Final

Proposed Plan
for Soil, Sediment, and Surface Water
at RVAAP-45 Wet Storage Area

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract No. W912QR-15-C-0046

Prepared for:

US Army Corps of Engineers®

U.S. Army Corps of Engineers
Louisville District

Prepared by:

leidos

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Twinsburg, Ohio 44087

February 21, 2018

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None.

14. ABSTRACT

This Proposed Plan for Wet Storage Area presents to the public the physical characteristics, geology, and hydrogeology of Wet Storage Area. This plan summarizes nature and extent of contamination in soil, sediment, and surface water; contaminant fate and transport; and human health and ecological risk assessments. These evaluations indicate there is a chemical of concern (COC) that poses unacceptable risk. Therefore, this plan presents Alternative 3: Ex-situ Thermal Treatment to attain Unrestricted (Residential) Land Use as the preferred alternative to the public with respect to soil, sediment, and surface water.

15. SUBJECT TERMS

proposed plan, ex-situ thermal treatment, land use, chemicals of concern

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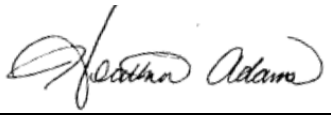
CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Leidos has completed the Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area at the Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, 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 the 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 level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing United States Army Corps of Engineers (USACE) policy. In addition, an independent verification was performed to ensure all applicable changes were made per regulatory and Army comments.

2/21/18

Jed Thomas, P.E.
Study/Design Team Leader

Date



2/21/18

Heather Adams, P.G.
Independent Technical Review Team Leader

Date

Significant concerns and the explanation of the resolution are as follows:

Internal Leidos Independent Technical Review comments are recorded on a Document Review Record per Leidos standard operating procedure ESE A3.1 Document Review. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader. As noted above, all concerns resulting from independent technical review of the project have been considered.

2/21/18

Lisa Jones-Bateman
Senior Program Manager

Date

Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

April 25, 2018

LTC James Crowley, ARNG-IED
National Guard Bureau
111 South George Mason Drive
Arlington, VA 22204

Re: US Army Ravenna Ammunition Plt RVAAP
Remediation Response
Project records
Remedial Response
Portage County
267000859127

Subject: Concurrence of Final Proposed Plan for Soil, Sediment and Surface Water at Wet Storage Area for the Former Ravenna Army Ammunition Plant (RVAAP) Document (Work Activity No. 267000859127)

Dear Mr. Crowley:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the Final Proposed Plan (PP) for Soil, Sediment and Surface Water at RVAAP-45 Wet Storage Area. The document is dated February 21, 2018 and was received at Ohio EPA, Northeast District Office (NEDO) on February 21, 2018. This letter serves to document Ohio EPA's concurrence regarding the proposal of soil remediation to attain Unrestricted (Residential) Land Use for the RVAAP Wet Storage Area site as contained in the Final PP.

Based on the information contained in the Final PP document, other investigation documents/reports, and Ohio EPA's oversight participation during the investigation, Ohio EPA concurs with the Final PP document for the RVAAP Wet Storage Area for remedial activities. As stated in the Final PP, the Army will offer a public comment period and hold an open house/public meeting in the near future to present the conclusions and investigative findings for Wet Storage Area.

If you have any questions concerning the above, please feel free to contact Megan Oravec at (330) 963-1168.

Sincerely,

Michael Proffitt, Chief
Division of Environmental Response and Revitalization

MP/MO/nvp

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DOCUMENT DISTRIBUTION
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Portage and Trumbull Counties, Ohio

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ARNG = Army National Guard.
CO = Central Office.
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IED = Installation & Environment Division.
NEDO = Northeast District Office.
OHARNG = Ohio Army National Guard.
Ohio EPA = Ohio Environmental Protection Agency.
REIMS = Ravenna Environmental Information Management System.
SWDO = Southwest District Office.
USACE = U.S. Army Corps of Engineers.

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LIST OF ACRONYMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
Army	U.S. Department of the Army
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Chemical of Concern
COPEC	Chemical of Potential Ecological Concern

CUG	Cleanup Goal
ERA	Ecological Risk Assessment
FWCUG	Facility-wide Cleanup Goal
HHRA	Human Health Risk Assessment
HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HQ	Hazard Quotient
ISM	Incremental Sampling Method
Ohio EPA	Ohio Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbon
PBA08	2008 Performance-based Acquisition
PCB	Polychlorinated Biphenyl
PP	Proposed Plan
RAO	Remedial Action Objective
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant
SRC	Site-related Contaminant
SVOC	Semi-volatile Organic Compound
TNT	2,4,6-Trinitrotoluene
TR	Target Risk
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Proposed Plan (PP) presents the conclusions and recommendations for soil, sediment, and surface water within the Wet Storage 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, abbreviated as Camp Ravenna, and is located in Portage and Trumbull counties, Ohio (Figure 1). Wet Storage Area is designated as AOC RVAAP-45. The U.S. Department of the Army (Army), in coordination with the Ohio Environmental Protection Agency (Ohio EPA), issues this PP to provide the public with necessary information to comment on selecting an appropriate response action. The remedy will be selected for Wet Storage 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 PP.

The Army is issuing this PP 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 of 1986 and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (40 *Code of Federal Regulations* 300). Selecting and implementing a remedy will be consistent with the requirements of the Ohio EPA *Director's Final Findings and Orders*, dated June 10, 2004.

This PP summarizes information that can be found in detail in the *Remedial Investigation/Feasibility Study Report for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area* (USACE 2017) and provides a basis for revisions to the human health risk assessment (HHRA) remedial action objective (RAO). Other documents discussing Wet Storage Area are contained in the Administrative Record file. The Army's preferred alternative at Wet Storage Area is Alternative 3: Ex-situ Thermal Treatment-Attain Unrestricted (Residential) Land Use.

Public Comment Period:
June 6, 2018 to July 6, 2018

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 Report for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area* (USACE 2017). Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for 6:00PM, June 21, 2018, at the Shearer Community Center, 9355 Newton Falls Road, 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:
9AM-9PM Monday-Thursday
9AM-6PM Friday
9AM-5PM Saturday
1PM-5PM Sunday

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

Hours of operation:
9AM-8PM Monday-Thursday
9AM-5PM 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
(614) 336-6136
Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

The Army encourages the public to review the 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 facility, consisting of 21,683 acres, is federally owned and is located in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 km (3 miles) east/northeast of the city of Ravenna and approximately 1.6 km (1 mile) northwest of the city of Newton Falls (Figure 1). The facility, previously known as RVAAP, was formerly used as a load, assemble, and pack facility for munitions production. As of September 2013, administrative accountability for the entire acreage of the facility has been transferred to the U.S. Property and Fiscal Officer for Ohio and subsequently licensed to the Ohio Army National Guard for use as a military training site (Camp Ravenna). References in this document to RVAAP relate to previous activities at the facility as related to former munitions production activities or to activities being conducted under the restoration/cleanup program.

3.0 WET STORAGE AREA DESCRIPTION AND BACKGROUND

3.1 Site Description

Wet Storage Area is a 36-acre fenced AOC located directly northwest of the intersection of George Road and Newton Falls Road near the geographic center of Camp Ravenna (Figure 2). Most of the buildings at Wet Storage Area were demolished and removed in 2003 and 2004. Remaining features at Wet Storage Area include two storage igloos (WS-3 and WS-3A), access roads that enter the AOC from the south, and a fence that is not currently maintained. Small construction drainage ditches border the access roads near the igloo locations. Wet Storage Area is forested with the exception of those areas within the AOC consisting of access roads and the former and extant igloos.

Wet Storage Area is located on a topographic high relative to adjacent streams. The former operations area of the AOC is generally flat to gently sloping except for the terrain west of the razed igloos, which falls steeply toward the unnamed tributary to Sand Creek. Ground elevations within Wet Storage Area range from approximately 1,028–1,077 ft above mean sea level (Figure 3).

Surface water drainage generally follows the topography of the AOC toward the west and the north. In addition to the intermittent storm water runoff in drainage ditches, there is also perennial surface water at Wet Storage Area within the unnamed tributary on the west side of the AOC, which flows from south to north and enters into Sand Creek northwest of the AOC. Sand Creek drains to the northeast into South Fork Eagle Creek.

A wetland delineation conducted in 2006 identified 26 wetlands of varying sizes and quality (from Category 1 to Category 3) on the AOC (EnviroScience 2006). A wetland complex consisting of approximately 1.2 acres exists on the floodplain of the unnamed tributary to Sand Creek along the western edge of the AOC.

Clay to sand-rich silt tills overlie the shale bedrock at Wet Storage Area, except where disturbed by RVAAP activities. The top of bedrock (Sharon Shale Member) was encountered in soil borings drilled at Wet Storage Area at depths ranging from 11–23.3 ft below ground surface (bgs). The Sharon Sandstone Member was also encountered at 29.4 ft bgs during 2012 monitoring well installations. Groundwater was encountered from 16.18–17.31 ft bgs and groundwater elevations ranged from 1,043.33–1,042.20 ft above mean sea level, flowing north towards Sand Creek.

3.2 Background

From 1941–1945, Wet Storage Area was used to store highly explosive, shock-sensitive primary explosives, including lead azide, mercury fulminate, tetryl (USACHPPM 1998), and potentially nitroguanidine (USACE 2017). During storage activities, explosive material was containerized and covered with water within

drums that were stored separately in six storage igloos at the AOC. All six igloos were earth-covered, and the floors, walls, and ceilings were constructed of reinforced concrete. The four westernmost igloos were constructed with a conductive lead floor liner in order to dissipate static electricity. Historical drawings indicate igloo WS-3A was later used as a Command Post and as an air raid shelter. Remnant infrastructure within the eastern part of Wet Storage Area consists of refurbished and maintained igloos WS-3 and WS-3A.

There is no documentation indicating any spills occurred at the AOC. No historical information exists to indicate a fuel storage tank was present at Wet Storage Area; however, Building PS-7 was a generator house, which likely used diesel fuel. As of August 2016, Building PS-7 is not present (there is no documentation of its removal).

Four storage igloos (WS-1, WS-1A, WS-2, and WS-2A) (including slabs and foundations) were removed in 2003–2004. After demolition, the earthen mounds were re-graded to ensure positive drainage and seeded and mulched. Final site restoration operations were completed at the wet storage igloos in July 2004 (MKM 2005).

3.3 Potential Contaminants

The 1978 Installation Assessment identified the major contaminants of the former RVAAP to be 2,4,6-trinitrotoluene (TNT); composition B [a combination of TNT and hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)]; sulfates; nitrates; lead styphnate; and lead azide (USATHAMA 1978). Potential contaminants at Wet Storage Area include primary explosives [lead azide; mercury fulminate; tetryl; TNT; RDX; octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX); nitroglycerine, nitrocellulose; and nitroguanidine] and inorganic chemicals (arsenic, chromium, lead, and mercury). Other potential contaminants at Wet Storage Area include polycyclic aromatic hydrocarbons (PAHs) from Building PS-7, which served as a Generator House.

4.0 REMEDIAL INVESTIGATIONS

The AOC characteristics, nature and extent of contamination, and conceptual site model are based on investigations conducted from 1978–2011. The following environmental investigations have been conducted at Wet Storage Area:

- Installation Assessment (USATHAMA 1978);
- Relative Risk Site Evaluation (USACHPPM 1998);
- Characterization of 14 AOCs (MKM 2007);
- 2008 Performance-based Acquisition (PBA08) Remedial Investigation (RI), as summarized in the *Remedial Investigation/Feasibility Study Report for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area* (USACE 2017).

Sediment and surface water samples from Sand Creek near Wet Storage Area were collected to support the Building T-5301 Interim Removal Action and the Open Demolition Area #2 Phase II RI. These samples (5301sd-S11, DA2sd-101, DA2sd-103, and DA2sw-102) were used in evaluating the nature and extent of contamination at Wet Storage Area.

4.1 Surface and Subsurface Soil

Figure 4 shows the sample locations included in the RI. The results of the 2004 Characterization of 14 AOCs (MKM 2007) and 2010/2011 PBA08 RI (USACE 2017) were used to evaluate nature and extent of contamination, assess potential future impacts to groundwater, conduct human HHRAs and ecological risk assessments (ERAs), and evaluate the need for remedial alternatives.

Ohio EPA identifies a target risk (TR) of 1E-05 as a cancer risk for carcinogens and an acceptable hazard quotient (HQ) of 1 for non-carcinogens.

The evaluation summarized below was performed to assess which chemicals in

surface soil (0–1 ft bgs) and subsurface soil (greater than 1 ft bgs) exceeded a TR of 1E-05, HQ of 1 and establish which site-related contaminants (SRCs) were above their respective background concentrations.

- Of the metals, only arsenic had concentrations that exceeded the Resident Receptor (Adult and Child) at a TR of 1E-05, HQ of 1; however, the maximum soil concentration in the incremental sampling method (ISM) samples (21.3 mg/kg) was only slightly greater than the subsurface soil background concentration (19.8 mg/kg). The arsenic exceedance does not appear to be concentrated in any particular area of the AOC.
- Figure 5 shows locations of PAH exceedances of the Resident Receptor (Adult and Child) facility-wide cleanup goal (FWCUG) at a TR of 1E-06, HQ of 0.1.
    - Surface soil exceeded Resident Receptor FWCUGs at a TR of 1E-05, HQ of 1 at the following locations: WSA-004M, WSAsb-022, WSAsb-024, WSAsb-027, and WSAsb-028. These locations are discussed in the HHRA.
    - No semi-volatile organic compounds (SVOCs) (including PAHs) were detected in subsurface soil except benzo(a)pyrene in WSAsb-024 from 1–4 bgs at a concentration of 0.12 mg/kg, below the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1.
- No polychlorinated biphenyls (PCBs) were detected at Wet Storage Area, and all volatile organic compounds (VOCs), pesticides, explosives, and propellants were below a TR of 1E-05, HQ of 1.

4.2 Sediment and Surface Water

Surface water at Wet Storage Area is present within the unnamed tributary on the west side of the AOC, which then enters into Sand Creek to the north. Within the former operational area, surface water only occurs as stormwater runoff either overland or within discontinuous ditch lines immediately adjacent to access roads. Four surface water samples were collected during the PBA08 RI and used to evaluate nature and extent of contamination. The SRCs are discussed below.

- Manganese concentrations at WSAsd-037 (2,230 mg/kg) exceeded the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1. However, this concentration and the average of manganese concentrations in sediment (1,990 mg/kg) only slightly exceeded the background concentration for manganese (1,950 mg/kg) and is below the accepted Resident Receptor FWCUG at HQ of 1 of 2,927 mg/kg.
- Only one SVOC [benzo(a)pyrene at a concentration of 0.092 mg/kg at WSAsd-037] and one VOC (2-butanone with a concentration of 0.0021J mg/kg) were detected in sediment above the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-06, HQ of 0.1. Both concentrations were below the FWCUG at a TR of 1E-05, HQ of 1 and do not need further evaluation. SVOCs and VOCs were not detected in surface water samples.
- Explosives, propellants, pesticides, and PCBs were not detected in sediment or surface water samples at Wet Storage Area.

4.3 Impacts to Groundwater

The potential for soil and sediment contaminants to impact groundwater was evaluated in the fate and transport evaluation presented in the Wet Storage Area RI/Feasibility Study (FS) Report (USACE 2017). This evaluation included modeling and compared the model results to current groundwater monitoring data. The modeling evaluated the potential for contaminants to leach from soil and sediment and impact groundwater beneath the AOC. The modeling also evaluated if contaminants could potentially migrate from Wet Storage Area to the closest downgradient surface water features (tributary to Sand Creek).

Arsenic and naphthalene in soil were predicted to exceed the screening criteria in groundwater beneath the source area; however, none of these constituents were predicted to exceed screening criteria at the downgradient receptor location.

Manganese, benz(a)anthracene benzo(b)fluoranthene, and naphthalene in sediment were predicted to exceed the screening criteria in groundwater beneath the source area; however, none of these constituents were predicted to exceed screening criteria at the downgradient receptor location.

This qualitative assessment concluded that there were no contaminant migration chemicals of concern (COCs) present in soil and sediment that may impact the groundwater beneath the source or at the downstream receptor location. No further action is required of soil and sediment at Wet Storage Area for the protection of groundwater.

5.0 SCOPE AND ROLE OF RESPONSE ACTION

Resident Receptor (Adult and Child) FWCUGs were used to evaluate Unrestricted (Residential) Land Use, which is considered protective for all other Land Uses at Camp Ravenna (Military Training and Commercial/Industrial Land Use). The response action associated with Wet Storage Area will address CERCLA risk and contamination identified in the HHRA or ERA such that the site can attain Unrestricted (Residential) Land Use for soil, sediment, and surface water.

Groundwater will be addressed under the RVAAP Facility-wide Groundwater AOC (RVAAP-66) as a separate decision. However, the selected remedy for soil and sediment at Wet Storage Area must also be protective of groundwater.

6.0 SUMMARY OF HUMAN HEALTH AND ECOLOGICAL RISKS

6.1 Human Health Risk Assessment

Using information presented in Section 4.0, an HHRA was performed to identify COCs and provide a risk management evaluation to determine if remediation is required under CERCLA based on potential risks to human receptors.

The media of concern at Wet Storage Area are surface soil (0–1 ft bgs), subsurface soil (1–13 ft bgs), surface water, and sediment. Soil data associated with Wet Storage Area were aggregated into surface and subsurface soil.

No COCs were identified for the Resident Receptor (Adult and Child) in subsurface soil, sediment, or surface water.

Arsenic and five PAHs [benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] were identified as COCs for the Resident Receptor (Adult and Child) in surface soil.

Arsenic at WSAss-020M (21.3 mg/kg) slightly exceeded the subsurface soil background concentration (19.8 mg/kg). All other 21 ISM samples had concentrations less than the subsurface soil background concentration. Since arsenic was detected at naturally occurring concentrations at Wet Storage Area, it is not identified as a COC requiring remediation.

Benzo(a)pyrene at WSAsb-027 (0.3J mg/kg) had a slight exceedance of the Resident Receptor FWCUG (0.221 mg/kg). None of the other PAHs exceeded their respective Resident Receptor FWCUGs. As a result, the HHRA in the Wet Storage Area RI/FS Report (USACE 2017) determined this location does not require remediation. In addition, this concentration is below the June 2017 U.S. Environmental Protection Agency (USEPA) regional screening level (RSL) for benzo(a)pyrene (1.1 mg/kg).

Benzo(a)pyrene at WSAsb-022 (1.1 mg/kg) also exceeded the Resident Receptor FWCUG. None of the other PAHs exceeded their respective Resident Receptor FWCUGs. WSAsb-022 was collected from the center of a ditch adjacent to ISM sample WSAss-034M that had very low concentrations of benzo(a)pyrene (0.071 mg/kg). The HHRA in the Wet Storage Area RI/FS Report (USACE 2017) determined that this location does not require remediation. In addition, this concentration is equal to the June 2017 USEPA RSL for benzo(a)pyrene (1.1 mg/kg).

The Wet Storage Area RI/FS Report (USACE 2017) identified five PAHs [benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] as surface soil COCs to be carried forward for potential remediation at sample locations WSAss-004M, WSAsb-028, and WSAsb-024 in the area of the former igloos (WS-1 and WS-2) for Unrestricted (Residential) Land Use. However, the HHRA assessed risk using Resident Receptor FWCUGs and the June 2015 RSLs. The USEPA released updated RSLs in June 2017, after the finalization of the Wet Storage Area RI/FS Report.

Table 1 shows the PAH COC maximum concentrations in soil at Wet Storage Area compared to the Resident Receptor FWCUG, June 2015 RSLs, and June 2017 RSLs. Four of the five PAH COCs [benz(a)anthracene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene] had maximum concentrations lower than the June 2017 RSLs. Accordingly, this PP eliminates these four as COCs requiring remediation.

The one remaining surface soil COC requiring remediation at Wet Storage Area is benzo(a)pyrene. The locations to be remediated to a remedial cleanup goal (CUG) of 1.1 mg/kg for benzo(a)pyrene are the same sample locations identified in the Wet Storage Area RI/FS Report (WSAss-004M, WSAsb-028, and WSAsb-024) in the area of the former igloos (WS-1 and WS-2). Upon addressing benzo(a)pyrene at sample locations WSAss-004M, WSAsb-028, and WSAsb-024, Wet Storage Area will attain Unrestricted (Residential) Land Use. Once the site is protective for Unrestricted (Residential) Land Use, it will also be protective for Military Training Land Use and Commercial/Industrial Land Use.

6.2 Ecological Risk Assessment

The ecological habitat at Wet Storage Area consists of 36 acres of mostly shrubland and forest, and the size of the habitat is large enough to completely support cover and food for small birds and mammals that typically require approximately 1 acre (USEPA 1993).

The terrestrial vegetation provides a habitat for birds, mammals, insects, and other organisms.

A wetland delineation conducted in 2006 identified 26 wetlands of varying sizes and quality on the AOC (OHARNG 2006). Most jurisdictional wetlands are associated with drainage ditches/natural conveyances. A wetland complex consisting of approximately 1.2 acres of high quality, Category 3 wetlands exists on the floodplain of the unnamed tributary to Sand Creek within the western portion of the AOC. Perennial surface water features exist in the fenced AOC boundary in the form of the unnamed tributary to Sand Creek. Intermittent surface water also flows in small drainage ditches bordering the roads and features within the AOC.

The northern long-eared bat (*Myotis septentrionalis*; federally threatened) exists at Camp Ravenna. There are no other federally listed species or critical habitats on Camp Ravenna. Wet Storage Area has not been previously surveyed for federal or state-listed species; however, there have been no documented sightings of state-listed, federally listed, threatened, or endangered species at the AOC (OHARNG 2014).

Table 1. Maximum Soil COC Concentrations Compared to Screening Levels at HQ of 1, TR of 10-5

COC	Maximum Concentration (mg/kg)	Resident Receptor FWCUG (mg/kg)	June 2015 RSL (mg/kg)	June 2017 RSL (mg/kg)
Benz(a)anthracene	8.2	2.21	1.6	11
Benzo(a)pyrene	5.5	0.221	0.16	1.1
Benzo(b)fluoranthene	7.3	2.21	1.6	11
Dibenz(a,h)anthracene	0.94	0.221	0.16	1.1
Indeno(1,2,3-cd)pyrene	3.4	2.21	1.6	11

All maximum concentrations of the COCs are at location WSAss-004M.
Maximum concentrations highlighted in yellow exceed the June 2017 RSL.
The remedial cleanup goals are at HQ=1, TR=1E-05.
COC = Chemical of concern.
FWCUG = Facility-wide cleanup goal.
HQ = Hazard quotient.
mg/kg = Milligrams per kilogram.
RSL = Regional screening level.
TR = Target risk.

The Level I Scoping ERA presents important ecological resources on or near the AOC and evaluates whether chemical contamination is present in the environment. Ecological resources at Wet Storage Area were compared to the list of important ecological places and resources (USACE 2017). Based on the 39 criteria defining important places and resources as identified by the Army and Ohio EPA, there are important and significant ecological resources in the AOC. Specifically, wetlands and surface water (unnamed tributary to Sand Creek) are present and near contamination. The ERA incorporates available data to identify integrated chemicals of potential ecological concern (COPECs). There is chemical contamination present in surface soil. This contamination was identified using historical and PBA08 RI data. Per the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008), this ERA was continued to a Level II Screening Level ERA.

The Level II ERA evaluated soil and sediment COPECs. Seventeen integrated COPECs were identified for soil. Four integrated COPECs were identified for sediment. There are no integrated COPECs that are of ecological concern requiring remediation or further evaluation. Consequently, the Level II Screening ERA for Wet Storage Area concludes with a recommendation that no further action is necessary to be protective of important ecological receptors.

7.0 REMEDIAL INVESTIGATION CONCLUSIONS

Based on the investigation results, Wet Storage Area has been adequately characterized, and further investigation is not warranted at this AOC. The nature and extent of potentially impacted media has been sufficiently characterized, the fate and transport modeling did not identify soil contaminant migration COCs impacting groundwater, and no ecological risk was identified. However, benzo(a)pyrene is a COC at sample locations WSAss-004M, WSAsb-028, and WSAsb-024 to be carried forward for potential remediation, as presented in Figure 6.

8.0 REMEDIAL ACTION OBJECTIVE, VOLUME ESTIMATES, AND CLEANUP GOAL

As discussed in Section 6.1, benzo(a)pyrene is the only COC requiring remediation at concentrations above 1.1 mg/kg at sample locations WSAss-004M, WSAsb-028, and WSAsb-024. The following sections present the RAO, volume estimates, remedial CUG, and subsequent FS evaluation. The locations requiring remediation (sample locations WSAss-004M, WSAsb-028, and WSAsb-024) remain the same; therefore, the volumes, method of execution, cost estimate, and comparative analysis of the FS have not changed.

8.1 Remedial Action Objective

The revised RAO for Wet Storage Area is to prevent Resident Receptor exposure to surface soil (0–1 ft bgs) with a benzo(a)pyrene concentration above the remedial CUG of 1.1 mg/kg at sample locations WSAss-004M, WSAsb-028, and WSAsb-024.

8.2 Volume Estimates and Cleanup Goal

The extent and volumes of contaminated surface soil are presented on Figure 6. Soil boring WSAsb-028 was collected within the boundary of WSAss-004M. Benzo(a)pyrene was not detected in the 1–4, 4–7, or 7–13 ft bgs samples collected from WSAsb-028. Accordingly, the soil depth requiring remediation to attain Unrestricted (Residential) Land Use is limited to 0–1 ft bgs. The boundary of WSAss-004M is considered the horizontal extent of the proposed remediation area. The entire area to be remediated that includes these two sample locations is named "WSA Area 1."

Soil boring WSAsb-024 was collected within the boundary of WSAss-002M. Benzo(a)pyrene only exceeded the CUG in the 0–1 ft bgs sample. Benzo(a)pyrene was detected at a low concentration of 0.12 mg/kg in the 1–4 ft bgs sample and not detected in the 4–7 or 7–13 ft bgs samples collected from WSAsb-024. Accordingly, the soil depth requiring remediation to attain Unrestricted (Residential) Land Use is limited to 0–1 ft bgs. WSAss-002M was not analyzed for PAHs in 2004. Therefore, to be conservative, the boundary of WSAss-002M is considered the horizontal extent of the proposed remediation area. The entire area to be remediated from these two sample locations is named "WSA Area 2."

An estimated 70 yd^3 (in-situ) of surface soil (0–1 ft bgs) at WSA Area 1 and WSA Area 2 require remediation to attain the RAO. Table 2 presents the COC and remedial CUG. Figure 6 presents the estimated extent of surface soil requiring remediation.

In addition to the CUG, applicable or relevant and appropriate requirements (ARARs) were developed for evaluation in the FS.

Table 2. Remedial CUG for Wet Storage Area

COC	Remedial CUG (mg/kg)
Benzo(a)pyrene	1.1

The remedial CUG is based on the 2017 RSL at hazard quotient=1, target risk=1E-05.
COC = Chemical of concern.
CUG = Cleanup goal.
mg/kg = Milligrams per kilogram.

9.0 SUMMARY OF FEASIBILTY STUDY ALTERNATIVES

Remedial technologies and process options were screened to identify potential remedial alternatives that can achieve the RAO. These remedial alternatives are presented below.

9.1 Alternative 1: No Action

No action is required for evaluation under the National Oil and Hazardous Substances Pollution Contingency Plan and provides the baseline against which other remedial alternatives are compared. This alternative assumes all current actions (e.g., access restrictions and environmental monitoring) are discontinued and that no future actions will take place to protect human receptors or the environment. Consequently, the COC at the AOC is not removed or treated.

9.2 Alternative 2: Excavation and Off-site Disposal – Attain Unrestricted (Residential) Land Use.

Implementing surface soil removal (0–1 ft bgs) at WSA Areas 1 and 2 will attain Unrestricted (Residential) Land Use and will be protective of all potential RVAAP receptors.

Delineation/pre-excavation confirmation sampling will be conducted to confirm the limits of soil excavation. Soil samples will be analyzed for benzo(a)pyrene until the lateral and horizontal extents of

contamination are established by soil samples as having concentrations below the remedial CUG. When the delineation sampling is complete, the vertical and horizontal extents of soil removal will be defined.

Soil removal will be accomplished using conventional construction equipment such as backhoes, bulldozers, front-end loaders, and scrapers. Excavated soil will be segregated if certain areas have different soil characteristics. The soil will be hauled by truck to a licensed and permitted disposal facility. The vertical limit of the excavation is 1 ft bgs, and the horizontal limits of the excavation will be defined by the pre-excavation samples collected.

At the end of the soil excavation, confirmatory samples will not be needed, as the previously conducted delineation/pre-excavation confirmation sampling will provide the vertical and lateral boundary of the areas requiring excavation. Upon completing soil excavation, all disturbed and excavated areas will be backfilled with clean soil and graded to meet neighboring contours. The backfill soil will come from a clean source that was previously sampled and approved for use by Ohio EPA. After the area is backfilled and graded, workers will apply a seed mixture (as approved by OHARNG) and mulch.

9.3 Alternative 3: Ex-situ Thermal Treatment – Attain Unrestricted (Residential) Land Use.

Implementing ex-situ thermal treatment, such as the Vapor Energy Generation© treatment, for surface soil (0–1 ft bgs) at WSA Areas 1 and 2 will attain Unrestricted (Residential) Land Use and be protective of all potential RVAAP receptors.

Delineation/pre-excavation confirmation sampling will be conducted to confirm the limits of soil excavation. Soil samples will be analyzed for benzo(a)pyrene until the lateral and horizontal extents of contamination are established by soil samples as having concentrations below the remedial CUG. When the delineation sampling is complete, the vertical and horizontal extents of soil removal will be defined.

Once the vertical and horizontal extents are defined, soil will undergo ex-situ thermal treatment. The treatment system will be pre-heated to the optimal treatment temperature based on results of past bench- and pilot-scale tests. While the system is being heated, soil will be excavated using conventional construction equipment such as backhoes, bulldozers, front-end loaders, and scrapers and will be stockpiled immediately adjacent to the treatment system into approximately 50 yd^3 (ex-situ) piles. Once the treatment system is at the optimal treatment temperature, contaminated soil will be fed directly into the fully enclosed, preheated chamber and exposed to steam to serve as the heat source for the thermal treatment. While emissions are contained within the system, benzo(a)pyrene is removed from the soil.

Soil samples will be collected from stockpiles of treated soil. Once the laboratory analysis determines the benzo(a)pyrene concentration is below the remedial CUG, the treated soil will be placed back into the excavated area and graded to meet neighboring contours. Topsoil will be added prior to seeding and mulching.

10.0 EVALUATION OF FEASIBILITY STUDY ALTERNATIVES

A comparative analysis was performed for the three alternatives in order to provide a direct comparison to one another with respect to common criteria. Table 3 provides a comparative analysis of the alternatives conducted.

Alternative 1 was determined not to be protective of human health and is not compliant with ARARs. In addition, Alternative 1 did not meet the RAO to prevent Resident Receptor exposure to surface soil (0–1 ft bgs). Therefore, Alternative 1 was not eligible for selection.

For the remaining alternatives, the balancing criteria (i.e., long-term effectiveness and permanence; reduction of contaminant toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost) were used to select a recommended alternative among the alternatives that would satisfy the threshold criteria. The remaining alternatives were scored amongst one another for each of the balancing criteria and a total score was generated.

If an on-site thermal treatment system is available at Camp Ravenna, Alternative 3 scores the highest and is the recommended alternative. Alternative 3 is effective in the long term and will attain Unrestricted (Residential) Land Use. In addition, Alternative 3 is a green and highly sustainable alternative for on-site treatment and unrestricted reuse of soil and implements a treatment alternative to reduce the toxicity, mobility, and volume of contamination.

The selection of Alternative 3 assumes that an existing on-site thermal treatment system is at Camp Ravenna. In the event that a thermal treatment system is not available on site at Camp Ravenna, Alternative 2 would be readily available for implementation. Excavation and off-site disposal alternatives have been implemented multiple times during restoration efforts at the former RVAAP. As with Alternative 3, Alternative 2 is effective in the long term and attains Unrestricted (Residential) Land Use. Alternative 2 reduces the mobility of contaminants by placing contamination in an engineered landfill.

Table 3. Summary of Comparative Analysis of Remedial Alternatives

NCP Evaluation Criteria	Alternative 1: No Action	Alternative 2: Excavation and Off-site Disposal - Attain Unrestricted (Residential) Land Use	Alternative 3: Ex-situ Thermal Treatment - Attain Unrestricted (Residential) Land Use
Threshold Criteria	***Result***	***Result***	***Result***
1. Overall Protectiveness of Human Health and the Environment	Not protective	Protective	Protective
2. Compliance with ARARs	Not compliant	Compliant	Compliant
Balancing Criteria	***Score***	***Score***	***Score***
3. Long-term Effectiveness and Permanence	Not applicable	1	2
4. Reduction of Toxicity, Mobility, or Volume through Treatment	Not applicable	1	2
5. Short-term Effectiveness	Not applicable	1	2
6. Implementability	Not applicable	2	1
7. Cost	Not applicable ($0)	2 ($116,346)	1 ($134,587)
Balancing Criteria Score	*Not applicable*	*7*	*8*

Any alternative considered "not protective" for overall protectiveness of human health and the environment or "not compliant" for compliance with ARARs, it is not eligible for selection as the recommended alternative. Therefore, that alternative is not scored as part of the balancing criteria evaluation.

Scoring for the balancing criteria is as follows for applicable alternatives: Most favorable = 2, least favorable = 1. The alternative with the highest total balancing criteria score is considered the most feasible.

ARAR = Applicable or Relevant and Appropriate Requirement.

NCP = National Contingency Plan.

11.0 PREFERRED ALTERNATIVE

The recommended alternative for Wet Storage Area is Alternative 3: Ex-situ Thermal Treatment – Attain Unrestricted (Residential) Land Use if an on-site thermal treatment system is available at the former RVAAP. Alternative 3 meets the threshold and primary balancing criteria and is protective of the Resident Receptor by thermally treating contaminated soil. The cost of Alternative 3 is $134,587 and has no operations and maintenance costs, as implementing the alternative results in attaining Unrestricted (Residential) Land Use. In addition, Alternative 3 is a green and highly sustainable alternative for on-site treatment and unrestricted reuse of soil and implements a treatment alternative to reduce the toxicity, mobility, and volume of contamination.

In the event that a thermal treatment system is not available on site at the former RVAAP, Alternative 2 would be readily available for implementation. Excavation and off-site disposal alternatives have been implemented multiple times during restoration efforts at the former RVAAP. As with Alternative 3, Alternative 2 is effective in the long term and attains Unrestricted (Residential) Land Use.

This recommendation is not a final decision. The Army, in coordination with Ohio EPA, will select the remedy for Wet Storage Area after reviewing and considering all comments submitted during the 30-day public comment period. Comments received from the public on this PP will be considered in preparing a Record of Decision (ROD) to document the final remedy. The ROD will also include a responsiveness summary addressing comments received on the PP.

12.0 COMMUNITY PARTICIPATION

12.1 Community Participation

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

The comment period extends from June 6, 2018 to July 6, 2018. This period includes a public meeting at which the Army will present this PP and accept oral and written comments.

12.2 Public Comment Period

The 30-day comment period is from June 6, 2018 to July 6, 2018, 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 PP.

The Army and Ohio EPA will consider all public comments before selecting a remedy. During the comment period, the public is encouraged to review documents pertinent to Wet Storage 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.

12.3 Written Comments

If the public would like to comment in writing on this PP or other relevant issues, please deliver comments to the Army at the public meeting or mail written comments (postmarked no later than July 6, 2018).

POINT 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

E-mail Address:
kathryn.s.tait.nfg@mail.mil

12.4 Public Meeting

The Army will hold an open house and public meeting on this PP on June 21, 2018, at 6:00PM, in the Shearer Community Center, 9355 Newton Falls Road 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.

12.5 Army Review of Public Comments

The 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 Army's responses to comments received during the public comment period, will be included in the ROD. The Army's final choice of action will be documented in the ROD.

The ROD will be added to the RVAAP Restoration Program Administrative Record and Information Repositories.

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
(614) 336-6136
Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

INFORMATION REPOSITORIES

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

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

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282
Hours of operation:
9AM-8PM Monday-Thursday
9AM-5PM 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 the preferred alternative.

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.

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

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

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

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

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 Ravenna Army Ammunition Plant (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 signed legal record that describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, and responses to comments.

Remedial Action Objective (RAO): medium-specific goal for protecting human health and the environment that specifies contaminants, media of interest, and cleanup goals.

Remedial Investigation (RI): a 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.

Target Risk: The Ohio Environmental Protection Agency identifies 1E-05 as a target for cancer risk for carcinogens and an acceptable target hazard quotient of 1 for non-carcinogens (Ohio EPA 2009).

Unrestricted (Residential) Land Use: defined for the former RVAAP restoration that is considered protective for all three Land Uses at Camp Ravenna Joint Military Training Center. 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

EnviroScience (EnviroScience Incorporated) 2006. *Wetlands and Other Waters, Delineation Draft Report, Approximately 390 Acres at the Ravenna Training and Logistics Site, Portage County, Ohio.* Prepared for The Ohio Army National Guard. September 2006.

MKM (MKM Engineers, Inc.) 2005. *Thermal Decomposition and 5X Certification of Load Lines 6, 9 and Wet Storage Igloos 1, 1A, 2, & 2A*. December 2005.

MKM 2007. *Characterization of 14 AOCs at the Ravenna Army Ammunition Plant at Ravenna Army Ammunition Plant.* March 2007.

OHARNG (Ohio Army National Guard). 2006. *Wetlands and Other Waters Delineation Report, Approximately 390 Acres at the Ravenna Training and Logistics Site, Portage County, Ohio.*

OHARNG 2014. *Integrated Natural Resources Management Plan at the Camp Ravenna Joint Military Training Center, Portage and Trumbull Counties, Ohio.* December 2014.

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

Ohio EPA 2008. *Guidance for Conducting Ecological Risk Assessments*. Division of Emergency and Remedial Response. April 2008.

Ohio EPA 2009. *Technical Decision Compendium: Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response Program.* August 2009.

USACE (U.S. Army Corps of Engineers) 2017. *Remedial Investigation/Feasibility Study Report for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area, Former Ravenna Army Ammunition Plant Portage and Trumbull Counties, Ohio.* February 2017.

USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine) 1998. *Relative Risk Site Evaluation for Newly Added Sites at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. Hazardous and Medical Waste Study No. 37-EF-5360-99. October 1998.

USATHAMA (U.S. Army Toxic and Hazardous Materials Agency) 1978. *Installation Assessment of Ravenna Army Ammunition Plant*, Records Evaluation Report No. 132. November 1978

USEPA (U.S. Environmental Protection Agency) 1993. Wildlife Exposure Factors Handbook. Office of Research and Development, Washington, D.C., Volume 1 of 2. December 1993.

FIGURES

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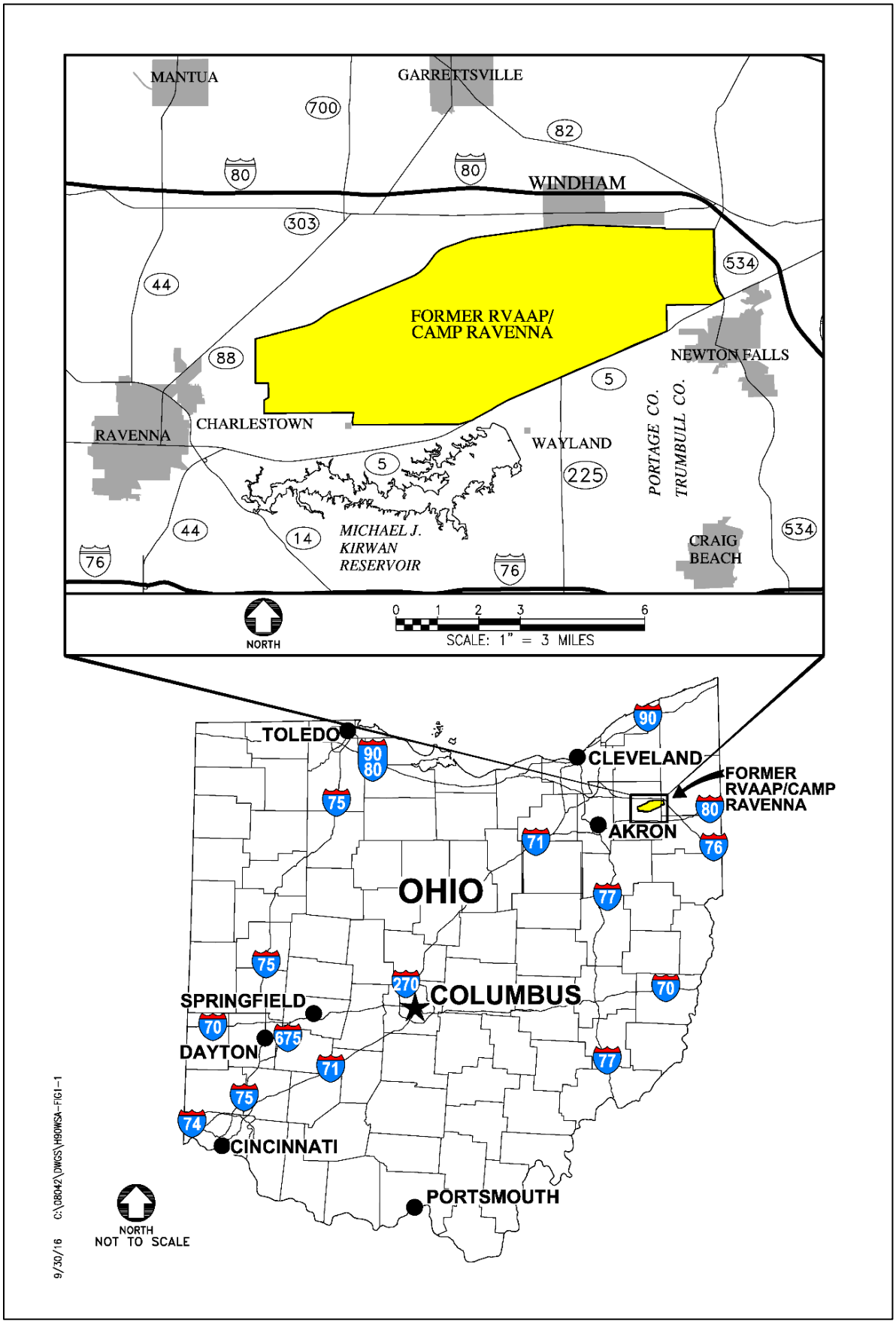


Figure 1. General Location and Orientation of Camp Ravenna

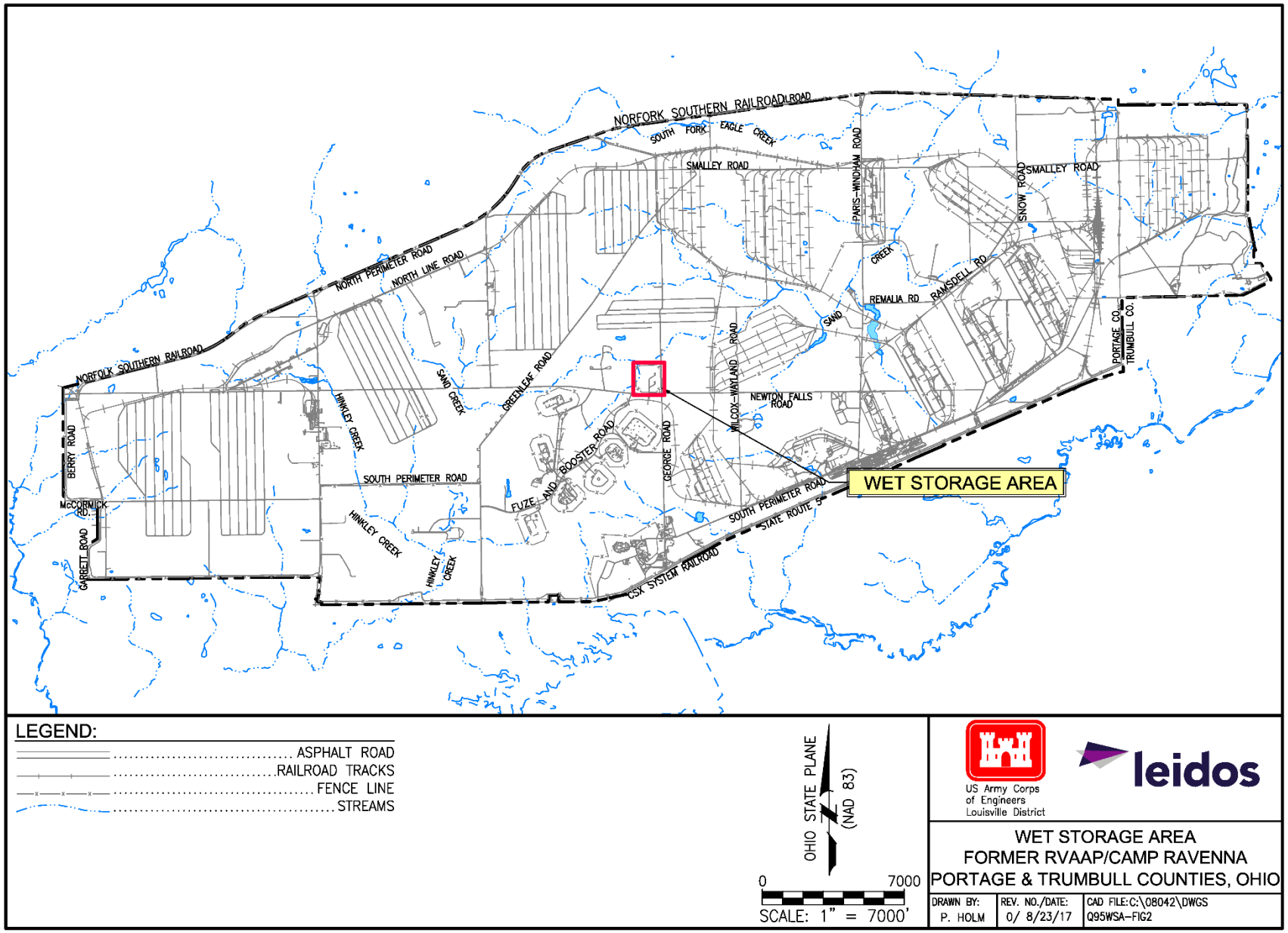


Figure 2. Location of Wet Storage Area at Camp Ravenna

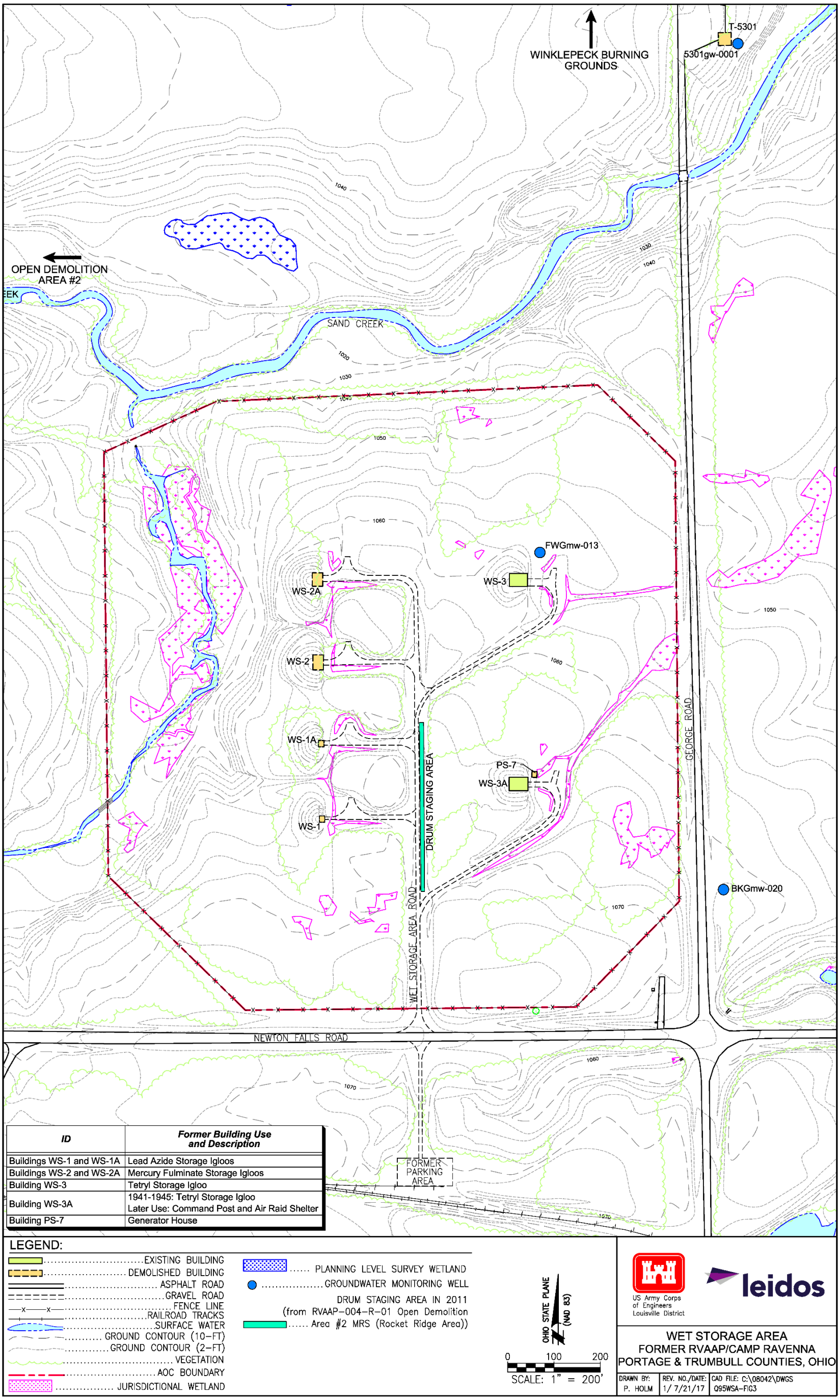
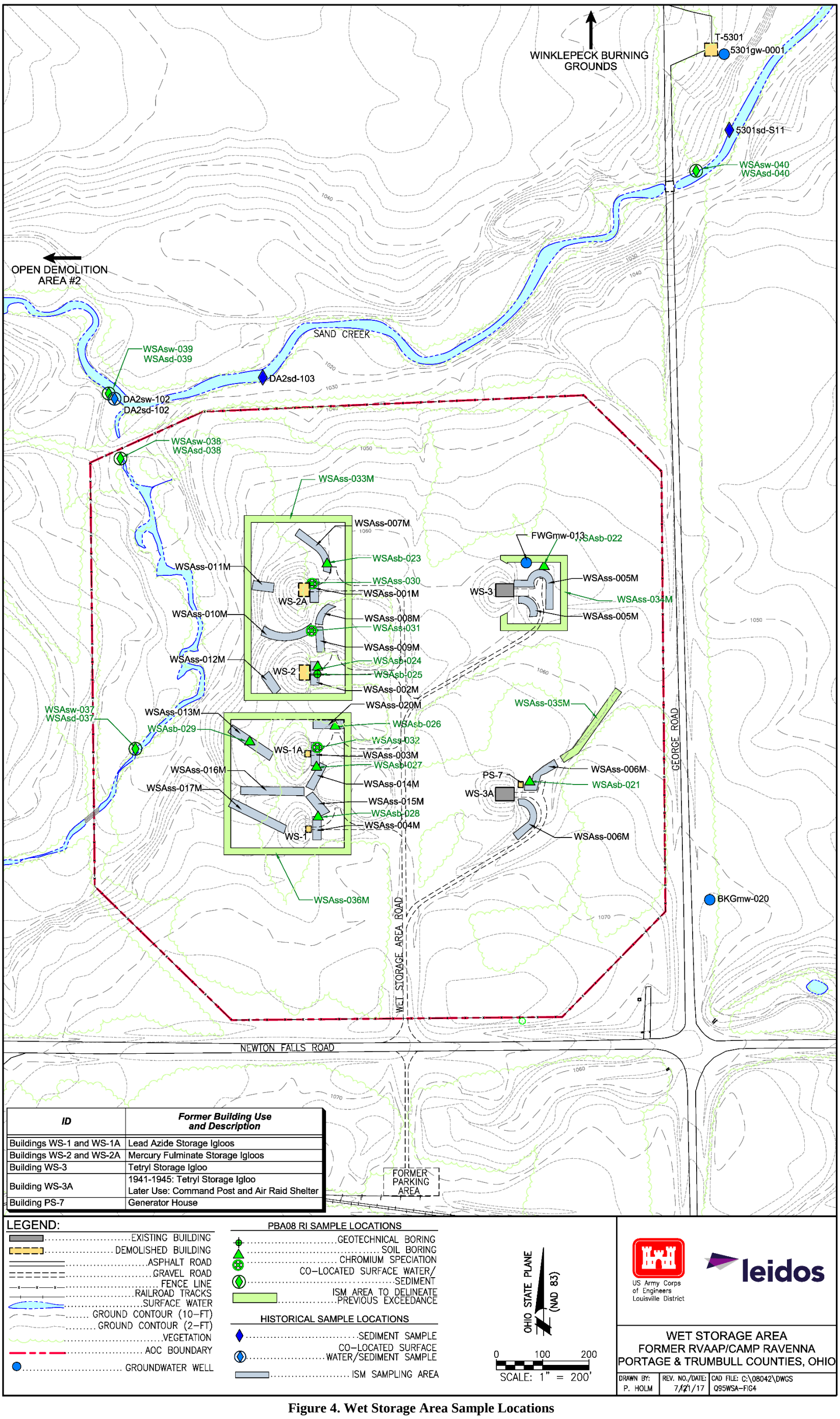


Figure 3. Wet Storage Area Site Features



ID	Former Building Use and Description
Buildings WS-1 and WS-1A	Lead Azide Storage Igloos
Buildings WS-2 and WS-2A	Mercury Fulminate Storage Igloos
Building WS-3	Tetryl Storage Igloo
Building WS-3A	1941-1945: Tetryl Storage Igloo Later Use: Command Post and Air Raid Shelter
Building PS-7	Generator House

Figure 4. Wet Storage Area Sample Locations

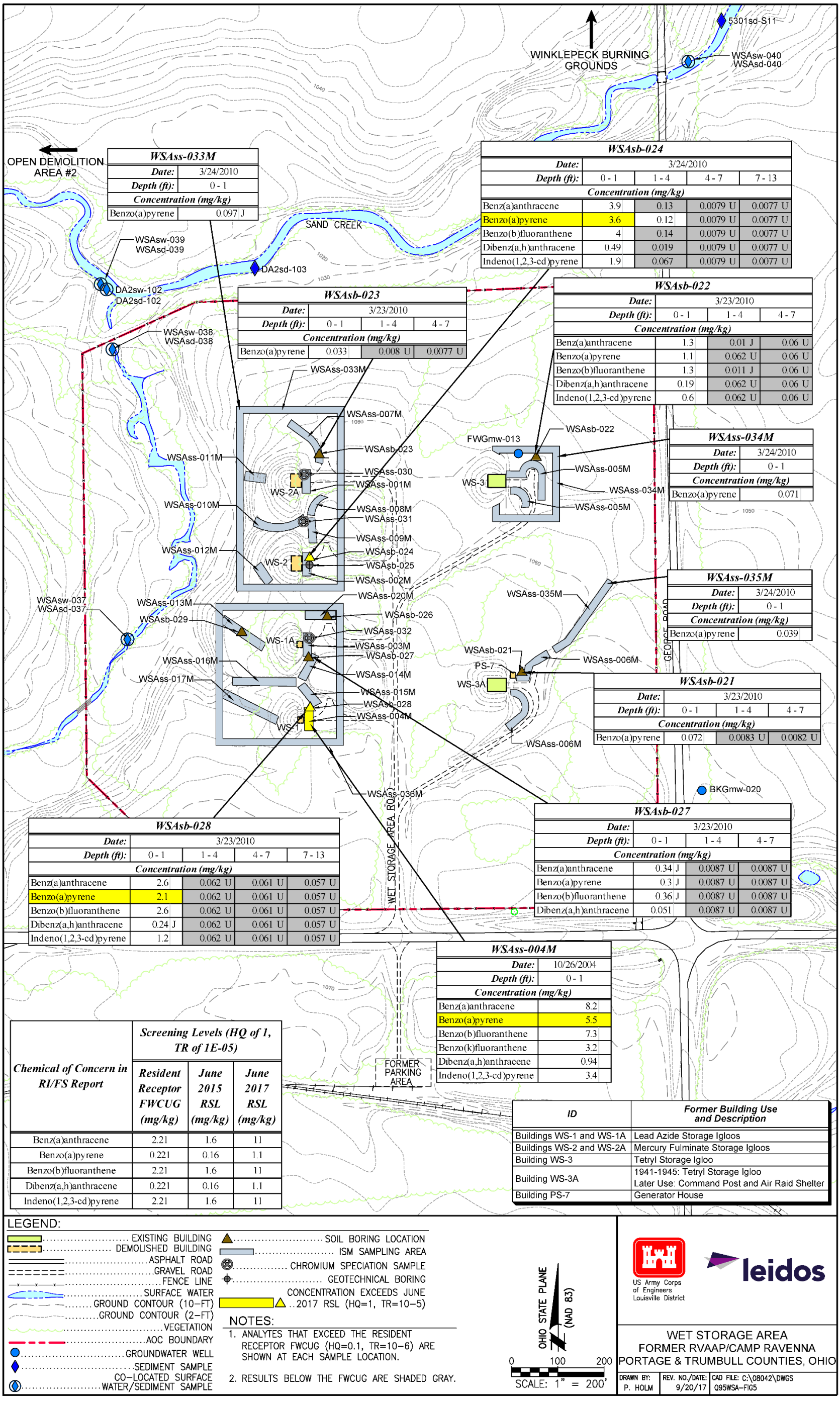
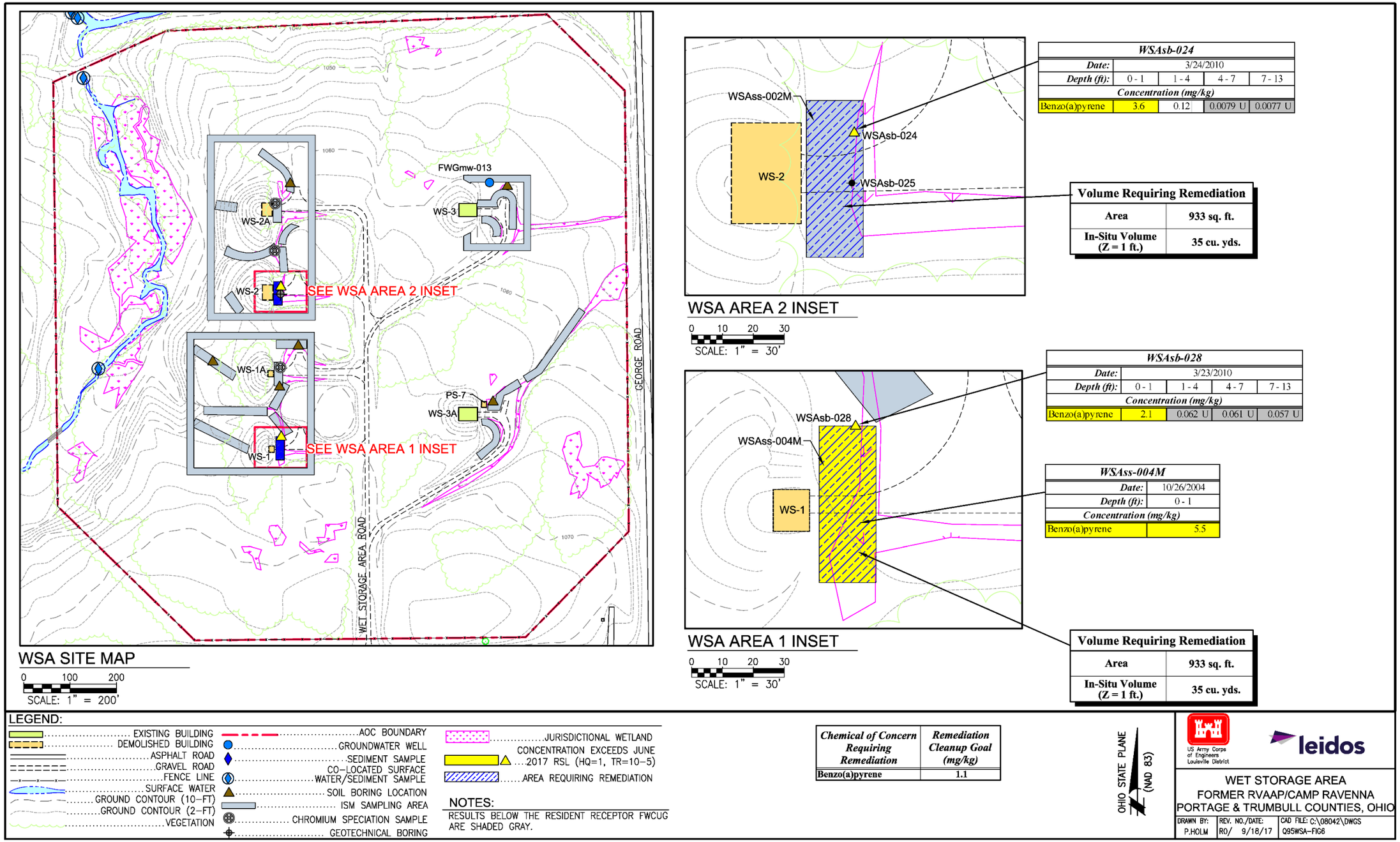


Figure 5. PAH Exceedances of Resident Receptor FWCUG (HQ of 0.1, TR of 1E-06) in Soil



WSAsb-024				
Date:	3/24/2010			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Benzo(a)pyrene	3.6	0.12	0.0079 U	0.0077 U

Volume Requiring Remediation	
Area	933 sq. ft.
In-Situ Volume (Z = 1 ft.)	35 cu. yds.

WSAsb-028				
Date:	3/23/2010			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Benzo(a)pyrene	2.1	0.062 U	0.061 U	0.057 U

WSAss-004M	
Date:	10/26/2004
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benzo(a)pyrene	5.5

Volume Requiring Remediation	
Area	933 sq. ft.
In-Situ Volume (Z = 1 ft.)	35 cu. yds.

Chemical of Concern Requiring Remediation	Remediation Cleanup Goal (mg/kg)
Benzo(a)pyrene	1.1

Figure 6. Estimated Extent of Soil Requiring Remediation

ATTACHMENT A
OHIO EPA CORRESPONDENCE

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Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

February 14, 2018

Mr. Mark Leeper
Team Lead
Cleanup/Restoration Branch
Army National Guard Directorate
111 South George Mason Drive
Arlington, VA 22204

Re: **US Army Ammunition Plt RVAAP**
Remediation Response
Project records
Remedial Response
Portage County
267000859127

Subject: **Ravenna Army Ammunition Plant, Portage/Trumbull Counties. "Response to Comments, Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45, Wet Storage Area," Dated January 3, 2018**

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Response to Comments, Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area" for the Ravenna Army Ammunition Plant (RVAAP), Portage/Trumbull Counties. This document is dated and was received at Ohio EPA, Northeast District Office (NEDO) on January 3, 2018.

The comments have been adequately addressed. As stated in the response letter, once the comments have been resolved, the final version of the Proposed Plan (PP) will be forwarded to Ohio EPA. If Ohio EPA has comments on the final version that requires revision to the PP, the Army will address the comments and submit a Revised Final version. Please forward the final version of the PP to Ohio EPA for review. If you have any questions, please call me at (330) 963-1168.

Sincerely,

Megan Oravec

Megan Oravec, Site Coordinator
Division of Environmental Response and Revitalization

MO/nvp

cc: Katie Tait/Kevin Sedlak, OHARNG RTLS
Gail Harris/Rebecca Shreffler, VISTA Sciences Corp.
Craig Coombs, USACE

ec: Mark Leeper, ARNG
Nat Peters, USACE
Bob Princic, NEDO, DERR
Rodney Beals, NEDO, DERR
Vicki Deppisch, NEDO, DERR
Tom Schneider, SWDO, DERR

NATIONAL GUARD BUREAU
111 SOUTH GEORGE MASON DRIVE
ARLINGTON VA 22204-1373

January 3, 2018

Ohio Environmental Protection Agency
DERR-NEDO
Attn: Vicki Deppisch, Hydrogeologist/Project Coordinator
2110 East Aurora Road
Twinsburg, Ohio 44087-1924

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-45 Wet Storage Area, Responses to Comments on the Draft Proposed Plan (Work Activity No. 267-000-859-127)

Dear Ms. Deppisch:

Enclosed is a response to your recent comment letter (dated December 14, 2017) on the *Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area*. Upon your concurrence of this response, the Army will revise the plan and submit a final version to Ohio EPA.

Please contact the undersigned at (703) 607-7955 or Mark.S.Leeper.civ@mail.mil if there are issues or concerns with this submission.

Sincerely,

Mark Leeper
RVAAP Restoration Program Manager
Army National Guard Directorate

ec: Rodney Beals, Ohio EPA, NEDO-DERR
Bob Princic, Ohio EPA NEDO-DERR
Tom Schneider, Ohio EPA, SWDO-DERR
Kevin Sedlak, ARNG, Camp Ravenna
Katie Tait, OHARNG, Camp Ravenna
Nathaniel Peters, USACE Louisville
Craig Coombs, USACE Louisville
Gail Harris, Vista Sciences Corporation
Jed Thomas, Leidos

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-45 Wet Storage Area (Work Activity No. 267-000-859-127)

RESPONSES TO OHIO EPA COMMENT DATED 14 DECEMBER 2017

Ohio EPA Comment:
Please provide a weight of evidence demonstration for the elimination of benzo(a)pyrene at locations WSAsb-022 and WSAsb-027, as was discussed in the previous comment letters.

Army Response:
Agree. The discussion of benzo(a)pyrene at locations WSAsb-022 and WSAsb-027 has been enhanced in the Proposed Plan, as presented below.

The surface and subsurface soil summary presented on Page 4, lines 31-45 has been revised as follows:

- Surface soil exceeded Resident Receptor FWCUGs at a TR of 1E-05, HQ of 1 at the following locations: WSA-004M, WSAsb-022, WSAsb-024, WSAsb-027, and WSAsb-028. These locations are discussed in the HHRA. ~~Benzo(a)pyrene at locations WSAsb-022 and WSAsb-027 only slightly exceeded the Resident Receptor FWCUG; therefore, these two locations did not require further evaluation. The other three locations (WSA-004M, WSAsb-024, and WSAsb-028) required further evaluation in the HHRA.~~

The following addition is made to Section 6.1 Human Health Risk Assessment at the top of Page 6:

"…concentrations at Wet Storage Area, it is not identified as a COC requiring remediation.

Benzo(a)pyrene at WSAsb-027 (0.3J mg/kg) had a slight exceedance of the Resident Receptor FWCUG (0.221 mg/kg). None of the other PAHs exceeded their respective Resident Receptor FWCUGs. As a result, the HHRA in the Wet Storage Area RI/FS Report (USACE 2017) determined this location does not require remediation. In addition, this concentration is below the June 2017 U.S. Environmental Protection Agency (USEPA) regional screening level (RSL) for benzo(a)pyrene (1.1 mg/kg).

Benzo(a)pyrene at WSAsb-022 (1.1 mg/kg) also exceeded of the Resident Receptor FWCUG. None of the other PAHs exceeded their respective Resident Receptor FWCUGs. WSAsb-022 was collected from the center of a ditch adjacent to ISM sample WSAss-034M that had very low concentrations of benzo(a)pyrene (0.071 mg/kg). The HHRA in the Wet Storage Area RI/FS Report (USACE 2017) determined that this location does not require remediation. In addition, this concentration is equal to the June 2017 USEPA RSL for benzo(a)pyrene (1.1 mg/kg).

The Wet Storage Area RI/FS Report (USACE 2017)…"

Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

December 14, 2017

Mr. Mark Leeper
Team Lead
Cleanup/Restoration Branch
Army National Guard Directorate
111 South George Mason Drive
Arlington, VA 22204

Re: **US Army Ammunition PLT RVAAP**
Remediation Response
Project Records
Remedial Response
Portage County
267000859127

Subject: **Ravenna Army Ammunition Plant, Portage/Trumbull Counties. "Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45, Wet Storage Area," Dated November 30, 2017**

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-45 Wet Storage Area" for the Ravenna Army Ammunition Plant (RVAAP), Portage/Trumbull Counties. This document is dated and was received at Ohio EPA, Northeast District Office (NEDO) on November 30, 2017.

Ohio EPA has one comment. Please provide a weight of evidence demonstration for the elimination of benzo(a)pyrene at locations WSAsb-022 and WSAsb-027, as was discussed in the previous comment letters.

If you have any questions, please call me at (330) 963-1207.

Sincerely,

Vicki Deppisch
Hydrogeologist/Project Coordinator
Division of Environmental Response and Revitalization

VD/nvp

cc: Katie Tait, OHARNG RTLS
Gail Harris, VISTA Sciences Corp.
Craig Coombs, USACE
Kevin Sedlak, OHARNG RTLS
Rebecca Shreffler, VISTA Sciences Corp.

ec: Bob Princic, Ohio EPA, NEDO DERR
Rodney Beals, Ohio EPA, NEDO, DERR
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Mark Leeper, ARNG
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