

Final

**Proposed Plan
for Soil, Sediment, and Surface Water
at RVAAP-40 Load Line 7**

**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:



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8866 Commons Boulevard, Suite 201
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March 22, 2017

REPORT DOCUMENTATION PAGE

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14. ABSTRACT
This Proposed Plan for Load Line 7 presents to the public the physical characteristics, geology, and hydrogeology of Load Line 7. 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 are chemicals of concern (COCs) that pose unacceptable risk. Therefore, this plan presents Alternative 4: 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.

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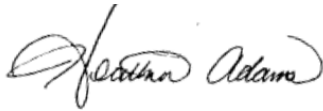
Leidos has completed the Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-40 Load Line 7 at the Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk 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.



Craig Hebert, P.G.
Study/Design Team Leader

3/22/2017

Date



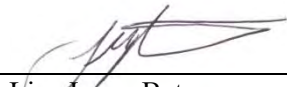
Heather Adams, P.G.
Independent Technical Review Team Leader

3/22/2017

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.



Lisa Jones-Bateman
Senior Program Manager

3/22/2017

Date

PLACEHOLDER FOR:

**Documentation of Ohio EPA Concurrence of
Final Document**

(Documentation to be provided once concurrence is issued.)

Final

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Portage and Trumbull Counties, Ohio

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ARNG = Army National Guard.
CO = Central Office.
DERR = Division of Environmental Response and Revitalization.
IED = Installation and 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 ATTACHMENTS

Attachment 1.	Ohio EPA Comments and Responses
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LIST OF ACRONYMS

amsl	Above Mean Sea Level
AOC	Area of Concern
ARAR	Applicable and Relevant or Appropriate Requirement
Army	U.S. Department of the Army
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMCOC	Contaminant Migration Chemical of Concern
COC	Chemical of Concern
CUG	Cleanup Goal
ERA	Ecological Risk Assessment
FS	Feasibility Study
FWCUG	Facility-wide Cleanup Goal
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient

LUC	Land Use Control
Ohio EPA	Ohio Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbon
PBA08	2008 Performance-based Acquisition
PP	Proposed Plan
RAO	Remedial Action Objective
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RI	Remedial Investigation
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
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 Load Line 7 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). Load Line 7 is designated as AOC RVAAP-40. 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 Load Line 7 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-40 Load Line 7* (USACE 2016) and other documents contained in the Administrative Record file for Load Line 7. The Army's preferred alternative at Load Line 7 is Alternative 4: Ex-situ Thermal Treatment-Attain Unrestricted (Residential) Land Use. The Army encourages the public to review the background documents to gain a more

Public Comment Period:

Month DD, YYYY to Month DD, YYYY

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-40 Load Line 7* (USACE 2016). Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for PM, Month DD, YYYY, 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:

10AM-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
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

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 LOAD LINE 7 DESCRIPTION AND BACKGROUND

3.1 Site Description

Load Line 7, formerly known as Booster Line #1, is a 37-acre fenced AOC located on the west side of Fuze and Booster Spur Road, south of Load Line 11, and northeast of Water Works #4 in the south-central portion of Camp Ravenna (Figure 2). Remaining features at Load Line 7 include a one-lane asphalt perimeter road that enters the AOC from the south and runs along the east and north sides of the locations of the former production buildings. The buildings at Load Line 7 were demolished and removed in 2006. Three access roads lead from the perimeter road to the western production areas. The Load Line 7 perimeter fence is still in place, but it is not currently maintained. Small construction drainage ditches border the access road. Load Line 7 is currently overgrown with grass, trees, and scrub vegetation

Topographic relief at the AOC is moderate, with a topographic high on the western boundary of the AOC that slopes downward to the topographic low in the northeastern boundary of the AOC. Ground elevations within Load Line 7 range from approximately 1,110–1,146 ft above mean sea level (amsl) (Figure 3).

Surface water drainage generally follows the topography of Load Line 7 and drains toward the east. However, surface water at Load Line 7 occurs intermittently as storm water runoff within constructed or natural drainage ditches or conveyances throughout the AOC. These ditches contain water for short periods only during precipitation or periods of snow melt. The ditches ultimately flow towards Sand Creek, which is located 1,775 ft east of the AOC.

There are no wetlands present within the Load Line 7 AOC; however, a planning-level survey has identified five wetland areas within 400 ft of the AOC boundary.

Silty clay tills with trace gravel followed by fine-grained sand overlie the sandstone bedrock at Load Line 7, except where disturbed by RVAAP activities. The top of bedrock (Homewood sandstone) was encountered in soil borings drilled at Load Line 7 at depths ranging from 3.5–13 ft below ground surface (bgs). Groundwater was encountered from 11–19 ft bgs and groundwater elevations ranged from 1,108.36–1,113.39 ft amsl, flowing east towards Sand Creek. The average hydraulic gradient at the AOC is 0.00834 ft/ft.

3.2 Background

From 1941–1945, Load Line 7 and Load Line 8 operated at full capacity to produce booster charges for artillery projectiles. The Installation Assessment (USATHAMA 1978) indicated 44,297,485 miscellaneous boosters were produced. At the end of World War II, Load Line 7 was deactivated, and the process equipment was removed.

In 1968, Load Line 7 was modified to produce M-406 High Explosive and M-407A1 practice 40mm projectiles. Load Line 7 was reactivated from 1969–1970. During this time, 16,000,000 40mm projectiles were assembled and produced at Load Line 7.

In 1970, Load Line 7 was again deactivated, and the process equipment was removed. No historical information exists to indicate Load Line 7 was used for any other processes other than what is presented above.

All buildings and structures have been demolished, and building slabs and footers have been removed. Soil near former production buildings was extensively disturbed during building demolition activities. The work areas were re-graded, cavities were filled with approved fill dirt as needed, and the area was vegetated in 2007 (USACE 2016).

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 Load Line 7 include explosives and inorganic chemicals (e.g., metals). Other potential contaminants at Load Line 7 include volatile organic compounds from former Building 1B-22 that was utilized for solvent storage, polychlorinated biphenyls from on-site transformers, and polycyclic aromatic hydrocarbons (PAHs) from former Buildings 1B-23 and 1B-24 that were used as heater houses. There is no evidence that bulk handling of the primary explosives took place within the boundaries of Load Line 7.

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 Load Line 7:

- Installation Assessment (USATHAMA 1978);
- Resource Conservation and Recovery Act Facility Assessment (Jacobs 1989);
- Preliminary Assessment (USACE 1996);
- Relative Risk Site Evaluation (USACHPPM 1998);
- Characterization of 14 AOCs (MKM 2007);
- Investigation of the Under Slab Surface Soil (USACE 2009); and
- 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-40 Load Line 7* (USACE 2016).

4.1 Surface and Subsurface Soil

In surface soil (0–1 ft bgs) and subsurface soil (greater than 1 ft bgs), the prevalent site-related contaminants and chemicals of potential concern were identified as discussed below.

Figure 4 shows the sample locations included in the RI. The results of the 2004 Characterization of 14 AOCs (MKM 2007), 2007 Investigation of the Under Slab Surface Soil (USACE 2009), and 2010 and 2011 PBA08 RI (USACE 2016) were used to evaluate nature and extent of contamination, assess potential future impacts to groundwater, conduct human health risk assessments (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 exceeded a TR of 1E-05, HQ of 1, and to establish which chemicals were above their respective background concentrations.

- All explosive, propellant, volatile organic compound, polychlorinated biphenyl, and pesticide concentrations were below a TR of 1E-05, HQ of 1.
- PAHs were the only semi-volatile organic compounds found to exceed a TR of 1E-05, HQ of 1. Five surface soil locations (LL7ss-005M, LL7ss-013M, LL7ss-043M, LL7ss-073M, and LL7ss-074M) had PAH concentrations above the Resident Receptor (Adult and Child) facility-wide cleanup goal (FWCUG) at a TR of 1E-05, HQ of 1 during the 2004, 2007, and 2010 sampling events.
 - At four of these locations (LL7ss-005M, LL7ss-043M, LL7ss-073M, and LL7ss-074M), benzo(a)pyrene was the only compound that exceeded the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1 (0.221 mg/kg) with a maximum concentration of 0.48 mg/kg. These sample locations did not require further evaluation due to the low concentrations and the fact that these samples were collected adjacent to asphalt and slag/gravel roads where parking was common.
 - Soil sample location LL7ss-013M was further evaluated and recommended for remediation, as discussed in Section 6.1.
- Two subsurface soil locations (LL7sb-061 and LL7sb-069) had PAH concentrations above the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1 during the 2010 sampling event in the 1–4 ft bgs layer. The maximum benzo(a)pyrene concentration was 2 mg/kg at LL7sb-061. However, soil borings had benzo(a)pyrene concentrations below the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1 in the upper interval (0–1 ft bgs) and lower interval (4–7 ft bgs). In addition, the elevated PAH

concentrations are most likely from debris, given that the samples contained brick, wood, trace slag, and gravel. This suggests debris from building demolition may have gotten into the 1–4 ft bgs interval. The exposure point concentrations for most of the PAHs are below the Resident Receptor FWCUG (Adult and Child), and PAHs at these locations were determined not to require remediation to address risk.

- Arsenic and manganese were the only metals that had concentrations that exceeded a TR of 1E-05, HQ of 1 and background concentrations. However, arsenic was not identified as a chemical of concern (COC) in the HHRA based on the one surface soil exceedance with a concentration of 16 mg/kg only being slightly above the established background concentration (15.4 mg/kg). Two subsurface exceedances had maximum subsurface soil concentrations of 27 mg/kg only slightly above the established background concentration (19.8 mg/kg). Additionally, manganese was only detected above its background concentration once at 1,600 mg/kg, which is only slightly above the established background concentration (1,450 mg/kg). Therefore, manganese was not identified as a COC in the HHRA.

4.2 Sediment and Surface Water

Sediment and surface water were not evaluated during the RI at Load Line 7, as surface water is not a permanent feature at the AOC.

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 Load Line 7 RI Report (USACE 2016). 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 Load Line 7 to the closest downgradient surface water features (tributary to Sand Creek).

Modeling results indicated that one inorganic chemical, one semi-volatile organic compound, and five explosives in soil were contaminant migration chemicals of concern (CMCOCs). Four CMCOCs (silver, TNT, 3-nitrotoluene, and naphthalene) could potentially leach from soil or sediment and mix with groundwater beneath Load Line 7, resulting in concentrations above maximum contaminant levels, U.S. Environmental Protection Agency regional screening levels, and RVAAP groundwater FWCUGs. The results also indicated that three CMCOCs (2,6-dinitrotoluene; nitroglycerin; and RDX) could potentially exceed screening criteria at the downgradient receptor location.

Evaluation of modeling results with respect to current AOC groundwater data and model limitations indicates that identified soil site-related contaminants are not currently impacting groundwater beneath the source areas or the downgradient receptor, and that predicted future impacts would be mitigated by factors such as chemical and biological degradation and lateral dispersivity. Based on the fate and transport evaluation, no soil or sediment CMCOCs were identified as impacting groundwater or the downgradient receptor. Groundwater will be further evaluated under the Facility-wide Groundwater Monitoring Program.

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). Additional human health receptors associated with Camp Ravenna are the National Guard Trainee and Industrial Receptor. The response action evaluated alternatives to 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 at Load Line 7 must also be protective of groundwater.

6.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

6.1 Human Health Risk Assessment

Using information presented in Section 5.0, 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 evaluated in the HHRA for the Resident Receptor (Adult and Child) were surface soil (0–1 ft bgs) and subsurface soil (1–13 ft bgs).

The HHRA identified four PAHs in surface soil (0–1 ft bgs): benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene. As shown on Figure 5, locations LL7ss-005M, LL7ss-013M, LL7ss-043M, LLss-073M, and LL7ss-074M had an exceedance of at least one Resident Receptor FWCUG in surface soil.

Sample locations LL7ss-005M, LL7ss-043M, and LLss-073M are small (less than 0.15 acres) samples located adjacent to asphalt and slag/gravel roads and have benzo(a)pyrene concentrations only slightly above the Resident Receptor (Adult and Child) FWCUG of 0.221 mg/kg (i.e., ranging from 0.3–0.48 mg/kg). These locations are not recommended for further evaluation or remediation.

The areas associated with sample locations LL7ss-013M and LL7ss-074M were re-evaluated as part of the 2011 PBA08 RI using a subset of six incremental sampling methodology samples ranging in size from 0.02–0.11 acres to further refine the area of

contamination. These six locations and the COC concentrations are presented in Figure 6. This sampling effort resulted in the following:

- Sample location LL7ss-096M had only one exceedance of benzo(a)pyrene (1.3 mg/kg) which was attributed to the adjacent asphalt driveway.
- Sample location LL7ss-097M exceeded the benzo(a)pyrene Resident Receptor FWCUG at a concentration of 1.4 mg/kg and the dibenzo(a,h)anthracene Resident Receptor FWCUG at a concentration of 0.23 mg/kg.
- Sample location LL7ss-098M exceeded the benzo(a)pyrene Resident Receptor FWCUG at a concentration of 0.47 mg/kg.
- Sample location LL7ss-101M only slightly exceeded the benzo(a)pyrene Resident Receptor FWCUG (0.221 mg/kg) at a concentration of 0.28 mg/kg.
- Sample locations LL7ss-099M and LL7ss-100M did not have any PAH exceedances of the Resident Receptor FWCUG.

Using the information collected from this 2011 sampling event, the HHRA recommended benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in surface soil (0–1 ft bgs) at LL7ss-097M and LL7ss-098M be evaluated for potential remediation in a Feasibility Study (FS). These locations are depicted on Figure 7.

Because unacceptable risk was identified for the Resident Receptor, the HHRA also evaluated risk to the National Guard Trainee and/or Industrial Receptor. The HHRA concluded that there was no unacceptable risk to these receptors in surface or subsurface soil.

6.2 Ecological Risk Assessment

The ecological habitat at Load Line 7 consists of 36.7 acres of herbaceous field (grasses) surrounded by dry shrubland to the west, north, and east and further surrounded by red maple forest to the west and north. A seasonally flooded pin-oak/swamp white oak forest

alliance within the eastern boundary of Load Line 7 is limited in extent. There is no aquatic habitat; intermittent surface water flows in small drainage ditches bordering the roads and features within the AOC. The terrestrial vegetation provides a habitat for birds, mammals, insects, and other organisms. 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. Load Line 7 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).

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 Load Line 7 were compared to the list of important ecological places and resources (USACE 2016). Based on the 39 criteria defining important places and resources as identified by the Army and Ohio EPA, no important ecological resources were identified at Load Line 7. The ERA incorporates available data to identify integrated chemicals of potential ecological concern (COPECs). There is chemical contamination present in soil. This contamination was identified using historical and PBA08 RI data.

The Level I ERA concluded that there are no important ecological resources present near contamination at Load Line 7. Per the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008), the ERA can be completed. No further action is recommended to be protective from an ecological perspective at Load Line 7.

7.0 REMEDIAL INVESTIGATION CONCLUSIONS

Based on the investigation results, Load Line 7 has been adequately characterized and the nature and extent of the contamination has

been defined. The fate and transport assessment concluded that chemicals in soil are not adversely impacting groundwater quality and are not predicted to have future impacts. The ERA concluded that there are no important or ecologically significant resources at the AOC; consequently, no further action is recommended from the ecological risk perspective.

The HHRA identified the PAHs benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene as surface soil COCs for potential remediation near soil sample locations LL7ss-097M and LL7ss-098M, in the area of the former tetryl pellet manufacturing and storage building (1B-4). As a result, an FS was developed to establish remedial alternatives to address these COCs.

8.0 REMEDIAL ACTION OBJECTIVE

The remedial action objective (RAO) for Load Line 7 is to prevent Resident Receptor exposure to surface soil (0–1 ft bgs) with concentrations of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene above cleanup goals (CUGs) at sample locations LL7ss-097M and LL7ss-098M. An estimated 290 yd³ of surface soil (0–1 ft bgs) at sample locations LL7ss-097M and LL7ss-098M requires remediation to attain this RAO. Table 1 presents COCs and CUGs. Figure 7 presents the estimated extent of surface soil requiring remediation. The purpose of the FS discussed below was to evaluate and select an alternative that best achieves the RAO.

In addition to the RAO CUGs, applicable and relevant or appropriate requirements (ARARs) were developed to be applied during the evaluation of FS alternatives.

Table 1. Cleanup Goals for Load Line 7

Chemical of Concern	Cleanup Goal (mg/kg)
	Resident Receptor
Benz(a)anthracene	2.21
Benzo(a)pyrene	0.221
Benzo(b)fluoranthene	2.21
Dibenz(a,h)anthracene	0.221

The Resident Receptor and National Guard Trainee cleanup goals are the facility-wide cleanup goals at hazard quotient=1, target risk=1E-05.

The Industrial Receptor cleanup goal is the industrial regional screening level.

mg/kg = Milligrams per kilogram.

9.0 SUMMARY OF FEASIBILITY 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, COCs at the AOC are not removed or treated.

9.2 Alternative 2: Land Use Controls

This alternative will rely on land use controls (LUCs) to limit access to the AOC and will prevent the Resident Receptor's exposure to surface soil (0–1 ft bgs) at sample locations LL7ss-097M and LL7ss-098M, as they contain COC concentrations that prevent Unrestricted (Residential) Land Use. It will be the Army's responsibility to implement, inspect, maintain and enforce LUCs at the former RVAAP.

9.3 Alternative 3: Excavation and Offsite Disposal – Attain Unrestricted (Residential) Land Use

This alternative involves removing surface soil (0–1 ft bgs) to achieve CUGs for the Resident Receptor COCs at sample locations LL7ss-097M and LL7ss-098M. The estimated 290 yd³ of soil would require removal and disposal under this alternative. Excavations would be backfilled with approved, clean soil from a local commercial supplier. Disturbed areas would be restored to grade and re-vegetated using an Ohio Army National Guard-approved seed mixture and mulched. No LUCs or five-year reviews pursuant to CERCLA would be required because this alternative attains a level of protection for Unrestricted (Residential) Land Use at the AOC.

9.4 Alternative 4: Ex-situ Thermal Treatment - Attain Unrestricted (Residential) Land Use

This alternative involves thermally treating the contaminated surface soil to achieve CUGs for the Resident Receptor COCs at sample locations LL7ss-097M and LL7ss-098M. The estimated 290 yd³ of soil would be excavated and placed into a thermal treatment system to remove COCs from soil. Once the treated soil is sampled and confirmed to be below CUGs, the treated soil will be placed back into the excavated area. Disturbed areas will be graded and re-vegetated using an OHARNG-approved seed mixture and mulched. No LUCs or five-year reviews pursuant to CERCLA would be required because this alternative attains a level of protection for Unrestricted (Residential) Land Use at the AOC.

10.0 EVALUATION OF FEASIBILITY STUDY ALTERNATIVES

A comparative analysis was performed for three of the four alternatives in order to provide a direct comparison to one another with respect to common criteria. Table 2 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., short- and long-term effectiveness; reduction of contaminant toxicity, mobility, or volume through treatment; ease of implementation; 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 (Table 2).

Although Alternative 2 scored well on many of the balancing criteria, the long-term effectiveness criterion scores poorly compared to the other two alternatives, as Resident Receptor COCs will remain in soil. Since the score indicates that Alternative 2 is not the most feasible alternative and the Army has a desire to minimize long-term environmental liability (and associated operations and maintenance costs) and attain Unrestricted (Residential) Land Use, Alternative 2 was eliminated from contention.

Table 2. Summary of Comparative Analysis of Remedial Alternatives

NCP Evaluation Criteria	Alternative 1: No Action	Alternative 2: Land Use Controls	Alternative 3: Excavation and Off-site Disposal - Attain Unrestricted (Residential) Land Use	Alternative 4: Ex-situ Thermal Treatment - Attain Unrestricted (Residential) Land Use
Threshold Criteria	Result	Result	Result	Result
1. Overall Protectiveness of Human Health and the Environment	Not protective	Protective	Protective	Protective
2. Compliance with ARARs	Not compliant	Compliant	Compliant	Compliant
Balancing Criteria	Score	Score	Score	Score
3. Long-term Effectiveness and Permanence	Not applicable	1	2	3
4. Reduction of Toxicity, Mobility, or Volume through Treatment	Not applicable	1	2	3
5. Short-term Effectiveness	Not applicable	3	1	2
6. Implementability	Not applicable	2	1	3
7. Cost	Not applicable (\$0)	3 (\$100,711)	1 (\$163,794)	2 (\$145,188)
Balancing Criteria Score	<i>Not applicable</i>	<i>10</i>	<i>7</i>	<i>13</i>

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: Most favorable = 3, second most favorable = 2, least favorable = 1. The alternative with the highest total balancing criteria score is considered the most feasible.

ARAR = Applicable and Relevant or Appropriate Requirement.

NCP = National Contingency Plan.

11.0 PREFERRED FEASIBILITY STUDY ALTERNATIVE

The recommended alternative for Load Line 7 is Alternative 4: Ex-situ Thermal Treatment – Attain Unrestricted (Residential) Land Use if an on-site thermal treatment system is available at the former RVAAP. Alternative 4 meets the threshold and primary balancing criteria and is protective of the Resident Receptor by thermally treating contaminated soil. The cost of Alternative 4 is \$145,188 and has no operations and maintenance costs, as implementing the alternative results in attaining Unrestricted (Residential) Land Use. In addition, Alternative 4 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 3 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 4, Alternative 3 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 Load Line 7 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 Month DD, YYYY to Month DD, YYYY. 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 Month DD, YYYY to Month DD, YYYY, 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 Load Line 7.

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 Month DD, YYYY).

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 Month DD, YYYY, at ___ PM, 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
(330) 872-8003

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:

10AM-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.

Contaminant Migration Chemical of Concern (CMCOC): a chemical substance specific to an area of concern (AOC) 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 AOC 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 AOC 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 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.

Exposure Point Concentration (EPC): in accordance with the *RVAAP Facility-wide Human Health Risk Assessors Manual – Amendment 1* (USACE 2005), the EPC is the calculated 95% upper confidence limit of the mean concentration of a chemical or the maximum detected concentration of a chemical, whichever value is lowest.

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.

Sum-of-Ratio (SOR): to adjust for multiple chemicals, divide the standard for each COC by the number of COCs. The adjusted value can then be compared to the single chemical value, and each ratio summed. If the summed

ratios are less than one, the applicable standards are met. If summed ratios exceed one, the applicable standards are not met.

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

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

Jacobs (Jacobs Engineering Group, Inc.) 1989. *RCRA Facility Assessment, Preliminary Review/Visual Site Inspection Ravenna Army Ammunition Plant Ravenna, Ohio*. October 1989.

MKM (MKM Engineers, Inc.) 2007. *Characterization of 14 AOCs at the Ravenna Army Ammunition Plant at Ravenna Army Ammunition Plant*. March 2007.

OHARNG (Ohio Army National Guard) 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) 1996. *Preliminary Assessment for the Characterization of Areas of Contamination at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. February 1996.

USACE 2005. *RVAAP Facility-wide Human Health Risk Assessors Manual – Amendment 1*. December 2005.

USACE 2009. *Final Investigation of the Under Slab Surface Soils Post Slab and Foundation Removal at RVAAP-39 Load Line 5, RVAAP-40 Load Line 7, RVAAP-41 Load Line -LL 8, and RVAAP-43 Load Line 10 at Ravenna Army Ammunition Plant, Ravenna, Ohio*. January 2009.

USACE 2016. *Remedial Investigation/Feasibility Study Report for Soil, Sediment, and Surface Water at RVAAP-40 Load Line 7, Former Ravenna Army Ammunition Plant Portage and Trumbull Counties, Ohio*. July 2016.

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.

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FIGURES

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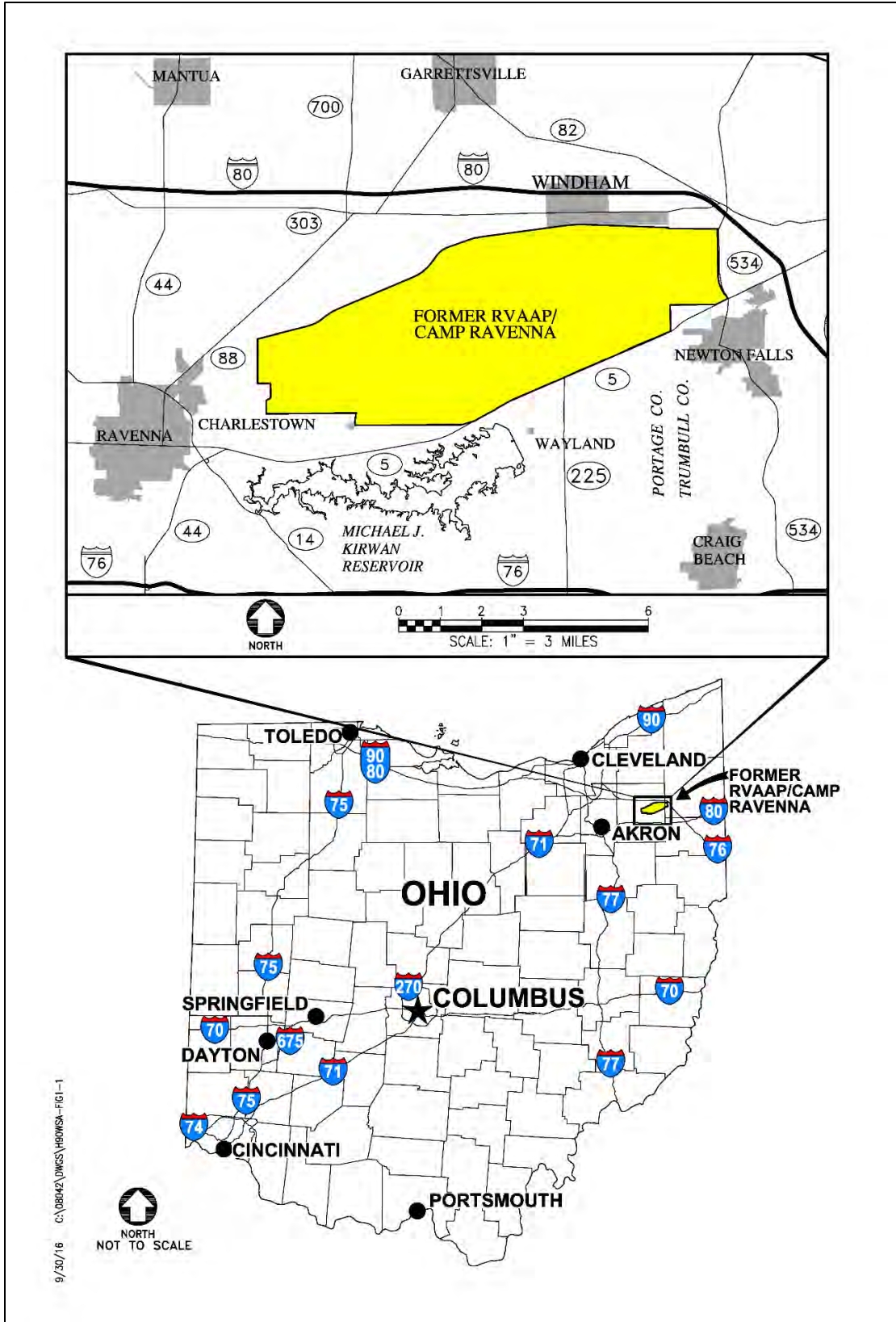


Figure 1. General Location and Orientation of Camp Ravenna

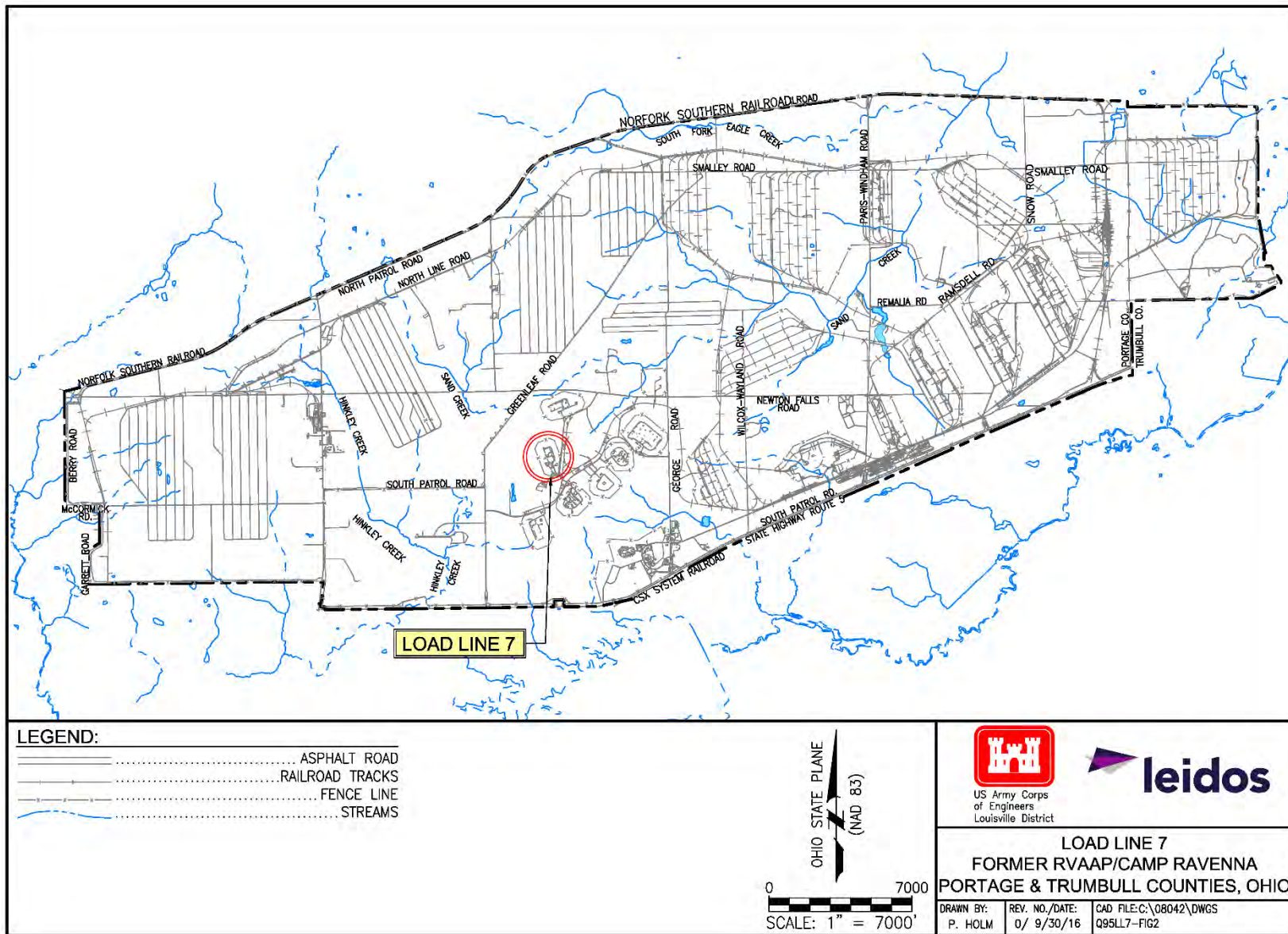


Figure 2. Location of Load Line 7 at Camp Ravenna

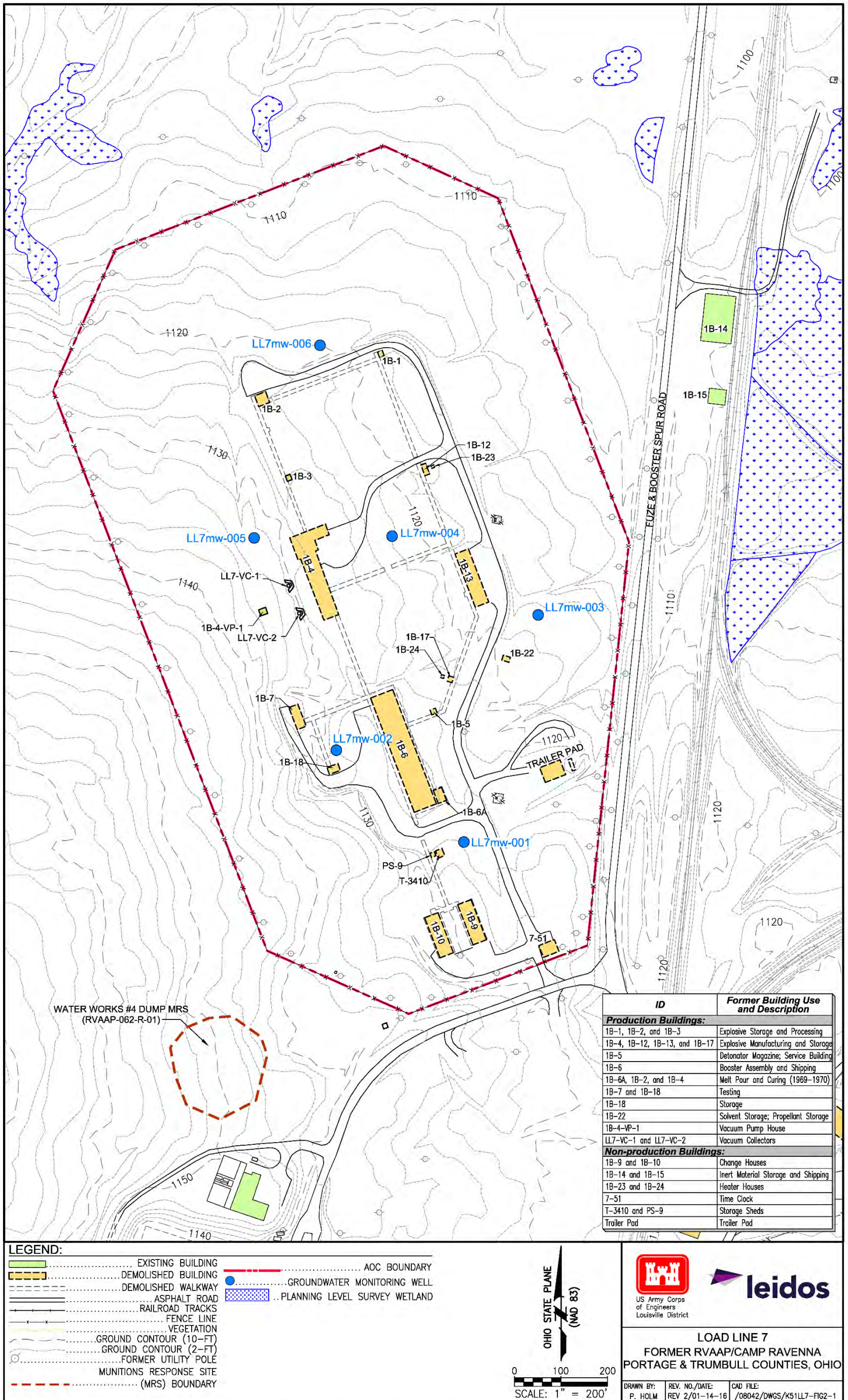


Figure 3. Load Line 7 Site Features

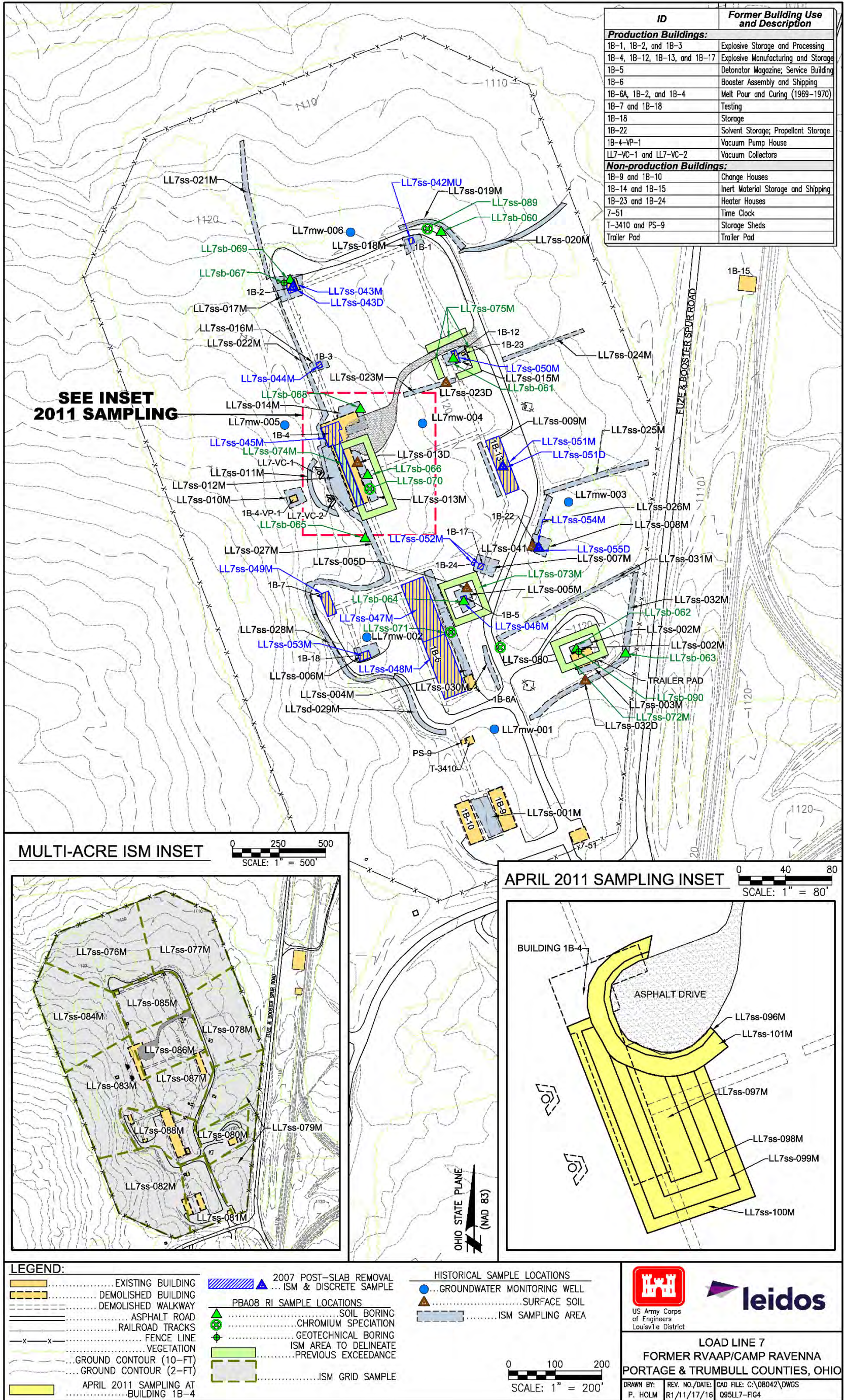


Figure 4. Load Line 7 Sample Locations

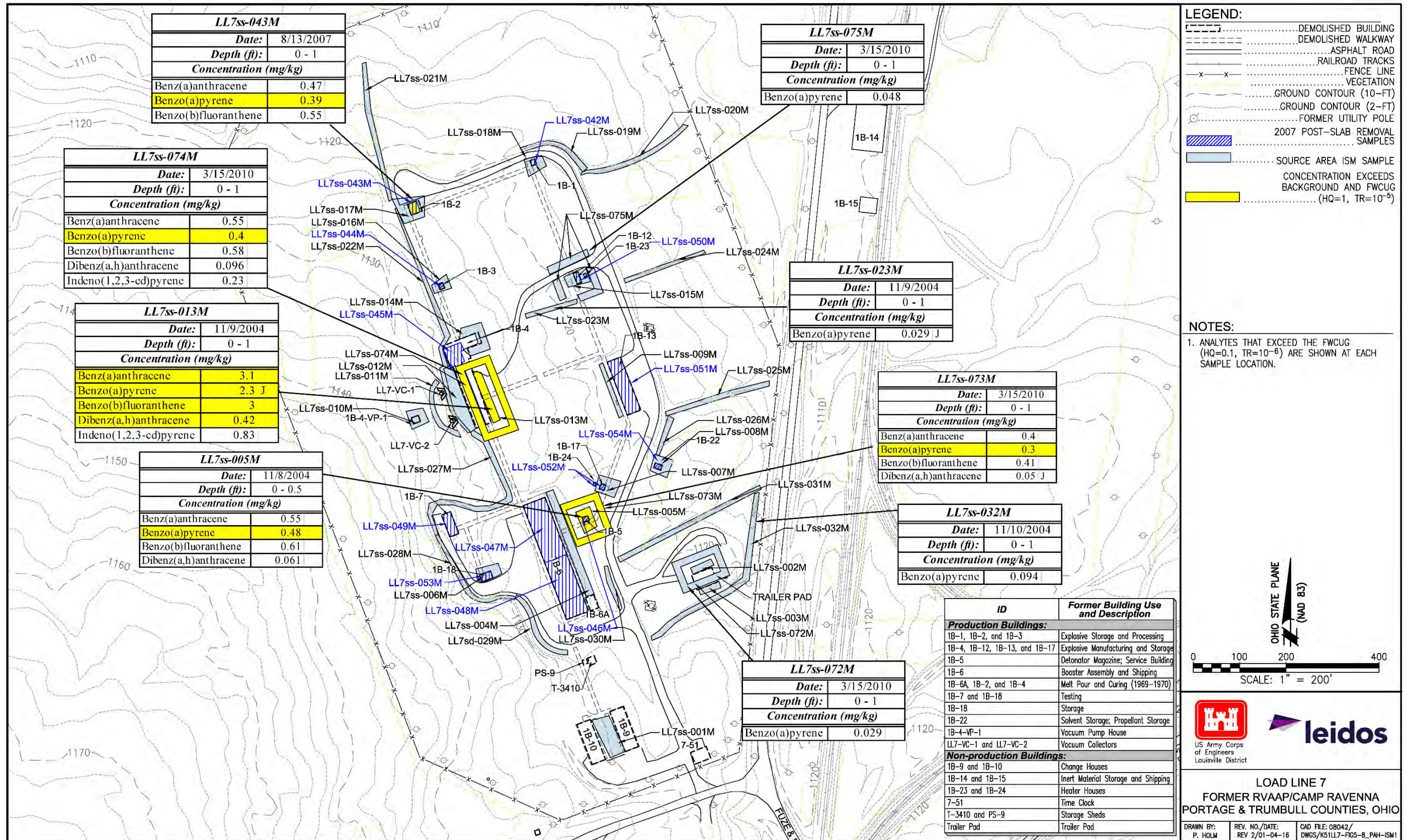


Figure 5. PAH Exceedances of FWUG in Surface Soil (Source Area ISM Samples)

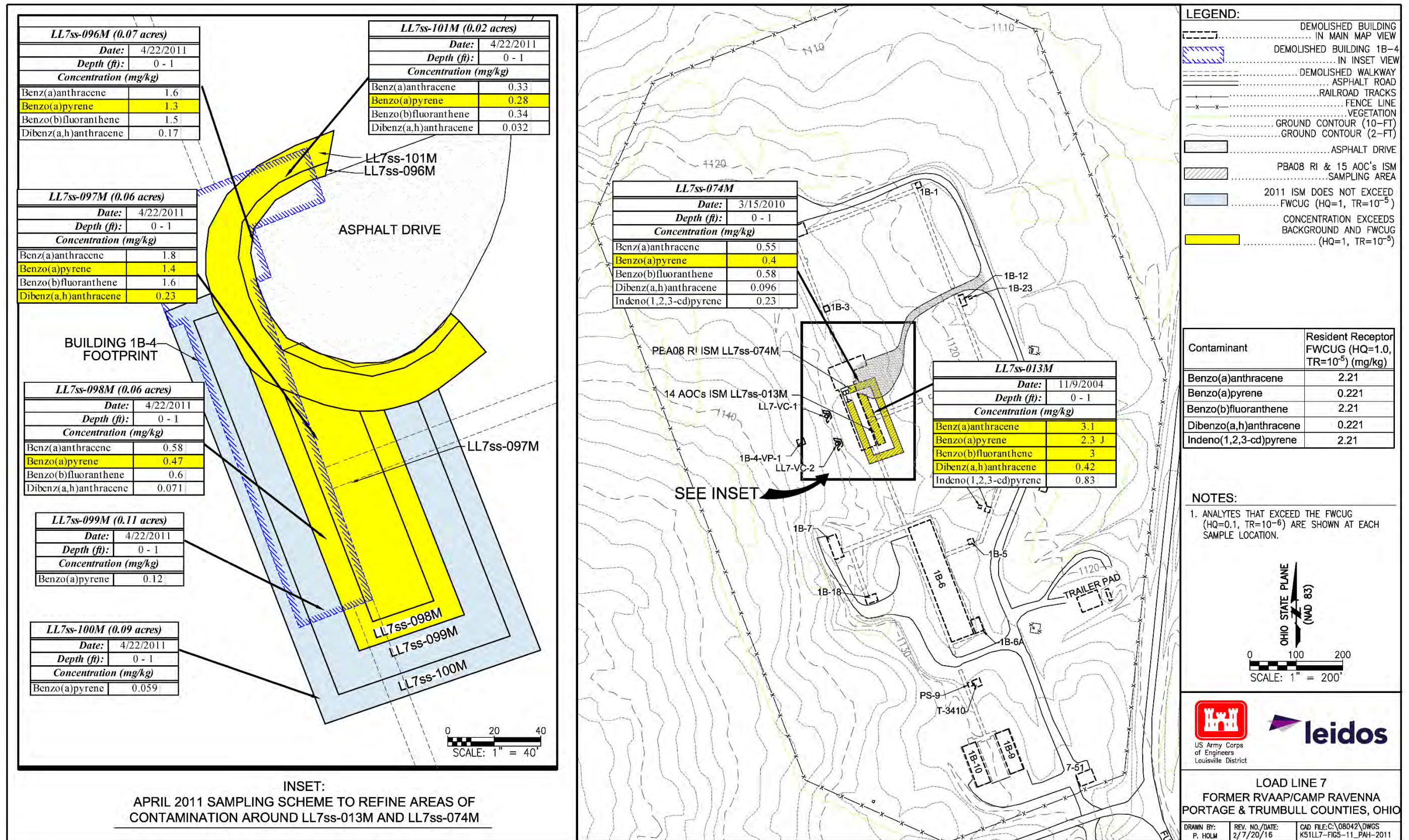
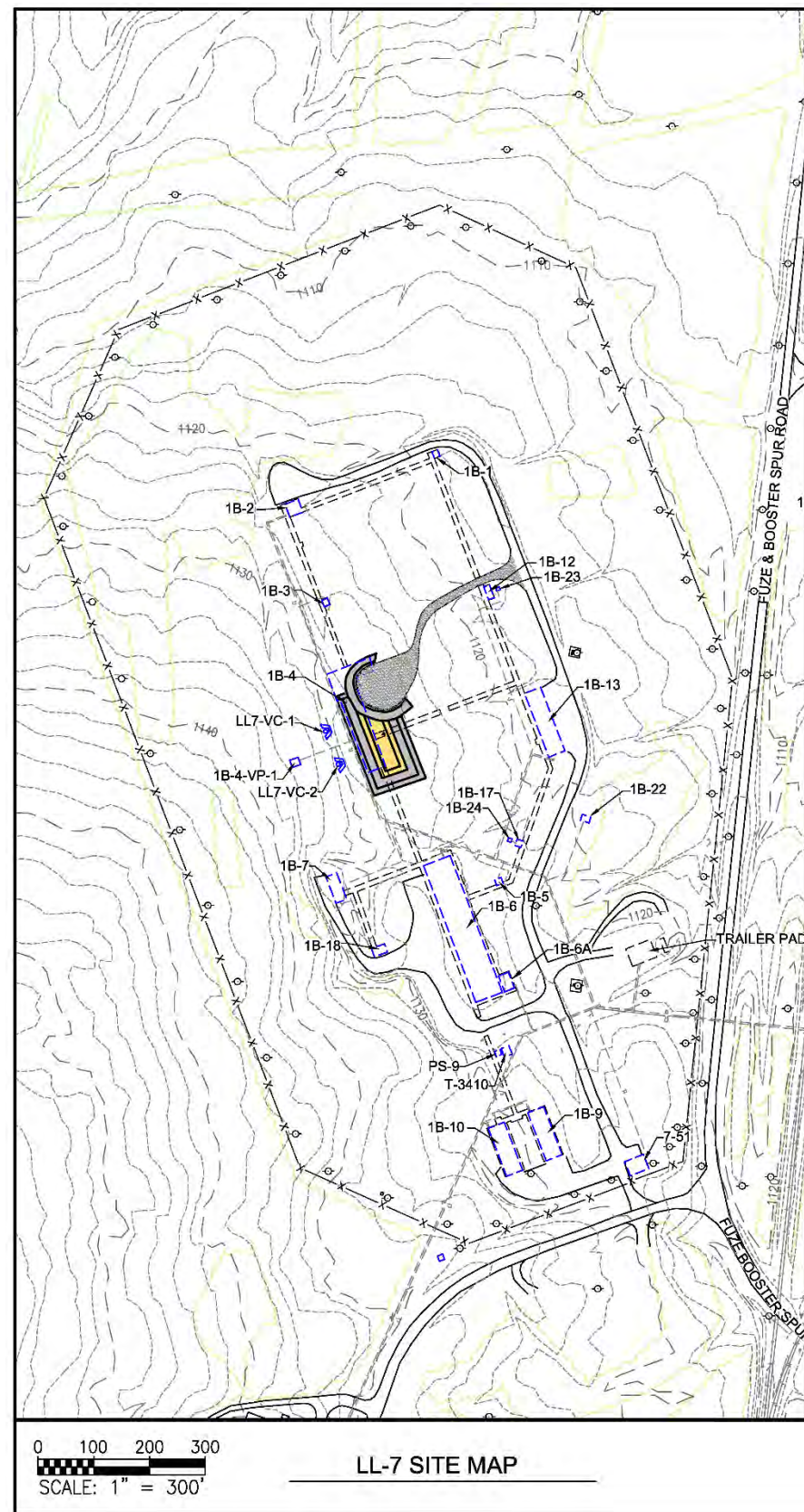


Figure 6. Concentrations of PAHs Near LL7ss-013M and LL7ss-074M from April 2011 Sampling Event



LL7sb-066M		
Date	3/10/2010	3/10/2010
Depth (ft bgs)	1.0 - 4.0	4.0 - 7.0
Concentration		
Benzo(a)anthracene	ND	ND
Benzo(a)pyrene	ND	ND
Benzo(b)fluoranthene	ND	ND
Dibenzo(a,h)anthracene	ND	ND

LL7ss-097M	
Date	4/22/2011
Depth (ft bgs)	0.0 - 1.0
Concentration	
Benzo(a)anthracene	1.8
Benzo(a)pyrene	1.4
Benzo(b)fluoranthene	1.6
Dibenzo(a,h)anthracene	0.23

LL7ss-098M	
Date	4/22/2011
Depth (ft bgs)	0.0 - 1.0
Concentration	
Benzo(a)anthracene	0.58
Benzo(a)pyrene	0.47
Benzo(b)fluoranthene	0.6
Dibenzo(a,h)anthracene	0.071

LL7ss-099M	
Date	4/22/2011
Depth (ft bgs)	0.0 - 1.0
Concentration	
Benzo(a)anthracene	0.14
Benzo(a)pyrene	0.12
Benzo(b)fluoranthene	0.14
Dibenzo(a,h)anthracene	0.018

Volume Requiring Remediation	
AREA	5,130 SQ. FT.
IN-SITU VOLUME (Z = 1 FT.)	190 CU. YDS.

LEGEND:

- DEMOLISHED BUILDING
- DEMOLISHED WALKWAY
- ASPHALT ROAD
- RAILROAD TRACKS
- FENCE LINE
- VEGETATION
- GROUND CONTOUR (10-FT)
- GROUND CONTOUR (2-FT)
- ASPHALT DRIVE
- 2011 ISM DOES NOT EXCEED FWCUG (HQ=1, TR=10⁻⁵)
- CONCENTRATION EXCEEDS BACKGROUND AND FWCUG (HQ=1, TR=10⁻⁵)
- AREA REQUIRING REMEDIATION

Contaminant	Resident Receptor FWCUG (HQ=1.0, TR=10 ⁻⁵) (mg/kg)
Benzo(a)anthracene	2.21
Benzo(a)pyrene	0.221
Benzo(b)fluoranthene	2.21
Dibenzo(a,h)anthracene	0.221



LOAD LINE 7
 FORMER RVAAP/CAMP RAVENNA
 PORTAGE & TRUMBULL COUNTIES, OHIO
 DRAWN BY: P. HOLM | REV. NO./DATE: REV 2/01-12-16 | CAD FILE: 08042/DWGS/K51LL7-FG9-1

Figure 7. Estimated Extents of Surface Soil Requiring Remediation at Load Line 7

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ATTACHMENT A

Ohio EPA Comments and Responses

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

March 16, 2017

Mr. Mark Leeper
Chief (Acting)
Army National Guard Directorate
ARNGD-ILE Clean Up
111 South George Mason Drive
Arlington, VA 22204

**Re: US Army Ammunition PLT RVAAP
Remediation Response
Project Records
Remedial Response
Portage County
267000859118**

**Subject: Ravenna Army Ammunition Plant, Portage/Trumbull Counties,
"Responses to Ohio EPA Comments on the Draft Proposed Plan for
Soil, Sediment, and Surface Water at RVAAP-40, Load Line 7" Letter,
Dated February 28, 2017**

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Responses to Ohio EPA Comments on the Draft, Proposed Plan for Soil, Sediment and Surface Water at RVAAP-40 Load Line 7" letter for the Ravenna Army Ammunition Plant, Portage/Trumbull Counties. The letter is dated February 28, 2017 and was received at Ohio EPA, Northeast District Office (NEDO) on March 2, 2017.

Both comments have been adequately addressed with one minor clarification.

Regarding comment #2 requesting additional maps: Ohio EPA requested Figures 5-8, 5-10 and 5-11 be added to the Proposed Plan for clarification. The author of the Leidos response letter agreed, although only figures 5-8 and 5-11 (and not figure 5-10) were added. Upon consideration, this acceptable to Ohio EPA.

Ohio EPA has no additional comments to the Draft Proposed Plan. Please forward the Final Proposed Plan to Ohio EPA.

Received
17 MAR 2017

MR. MARK LEEPER
ARMY NATIONAL GUARD DIRECTORATE
MARCH 16, 2017
PAGE 2

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

Sincerely,



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

VD/nvr

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

ec: Mark Leeper, ARNG
Bob Princic, Ohio EPA, NEDO, DERR
Rodney Beals, Ohio EPA, NEDO, DERR
Tom Schneider, Ohio EPA, SWDO, DERR
Tim Christman, Ohio EPA, CO, DERR
Nat Peters, USACE
Vanessa Steigerwald-Dick, Ohio EPA NEDO DERR



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

February 28, 2017

Ohio Environmental Protection Agency
DERR-NEDO
Attn: Ms. Vicki Deppisch
2110 East Aurora Road
Twinsburg, OH 44087-1924

Subject: Responses to Ohio EPA Comments on the Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-40 Load Line 7 for the Former Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties (Work Activity No. 267000859118)

Dear Ms. Deppisch:

The Army appreciates your review and comment letter (dated February 10, 2017) pertaining to the Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-40 Load Line 7. Enclosed for your review and concurrence are responses to Ohio EPA's comments. Upon the final resolution, the Army will distribute the final version of this proposed plan.

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,

A handwritten signature in black ink, appearing to read "Mark Leeper".

Mark Leeper
RVAAP Restoration Program Manager
Army National Guard Directorate

cc: Rodney Beals, Ohio EPA, NEDO-DERR
Robert Princic, Ohio EPA NEDO-DERR
Tom Schneider, Ohio EPA, SWDO-DERR
Vanessa Steigerwald-Dick, Ohio EPA, NEDO-DERR
Kevin Sedlak, ARNG, Camp Ravenna
Katie Tait, OHARNG, Camp Ravenna
Nat 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-40 Load Line 7 Proposed Plan (Work Activity No. 267000859118)

Ohio EPA Comments:

- 1) Page 6, lines 70-73, regarding the ecological risk assessment: Please specify which Ohio EPA guidance document regarding ecological risk was used to provide “sufficient justification to recommend no further action to be protective of ecological receptors at Load Line 7.” Please add, where appropriate, to all forthcoming PPs and Decision Documents.

Army Response: Agree. The last paragraph of Section 6.2 (including page 6, lines 70-73) has been revised as presented below. This revision will be made to forthcoming proposed plans and decision documents, where appropriate.

“The **Level I** ERA concluded that there are no important ecological resources present near contamination at Load Line 7. **Per the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008), the ERA can be completed. No further action is recommended to be protective from an ecological perspective at Load Line 7.”**

In addition, the following has been added to the References:

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

- 2) As the Polynuclear Aromatic Hydrocarbon (PAHs) are proposed for remediation at LL-7 and are focused in the Draft PP. It would be helpful to add additional figures from the Final Remedial Investigation/Feasibility Study (RI/FS) report regarding PAHs to the PP, for clarification purposes. Some of the original ISM sampling areas were resampled with new redrawn boundaries that may have used a combination of the following: (1) included some of the original ISM sample area, (2) eliminated some of the original area, (3) included a portion of another original ISM area, or (4) included an area not previously sampled. The ISM resample area results were then evaluated and either eliminated or moved forward for evaluation in the FS for remedial activities. Although the PP text presents the sample identification number not all corresponding PAH concentrations are provided. Ohio EPA suggests Figure 5-8 (PAH exceedances in surface soil), Figure 5-10 (PAH exceedances in discrete/subsurface soil samples), and Figure 5-11 (Concentrations of PAHs Near LL-7ss-013M from April 2011 Sampling Event) be included in the PP. These Figures clearly present the sampling locations, concentrations, eliminated areas, and designated areas moved forward for remediation activities in a logical progression that supports the text in the PP.

Army Response: Agree. As surface soil COCs (PAHs) are discussed in the Proposed Plan, the Army agrees to include figures pertaining to the surface soil sample results presented in the RI/FS Report (figures 5-8 and 5-11). The figure list will now be as follows:

- Figure 1. General Location and Orientation of Camp Ravenna
- Figure 2. Location of Load Line 7 at Camp Ravenna
- Figure 3. Load Line 7 Site Features
- Figure 4. Load Line 7 Sample Locations
- Figure 5. PAH Exceedances of FWCUG in Surface Soil (Source Area ISM Samples) ~ *figure 5-8 of RI-FS Report*

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- Figure 6. Concentrations of PAHs Near LL7ss-013M and LL7ss-074M from April 2011 Sampling Event ~ *figure 5-11 of RI-FS Report*
- Figure 7. Estimated Extents of Surface Soil Requiring Remediation at Load Line 7 ~ *same as figure 5 in Draft Proposed Plan*

Accordingly, Section 6.1 Human Health Risk Assessment has been revised as follows:

“Using information presented in Section 5.0, 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 evaluated in the HHRA for the Resident Receptor (Adult and Child) were surface soil (0–1 ft bgs) and subsurface soil (1–13 ft bgs).

The HHRA identified four PAHs in surface soil (0–1 ft bgs): **benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene**. As shown on Figure 5, locations LL7ss-005M, LL7ss-013M, LL7ss-043M, LL7ss-073M, and LL7ss-074M had an exceedance of at least one Resident Receptor FWCUG in surface soil.

Sample locations LL7ss-005M, LL7ss-043M, and LL7ss-073M are small (less than 0.15 acres) samples located adjacent to asphalt and slag/gravel roads and have benzo(a)pyrene concentrations only slightly above the Resident Receptor (Adult and Child) FWCUG of 0.221 mg/kg (i.e., ranging from 0.3–0.48 mg/kg). These locations are not recommended for further evaluation or remediation.

The areas associated with sample locations LL7ss-013M and LL7ss-074M were re-evaluated as part of the 2011 PBA08 RI using a subset of six incremental sampling methodology samples ranging in size from 0.02 to 0.11 acres to further refine the area of contamination. These six locations and the COC concentrations are presented in Figure 6. This sampling effort resulted in the following:

- Sample location LL7ss-096M had only one exceedance of benzo(a)pyrene (1.3 mg/kg) which was attributed to the adjacent asphalt driveway.
- Sample location LL7ss-097M exceeded the benzo(a)pyrene Resident Receptor FWCUG at a concentration of 1.4 mg/kg and the dibenzo(a,h)anthracene Resident Receptor FWCUG at a concentration of 0.23 mg/kg.
- Sample location LL7ss-098M exceeded the benzo(a)pyrene Resident Receptor FWCUG at a concentration of 0.47 mg/kg.
- Sample location LL7ss-101M only slightly exceeded the benzo(a)pyrene Resident Receptor FWCUG (0.221 mg/kg) at a concentration of 0.28 mg/kg.
- Sample locations LL7ss-099M and LL7ss-100M did not have any PAH exceedances of the Resident Receptor FWCUG.

Using the information collected from this 2011 sampling event, the HHRA recommended benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and dibenz(a,h)anthracene in surface soil (0–1 ft bgs) at LL7ss-097M and LL7ss-098M be evaluated for potential remediation in a Feasibility Study (FS). **These locations are depicted on Figure 7.**

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Because unacceptable risk was identified for the Resident Receptor, the HHRA also evaluated risk to the National Guard Trainee and/or Industrial Receptor. The HHRA concluded that there was no unacceptable risk to these receptors in surface or subsurface soil.”



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

February 10, 2017

**Re: US Army Ammunition PLT RVAAP
Remediation Response
Project Records
Remedial Response
Portage County
267000859118**

Mr. Mark Leeper
Restoration Program Manager
Army National Guard Directorate
ARNGD-ILE Clean Up
111 South George Mason Drive
Arlington, VA 22204

Subject: Ravenna Army Ammunition Plant, Portage/Trumbull Counties. "Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-40, Load Line 7," Dated January 24, 2017

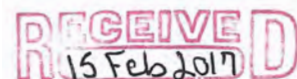
Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Draft Proposed Plan for Soil, Sediment and Surface Water at RVAAP-40 Load Line 7" document for the Ravenna Army Ammunition Plant, Portage/Trumbull Counties. The Draft Proposed Plan (PP) is dated and was received at Ohio EPA, Northeast District Office (NEDO) on January 24, 2017.

Ohio EPA has the following comments:

Page 6, lines 70-73, regarding the ecological risk assessment: Please specify which Ohio EPA guidance document regarding ecological risk was used to provide "sufficient justification to recommend no further action to be protective of ecological receptors at Load Line 7." Please add, where appropriate, to all forthcoming PPs and Decision Documents.

As the Polynuclear Aromatic Hydrocarbon (PAHs) are proposed for remediation at LL-7 and are focused in the Draft PP. It would be helpful to add additional figures from the Final Remedial Investigation/Feasibility Study (RI/FS) report regarding PAHs to the PP, for clarification purposes. Some of the original ISM sampling areas were resampled with new redrawn boundaries that may have used a combination of the following: (1) included some of the original ISM sample area, (2) eliminated some of the original area, (3) included a portion of another original ISM area, or (4) included an area not previously



sampled. The ISM resample area results were then evaluated and either eliminated or moved forward for evaluation in the FS for remedial activities. Although the PP text presents the sample identification number not all corresponding PAH concentrations are provided. Ohio EPA suggests Figure 5-8 (PAH exceedances in surface soil), Figure 5-10 (PAH exceedances in discreet/subsurface soil samples), and Figure 5-11 (Concentrations of PAHs Near LL-7ss-013M from April 2011 Sampling Event) be included in the PP. These Figures clearly present the sampling locations, concentrations, eliminated areas, and designated areas moved forward for remediation activities in a logical progression that supports the text in the PP.

The above comments need to be addressed before moving forward with the PP for LL-7.

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

Sincerely,



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

VD/nvr

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

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