, there is currently no risk to ecological receptors.

Because contamination is left in-place, this Alternative does not allow for unrestricted site use and unlimited exposure. Therefore, all available data would be analyzed as part of the Five Year Review process required by CERCLA to determine whether additional remedial actions or site controls are required to assure that human health is being protected and include a determination that Land Use restrictions are still in place.

This Alternative includes the following components:

- Regulation of intrusive activities in areas containing potentially contaminated soil
- Implementation of Land Use restrictions for the Resident Receptor (Adult and Child)
- Five Year Reviews

8.3 Alternative 3—Excavation and Off-Site Disposal

Estimated Cost: $215,000 (Includes capital costs. There are no annual O&M costs. A cost summary is provided in Attachment 1).

This Alternative would involve the excavation of contaminated surface soil up to 1 foot bgs from around Building U-4 and Building U-5 and permanent disposal in a RCRA-permitted landfill as a non-hazardous waste. The areas to be excavated within CC RVAAP-76 Depot Area are shown in Figure 3. The total volume of contaminated soil is estimated to be 1,133 cubic yards. Off-site disposal of contaminated soils will require coordination with facilities accepting the material to ensure that proper documentation is prepared. Consultation with State and local agencies, and concurrence of this remedy and disposal facilities from Ohio EPA, will be required.

This Alternative includes the following components:

- Excavation of the discrete area of contaminated surface soil as defined in Figure 3;
- Disposal of excavated soil at a Subtitle D non-hazardous landfill; and
- Replacement of excavated material with compacted clean backfill.

There is no significant residual risk associated with this Alternative for the Resident Receptor at CC RVAAP-76 Depot Area once the excavated soils have been removed and disposed. The risk of contamination to groundwater and surface water within CC RVAAP-76 Depot Area is expected to be minimal during construction due to the

implementation of control measures and management procedures. During removal activities, best management practices will be implemented to minimize surface water runoff, dust, and deposition of the excavated material. Such practices include the following:

- Using silt fence downgradient of the excavation;
- Use of sprayed water to minimize dust generated from excavated materials;
- Washing truck and vehicle tires prior to leaving CC RVAAP-76 Depot Area to minimize tracking of soils to other areas; and
- Dust monitoring at the excavation and at the Site perimeter.

Following excavation of the contaminated soil, clean backfill would be placed in excavated areas, and CC RVAAP-76 Depot Area would be restored to pre-excavation topography. Backfill and topsoil will consist of on- or off-site soil that has passed the chemical and physical requirements in accordance with the RVAAP facility-wide plans. This Alternative would support the planned future Land Use (i.e., National Guard training and residential). The time to achieve RAOs would be approximately two weeks. Under this Alternative, long-term institutional controls, warning signs, and Land Use restrictions will not be necessary. There would also be no requirement for doing Five Year Reviews.

9.0 EVALUATION OF FOCUSED FEASIBILITY STUDY ALTERNATIVES

The Alternatives were evaluated with respect to the nine NCP criteria, as outlined by CERCLA (Table 2). The nine NCP criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria.

The comparative analysis evaluates the relative performance of Alternatives 1, 2 and 3 with respect to each of the nine NCP criteria (Table 3). Identifying the advantages and disadvantages of each Alternative, with respect to each other, helps identify relative strengths of the preferred Alternative. These strengths, combined with risk management decisions made by the Army and Ohio EPA, as well as input from the community, will serve as the basis for selecting the remedy.

Alternative 1, No Action, is not protective of human health or the environment. No effort would be taken to prevent or minimize human exposure to contaminated soil. Concentrations of contaminants could pose a risk to future receptors (e.g., Resident Receptor) in an Unrestricted (Residential) Land Use scenario.

The No Action Alternative would not comply with chemical-specific Applicable or Relevant

Table 2. Summary of Comparative Analysis

Criteria	Alternative		
	1 No Action	2 Land Use Controls	3 Excavation and Off-Site Disposal
Threshold Criteria			
Overall Protection of Human Health and the Environment	No	No	Yes
Compliance with ARARs	No	No	Yes
Balancing Criteria			
Long-Term Effectiveness and Permanence	○	○	●
Reduction of Toxicity, Mobility, or Volume by Treatment	○	○	◑
Short-Term Effectiveness	Not Applicable	●	●
Implementability	Not Applicable	●	●
Cost ($)	0	69,400	215,000
Modifying Criteria			
State Acceptance	NR	NR	NR
Community Acceptance	NR	NR	NR

○ Low ◑ Moderate ● High NR = Not Rated

Table 3. NCP Criteria

Threshold Criteria – must be met for the Alternative to be eligible for selection as a remedial option.

1. **Overall Protection of Human Health and the Environment** – considers whether or not an Alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
2. **Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)** – considers how a remedy will meet all the ARARs and other federal and state environmental statutes and/or provide grounds for invoking a waiver.

Balancing Criteria – are rated high, medium, or low and are used to weigh major trade-offs among Alternatives.

3. **Long-term Effectiveness and Permanence** – considers the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once facility wide-cleanup goals have been met.
4. **Reduction of Toxicity, Mobility, or Volume Through Treatment** – considers the anticipated performance of the treatment technologies that may be employed in a remedy.
5. **Short-term Effectiveness** – considers the speed with which the remedy achieves protection, as well as the potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.
6. **Implementability** – considers the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.
7. **Cost** – considers capital costs and operation and maintenance costs associated with the implementation of the Alternative.

Modifying Criteria – may be considered to the extent that information is available during development of the feasibility study but can be fully considered only after public comment on this Proposed Plan.

8. **State Acceptance** – indicates whether the state concurs with, opposes, or has no comment on the preferred Alternative.
9. **Community Acceptance** – will be addressed in the Record of Decision following a review of the public comments received on the site characterization report, focused Feasibility Study, and Proposed Plan.

and Appropriate Requirements (ARAR). The concentrations in soil would remain above the remediation goals, and although natural attenuation may occur for some COCs, the soil would not be confirmed to have been restored to the Resident Receptor use standards.

Alternative 1 is rated low for long-term effectiveness and permanence and reduction of toxicity, mobility or volume through treatment because no action is taken. Short-term effectiveness and implementability are not applicable because no action is taken. There are no costs for this Alternative.

Alternative 2, Land Use Controls, would prevent or limit exposure to hazardous chemicals left in place at the site to humans through ingestion, inhalation, or contact with exposed COC-impacted soils but does not provide long-term protection of human health and the environment. This Alternative would not comply with chemical-specific ARARs.

The Land Use Controls Alternative does not involve active treatment and would require long-term management. This Alternative is rated low for long-term effectiveness and permanence and reduction of toxicity, mobility or volume through treatment because no action is taken. Short-term effectiveness and implementability are rated high because Alternative 2 is readily and quickly implementable and short-term risks to site workers and the environment would be minimal during implementation of the remedy.

The total capital cost of Alternative 2 is estimated at $16,500 while the total annual O&M costs for 30 years are estimated at $52,910 for a total present worth cost of

$69,410. The combined -30%+ 50% total capital and annual O&M costs are expected to be between $48,600 and $104,110 over 30 years.

Alternative 3, Excavation and Off-Site Disposal, provides overall protection of human health and the environment by removing soils containing contaminants at concentrations above remediation goals at the site. This Alternative allows for unrestricted Land Use for the NGT Receptor and the Resident Receptor. This Alternative complies with chemical-specific ARARs and would be implemented to comply with Action- and Location-Specific ARARs.

Although Alternative 3 will not treat or destroy the contaminated material, it will significantly reduce the total mass of the COCs at CC RVAAP-76 Depot Area by removing impacted soils. Alternative 3 permanently reduces the mobility and volume of COC-impacted soil at CC RVAAP-76 Depot Area by transferring the material to a proper off-site disposal facility, but does not treat or destroy the contaminated material; therefore, this criterion is rated moderate. Potential short-term risks to site workers would be mitigated by protection procedures specified in the health and safety plan and through engineering controls. Excavation and off-site disposal involves common, proven, and reliable methods and practices. Therefore, short-term effectiveness and implementability are rated high. The total capital cost of Alternative 3 is estimated at $215,000. There are no annual O&M costs with this Alternative. The -30% to +50% total capital cost is expected to be between $150,500 and $322,000. It is expected that remedial goals will be achieved in approximately two to three weeks.

10.0 PREFERRED FEASIBILITY STUDY ALTERNATIVE

The recommended Alternative for CC RVAAP-76 Depot Area is Alternative 3: Excavation with Off-site Disposal. The comparative analysis of the three Alternatives indicates Alternative 1 and Alternative 2 are not protective for human health and the environment; therefore, Alternative 1 and Alternative 2 are eliminated as potential Alternatives. Alternative 3 is protective of human health and the environment and is compliant with ARARs.

Alternative 3 involves the excavation and off-site disposal of surface soil COC concentrations up to 1 foot bgs impacted above the FWCUGs surrounding Building U-4 and Building U-5; an estimated 1,133 cubic yards will be excavated (Figure 3). Alternative 3 is based on soil removal to achieve Unrestricted (Residential) Land Use; therefore, Land Use Controls and Five Year Reviews will not be required following the remedy. The -30% to +50% cost for Alternative 3 is estimated to be between $156,000 and $336,000.
Based on the available risk assessment information, the preferred Alternative will achieve the RAO. This recommendation is not a final decision. The Army, in coordination with Ohio EPA, will select the remedy for CC RVAAP-76 Depot Area after reviewing and considering all comments submitted during the 30-day public comment period.

11.0 COMMUNITY PARTICIPATION

11.1 Community Participation

Public participation is an important component of the remedy selection. The U.S. Army, in coordination with Ohio EPA, is soliciting input from the community on the preferred Alternative.

The comment period extends from [redacted]. This period includes a public meeting at which the U.S. Army will present this Proposed Plan. The U.S. Army will accept oral and written comments at this meeting.

11.2 Public Comment Period

The 30-day comment period is from [redacted], and provides an opportunity for public involvement in the decision-making process for the proposed action. The public is encouraged to review and comment on this Proposed Plan.

All public comments will be considered by the U.S. Army and Ohio EPA before selecting a remedy. During the comment period, the public is encouraged to review documents pertinent to CC RVAAP-76 Depot Area.

This information is available at the Information Repository and online at www.rvaap.org. To obtain further information, contact Kathryn Tait of the Camp Ravenna Environmental Office at kathryn.s.tait.nfg@mail.mil.

11.3 Written Comments

If the public would like to comment in writing on this Proposed Plan or other relevant issues, please deliver comments to the U.S. Army at the public meeting or mail written comments (

POINTS OF CONTACT FOR WRITTEN COMMENTS

Mailing Address:

Camp Ravenna Joint Military Training Center
Environmental Office
Attn: Kathryn Tait
1438 State Route 534 SW
Newton Falls, Ohio 44444

Email Address:
kathryn.s.tait.nfg@mail.mil

11.4 Public Meeting

The U.S. Army will hold an open house and public meeting on this Proposed Plan on in the Ravenna High School Community Room, 6589 North Chestnut Street, Ravenna, Ohio 44266 to accept comments.

This meeting will provide an opportunity for the public to comment on the proposed action. Comments made at the meeting will be transcribed.

11.5 Army Review of Public Comments

The U.S. Army will review the public's comments as part of the process in reaching a final decision for the most appropriate action to be taken.

The Responsiveness Summary, a document that summarizes the U.S. Army's responses to comments received during the public comment period, will be included in the Record of Decision (ROD). The U.S. Army's final choice of action will be documented in the ROD.

ADMINISTRATIVE RECORD FILE

Camp Ravenna Joint Military Training Center (former Ravenna Army Ammunition Plant)
Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but an appointment to review the Administrative Record File can be scheduled.

INFORMATION REPOSITORIES

Reed Memorial Library
167 East Main Street
Ravenna, Ohio 44266
(330) 296-2827

Hours of operation:
9 AM-9 PM Monday-Thursday
9 AM-6 PM Friday
9 AM-5 PM Saturday
1 PM-5 PM Sunday

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282

Hours of operation:
10 AM-8 PM Monday-Thursday
9 AM-5 PM Friday and Saturday

Online
http://www.rvaap.org/

GLOSSARY OF TERMS

Administrative Record: a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record represents the information used to select preferred Alternatives.

Comprehensive Environmental Response

Compensation, and Liability Act (CERCLA): a federal law passed in 1980, commonly referred to as the Superfund Program. It provides liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous substance release sites that endanger public health or the environment.

Contaminant Migration Chemical of Concern (CMCOC): a chemical substance specific to an area of concern that potentially poses significant potential to leach to groundwater at a concentration above human health risks goals. CMCOCs are typically further evaluated for remedial action.

Chemical of Concern (COC): a chemical substance specific to an area of concern that potentially poses significant human health or ecological risks. COCs are typically further evaluated for remedial action.

Chemical of Potential Concern (COPC): a chemical substance specific to an area of concern that potentially poses human health risks and requires further evaluation in the RI. COPCs are typically not evaluated for remedial action.

Chemical of Potential Ecological Concern (COPEC): a chemical substance specific to an area of concern that potentially poses ecological risks and requires further evaluation in the RI. Chemicals of Potential Ecological Concern are typically not evaluated for remedial action.

Ecological Receptor: a plant, animal, or habitat exposed to an adverse condition.

Feasibility Study (FS): a CERCLA document that reviews and evaluates multiple remedial technologies under consideration at a site. It also identifies the preferred remedial action Alternative.

Hazard Quotient (HQ): the ratio of the potential exposure to a substance and the level at which no adverse effects are expected.

Human Receptor: a hypothetical person, based on current or potential future Land Use, who may be exposed to an adverse condition. For example, the National Guard Trainee is considered the hypothetical person when evaluating Military Training Land Use at the former RVAAP.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): the set of regulations that implement CERCLA and address responses to hazardous substances and pollutants or contaminants.

Record of Decision (ROD): a legal record signed that describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, and responses to comments.

Remedial Investigation (RI): CERCLA investigation that involves sampling environmental media, such as air, soil, and water, to determine the nature and extent of contamination and to calculate human health and environmental risks that result from the contamination.

Responsiveness Summary: a section of the ROD that documents and responds to written and oral comments received from the public about the Proposed Plan.

Risk Assessment: an evaluation that determines potential harmful effects, or lack thereof, posed to human health and the environment due to exposure to chemicals found at a CERCLA site.

Unrestricted (Residential) Land Use: a Land Use defined for the former RVAAP restoration that is considered protective for all three Land Uses at Camp Ravenna Joint Military Training Center (Camp Ravenna). If an AOC meets the requirements for Unrestricted (Residential) Land Use, then the AOC can also be used for Military Training and Commercial/Industrial purposes.

REFERENCES

Ohio Environmental Protection Agency (Ohio EPA), 2004. *Director's Final Findings and Orders for the Ravenna Army Ammunition Plant*. June.

SAIC 2010. *Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio*. March 23.

SAIC 2011. *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. April.

TEC-Weston Joint Venture (TEC-Weston) 2017. Facility-Wide Groundwater Monitoring Program RVAAP-66 Facility-Wide Groundwater Annual Report for 2016, Former Ravenna Army Ammunition Plant, Ravenna, Ohio. February 15. Draft.

United States Army Corps of Engineers (USACE) 1996. *Preliminary Assessment for the characterization of Areas of Contamination. Ravenna Army Ammunition Plant, Ravenna, Ohio*. February.

USACE 2016. *Final Remedial Investigation/Feasibility Study (RI/FS) CC RVAAP-76 Depot Area, Ravenna Army Ammunition Plant, Ravenna, Ohio*. November 22.

United States Department of Agriculture (USDA) 2010. Soil Map of Portage County, Version 4. Website: www.websoilsurvey.nrcs.usda.gov. January.

THIS PAGE INTENTIONALLY LEFT BLANK

FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK

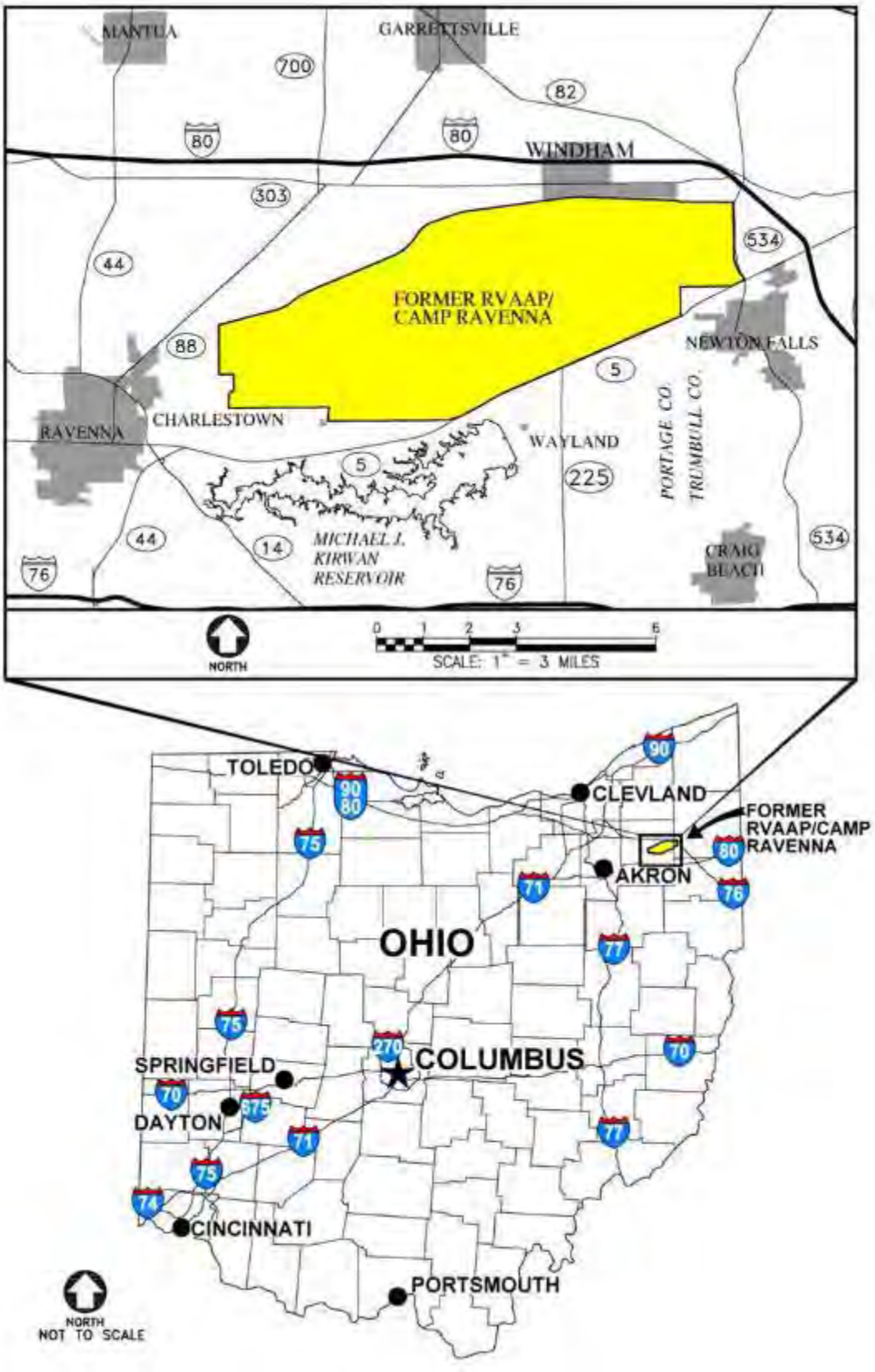


Figure 1 General Location and Orientation of Former RVAPP/Camp Ravenna

THIS PAGE INTENTIONALLY LEFT BLANK

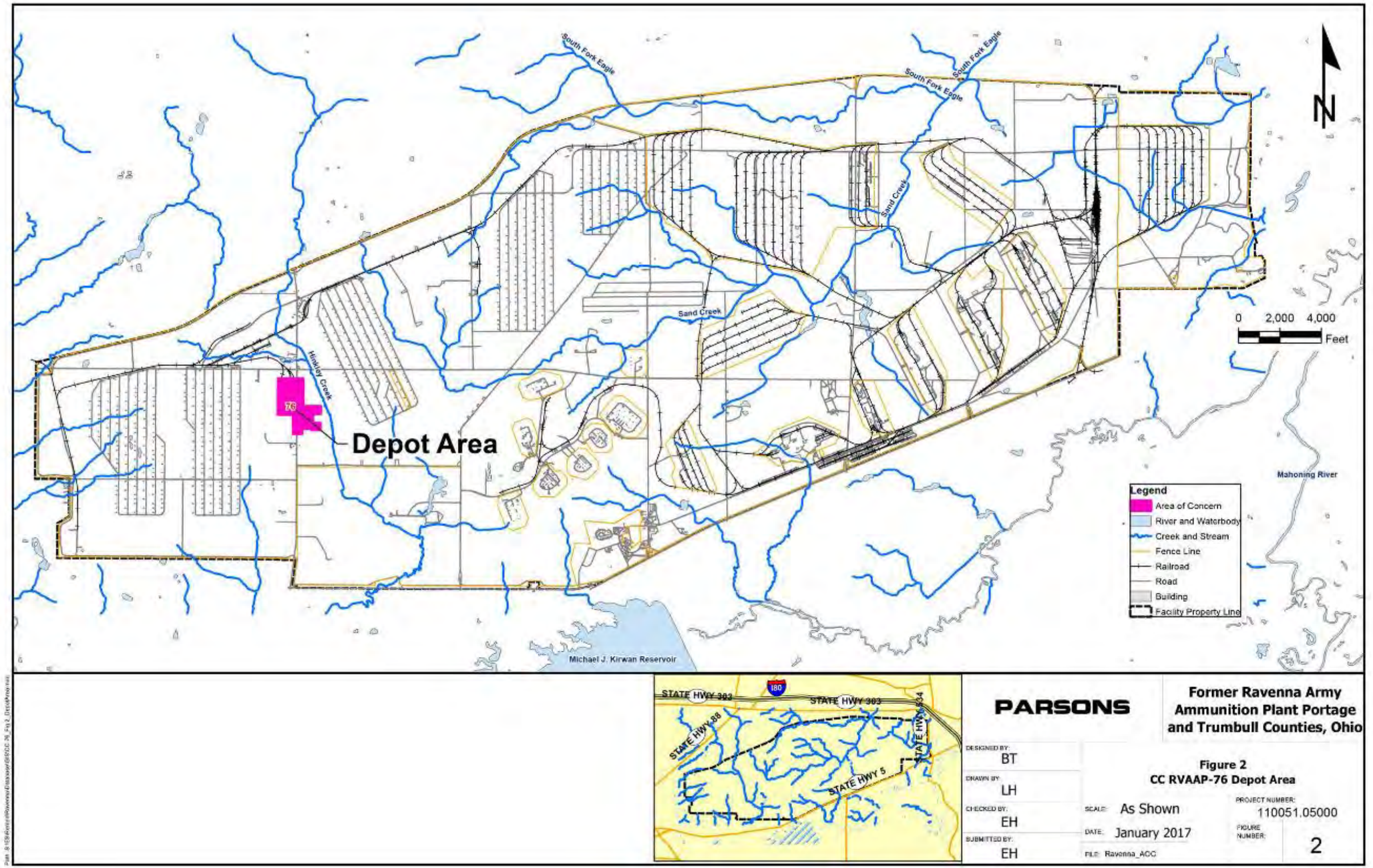


Figure 2 CC RVAAP-76 Depot Area Location

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

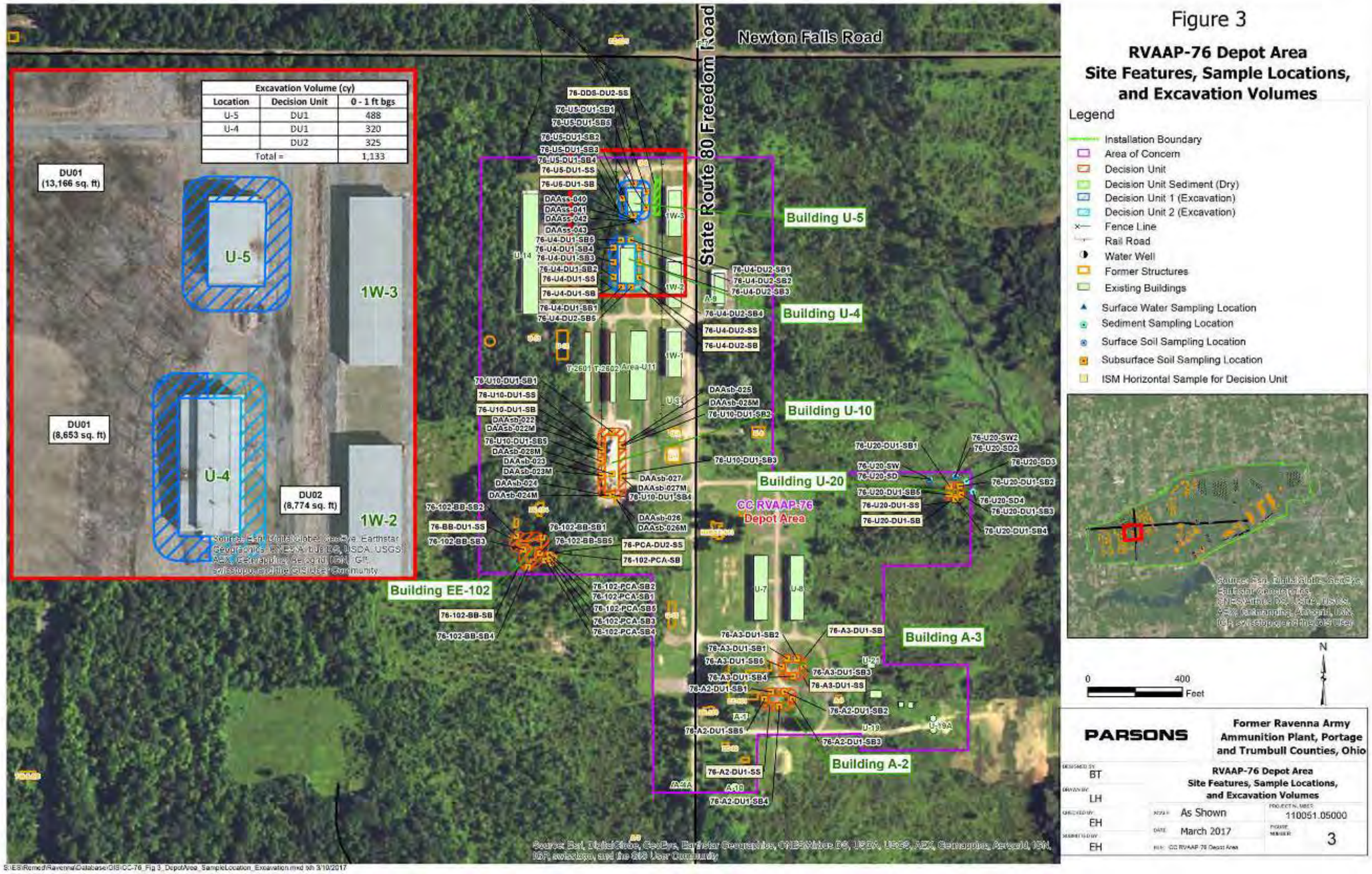


Figure 3 CC RVAAP-76 Depot Area Site Features, Sample Locations, and Excavation Volumes

THIS PAGE INTENTIONALLY LEFT BLANK

THIS PAGE INTENTIONALLY LEFT BLANK

ATTACHMENT

THIS PAGE INTENTIONALLY LEFT BLANK

Attachment 1 – Cost Summary for Alternative
Proposed Plan for CC RVAAP-76 Depot Area
Camp Ravenna Joint Military Training Center (Camp Ravenna)
Portage and Trumbull Counties, Ohio

Depot Area Alternatives		Duration	Capital Cost	O&M Cost	Total
1	No Action	0 years	$0	$0	$0
2	Land Use Controls	30 years	$16,500	$52,910	$69,410
3	Excavation with Off-Site Disposal	2 weeks	$215,000	$0	$215,000

Notes:

Approximate costs are presented for comparison purposes.

THIS PAGE INTENTIONALLY LEFT BLANK