Draft

Record of Decision
for Soil, Sediment, and Surface Water
at RVAAP-38 NACA Test Area

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract No. W912QR-15-C-0046

Prepared for:

U.S. Army Corps of Engineers
Louisville District

Prepared by:

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November 7, 2019

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. REPORT DATE *(DD-MM-YYYY)*
07-11-2019

2. REPORT TYPE
Technical

3. DATES COVERED *(From - To)*
Nov 1978 – Nov 2019

4. TITLE AND SUBTITLE
Draft
Record of Decision for Soil, Sediment, and Surface Water
at RVAAP-38 NACA Test Area
Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

5a. CONTRACT NUMBER
W912QR-15-C-0046

5b. GRANT NUMBER
NA

5c. PROGRAM ELEMENT NUMBER
NA

6. AUTHOR(S)
Stefansky, Jasmine

5d. PROJECT NUMBER
NA

5e. TASK NUMBER
NA

5f. WORK UNIT NUMBER
NA

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
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8. PERFORMING ORGANIZATION REPORT NUMBER
NA

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
USACE - Louisville District
U.S. Army Corps of Engineers
600 Martin Luther King Jr., Place
PO Box 59
Louisville, Kentucky 40202-0059

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

11. SPONSOR/MONITOR'S REPORT NUMBER(S)
NA

12. DISTRIBUTION/AVAILABILITY STATEMENT
Reference distribution page.

13. SUPPLEMENTARY NOTES
None.

14. ABSTRACT
This Record of Decision for NACA Test Area presents the physical characteristics, geology, and hydrogeology of NACA Test Area. This decision document summarizes nature and extent of contamination in soil, sediment, and surface water; contaminant fate and transport; and human health and ecological risk assessments. Remedial alternatives were developed and assessed, resulting in the selection of Alternative 3: Ex-situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal –Attain Unrestricted (Residential) Land Use as the remedial alternative. This information was presented to the public, and all public input was considered during the selection of the final remedy for soil, surface water, and sediment at NACA Test Area in this ROD.

15. SUBJECT TERMS
record of decision, amendment, proposed plan, land use, chemicals of concern, remediation

16. SECURITY CLASSIFICATION OF: a. REPORT	b. ABSTRACT	c. THIS PAGE	17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
U	U	U	U	88	Nathaniel Peters, II

19b. TELEPHONE NUMBER *(Include area code)*
502.315.2624

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

PLACEHOLDER FOR:

Documentation of Ohio EPA Concurrence of Final Document

(Documentation to be provided once concurrence is issued.)

DISCLAIMER STATEMENT

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Leidos has completed the Record of Decision for Soil, Sediment, and Surface Water at RVAAP-38 NACA Test 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 U.S. Army Corps of Engineers policy.

Jasmine Stefansky Study/Design Team Leader	November 7, 2019 Date

Sarika Johnson Independent Technical Review Team Leader	November 7, 2019 Date

Significant concerns and the explanation of the resolution are documented within the project file. As noted above, all concerns resulting from independent technical review of the project have been considered.

Lisa Jones-Bateman, PMP, REM Senior Program Manager	November 7, 2019 Date

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DOCUMENT DISTRIBUTION
for the
Draft Record of Decision
for Soil, Sediment, and Surface Water at RVAAP-38 NACA Test Area
Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

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ARNG = Army National Guard.
I&E = Installations & Environment.
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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ACRONYMS AND ABBREVIATIONS

amsl	Above Mean Sea Level
AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
ARNG	Army National Guard
Army	U.S. Department of the Army
AT123D	Analytical Transient 1-, 2-, and 3-Dimensional Model
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CJAG	Camp James A. Garfield
CMCOC	Contaminant Migration Chemical of Concern
CMCOPC	Contaminant Migration Chemical of Potential Concern
COC	Chemical of Concern
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
CUG	Cleanup Goal
DFFO	Director’s Final Findings and Orders
DNT	Dinitrotoluene
ERA	Ecological Risk Assessment
EU	Exposure Unit
FS	Feasibility Study
FWCUG	Facility-wide Cleanup Goal
FWGWMP	Facility-wide Groundwater Monitoring Program
HHRA	Human Health Risk Assessment
HQ	Hazard Quotient
IRP	Installation Restoration Program
LUC	Land Use Control
MDC	Maximum Detected Concentration
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PAH	Polycyclic Aromatic Hydrocarbon
PBA08 RI	2008 Performance-based Acquisition Remedial Investigation
PCB	Polychlorinated Biphenyl
PMP	Project Management Professional
RAO	Remedial Action Objective
RD	Remedial Design
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
REM	Registered Environmental Manager
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level

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ACRONYMS AND ABBREVIATIONS (continued)

RVAAP	Ravenna Army Ammunition Plant
SEMS	Superfund Environmental Management System
SL	Screening Level
SRC	Site-related Contaminant
SVOC	Semi-volatile Organic Compound
TNT	2,4,6-Trinitrotoluene
TR	Target Risk
USEPA	U.S. Environmental Protection Agency
USP&FO	U.S. Property and Fiscal Officer
VOC	Volatile Organic Compound

PART I: THE DECLARATION

A SITE NAME AND LOCATION

This Record of Decision (ROD) addresses soil, sediment, and surface water at NACA Test Area. NACA Test Area is designated as area of concern (AOC) RVAAP-38 within the former Ravenna Army Ammunition Plant (RVAAP) (Figures 1 and 2).

The former RVAAP, now known as Camp James A. Garfield (CJAG), located in northeastern Ohio within Portage and Trumbull counties, is approximately 3 miles east/northeast of the city of Ravenna and 1 mile north/northwest of the city of Newton Falls. The facility is approximately 11 miles long and 3.5 miles wide. The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garrett, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north; and State Route 534 to the east. In addition, the facility is surrounded by the communities of Windham, Garrettsville, Charlestown, and Wayland. The facility is federal property, which has had multiple accountability transfers amongst multiple Army agencies, making the property ownership and transfer history complex. The most recent administrative accountability transfer occurred in September 2013 when the remaining acreage (not previously transferred) was transferred to the U.S. Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a military training site (Camp James A. Garfield).

NACA Test Area is located west of Greenleaf Road at the southern end of Demolition Road in the southwestern portion of CJAG (Figure 2). The Superfund Environmental Management System (SEMS) Identifier for RVAAP is OH5210020736.

B STATEMENT OF BASIS AND PURPOSE

The Army National Guard (ARNG) is the lead agency and has chosen the selected remedy for NACA Test Area in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on information contained in the Administrative Record file for the AOC.

The Ohio Environmental Protection Agency (Ohio EPA), the supporting state regulatory agency, concurred with the *Phase II Remedial Investigation Report and Feasibility Study for Soil, Sediment, and Surface Water at RVAAP-38 NACA Test Area* (Leidos 2018; herein referred to as the NACA Test Area RI/FS Report) and *Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-38 NACA Test Area* (Leidos 2019; herein referred to as the NACA Test Area Proposed Plan).

The Director's Final Findings and Orders (DFFO) was issued to the U.S. Department of the Army (Army) on June 10, 2004 (Ohio EPA 2004). The objective of the DFFO was for the Army and Ohio EPA to "contribute to the protection of public health, safety, and welfare and the environment from the disposal, discharge, or release of contaminants at or from the site, through implementation of a CERCLA-based environmental remediation program. This program will include the development by respondent of a Remedial Investigation (RI)/Feasibility Study (FS) for each AOC or appropriate group of AOCs at the site, and upon completion and publication of a Proposed Plan and ROD or other appropriate document for each AOC or appropriate group of AOCs, the design, construction, operation, and maintenance of the selected remedy as set forth in the ROD or other appropriate document for each AOC or appropriate group of AOCs."

The NACA Test Area RI/FS Report evaluated surface soil, subsurface soil, sediment, and surface water at NACA Test Area. No chemicals of concern (COCs) were identified as requiring remediation for any receptor at any exposure unit (EU) in subsurface soil, sediment, or surface water; however, COCs that require remediation were identified in surface soil.

Polycyclic aromatic hydrocarbon (PAH) COCs that require remediation were identified in surface soil in Areas 1, 2, and 3 (all within the Former Plane Refueling Area/Crash Strip Area and Former Crash Area EUs). One COC requiring remediation (lead) was identified in the Former Crash Area Well Pit in surface soil. The NACA Test Area RI/FS Report provided an evaluation of remedial alternatives for soil. Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use was the recommended alternative.

The decision to conduct a remedial action to address contamination at NACA Test Area satisfies the requirements of the DFFO, as the Army and Ohio EPA have completed the CERCLA RI/FS phase of investigation at NACA Test Area. ARNG is publishing this ROD to select a remedy for this site that is protective of human health and the environment. Part II, Section M explains how the selected remedy is protective of human health and the environment and that the selected remedy satisfies the statutory requirements of CERCLA Section 121 and the NCP.

C ASSESSMENT OF SITE

The response action selected in this ROD is necessary to protect public health, welfare, or the environment from actual or threatened releases of contaminants in soil at NACA Test Area.

D DESCRIPTION OF THE SELECTED REMEDY

The potential future uses for NACA Test Area are Military Training Land Use or Commercial/Industrial Land Use. The Representative Receptors corresponding to these potential future uses are the National Guard Trainee and Industrial Receptor, respectively. Although residential use is not anticipated at the former RVAAP or at this AOC, an Unrestricted (Residential) Land Use scenario was evaluated. Unrestricted (Residential) Land Use is considered protective for, and may be applied to, all categories of land use on the former RVAAP, without further restriction.

The nature and extent of potentially impacted media has been sufficiently characterized, the fate and transport modeling did not identify soil or sediment contaminant migration chemicals of concern (CMCOCs) impacting groundwater, and no ecological risk was identified. However, the human health risk assessment (HHRA) in the NACA Test Area RI/FS Report (Leidos 2018) identified the following to be carried forward for remediation:

- PAHs as surface soil COCs in the Former Plane Refueling/Crash Strip Area requiring remediation for the Resident Receptor.
- Benzo(a)pyrene as a surface soil COC in the Former Crash Area requiring remediation for the Resident Receptor.
- Lead as a surface soil COC in the Former Crash Area Well Pit requiring remediation for the Resident Receptor, Industrial Receptor, and National Guard Trainee.

The NACA Test Area RI/FS Report (Leidos 2018) developed and evaluated the following remedial alternatives for soil at NACA Test Area:

- Alternative 1: No Action.
- Alternative 2: Excavation and Off-site Disposal of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use.
- Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use.

The selected remedy for NACA Test Area is Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use. This alternative involves removal and disposal of lead-contaminated soil from the Well Pit, abandonment of the production well, and thermally treating PAH-contaminated surface soil at the Former Plane Refueling/Crash Strip Area (Areas 1 and 2) and the Former Crash Area (Area 3).

The selected remedy was chosen because it is protective of all receptors (Resident Receptor, Industrial Receptor, and National Guard Trainee), is cost effective, and can be performed in a timely manner (no LUCs or 5-year reviews). Alternative 3 is also 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 following briefly lists the activities associated with Alternative 3:

- An estimated 1,270 yd^3 of contaminated soil from Areas 1, 2, and 3 will be excavated and placed into a thermal treatment system to remove the PAH COCs from soil.
- Confirmation sampling will be conducted to determine if cleanup goals (CUGs) have been attained.
- Once CUGs have been attained, treated soil will be placed back into the excavated area.
- Lead-contaminated soil at the Former Crash Area Well Pit will be removed and disposed of at an off-site engineered landfill.
- The former production well will be abandoned, and all surface structures with the former production well (e.g., concrete vault and lid) associated will be properly removed/disposed of.
- Successfully remediated areas will be graded and backfilled with clean soil and then seeded.

The selected remedy will achieve a requisite level of protectiveness for the AOC. The cost of Alternative 3 is $293,769. The Army will not be required to develop and implement LUCs and 5-year reviews, as this remedy attains Unrestricted (Residential) Land Use. In the event that a thermal treatment system is not on site at the former RVAAP, Alternative 2: Excavation and Off-site Disposal of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use is readily available and considered for implementation by the Army.

E STATUTORY DETERMINATIONS

The selected remedy protects human health and the environment, complies with federal and state laws and regulations that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions to the maximum extent practicable. The selected remedy satisfies the statutory preference for treatment, as a thermal treatment technology is part of the selected remedy for PAH-contaminated soil at Areas 1, 2, and 3.

Because the selected remedy will not result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for Unrestricted (Residential) Land Use, 5-year reviews will not be required for this remedial action.

F DATA CERTIFICATION CHECKLIST

Table 1 provides the location of key remedy selection information contained in Part II, Decision Summary. Additional information can be found in the Administrative Record file for NACA Test Area.

Table 1. ROD Data Certification Checklist

ROD Data Checklist Item	ROD Section
COCs and their respective concentrations	II.G.1
Baseline risk represented by the COCs	II.G
Cleanup goals established for COCs and the basis for these goals	II.H
How source materials constituting principal threats are addressed	II.K
Current and reasonably anticipated future land use assumptions used in the baseline risk assessment and ROD	II.F
Suitable potential land uses, following the selected remedy	II.L.4
Estimated capital and the total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected	II.L.3
Key factor(s) that led to selecting the remedy	II.L.1

COC = Chemical of concern.
ROD = Record of Decision.

G AUTHORIZING SIGNATURE AND APPROVAL

______________________________ __________________

Hallet Brazelton, Jr.
Acting Chief,
I&E, Army National Guard

Date

PART II: DECISION SUMMARY

A SITE NAME, LOCATION, AND DESCRIPTION

When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP (SEMS Identification Number OH5210020736) was identified as a 21,419-acre installation. In 2002 and 2003, OHARNG surveyed the property and the total acreage was found to be 21,683 acres. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683-acre former RVAAP.

As of September 2013, administrative accountability for the entire acreage of the facility has been transferred to the USP&FO for Ohio and subsequently licensed to OHARNG for use as a military training site. ARNG is the lead agency for any remediation, decisions, and applicable cleanup at NACA Test Area. These activities are being funded and conducted under the IRP. Ohio EPA is the supporting state regulatory agency.

CJAG is located in northeastern Ohio within Portage and Trumbull counties, approximately 3 miles east-northeast of the city of Ravenna and approximately 1 mile northwest of the city of Newton Falls. CJAG is a parcel of property approximately 11 miles long and 3.5 miles wide, bounded by State Route 5 and the CSX System Railroad on the south; Garrett, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east (see Figures 1 and 2). CJAG is surrounded by several communities: Windham 7 miles to the north, Garrettsville 6 miles to the north, Newton Falls 1 mile to the southeast, Charlestown 6 miles to the southwest, and Wayland 3 miles to the south.

NACA Test Area is approximately 47 acres located west of Greenleaf Road at the southern end of Demolition Road in the southwestern portion of CJAG (Figure 2). NACA Test Area was designed and used by NACA from 1947–1953 to simulate a take-off accident in which an airplane fails to become airborne and strikes an embankment, which results in rupturing of the fuel tanks (NACA 1952). Figure 3 presents a 1952 aerial photograph depicting the engineered infrastructure such as the crash strip runway, observation towers, fuel and storage shacks, crash barrier, and access roads.

The distinct, current surface features of the AOC, shown in Figure 4, include a concrete pad immediately west of the crash strip, the crash strip, and remnants of a fire protection system (a small man-made water reservoir southeast of the former crash barrier and an out-of-service production water well with associated well pit). Seibert stakes currently mark the boundary of ODA1, which used to be included in the NACA Test Area AOC but is being evaluated separately. Most of the engineered structures used during the plane simulation tests (e.g., crash barrier, observation towers, fuel and storage shacks, storage sheds) have been demolished and removed.

The AOC is currently forested around the perimeter with occasionally mowed grass in the interior. A tributary to Hinkley Creek is located in the center of the AOC near the eastern end of the crash strip. The tributary flows form the northern wetlands south through the AOC toward Hinkley Creek.

The AOC boundary encompasses sediment, surface water, and soil EUs, which are shown in Figure 5. Surface water and sediment EUs include the Tributary to Hinkley Creek, Wetland/Pond North of the Former Crash Area, Former Crash Area Reservoir, and for reference an Off-site AOC EU. The soil EUs include the Former Crash Area, Former Crash Area Well Pit, Former Plane Burial Area, and Former Plane Refueling/Crash Strip Area.

B SITE HISTORY AND ENFORCEMENT ACTIVITIES

RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading and was placed on standby status in 1950. The primary purpose of the former RVAAP was to load medium and major caliber artillery ammunition (i.e., bombs, mines, fuze and boosters, primers, percussion elements) and store finished components. Load Lines 5 through 11 produced fuzes, boosters, primers, detonators, and percussion elements.

In June 2004, the DFFO was issued to the Army (Ohio EPA 2004). The objective of the DFFO was for the Army and Ohio EPA to "contribute to the protection of public health, safety, and welfare and the environment from the disposal, discharge, or release of contaminants at or from the site, through implementation of a CERCLA-based environmental remediation program. This program will include the development by respondent of an RI/FS for each AOC or appropriate group of AOCs at the site, and upon completion and publication of a Proposed Plan and ROD or other appropriate document for each AOC or appropriate group of AOCs, the design, construction, operation, and maintenance of the selected remedy as set forth in the ROD or other appropriate document for each AOC or appropriate group of AOCs."

From 1947–1953, NACA Test Area was used to simulate take-off accidents in which an airplane fails to become airborne and strikes an embankment, resulting in rupturing of the fuel tanks (NACA 1952). Crash tests were performed on 17 excess military airplanes provided by the U.S. Air Force to develop explosion-proof fuel tanks and fuel for airplanes. NACA used 4 Curtiss C-46 Commando and 13 Fairchild C-82 Packet airplanes to conduct the tests. No historical information exists to indicate NACA Test Area was used for any other processes other than what is presented above. Fuel storage capabilities were present at the AOC during operations. Burning, due to crashes, occurred at NACA Test Area.

There have been no CERCLA enforcement actions related to NACA Test Area.

C COMMUNITY PARTICIPATION

Using the RVAAP community relations program, the Army and Ohio EPA have interacted with the public through public notices, public meetings, reading materials, direct mailings, an internet website, and receiving and responding to public comments.

Specific items in the community relations program include the following:

- **Restoration Advisory Board –** The Army established a Restoration Advisory Board in 1996 to promote community involvement in U.S. Department of Defense environmental cleanup activities and allow the public to review and discuss the progress with decision makers. Board meetings are generally held two to three times per year and are open to the public.

- **Community Relations Plan –** The *Community Relations Plan* (Chenega 2019) is maintained to establish processes to keep the public informed of activities at RVAAP. The plan is available in the Administrative Record at CJAG.
- **Internet Website –** The Army established an internet website in 2004 for RVAAP. It is accessible to the public at www.rvaap.org.

In accordance with CERCLA Section 117(a) and NCP Section 300.430(f)(2), the Army released the NACA Test Area Proposed Plan (Leidos 2019) to the public on July 29, 2019. The Proposed Plan and other project-related documents were made available to the public in the Administrative Record maintained at CJAG and in the Information Repositories at Reed Memorial Library in Ravenna, Ohio, and Newton Falls Public Library in Newton Falls, Ohio. A notice of availability for the Proposed Plan was sent to radio stations, television stations, and newspapers (e.g., *Warren Tribune-Chronicle* and *Ravenna Record Courier*), as specified in the Community Relations Plan. The notice of availability initiated the 30-day public comment period beginning July 29, 2019 and ending August 27, 2019.

The Army held a public meeting on August 15, 2019 at the Shearer Community Center, 9355 Newton Falls Road, Ravenna, Ohio 44266 to present the Proposed Plan. At this meeting, representatives of the Army provided information and were available to answer any questions. A transcript of the public meeting is available to the public and has been included in the Administrative Record. Responses to any comments received at this meeting and during the public notification period are included in the Responsiveness Summary, which is Part III of this ROD.

The Army considered public input from the public meeting on the Proposed Plan when selecting the remedy.

D SCOPE AND ROLE OF RESPONSE ACTIONS

The overall program goal of the IRP at the former RVAAP is to clean up previously contaminated lands to reduce contamination to concentrations that are not anticipated to cause risks to human health or the environment. No IRP remedial activities have been performed at NACA Test Area to date.

This ROD addresses soil, sediment, and surface water. The potential future Land Uses for NACA Test Area are Military Training Land Use or Commercial/Industrial Land Use, which are consistent with the intended future land uses for CJAG. No COCs require remediation for subsurface soil, sediment, or surface water at NACA Test Area; however, COCs that require remediation were identified in surface soil. The surface soil contamination present at NACA Test Area poses a potential risk to human health because the COC concentrations exceeded CUGs for the Representative Receptor for Military Training Land Use (National Guard Trainee) and Commercial/Industrial Land Use (Industrial Receptor), as well as the Resident Receptor for Unrestricted (Residential) Land Use.

Implementing the remedy described in this ROD will address potential risk through thermal treatment and removal and off-site disposal of contaminated soil. The selected remedy described in the ROD is consistent with, and protective for, the intended future use (Military Training or Commercial/Industrial) at the AOC. Other media (e.g., groundwater) and AOCs at CJAG will be managed as separate actions or decisions by the Army and will be considered under separate RODs.

Potential impacts to groundwater from soil (e.g., contaminant leaching) were evaluated in the NACA Test Area RI/FS Report (Leidos 2018), as protectiveness to groundwater was included in the fate and transport analysis. However, groundwater will be evaluated as an individual AOC for the entire facility (designated as RVAAP-66) under the Facility-wide Groundwater Monitoring Program (FWGWMP).

E SITE CHARACTERISTICS

This section presents site characteristics, nature and extent of contamination, and the conceptual site model for NACA Test Area. These characteristics and findings are based on investigations conducted from 1978–2017 and are further summarized in the NACA Test Area RI/FS Report (Leidos 2018).

E.1 Physical Characteristics

This section describes the topography/physiology, geology, hydrogeology, and ecological characteristics of CJAG and NACA Test Area that were key factors in identifying the potential contaminant transport pathways, receptor populations, and exposure scenarios to evaluate human health and ecological risks.

E.1.1 Topography/Physiography

The topography of CJAG is gently undulating with an overall decrease in ground elevation from a topographic high of approximately 1,220 ft above mean sea level (amsl) in the far western portion of the facility to low areas at approximately 930 ft amsl in the far eastern portion. Ground elevations within NACA Test Area range from approximately 1,070-1,094 ft amsl. Topographic relief at NACA Test Area is low, with most of the relief occurring at the eastern end of the AOC. Hinkley Creek is south of the AOC, and a tributary to Hinkley Creek runs through the center of the AOC, west of the location of the former crash barrier (Figure 4).

Several perennial surface water features are present within the AOC or in the immediate vicinity. The main surface water features include a large pond at the north-central portion of the AOC, a tributary flowing north to south through the middle of the AOC to Hinkley Creek, and an approximate 40- by 45-ft reservoir located southeast of the former crash barrier used to contain water as part of the fire protection system during NACA operations from 1947–1953. Several large wetlands also are located within the AOC boundary.

E.1.2 Geology

NACA Test Area is located on the eastern boundary of the Lavery Till and the western boundary of the younger Hiram Till glacial deposits. The primary soil types found at NACA Test Area are the Mahoning silt loam (2-6% slopes) in the eastern half of the AOC and the Fitchville silt loam series in the western half of the AOC. Mahoning silt loam is a gently sloping, poorly drained soil formed in silty clay loam or clay loam glacial till, generally where bedrock is greater than 6 ft below ground surface (bgs). The Mahoning silt loam has low permeability, with rapid runoff, and seasonal wetness. The Fitchville silt loam series (0-2% and 2-6% slopes) is a somewhat poorly drained, gently sloping silt loam to silty clay loam formed from glaciolacustrine deposits (USDA 2010), as shown in Figure 6.

The bedrock formation at NACA Test Area is the Pennsylvanian age Pottsville Formation, Sharon Sandstone member, informally referred to as the Sharon Conglomerate (Winslow and White 1966). The Sharon Sandstone Member, the lowest unit of the Pottsville Formation, is a highly porous, loosely cemented, permeable, cross-bedded, frequently fractured and weathered orthoquartzite sandstone, which is locally conglomeratic. The Sharon Conglomerate exhibits locally occurring thin shale lenses in the upper portion of the unit, as shown in Figure 7.

During the NACA Test Area RI, bedrock was not encountered within 30 ft of the ground surface. This observation supports the premise that NACA Test Area is located in the suspected pre-glacial buried bedrock valley that trends northeast to southwest through the facility. The thickness of glacial deposits may exceed 150 ft in this area (Winslow and White 1966).

E.1.3 Hydrogeology

Twelve groundwater monitoring wells (NTAmw-107 to NTAmw-118) were installed in 2004 at NACA Test Area during the Characterization of 14 AOCs and were screened in the unconsolidated overburden (MKM 2007). Initial depths to groundwater encountered during well installation varied from 5.5–23 ft bgs.

One additional well (NTAmw-119) was installed in 2012 into the deeper unconsolidated aquifer zone to assess the vertical extent of groundwater (EQM 2012), and one additional well (NTAmw-120) was installed in 2016 into the Upper Sharon bedrock.

In 2017, water level elevations at the AOC had a range of 1,067.38-1090.10 ft amsl (TEC-Weston 2018). Potentiometric data are consistent with previous reports and show the groundwater flow pattern to the southwest toward Hinkley Creek (Figure 4).

E.1.4 Ecology

The ecological risk assessment (ERA) in the NACA Test Area RI/FS Report (Leidos 2018) concluded that the AOC contains important and significant ecological resources. Specifically, wetlands and surface water (i.e., pond, streams) are present and near contamination. 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 of habitat (USEPA 1993). The findings of the Level I Scoping ERA invoked a Level II Screening ERA. The Level II Screening ERA evaluated soil, sediment, and surface water chemicals of potential ecological concern (COPECs), and concluded that no COPECs require remediation.

The main habitats at NACA Test Area include dry, early-successional (dominant vegetation type) and seasonally flooded herbaceous fields; dry, mid-successional, cold deciduous and semi-permanently flooded shrublands; and four types of forests (Figure 8). The northern long-eared bat (*Myotis septentrionalis*; endangered species) exists at CJAG. No other federally listed species and no critical habitat occur on CJAG. The closest recorded state-listed or federally listed species (Yellow-bellied sapsucker [*Sphyrapicus varius*] and Eastern box turtle [*Terrapene carolina*]) were identified approximately 200 ft east and 200 ft north of NACA Test Area (OHARNG 2014).

E.2 Site Investigations

In 1978, the U.S. Army Toxic and Hazardous Materials Agency conducted an Installation Assessment of RVAAP to review the potential for contaminant releases at multiple former operations areas, as documented in *Installation Assessment of Ravenna Army Ammunition Plant* (USATHAMA 1978). This assessment identified NACA Test Area only as an airplane crash facility test site adjacent to the old demolition area. 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]), and heavy metals (USACE 1996).

Additional potential contaminants at NACA Test Area, based on operational history, include metals, pesticides, polychlorinated biphenyls (PCBs), semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs). These chemical groups are associated with burned or partially combusted fuels, deicing compounds, lubricants, hydraulic fluids, and fire extinguishing agents (specifically bromochloromethane) (NACA 1953). Explosives, such as TNT and its associated degradation products, and propellants are not directly related to past operations. However, due to the proximity of ODA1, explosives and propellants are also considered potential contaminants, especially in the southern portion of the crash strip area.

Since 1978, NACA Test Area has been included in various historical assessments and investigations conducted at the former RVAAP. The following environmental investigations have been completed for NACA Test Area:

- Installation Assessment of Ravenna Army Ammunition Plant (USATHAMA 1978);
- Preliminary Assessment for the Characterization of Areas of Contamination (USACE 1996);
- Relative Risk Site Evaluation (USACHPPM 1996);
- Environmental Baseline Survey of Ravenna Army Ammunition Plant (Vista 1998);
- 1999 Phase I RI (SAIC 2001);
- 2004/2005 Characterization of 14 AOCs (MKM 2007); and
- 2010/2011 2008 Performance-based Acquisition Remedial Investigation (PBA08 RI) and 2017 Supplemental Investigation (Leidos 2018).

The results of the 2010/2011 PBA08 RI and 2017 Supplemental Investigation were combined with applicable results of previous sampling events to evaluate the nature and extent of contamination, examine contaminant fate and transport, conduct risk assessments, and evaluate potential remedial alternatives, as summarized in the NACA Test Area RI/FS Report (Leidos 2018).

E.3 Nature and Extent of Contamination

Nature and extent of contamination in surface soil (0–1 ft bgs), subsurface soil (greater than 1 ft bgs), sediment, and surface water was evaluated in the NACA Test Area RI/FS Report using data from the 1999 Phase I RI and 2010 PBA08 RI. Subsequent to this evaluation, the 2017 Supplemental Investigation was conducted and is summarized separately in this section.

The nature and extent of contamination at the AOC has been effectively characterized by these reports. Figure 5 presents the RI sample locations. Metals, explosives, propellants, SVOCs, VOCs, pesticides, and PCBs were evaluated across all EUs. No propellants, VOCs, pesticides, or PCBs are retained as chemicals of potential concern (COPCs) in surface or subsurface soil, sediment, or surface water at any NACA Test Area EU.

E.3.1 Surface and Subsurface Soil

Locations where explosives were identified as potential contaminants from previous site use were thoroughly evaluated across each EU. The maximum concentrations of explosives and propellants were all below their respective screening levels (SLs) and were not considered COPCs, except one surface sample location at the Former Plane Refueling/Crash Strip Area. TNT was detected at a concentration of 5.5 mg/kg, which exceeded the SL of 3.65 mg/kg and was considered a COPC for the EU. TNT was not detected in the subsurface samples collected at the Former Plane Refueling/Crash Strip.

A total of 12 inorganic chemicals (arsenic, aluminum, barium, cadmium, chromium, copper, lead, manganese, mercury, selenium, silver, and zinc) were identified as potential inorganic site-related contaminants (SRCs) and as potentially related to previous AOC operations. When evaluating these chemicals against their SLs (using the trivalent chromium Facility-wide Cleanup Goal [FWCUG] for chromium and the Regional Screening Level (RSL) of 400 mg/kg for lead), chromium, mercury, selenium, silver, and zinc concentrations were below their respective SLs; therefore, these chemicals were not considered COPCs at any of the EUs comprising NACA Test Area.

Aluminum, arsenic, and manganese were considered COPCs in surface soil at the Former Crash Area. Of these three inorganic chemicals, arsenic was the only COPC in subsurface soil in one PBA08 RI sample location (NTAsb-124, 4–7 ft bgs interval). Arsenic exceeded the Resident Receptor (Adult and Child) FWCUG at a target risk (TR) of 1E-05, hazard quotient (HQ) of 1 in surface and subsurface soil with a maximum detected concentration (MDC) of 24.7J mg/kg at NTAsb-124 (4–7 ft bgs interval). Arsenic was detected below the background concentration (13.9J mg/kg) in the next sample interval (7–13 ft bgs). Manganese exceeded the National Guard Trainee (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1 in surface soil with an MDC of 4,500 mg/kg at NTA-034.

Barium and lead concentrations of 436 and 13,200 mg/kg, respectively, exceeded their respective SLs of 351 and 400 mg/kg in the one surface soil sample collected at the Former Crash Area Well Pit. Both inorganic chemicals were considered COPCs. Only lead exceeded the RSL, but barium was below the National Guard Trainee FWCUG at a TR of 1E-05, HQ of 1.

Five chemicals (aluminum, arsenic, cadmium, copper, and manganese) were considered COPCs in surface soil at the Former Plane Burial Area. In subsurface soil, cadmium and copper were considered COPCs. Although not identified as previously used during historical operations, antimony and cobalt also were considered COPCs in surface soil at the Former Plane Burial Area. Of the COPCs identified in surface and subsurface soil at the Former Plane Burial Area, only concentrations of arsenic and manganese in surface soil exceeded the National Guard Trainee or Resident Receptor (Adult and Child) FWCUGs at a TR of 1E-05, HQ of 1. The MDCs of arsenic and manganese were 23 and 2,190 mg/kg, respectively, at Phase I RI sample location NTA-067.

Aluminum, arsenic, barium, and manganese were considered COPCs in surface soil at the Former Plane Refueling/Crash Strip Area. Although not identified as previously used during historical operations, cobalt and cyanide also were considered COPCs in surface soil. Arsenic and manganese exceeded the National Guard Trainee or Resident Receptor (Adult and Child) FWCUGs at a TR of 1E-05, HQ of 1. The MDC of arsenic was 22.1 mg/kg at PBA08 RI sample location NTAss-128. Manganese was detected at a maximum concentration of 6,240J mg/kg at Phase I RI sample location NTA-084. No inorganic chemical COPCs were identified in subsurface soil.

SVOCs were not detected in surface soil at the Former Crash Area Well Pit. SVOCs were COPCs in surface and subsurface soil at the Former Plane Burial Area. Concentrations of benzo(a)pyrene, benzo(b)fluoranthene, and dibenzo(a,h)anthracene were detected in Former Crash Area surface soil at Phase I RI sample location NTA-026, which exceeded the Resident Receptor (Adult and Child) FWCUGs at a TR of 1E-05, HQ of 1. The detected concentration of benzo(a)pyrene in the surface sample at Phase I RI sample location NTA-032 also exceeded the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1. Concentrations of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenzo(a,h)anthracene, and indeno(1,2,3-cd)pyrene exceeded the Resident Receptor (Adult and Child) FWCUGs at a TR of 1E-05, HQ of 1 at multiple surface soil sample locations at the Former Plane Refueling/Crash Strip Area. In subsurface soil, only benzo(a)pyrene exceeded the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1 at one subsurface sample location. All other PAH concentrations detected in surface and subsurface soil at the Former Crash Area and Former Plane Refueling/Crash Strip Area were below the Resident Receptor (Adult and Child) FWCUGs at a TR of 1E-05, HQ of 1.

None of the detected VOC concentrations at NACA Test Area in surface or subsurface soil exceeded their respective SLs. Pesticides and PCBs were not detected in any of the surface or subsurface samples collected for the four EUs comprising NACA Test Area except for the pesticide delta-hexachlorobenzene, which was identified as an SRC in subsurface soil at the Former Crash Area.

E.3.2 Sediment and Surface Water

The tributary to Hinkley Creek was evaluated using two sediment and two surface water samples. No explosives or propellants were detected in the surface water samples, and no propellants were detected in the sediment samples. One explosive (HMX) was detected at a low, estimated concentration in one sediment sample, but was not detected at the downstream sample. The concentration was below the Resident Receptor (Adult and Child) FWCUG and RSL at a TR of 1E-06, HQ of 0.1. No sediment or surface water concentrations for inorganic chemicals in the tributary to Hinkley Creek exceeded the RSL at a TR of 1E-06, HQ of 0.1, except a sediment concentration of cobalt at NTAsd-145. One PAH, benzo(a)pyrene, exceeded its respective SL in sediment; however, the concentration was below the Resident Receptor (Adult and Child) FWCUG at a TR of 1E-05, HQ of 1. Bis(2-ethylhexyl)phthalate was detected above its respective SL in a surface water sample. No pesticides or PCBs were detected in sediment, and no VOCs, pesticides, or PCBs were detected in surface water at the tributary to Hinkley Creek. One VOC (2-butanone) was detected at NTAsd-143 below the SL.

One sediment and one surface water sample were used to evaluate the Wetland/Pond North of the Former Crash Area. No explosives or propellants were detected in sediment or surface water. All of the detected concentrations of inorganic chemicals in sediment and surface water were below the RSL at a TR of 1E-06, HQ of 0.1. In surface water, cobalt and manganese exceeded the SL at a TR of 1E-06, HQ of 0.1, but not at a TR of 1E-05, HQ of 1. SVOCs, pesticides, and PCBs were not detected in sediment or surface water samples at the Wetland/Pond North of the Former Crash Area. Three VOCs (2-butanone, ethylbenzene, and toluene) were detected in sediment and one VOC (toluene) was detected in surface water. The detected concentrations were below the SL at a TR of 1E-06, HQ of 0.1.

Sediment and surface water samples collected during the Phase I RI at the Former Crash Reservoir were used to evaluate the nature and extent for comparison purposes only. No explosives, propellants, SVOCs, pesticides, or PCBs were detected in sediment or surface water. In addition, no inorganic chemicals were identified as SRCs in sediment or surface water. Two VOCs (2-butanone and acetone) were detected in sediment at concentrations below the RSL at a TR of 1E-06, HQ of 0.1. VOCs were not detected in surface water for the Former Crash Area Reservoir.

One sediment and one surface water sample were collected during the Phase I RI at a drainage conveyance upstream of NACA Test Area. These samples were included in the nature and extent evaluation to provide data on off-AOC conditions for comparison purposes. No explosives were detected in sediment at the off-AOC Phase I RI sample location; however, the propellant nitrocellulose was detected at a concentration of 4.8 mg/kg. The explosive DNT was detected at Phase I RI off-AOC surface water station NTA-104 at a concentration of 0.000051J mg/L. This explosive was not detected in any of the other surface water samples collected at NACA Test Area. Eight inorganic chemicals (barium, beryllium, cadmium, cobalt, cyanide, manganese, nickel, and selenium) were detected above background concentrations in sediment. Of these, barium, cobalt, cyanide, and manganese were detected at concentrations above their respective SLs in sediment. The concentrations detected at the upstream, off-AOC location were higher than those observed at either of the NACA Test Area sediment data EUs. VOCs were not detected in sediment, but acetone was detected in surface water below the RSL. SVOCs, pesticides, and PCBs were not detected in sediment and surface water at the off-AOC sample locations.

E.3.3 2017 Supplemental Investigation

During the review of initial versions of the NACA Test Area RI/FS Report, Ohio EPA identified data gaps associated with the RI, and the Army and Ohio EPA resolved to conduct a geophysical investigation and additional sampling at NACA Test Area to address these data gaps. The *Sampling* *and Analysis Plan Addendum for Supplemental Sampling at RVAAP-38 NACA Test Area* (Leidos 2017) (herein referred to as the SAP Addendum) was developed to outline the scope, objectives, procedures, and methods associated with the geophysical investigation and sampling that was conducted to address data gaps associated with NACA Test Area.

The primary scope and objectives of this supplemental investigation were to:

- Further investigate the area within NACA Test Area that potentially was used for plane burial,
- Evaluate PAH COCs beneath the concrete in the crash strip,
- Evaluate potential lead contamination in groundwater associated with the production well,
- Evaluate sediment in the Former Crash Area Reservoir, and
- Collect samples to define the extent of PAH contamination around historical sampling locations NTA-083 and NTA-120.

The following subsections present the results of the investigation conducted from October 23 to November 20, 2017.

E.3.3.1 Former Plane Burial Area Investigation

There had been speculation that airplanes were bulldozed and buried at the eastern end of the AOC within the Former Plane Burial Area. Additional subsurface investigation was performed to further assess the potential for buried debris and collect chemical data to determine if CERCLA risk resulted from this potential former burial activity.

Results of the EM31-MK2 and EM61-MK2 geophysical surveys indicate that no large or symmetrical anomaly consistent with the shape and size of a C-46 airplane (76 ft long, 22 ft high, 108 ft wingspan) or the C-82 (77 ft long, 26 ft high, 106 ft wingspan) could be substantiated. The anomalous trends are consistent with metallic debris co-mingled with re-worked or graded soil. Airplanes that were significantly damaged during testing were stripped of instrumentation and salvageable parts, and it was concluded that airplanes were moved to this area after the crash tests were performed. However, it does not appear that there was a large effort to bury airplanes used in the crash tests conducted from 1947–1953.

Six soil borings were installed to a depth of 13 ft bgs. The locations of these six soil borings are presented in Figure 9. The only debris (speculated to be metal wire) encountered was in soil boring NTA-153 at approximately 1.5 ft bgs. Debris was not encountered in any other soil borings.

From each boring, samples from 0–1, 1–4, 4–7, and 7–13 ft bgs were collected and analyzed for metals, SVOCs, and PCBs. Results were screened against the lowest FWCUG for the Resident Receptor (Adult and Child) and National Guard Trainee at a target HQ of 0.1 or TR of 1E-06, as presented in the FWCUG Report. If a chemical did not have an FWCUG, the SL was the lower of the U.S. Environmental Protection Agency (USEPA) Residential RSL at an HQ of 0.1 or TR of 1E-06.

None of the chemicals in the subsurface soil samples were considered COPCs in this screening process. In addition, none of the PCBs in surface soil were considered COPCs. The only chemicals that exceeded the SL were aluminum, cadmium, chromium, copper, and benzo(a)pyrene in surface soil. However, all of the sample results were well below the Resident Receptor (Adult and Child) FWCUG at a target HQ of 1 or TR of 1E-05. Accordingly, it can be concluded that there is no unacceptable risk to human health or the environment at the Former Plane Burial Area.

E.3.3.2 Crash Strip Concrete Subsurface

The crash strip runway consists of two concrete strips that are 10 ft wide, 7 inches thick, and separated by approximately 13.5 ft. An additional 1.5-ft concrete strip was located between these two concrete strips that was used to support the center monorail. The monorail has since been removed, but the 1.5-ft concrete strip remains. There is soil between the two 10-ft wide concrete strips and the one 1.5 ft center concrete strip that was identified to have PAH contamination during the Phase I RI and PBA08 RI. Therefore, sampling of soil beneath the concrete was conducted, as this medium was not previously sampled.

The following activities were completed:

- Eight holes were cored into the concrete crash strip. These eight cores were adjacent to target areas recommended for removal at the locations presented in Figure 10.
- Samples from 0–1 and 1–4 ft below the bottom of concrete were collected from sample locations NTA-156 to NTA-163. After sample collection, the sample locations were backfilled with bentonite and the cored holes were repaired with concrete.
- Collected samples were analyzed for benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. These chemicals are the target COCs for the Former Plane Refueling/Crash Strip Area.

The results were screened against the lowest FWCUG for the Resident Receptor (Adult and Child) at a target HQ of 0.1 or TR of 1E-06, as presented in the FWCUG Report. None of the PAH concentrations in the 0-1 ft interval beneath the concrete runway exceeded the SL. Benzo(a)pyrene in the 1-4 ft interval beneath the concrete runway was identified as a COPC; however, the benzo(a)pyrene maximum concentration of 0.029 mg/kg was below the FWCUG for the Resident Receptor (Adult and Child) at a target HQ of 1 or TR of 1E-5 and well below the 2017 USEPA Resident RSL of 1.1 mg/kg at a TR of 1E-05.

As a result, it was concluded that the soil beneath the concrete crash strip does not pose a risk to human health, and no further action is needed for this soil. Figure 10 presents the results of these five PAHs for samples collected underneath the concrete runway, as well as for samples collected in the soil medium between the concrete pavement that make up the runway.

E.3.3.3 Groundwater in Production Well

The Former Crash Area Well Pit contains a production well approximately 35 ft north of the Former Crash Area Reservoir. A soil sample was collected from within the well pit during the 1999 Phase I RI, and a high concentration of lead (13,200 mg/kg) was detected. Therefore, groundwater samples (filtered and unfiltered) were collected from the production well and analyzed for lead.

Lead was not detected in either sample. Consequently, it can be concluded that the contaminated soil in the Former Crash Area Well Pit is not impacting the groundwater.

E.3.3.4 Sediment in Former Crash Area Reservoir

Three sediment samples (NTAsd-173, NTAsd-174, and NTAsd-175) were collected from the Former Crash Area Reservoir. The sediment samples were analyzed for metals, SVOCs, explosives, propellants, VOCs, PCBs, and pesticides, as these chemicals are identified as primary COPCs at NACA Test Area per the Phase I RI.

Results were screened against the lowest FWCUG for the Resident Receptor (Adult and Child) and National Guard Trainee at a target HQ of 0.1 or TR of 1E-06, as presented in the FWCUG Report. If a chemical did not have an FWCUG, the SL was the lower of the USEPA Residential RSL for HQ of 0.1 or TR of 1E-06.

None of the SVOCs, explosives, propellants, VOCs, and PCBs exceeded the screening criteria. The only chemicals to exceed the SL were aluminum, chromium, cobalt, and delta-BHC. Figure 11 shows these results.

Aluminum was detected at a maximum concentration of 20,000 mg/kg, well below the Resident Receptor FWCUG at HQ of 1 or TR of 1E-05 of 73,800 mg/kg. The chromium maximum concentration was 25 mg/kg, well below the Resident Receptor FWCUG at HQ of 1 or TR of 1E-05 of 199 mg/kg. The cobalt maximum concentration was 15 mg/kg, well below the Resident Receptor FWCUG at HQ of 1 or TR of 1E-05 of 23 mg/kg. Delta-BHC was only detected in one of three samples at a concentration of 0.0036 mg/kg. Delta-BHC does not have an FWCUG or RSL to compare against. Given these results, it is confirmed that no unacceptable human health risk is associated with the Former Crash Area Reservoir.

E.3.3.5 Surface Soil at Previous Locations NTA-083 and NTA-120

PAHs were detected in historical surface soil samples at locations NTA-083 and NTA-102 at concentrations exceeding the SLs. To further evaluate the area north of the former fuel shack around these sample locations, the following additional investigation was conducted:

- Eleven discrete surface soil samples (0–1 ft bgs) from a sampling grid at and around historical samples NTA-083 and NTA-120 were collected. This included recollecting surface soil at locations NTA-083 and NTA-120. The sampling grid is presented in Figure 12.

- The samples were analyzed for benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene. These chemicals are the target COCs for the Former Plane Refueling/Crash Strip Area.

Figure 12 presents the PAH concentrations of the grid surface soil samples around and including older sample locations NTA-083 and NTA-102. The concentrations were screened against the 2017 USEPA RSLs for these PAHs at a TR of 1E-05. Generally, the samples collected in the western locations were below the RSLs, with the exception of a slight exceedance of benzo(a)pyrene at NTA-170. Concentrations were all below USEPA RSLs at sample locations NTA-165, NTA-168, and NTA-171.

The significant exceedances were in surface soil (0–1 ft bgs) at the eastern sample locations NTA-166, NTA-169, and NTA-172. These three sample locations were recommended for remediation in the FS from 0–1 ft bgs. This recommendation included additional delineation and confirmation sampling as part of the remedial alternative to further refine extent and confirm contaminant removal.

E.4 Conceptual Site Model

Conceptual site model elements are discussed in this section, including primary and secondary contaminant sources and release mechanisms, contaminant migration pathways and discharge or exit points, and potential human receptors and ecological resources.

E.4.1 Primary and Secondary Contaminant Sources and Release Mechanisms

No primary contaminant sources are located at NACA Test Area, and the minor residual infrastructure (e.g., Well Pit, concrete pads, crash strip) remain in place. Secondary sources (contaminated soil and sediment) are located at NACA Test Area. The potential mechanisms for contaminant releases from secondary sources at NACA Test Area include:

- Eroding soil with sorbed contaminants and mobilization in turbulent surface water flow under storm conditions,
- Dissolving soluble contaminants and transport in surface water,
- Re-suspending contaminated sediment during periods of high flow with downstream transport within the surface water system, and
- Contaminant leaching to groundwater.

E.4.2 Contaminant Migration Pathways and Exit Points

The potential for soil and sediment contaminants to impact groundwater was evaluated in the fate and transport evaluation presented in the NACA Test Area RI/FS Report (Leidos 2018). Contaminants in surface soil may migrate to surface water via drainage ditches in the dissolved phase following a storm event or as particulates in storm water runoff. Another potential secondary source of contamination at the AOC is contaminated sediment, which if deposited adjacent to a stream/ditch during a storm event, has potential to leach contaminants to groundwater.

Maximum site-related contaminant concentrations identified in surface and subsurface soil were evaluated using a series of generic screening steps to identify initial contaminant migration chemicals of potential concern (CMCOPCs). These CMCOPCs for soil were further evaluated using the Seasonal Soil Compartment model to predict leaching concentrations and identify final CMCOPCs based on RVAAP facility-wide background criteria and the lowest risk-based screening criteria among USEPA maximum contaminant levels, USEPA tap water RSLs, or RVAAP groundwater FWCUGs for the Resident Receptor Adult. Final CMCOPCs were evaluated using the Analytical Transient 1-, 2-, and 3-Dimensional (AT123D) model to predict groundwater mixing concentrations beneath source areas and concentrations at the nearest downgradient groundwater receptor to the AOC (e.g., stream). Maximum site-related contaminant concentrations in sediment were evaluated using an analytical solution to identify final CMCOPCs for evaluation using AT123D. The AT123D modeling results were evaluated with respect to AOC groundwater monitoring data, as well as model limitations and assumptions, to identify chemicals to be retained as CMCOCs.

SESOIL modeling was performed for initial CMCOPCs that have the potential to reach the water table within 1,000 years based on the soil screening analysis results. Conclusions of the soil and sediment screening, leachate modeling, and groundwater modeling are as follows:

- No sediment CMCOPCs exist at NACA Test Area.
- Among the soil CMCOPCs, antimony, arsenic, barium, cobalt, selenium, thallium, TNT, and naphthalene in the Former Crash Area were predicted to exceed the screening criteria in groundwater beneath the source area.
- Among the soil CMCOPCs, antimony, arsenic, barium, cadmium, copper, manganese, selenium, thallium,; and TNT in the Former Plane Burial Area were predicted to exceed the screening criteria in groundwater beneath the source area.
- Among the soil CMCOPCs, selenium; 2,4-dinitrotoluene (2,4-DNT); TNT; dibenzofuran; and naphthalene in the Former Plane Refueling/Crash Strip Area were predicted to exceed the screening criteria in groundwater beneath the source area, and naphthalene and 2,4-DNT are predicted to exceed the screening criteria in groundwater at the downgradient receptor location.

A qualitative assessment of the sample results was performed, and the limitations and assumptions of the models were considered to identify if any CMCOCs are present in soil at NACA Test Area that may potentially impact groundwater. This qualitative assessment concluded no CMCOCs were present in soil and sediment that may impact the groundwater beneath the source or at the downstream receptor location (Hinkley Creek). No further action is required of soil and sediment at NACA Test Area for the protection of groundwater. Groundwater will be further evaluated under the FWGWMP.

E.4.3 Potential Human Receptors and Ecological Resources

In February 2014, the Army and Ohio EPA amended the risk assessment process to address changes in the RVAAP restoration program. The *Final Technical Memorandum: Land Uses and Revised Risk Assessment Process for the RVAAP Installation Restoration Program* (ARNG 2014) identified the following three Categorical Land Uses and Representative Receptors to be considered during the RI phase of the CERCLA process.

1. Unrestricted (Residential) Land Use – Resident Receptor (Adult and Child) (formerly called Resident Farmer).
2. Military Training Land Use – National Guard Trainee.
3. Commercial/Industrial Land Use – Industrial Receptor (USEPA Composite Worker).

An evaluation using Resident Receptor (Adult and Child) FWCUGs was used to provide an Unrestricted (Residential) Land Use evaluation. If a site meets the standards for Unrestricted (Residential) Land Use, it can be used for all categories of land use at CJAG. The receptor is assumed to be exposed to surface soil from 0–1 ft bgs and subsurface soil from 1–13 ft bgs.

NACA Test Area has important and significant ecological resources such as wetlands, surface water, and terrestrial areas that completely support cover and food for small birds and mammals that typically require approximately 1 acre of habitat (USEPA 1993). Groundwater is not considered an exposure medium for ecological receptors on the AOC because these receptors are unlikely to contact groundwater greater than 5 ft bgs (initial depths to groundwater varied from 5.5–23 ft bgs at this AOC).

F CURRENT AND POTENTIAL FUTURE LAND AND RESOURCE USES

NACA Test Area is currently managed by ARNG/OHARNG. Since 1969, OHARNG has used NACA Test Area for training. The area is currently designated as Training Area 29 and is used as part of the land navigation course and for helicopter "touch and go" training for hasty landing zones.

The potential future uses for NACA Test Area are Military Training Land Use or Commercial/Industrial Land Use. The Resident Receptor was evaluated in the HHRA to assess an Unrestricted (Residential) Land Use scenario. This ROD discusses future land use as it pertains to soil, sediment, and surface water and how it impacts human health, the environment, and groundwater.

G SUMMARY OF SITE RISKS

The HHRA and ERA estimated risks to human receptors and ecological resources; identified exposure pathways; presented COCs and COPECs, if any; and provided a basis for remedial decisions. This section of the ROD summarizes the results of the HHRA and ERA, which are presented in detail in the NACA Test Area RI/FS Report (Leidos 2018) and NACA Test Area Proposed Plan (Leidos 2019) located in the Administrative Record and Information Repositories.

G.1 Human Health Risk Assessment

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 were surface soil, subsurface soil, sediment, and surface water. Using the results from the 1999 Phase I RI, 2010 PBA08 RI, and 2017 Supplemental Investigation, in addition to the USEPA RSLs revised in June 2017, the following COCs are recommended to be carried forward.

No COCs were identified for any receptor at any of the EUs in subsurface soil, sediment, or surface water. In addition, no COCs were identified for any receptor for surface soil in the Former Plane Burial Area.

The HHRA identified lead as a soil COC to be carried forward for remediation at the Former Crash Area Well Pit. Lead within the Former Crash Area Well Pit is likely attributable to lead-based paint on the metal cover and/or former equipment and piping that used to be in the pit, forming a hotspot of lead contamination. Lead is carried forward to be protective of the Resident Receptor, Industrial Receptor, and National Guard Trainee.

In addition, the HHRA identified five PAHs in surface soil (0–1 ft bgs) to be carried forward for potential remediation near the Former Plane Refueling/Crash Strip Area: benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene; specifically in the soil within the crash strip. Activities in this area (i.e., fueling, crashing, and burning airplanes) were a potential source of PAHs. These PAHs are carried forward to be protective of Unrestricted (Residential) Land Use. Benzo(a)pyrene in surface soil also were carried forward as a COC at the Former Crash Area. Lead in soil within the Former Crash Area Well Pit is carried forward to be protective of the Resident, Industrial, and National Guard Trainee Receptors.

G.2 Ecological Risk Assessment

The ecological habitat at NACA Test Area is approximately 47 acres and consists of mostly shrubland, field, and forest. The vegetation provides a habitat for birds, mammals, insects, and other organisms. 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 of habitat (USEPA 1993).Wetland/pond areas are located north of the Former Crash Area. Water generally flows southwest through the wetlands into the tributary to Hinkley Creek. Ecological resources at NACA Test Area were compared to the list of important ecological places and resources. Based on the 39 criteria defining important places as identified by the Army and Ohio EPA, important/significant ecological resources were identified at the AOC. The vegetation types present at NACA Test Area are also found elsewhere near the AOC, at CJAG, and in the ecoregion.

The northern long-eared bat (*Myotis septentrionalis*; federally threatened) exists at CJAG. There are no other federally listed species or critical habitats on CJAG. The closest recorded state-listed or federally listed species (Yellow-bellied sapsucker [*Sphyrapicus varius*] and Eastern box turtle [*Terrapene carolina*]) were identified approximately 200 ft east and 200 ft north of NACA Test Area (OHARNG 2014).

The ERA was conducted in accordance with the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008). The Level I Scoping ERA evaluated chemical contamination to determine if it posed a risk to the environment. Fourteen COPECs in sediment and 12 COPECs in surface water were retained. These COPECs consist of inorganic chemicals (metals) and SVOCs. Soil was not assessed in the historical ERA. Based on the identified COPECs, ecological risk in sediment and surface water was predicted in the historical investigation, and an additional investigation was recommended for NACA Test Area (SAIC 2001).

NACA Test Area has contamination and important/significant resources; therefore, the Scoping ERA continued to a Level II Screening ERA, evaluating soil, sediment, and surface water. Twenty-eight integrated COPECs were identified in soil, six in sediment, and two in surface water. However, no integrated COPECs are of ecological concern requiring remediation or further evaluation. Consequently, the Level II Screening ERA for NACA Test Area concluded with a recommendation that no further action is necessary to be protective of important ecological receptors.

The 2017 Supplemental Investigation confirmed that no further action is necessary to be protective of important ecological receptors. Specifically, findings concluded that the Former Crash Area Reservoir is isolated from the other water bodies at NACA Test Area, and any detected chemicals would have difficulty migrating to other wetlands in NACA Test Area. The lack of a migration pathway, absence of a source in the surrounding soils, along with the small size of the reservoir and the presence of quality aquatic habitat available nearby reduces ecological concern in this area. Maximum concentrations of PAHs at the Former Plane Refueling/Crash Strip Area from samples collected during the 2017 Supplemental Investigation are less than half of the previous maximum concentrations. Although additional remediation is not recommended to be protective for ecological risk, the proposed human-health driven remediation in this area would reduce exposure and risk to ecological receptors.

H REMEDIAL ACTION OBJECTIVES

The remedial action objective (RAO) references CUGs and risk levels that are considered protective of human health under current and future use scenarios. The RAO for NACA Test Area is to 1) prevent Industrial Receptor, National Guard Trainee, and Resident Receptor exposure to lead in soil above the CUG at the Former Crash Area Well Pit; and 2) prevent Resident Receptor exposure to surface soil (0–1 ft bgs) with concentrations of benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene above CUGs in the Former Plane Refueling/Crash Strip Area and benzo(a)pyrene in the Former Crash Area.

Figure 13 presents the estimated extent of surface soil (0–1 ft bgs) requiring remediation. Table 2 presents the remedial CUGs. The PAH CUGs presented in this ROD are different from the CUGs presented in the NACA Test Area RI/FS Report (Leidos 2018). Since the finalization of the NACA Test Area RI/FS Report, USEPA updated the cancer slope factors for the carcinogenic PAHs using more recent toxicity studies. These updated values are utilized in the June 2017 USEPA RSLs. The Resident Receptor FWCUGs and the USEPA Resident Soil RSLs at a TR of 1E-05 for the PAH COCs, updated in June 2017, are presented in Table 2. Accordingly, the current USEPA Resident Soil RSLs are being used as the CUGs for PAH remedial activities at NACA Test Area.

Table 2. Remedial Cleanup Goals

Chemical of Concern	Remedial Cleanup Goal (mg/kg)
Lead	400
Benz(a)anthracene	11
Benzo(a)pyrene	1.1
Benzo(b)fluoranthene	11
Dibenz(a,h)anthracene	1.1
Indeno(1,2,3-cd)pyrene	11

mg/kg = Milligrams per kilogram.

I DESCRIPTION OF ALTERNATIVES

Remedial alternatives for soil at NACA Test Area were developed and evaluated in the NACA Test Area RI/FS Report (Leidos 2018). The remedial alternatives are listed below:

- Alternative 1: No Action.
- Alternative 2: Excavation and Off-site Disposal of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use.
- Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use.

This section includes a description of various components of the remedial alternatives identified in the NACA Test Area RI/FS Report (Leidos 2018), including soil removal, disposal, and handling.

I.1 Alternative 1: No Action

Alternative 1 provides no remedial action and is required under the NCP as a baseline for comparison with other remedial alternatives. Alternative 1 provides no additional protection to human health and the environment. Any current legal and administrative LUC mechanisms at the AOC would be discontinued. No future legal, administrative, or physical LUC mechanisms would be employed at the AOC. Environmental monitoring would not be performed, and 5-year reviews would not be conducted in accordance with CERCLA 121(c). In addition, no restrictions on land use would be pursued. COCs at the AOC are not removed or treated.

I.2 Alternative 2: Excavation and Off-site Disposal – Attain Unrestricted Land Use

Implementing surface soil removal (0–1 ft bgs) at Areas 1, 2, and 3 and well pit removal would attain Unrestricted (Residential) Land Use. The following subsections describe activities associated with this alternative.

I.2.1 Delineation and Waste Characterization Sampling

To coincide with and support development of a remedial design (RD), a delineation/pre-excavation sampling plan would be implemented with the intent of: 1) adequately defining the extent of soil requiring removal to support the direct loading of soil on to trucks for off-site disposal, and

2) minimizing the time required to implement the remedial action by eliminating the need for post-excavation confirmation sampling. One waste characterization sample will be collected from the Well Pit soil to provide data to properly profile the waste and determine if the soil is characteristically non-hazardous or hazardous. Waste characterization samples will be collected from Areas 1, 2, and 3 before remedial activities are conducted to determine if it is characteristically non-hazardous or hazardous.

I.2.2 Remedial Design

An RD would be developed to outline site preparation activities. This RD will outline site preparation activities (e.g., staging and equipment storage areas, truck routes, storm water controls); the extent of the excavation; sequence and description of excavation and site restoration activities; decontamination; and segregation, transportation, and disposal of various waste streams. Erosion and health and safety controls will be enforced during the active construction period to ensure remediation workers and the environment are protected. No LUCs or 5-year reviews pursuant to CERCLA would be required because this alternative attains a level of protection for unrestricted use of the AOC.

I.2.3 Soil Removal

To achieve a scenario in which the AOC is protective for Unrestricted (Residential) Land Use, soil would be removed from Areas 1, 2, and 3, which are contaminated by PAHs, and soil from the well pit which exceeded the CUG for lead, would be hauled by truck to a licensed and permitted disposal facility. The former production well would be abandoned, and surface structures and casing to 3 ft bgs will be removed.

I.2.4 Site Restoration

All disturbed and excavated areas would be backfilled with clean soil and graded to meet neighboring contours. The backfill soil would come from a clean source that was previously sampled and approved for use by the Army and Ohio EPA. To ensure adequate vegetation is established within the excavated area, a layer of topsoil from a clean source would be placed on the backfilled soil.

After the areas are backfilled and graded, workers would apply a seed mixture (as approved by OHARNG) and mulch. Restored areas would be inspected and monitored as required in the storm water best management practices established in the RD.

I.3 Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use

This alternative involves two remedial technologies: 1) excavation and off-site disposal for the soil from the Well Pit and the Former Crash Area; and (2) ex situ thermal treatment for surface soil at Areas 1, 2, and 3. Implementing these remedial technologies would attain Unrestricted (Residential) Land Use. The following subsections describe activities associated with this alternative.

I.3.1 Delineation and Waste Characterization Sampling

To coincide with and support development of an RD, a delineation/pre-excavation sampling plan would be implemented with the intent of: 1) adequately defining the extent of soil requiring removal to support the direct loading of soil on to trucks for off-site disposal, and 2) minimizing the time required to implement the remedial action by eliminating the need for post-excavation confirmation sampling. One waste characterization sample will be collected from the Well Pit soil to provide data to properly profile the waste and determine if the soil is characteristically non-hazardous or hazardous. No waste characterization samples are required for the areas (Areas 1, 2, and 3) undergoing thermal treatment, as the treated soil is being placed back in the excavation area.

I.3.2 Remedial Design

An RD will be developed prior to initiating remedial actions. This RD will outline site preparation activities (e.g., staging and equipment storage areas, truck routes, storm water controls); the extent of the excavation; sequence and description of excavation and site restoration activities; decontamination; and segregation, transportation, and disposal of various waste streams. Erosion and health and safety controls will be enforced during the active construction period to ensure remediation workers and the environment are protected.

I.3.3 Soil Removal at the Well Pit

To achieve a scenario in which the AOC is protective for Unrestricted (Residential) Land Use, soil would be removed from the well pit which exceeded the CUG for lead, and hauled by truck to a licensed and permitted disposal facility. The former production well will be abandoned, and surface structures and casing to 3 ft bgs will be removed.

I.3.4 Soil Treatment at Areas 1, 2, and 3

The PAH-contaminated soil at Areas 1, 2, and 3 would undergo ex situ thermal treatment. Treated soil would be stockpiled and analyzed for COCs. Once the laboratory analysis determines COCs are below CUGs, the treated soil would be used for backfill and site restoration. Should confirmation samples indicate that any contaminants are not sufficiently treated, then those soils would be rerun through the treatment system, likely at a higher temperature, until the target post-treatment levels are reached. Five confirmatory samples will be collected from Area 1, and one confirmatory soil sample will be collected from the footprint of the removed Well Pit. Confirmation samples will not be required at Areas 2 and 3, as the pre-excavation delineation sampling will define the vertical and horizontal extents of soil removal.

I.3.5 Site Restoration

All disturbed and excavated areas would be backfilled with clean soil and graded to meet neighboring contours. The backfill soil would come from a clean source that was previously sampled and approved for use by the Army and Ohio EPA and from what was confirmed cleaned after thermal treatment. To ensure adequate vegetation is established within the excavated area, a layer of topsoil from a clean source would be placed on the treated soil.

After the areas are backfilled and graded, workers would apply a seed mixture (as approved by OHARNG) and mulch. Restored areas would be inspected and monitored as required in the storm water best management practices established in the RD.

J COMPARATIVE ANALYSIS OF ALTERNATIVES

These alternatives were evaluated with respect to the nine comparative analysis criteria. These criteria are further described, as outlined by CERCLA, in Table 3.

Table 3. CERCLA Evaluation Criteria

Overall Protection of Human Health and the Environment – Considers whether or not an alternative provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls.
Compliance with ARARs – Considers how a remedy will meet all of the applicable or relevant and appropriate requirements of other federal and state environmental statutes and/or provide grounds for invoking a waiver.
Long-term Effectiveness and Permanence – Considers the magnitude of residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met.
Reduction of Toxicity, Mobility, or Volume Through Treatment – Considers the anticipated performance of the treatment technologies that may be employed in a remedy.
Short-Term Effectiveness – Considers the speed with which the remedy achieves protection, as well as the potential to create adverse impacts on human health and the environment that may result during the construction and implementation period.
Implementability – Considers the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement the chosen solution.
Cost – Considers capital costs and operation and maintenance costs associated with the implementation of the alternative.
State Acceptance – Indicates whether the state concurs with, opposes, or has no comment on the preferred alternative.
Community Acceptance – Considers public input following a review of the public comments received on the RI/FS Report and Proposed Plan.

ARAR = Applicable or Relevant and Appropriate Requirement.
RI/FS = Remedial Investigation/Feasibility Study.

The nine criteria are categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria, as follows:

Threshold Criteria – Must be met for the alternative to be eligible for selection as a remedial option.

1. Overall protection of human health and the environment.
2. Compliance with applicable or relevant and appropriate requirements (ARARs).

Primary Balancing Criteria – Used to weigh major trade-offs among alternatives.

3. Long-term effectiveness and permanence.
4. Reduction of toxicity, mobility, or volume through treatment.
5. Short-term effectiveness.

6. Implementability.
7. Cost.

Modifying Criteria – FS consideration to the extent that information was available. Evaluated fully after public comment period on the Proposed Plan.

8. State acceptance.
9. Community acceptance.

The following subsections discuss the comparative analysis of the alternatives developed for NACA Test Area, and a scoring of these alternatives is presented in Table 4.

J.1 Overall Protection of Human Health and the Environment

Overall protection and compliance with ARARs are threshold criteria that must be met by any alternative to be eligible for selection. If any alternative is 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.

Alternative 1 is not protective of human health. In addition, Alternative 1 does not meet the RAO to prevent Resident Receptor exposure to surface soil (0–1 ft bgs). The concentrations of lead are above CUGs at the Well Pit and the concentrations of PAHs are above CUGs at Areas 1, 2, and 3. Therefore, Alternative 1 is not eligible for selection.

For the remaining alternatives, the balancing criteria (short- and long-term effectiveness; reduction of contaminant toxicity, mobility, or volume through treatment; ease of implementation; and cost) are used to select a recommended alternative among the alternatives that satisfy the threshold criteria. The remaining alternatives are ranked among one another for each of the balancing criteria and a total score is generated.

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 implementability of Alternative 3 is predicated on the on-site availability of the thermal treatment system. In the event that a thermal treatment system is not available on site at the former RVAAP, Alternative 2 is 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 4. Summary of Comparative Analysis of Remedial Alternatives

NCP Evaluation Criteria	Alternative 1: No Action	Alternative 2: Excavation and Off-site Disposal of Soil at Areas 1, 2, and 3 and Well Pit Removal - Attain Unrestricted (Residential) Land Use	Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal - 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 ($408,592)	3 ($293,769)
Balancing Criteria Score	*Not applicable*	*7*	*10*

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

Scoring for the balancing criteria is as follows: 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.

J.2 State Acceptance

State acceptance was evaluated formally after the public comment period on the Proposed Plan. Ohio EPA has expressed its support for Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal –Attain Unrestricted (Residential) Land Use.

J.3 Community Acceptance

Community acceptance was evaluated formally after the public comment period. During the public meeting, the community voiced no objections to Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal –Attain Unrestricted (Residential) Land Use, as indicated in Part III of this ROD, the Responsiveness Summary.

K PRINCIPAL THREAT WASTES

Principal threat wastes, as defined by USEPA in *A Guide to Principal Threat and Low Level Threat Wastes* (USEPA 1991), are source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or the environment should exposure occur.

Wastes that generally are considered to constitute principal threats include, but are not limited to:

- **Liquids** – Wastes contained in drums, lagoons, or tanks, free product floating on or under groundwater.
- **Mobile Source Material** – Surface soil or subsurface soil containing high concentrations of chemicals that are mobile due to wind entrainment, volatilization, surface runoff, or subsurface transport.
- **Highly Toxic Source Material** – Buried drummed non-liquid wastes, buried tanks containing non-liquid wastes, or soils containing significant concentrations of highly toxic materials.

USEPA guidance indicates where mobility and toxicity of source material combine to pose a potential risk of 10^{-3} or greater, generally treatment alternatives should be considered. NACA Test Area does not contain source materials that are considered principal threat wastes, as described above, and no chemicals pose a risk of 10^{-3} or greater. As such, no remedies are required to address principal threat wastes at this AOC.

L SELECTED REMEDY

Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal – Attain Unrestricted (Residential) Land Use is selected for implementation at NACA Test Area. This alternative also attains the requisite level of cleanup for Military Training Land Use and Commercial/Industrial Land Use.

L.1 Rationale for the Selected Remedy

The selected remedy meets the threshold criteria and provides the best overall balance of trade-offs in terms of the five balancing criteria:

- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, and volume;
- Short-term effectiveness;
- Implementability; and
- Cost.

The selected remedy is protective for the future use, is cost effective, and can be performed in a timely manner. Based on the available risk assessment information, the selected remedy will achieve the RAO, which prevents Resident Receptor exposure to surface soil (0–1 ft bgs) with concentrations of lead above CUGs at the Well Pit and PAH concentrations above CUGs at Areas 1, 2, and 3.

Using engineering controls, personal protective equipment, erosion and sediment controls, proper waste handling practices, and monitoring will mitigate short-term effects during construction. The selected remedy addresses state and community concerns by removing or treating contaminated soil from NACA Test Area.

Alternative 3 is a green and highly sustainable alternative for on-site treatment and unrestricted reuse of PAH-contaminated soil and implements a treatment alternative to reduce the toxicity, mobility, and volume of contamination.

L.2 Description of the Selected Remedy

Alternative 3 consists of thermally treating PAH-contaminated soil at Areas 1, 2, and 3; and excavation with off-site disposal of the lead contaminated soil at the Well Pit to achieve Unrestricted (Residential) Land Use. In the event that a thermal treatment system is not on-site at the former RVAAP, Alternative 2: Excavation and Off-site Disposal – Attain Unrestricted Land Use is readily available and considered for implementation by the Army. This alternative is described in more detail in Section I.3.

L.3 Summary of the Estimated Remedy Costs

The cost to complete Alternative 3 is approximately $293,769 (in base year 2018 dollars). This cost assumes an existing thermal treatment system is on site and ready for mobilization.

This cost estimate is based on the best available information regarding the anticipated scope of the selected remedy. This is an order of magnitude engineering cost estimate that is expected to be within –30 to +50% of the actual project cost in accordance with USEPA guidance (USEPA 1988).

L.4 Expected Outcomes of the Selected Remedy

Table 2 summarizes the CUGs to be achieved for soil at NACA Test Area after the remedial activities are complete. Residual risks after implementing the selected remedy will be within the acceptable risk range for the future use and will meet the criteria for Unrestricted (Residential) Land Use. Removing contaminated soil will reduce the likelihood of contaminant migration to other environmental media, such as surface water or groundwater. Removing soil to attain human health CUGs also will reduce risks to ecological receptors.

No negative socioeconomic and community revitalization impacts are expected from this remedial action. Positive socioeconomic impacts are expected from treating and excavating soil exceeding the CUGs because additional resources will available for use by the OHARNG training mission.

M STATUTORY DETERMINATIONS

The selected remedy satisfies the statutory requirements of CERCLA Section 121 and the NCP, as described below.

M.1 Protection of Human Health and the Environment

Human exposure to COCs will be eliminated to levels that are protective through treatment and excavation and off-site disposal of soil at NACA Test Area. The selected remedy also protects environmental resources from potential exposure to COC-contaminated media. The selected remedy will attain the CUGs listed in Table 2.

M.2 Compliance with ARARs

The selected remedy will comply with the action-specific ARARs listed in Attachment A.

M.3 Cost Effectiveness

The selected remedy meets the statutory requirement for a cost-effective remedy. Cost effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

M.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions are practicable for soil at the AOC. The selected remedy represents the best balance of trade-offs between the alternatives because it provides a permanent solution for contaminated media, is cost-effective, and eliminates the need for long-term LUCs respective to chemical contaminants in soil.

M.5 Preference for Treatment as a Principal Element

The selected remedy uses permanent solutions to the maximum extent practicable. The remedy satisfies the statutory preference for treatment, as a thermal treatment technology is the selected remedy for PAH-contaminated soil at Areas 1, 2, and 3.

M.6 Five-Year Review Requirements

Five-year reviews in compliance with CERCLA Section 121(c) and NCP Section 300.430(f)(4)(ii) will not be required.

N DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

The NACA Test Area Proposed Plan (Leidos 2019) was released for public comment on July 29, 2019. Feedback received from the public during the public comment period and public meeting are presented in Part III of this ROD. The Proposed Plan identified Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal –Attain Unrestricted (Residential) Land Use is selected for implementation at NACA Test Area. No significant changes were necessary or appropriate following the conclusion of the public comment period.

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PART III: RESPONSIVENESS SUMMARY FOR PUBLIC COMMENTS ON THE ARMY PROPOSED PLAN FOR RVAAP-38 NACA TEST AREA

A OVERVIEW

On July 29, 2019, the Army released the NACA Test Area Proposed Plan (Leidos 2019) for public comment. A 30-day public comment period was held from July 29, 2019 to August 27, 2019. The Army hosted a public meeting on August 15, 2019 to present the Proposed Plan and take questions and comments from the public for the record. The public comment period and public meeting also included proposed plans for Landfill North of Winklepeck Burning Grounds and Buildings F-15 and F-16.

For soil, surface water, and sediment at NACA Test Area, the Army recommended Alternative 3: Ex Situ Thermal Treatment of Soil at Areas 1, 2, and 3 and Well Pit Removal –Attain Unrestricted (Residential) Land Use is selected for implementation at NACA Test Area. During the public meeting, Ohio EPA concurred with the recommendation of this alternative.

The community voiced no objections to this recommendation. All public input, including the oral and written comments provided, was considered during the selection of the final remedy for soil, surface water, and sediment at NACA Test Area in this ROD.

B STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

The following subsections summarize the oral and written comments provided during the public comment period and public meeting. ARNG's responses provided below are considered final upon approval of the Final ROD.

B.1 Oral Comments from Public Meeting

No oral comments were received during the public meeting or public comment period.

B.2 Written Comments

No written comments were received during the public comment period.

C TECHNICAL AND LEGAL ISSUES

No technical or legal issues were raised during the public comment period.

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PART IV: REFERENCES

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FIGURES

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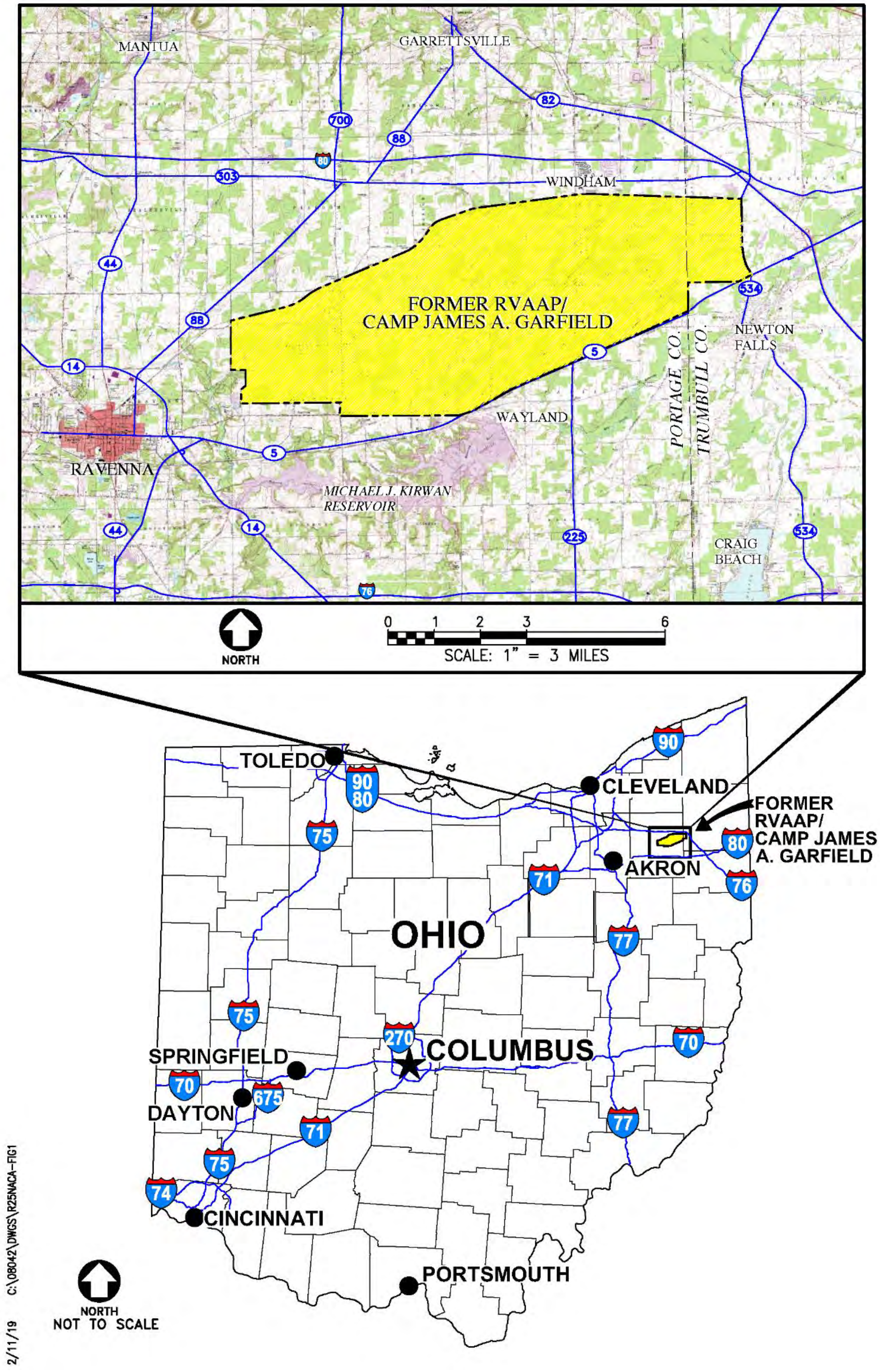

Figure 1. General Location and Orientation of Camp James A. Garfield

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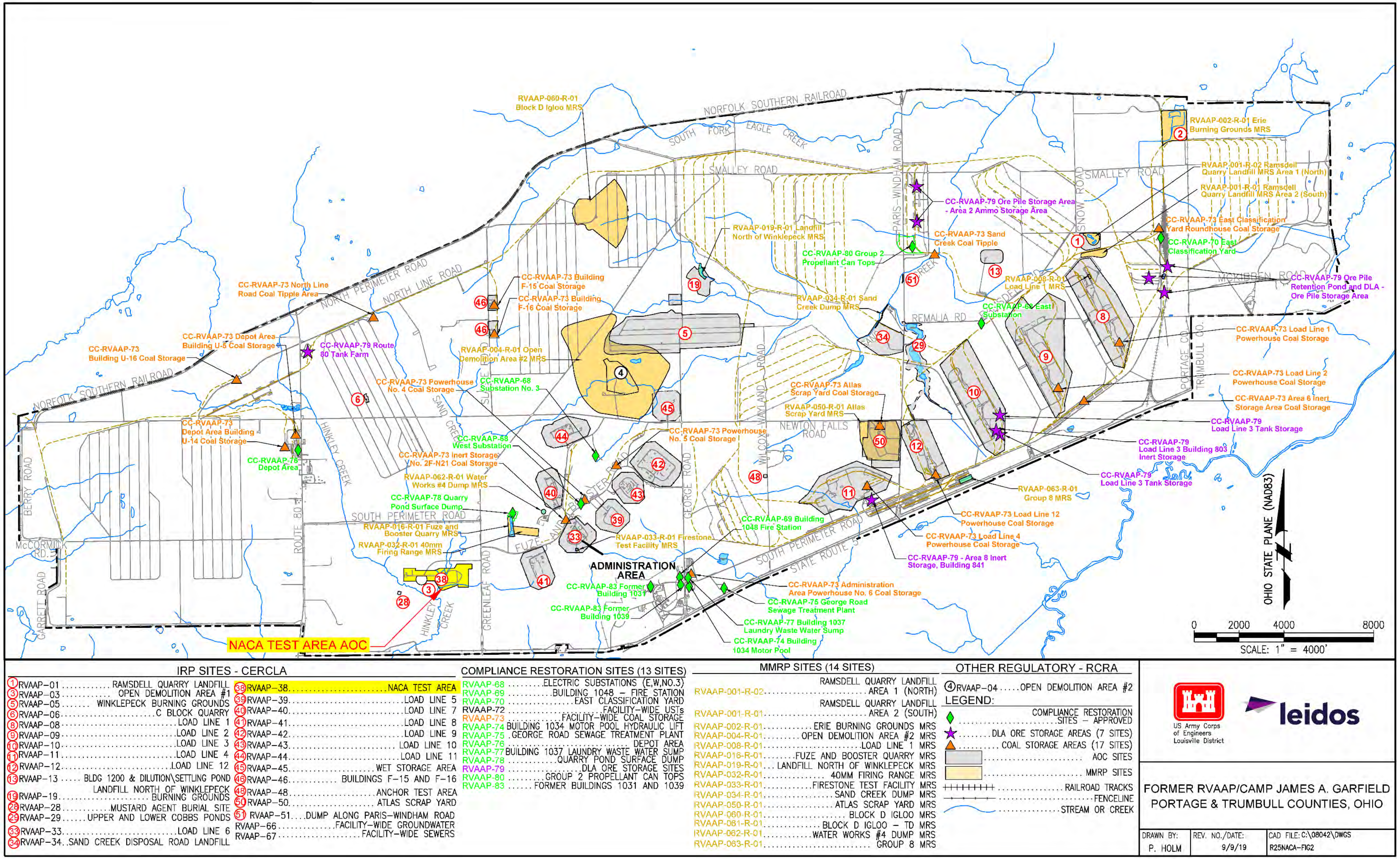

Figure 2. Location of NACA Test Area within Camp James A. Garfield

Figure 3. NACA Test Area – 1952 Aerial Photograph

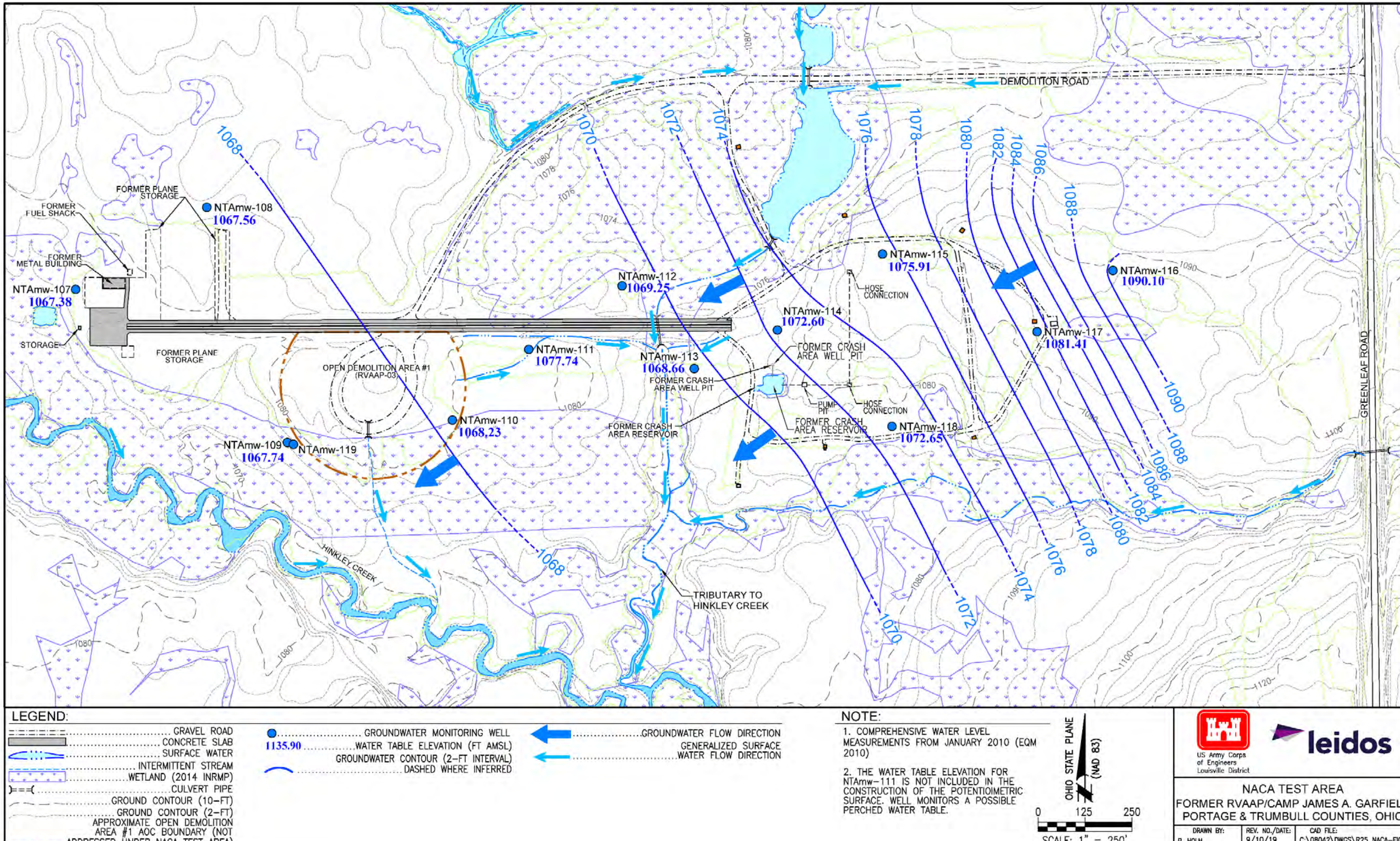

Figure 4. NACA Test Area – Current Site Features

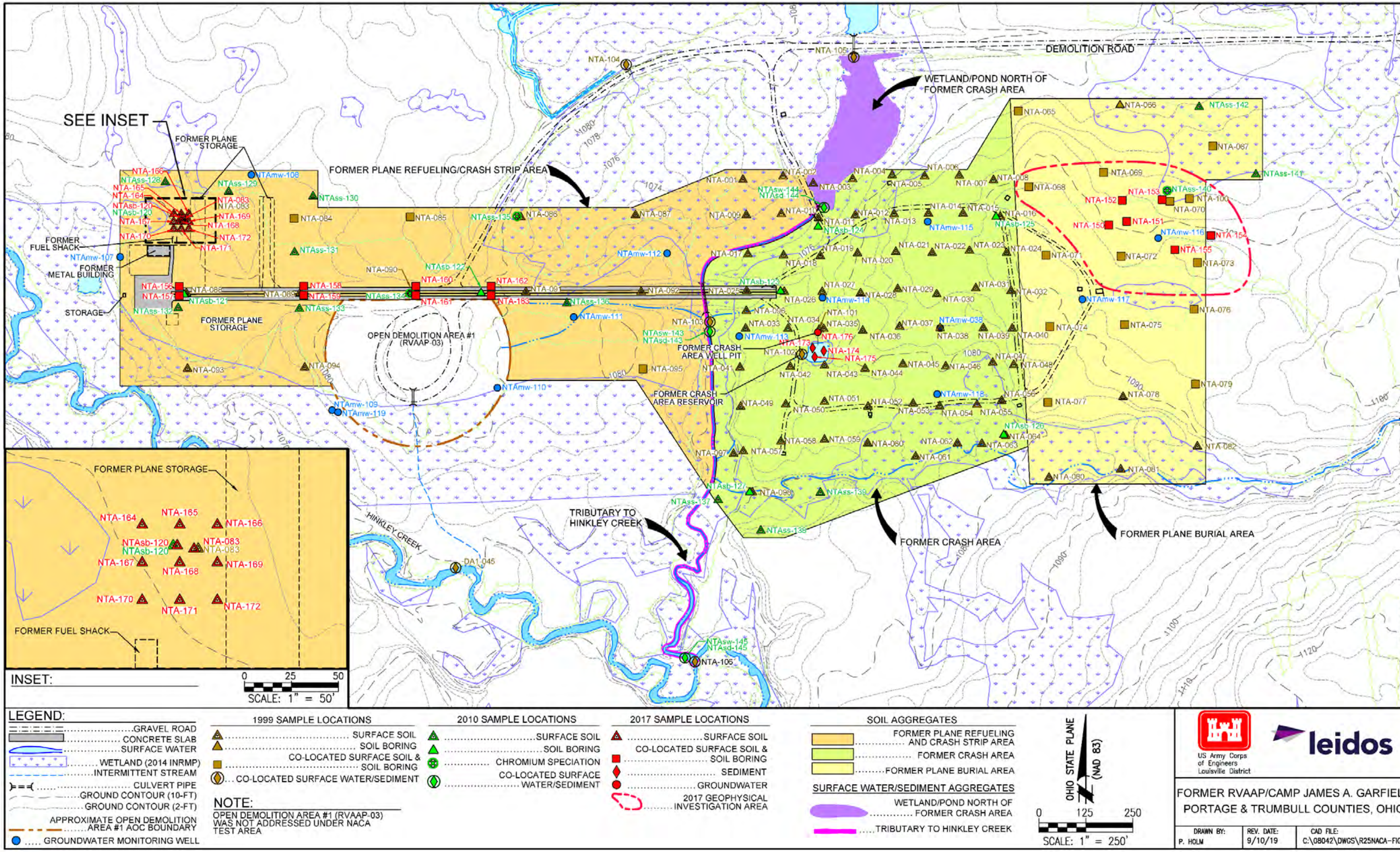

Figure 5. NACA Test Area Sample Locations

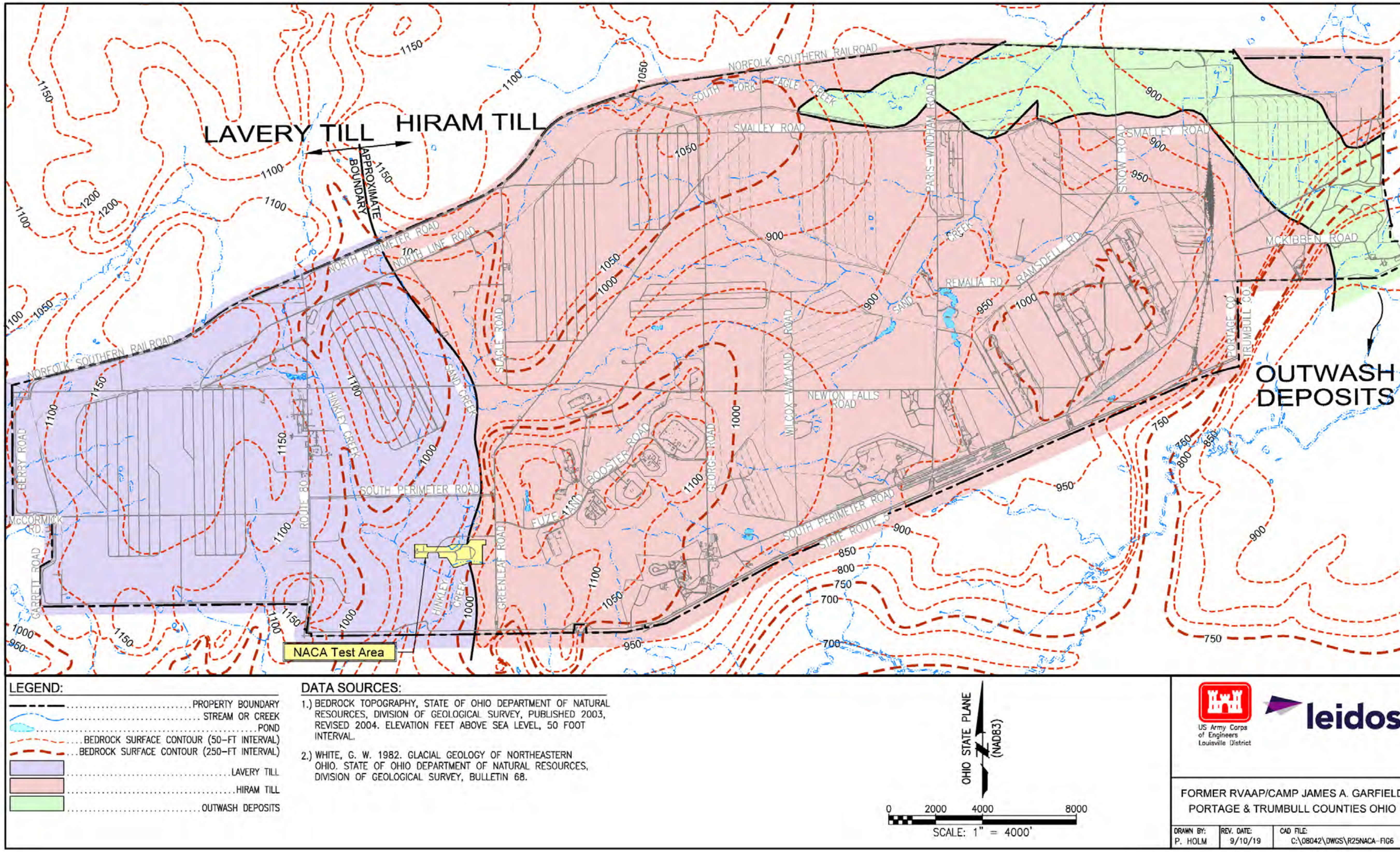

Figure 6. Geologic Map of Unconsolidated Deposits on Camp James A. Garfield

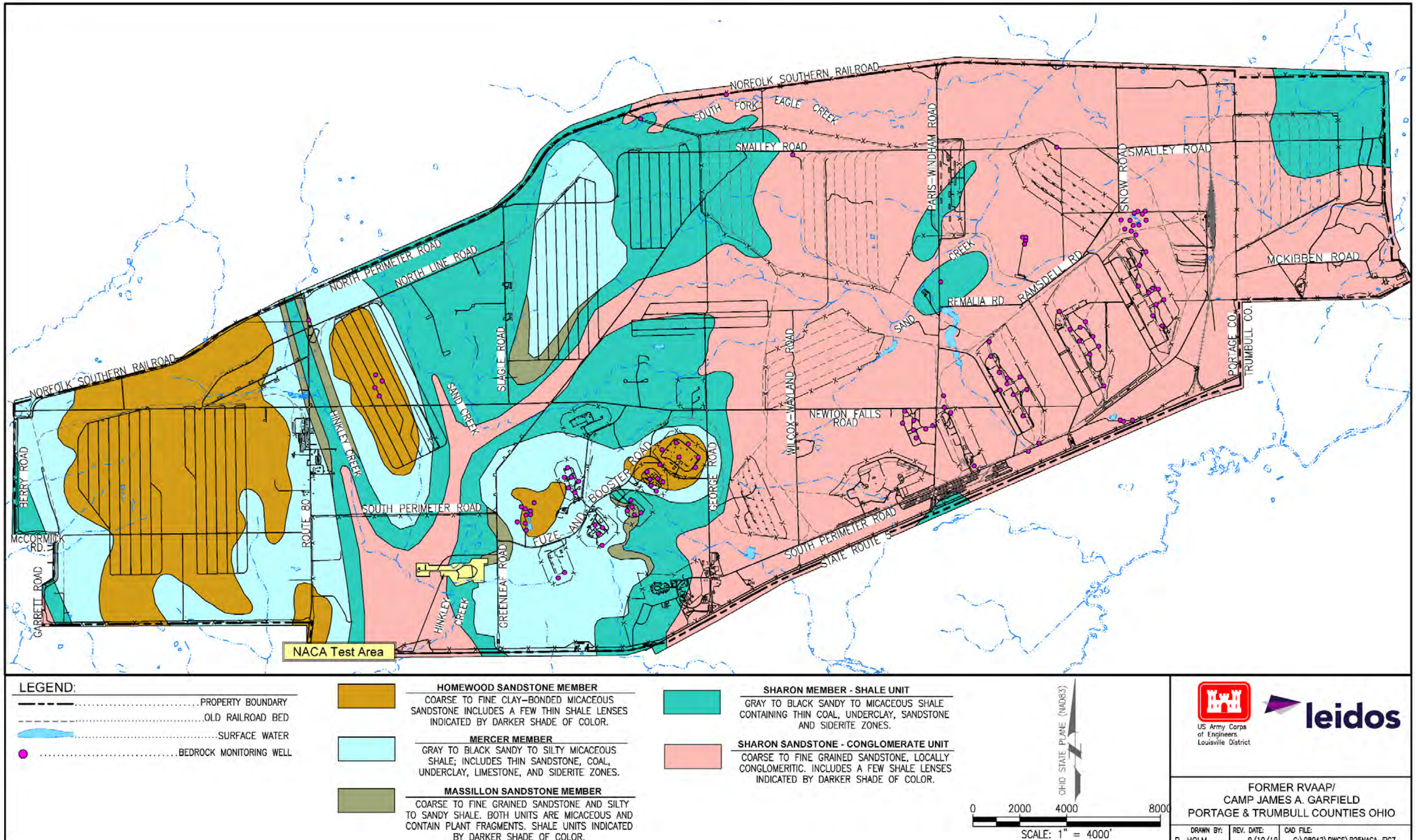

Figure 7. Geologic Bedrock Map and Stratigraphic Description of Units on Camp James A. Garfield

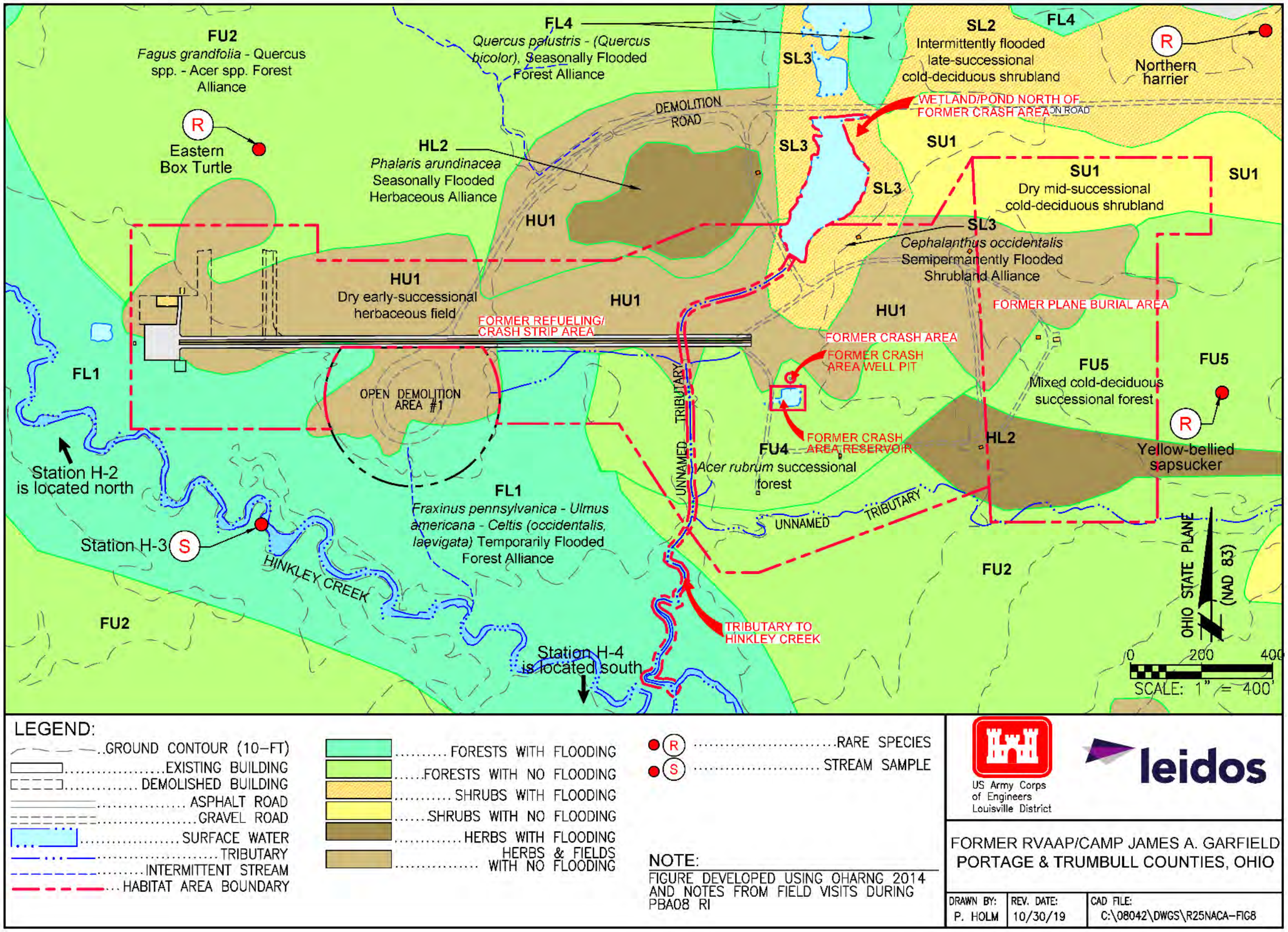

Figure 8. Natural Resources Inside and Near the Habitat Area at NACA Test Area

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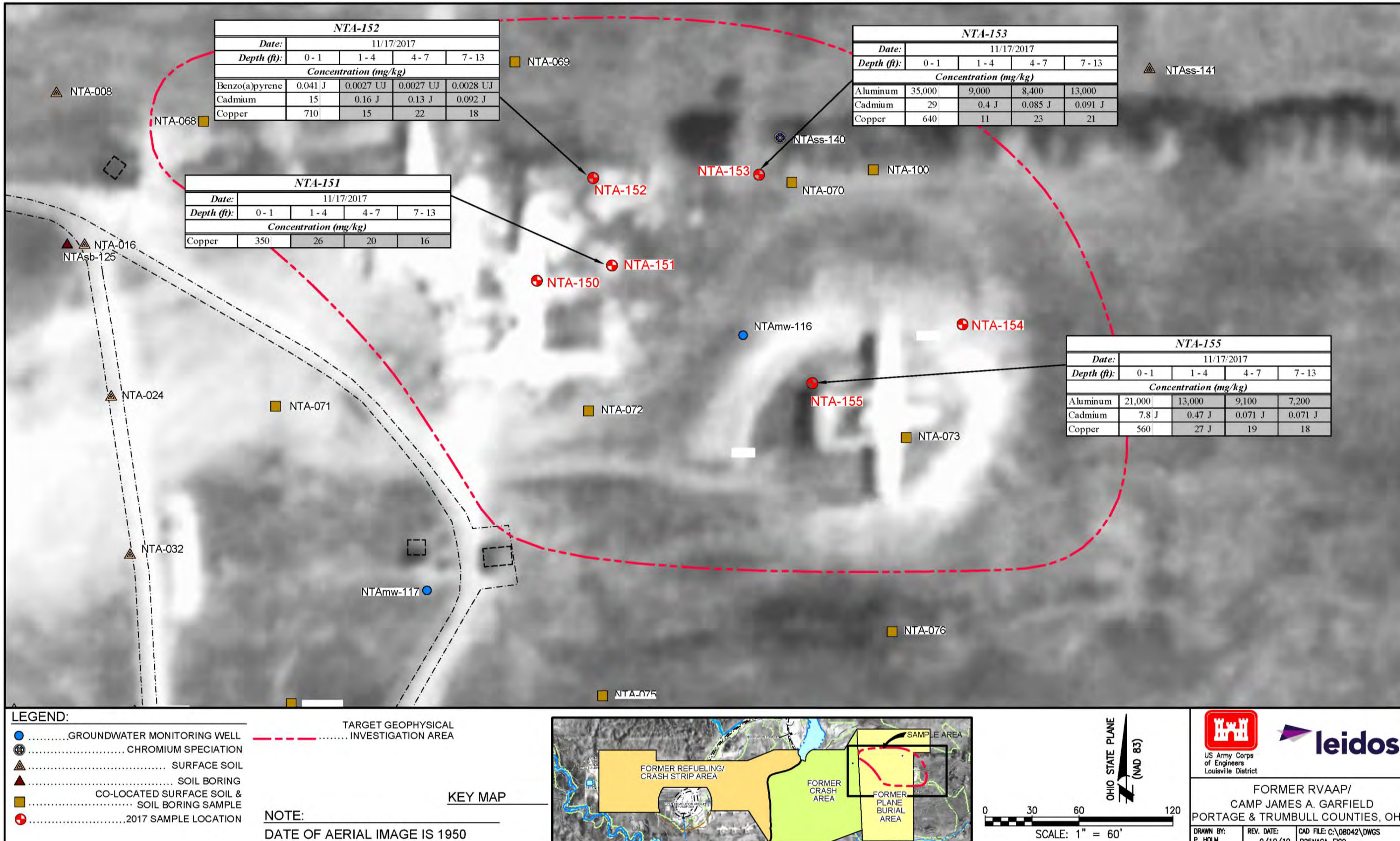


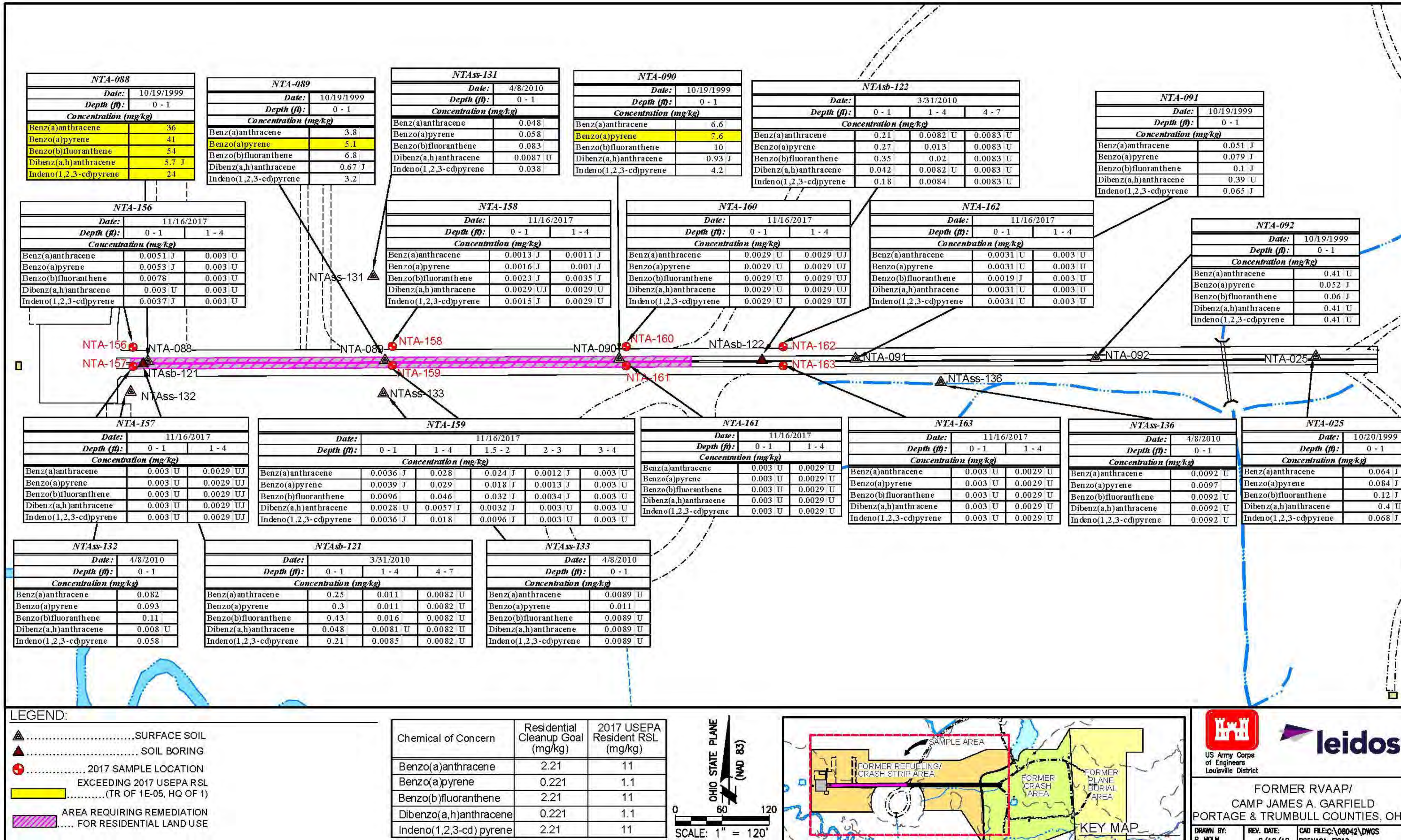
NTA-152				
Date:	11/17/2017			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Benzo(a)pyrene	0.041 J	0.0027 UJ	0.0027 UJ	0.0028 UJ
Cadmium	15	0.16 J	0.13 J	0.092 J
Copper	710	15	22	18

NTA-153				
Date:	11/17/2017			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Aluminum	35,000	9,000	8,400	13,000
Cadmium	29	0.4 J	0.085 J	0.091 J
Copper	640	11	23	21

NTA-151				
Date:	11/17/2017			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Copper	350	26	20	16

NTA-155				
Date:	11/17/2017			
Depth (ft):	0 - 1	1 - 4	4 - 7	7 - 13
Concentration (mg/kg)				
Aluminum	21,000	13,000	9,100	7,200
Cadmium	7.8 J	0.47 J	0.071 J	0.071 J
Copper	560	27 J	19	18

Figure 9. Exceedances of FWCUG (HQ of 0.1, TR of 1E-06) in Soil – Former Plane Burial Area, 2017 Supplemental Investigation



Chemical of Concern	Residential Cleanup Goal (mg/kg)	2017 USEPA Resident RSL (mg/kg)
Benzo(a)anthracene	2.21	11
Benzo(a)pyrene	0.221	1.1
Benzo(b)fluoranthene	2.21	11
Dibenzo(a,h)anthracene	0.221	1.1
Indeno(1,2,3-cd) pyrene	2.21	11

NTA-088

Date:	10/19/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	36
Benzo(a)pyrene	41
Benzo(b)fluoranthene	54
Dibenz(a,h)anthracene	5.7 J
Indeno(1,2,3-cd)pyrene	24

NTA-089

Date:	10/19/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	3.8
Benzo(a)pyrene	5.1
Benzo(b)fluoranthene	6.8
Dibenz(a,h)anthracene	0.67 J
Indeno(1,2,3-cd)pyrene	3.2

NTAss-131

Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.048
Benzo(a)pyrene	0.058
Benzo(b)fluoranthene	0.083
Dibenz(a,h)anthracene	0.0087 U
Indeno(1,2,3-cd)pyrene	0.038

NTA-090

Date:	10/19/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	6.6
Benzo(a)pyrene	7.6
Benzo(b)fluoranthene	10
Dibenz(a,h)anthracene	0.93 J
Indeno(1,2,3-cd)pyrene	4.2

NTAsb-122

Date:	3/31/2010		
Depth (ft):	0 - 1	1 - 4	4 - 7
Concentration (mg/kg)			
Benz(a)anthracene	0.21	0.0082 U	0.0083 U
Benzo(a)pyrene	0.27	0.013	0.0083 U
Benzo(b)fluoranthene	0.35	0.02	0.0083 U
Dibenz(a,h)anthracene	0.042	0.0082 U	0.0083 U
Indeno(1,2,3-cd)pyrene	0.18	0.0084	0.0083 U

NTA-091

Date:	10/19/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.051 J
Benzo(a)pyrene	0.079 J
Benzo(b)fluoranthene	0.1 J
Dibenz(a,h)anthracene	0.39 U
Indeno(1,2,3-cd)pyrene	0.065 J

NTA-156

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.0051 J	0.003 U
Benzo(a)pyrene	0.0053 J	0.003 U
Benzo(b)fluoranthene	0.0078	0.003 U
Dibenz(a,h)anthracene	0.003 U	0.003 U
Indeno(1,2,3-cd)pyrene	0.0037 J	0.003 U

NTA-158

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.0013 J	0.0011 J
Benzo(a)pyrene	0.0016 J	0.001 J
Benzo(b)fluoranthene	0.0023 J	0.0035 J
Dibenz(a,h)anthracene	0.0029 UJ	0.0029 U
Indeno(1,2,3-cd)pyrene	0.0015 J	0.0029 U

NTA-160

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.0029 U	0.0029 UJ
Benzo(a)pyrene	0.0029 U	0.0029 UJ
Benzo(b)fluoranthene	0.0029 U	0.0029 UJ
Dibenz(a,h)anthracene	0.0029 U	0.0029 UJ
Indeno(1,2,3-cd)pyrene	0.0029 U	0.0029 UJ

NTA-162

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.0031 U	0.003 U
Benzo(a)pyrene	0.0031 U	0.003 U
Benzo(b)fluoranthene	0.0019 J	0.003 U
Dibenz(a,h)anthracene	0.0031 U	0.003 U
Indeno(1,2,3-cd)pyrene	0.0031 U	0.003 U

NTA-092

Date:	10/19/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.41 U
Benzo(a)pyrene	0.052 J
Benzo(b)fluoranthene	0.06 J
Dibenz(a,h)anthracene	0.41 U
Indeno(1,2,3-cd)pyrene	0.41 U

NTA-157

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.003 U	0.0029 UJ
Benzo(a)pyrene	0.003 U	0.0029 UJ
Benzo(b)fluoranthene	0.003 U	0.0029 UJ
Dibenz(a,h)anthracene	0.003 U	0.0029 UJ
Indeno(1,2,3-cd)pyrene	0.003 U	0.0029 UJ

NTA-159

Date:	11/16/2017				
Depth (ft):	0 - 1	1 - 4	1.5 - 2	2 - 3	3 - 4
Concentration (mg/kg)					
Benz(a)anthracene	0.0036 J	0.028	0.024 J	0.0012 J	0.003 U
Benzo(a)pyrene	0.0039 J	0.029	0.018 J	0.0013 J	0.003 U
Benzo(b)fluoranthene	0.0096	0.046	0.032 J	0.0034 J	0.003 U
Dibenz(a,h)anthracene	0.0028 U	0.0057 J	0.0032 J	0.003 U	0.003 U
Indeno(1,2,3-cd)pyrene	0.0036 J	0.018	0.0096 J	0.003 U	0.003 U

NTA-161

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.003 U	0.0029 U
Benzo(a)pyrene	0.003 U	0.0029 U
Benzo(b)fluoranthene	0.003 U	0.0029 U
Dibenz(a,h)anthracene	0.003 U	0.0029 U
Indeno(1,2,3-cd)pyrene	0.003 U	0.0029 U

NTA-163

Date:	11/16/2017	
Depth (ft):	0 - 1	1 - 4
Concentration (mg/kg)		
Benz(a)anthracene	0.003 U	0.0029 U
Benzo(a)pyrene	0.003 U	0.0029 U
Benzo(b)fluoranthene	0.003 U	0.0029 U
Dibenz(a,h)anthracene	0.003 U	0.0029 U
Indeno(1,2,3-cd)pyrene	0.003 U	0.0029 U

NTAss-136

Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.0092 U
Benzo(a)pyrene	0.0097
Benzo(b)fluoranthene	0.0092 U
Dibenz(a,h)anthracene	0.0092 U
Indeno(1,2,3-cd)pyrene	0.0092 U

NTA-025

Date:	10/20/1999
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.064 J
Benzo(a)pyrene	0.084 J
Benzo(b)fluoranthene	0.12 J
Dibenz(a,h)anthracene	0.4 U
Indeno(1,2,3-cd)pyrene	0.068 J

NTAss-132

Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.082
Benzo(a)pyrene	0.093
Benzo(b)fluoranthene	0.11
Dibenz(a,h)anthracene	0.008 U
Indeno(1,2,3-cd)pyrene	0.058

NTAsb-121

Date:	3/31/2010		
Depth (ft):	0 - 1	1 - 4	4 - 7
Concentration (mg/kg)			
Benz(a)anthracene	0.25	0.011	0.0082 U
Benzo(a)pyrene	0.3	0.011	0.0082 U
Benzo(b)fluoranthene	0.43	0.016	0.0082 U
Dibenz(a,h)anthracene	0.048	0.0081 U	0.0082 U
Indeno(1,2,3-cd)pyrene	0.21	0.0085	0.0082 U

NTAss-133

Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.0089 U
Benzo(a)pyrene	0.011
Benzo(b)fluoranthene	0.0089 U
Dibenz(a,h)anthracene	0.0089 U
Indeno(1,2,3-cd)pyrene	0.0089 U

Figure 10. PAH Exceedances of RSLs within the Crash Strip

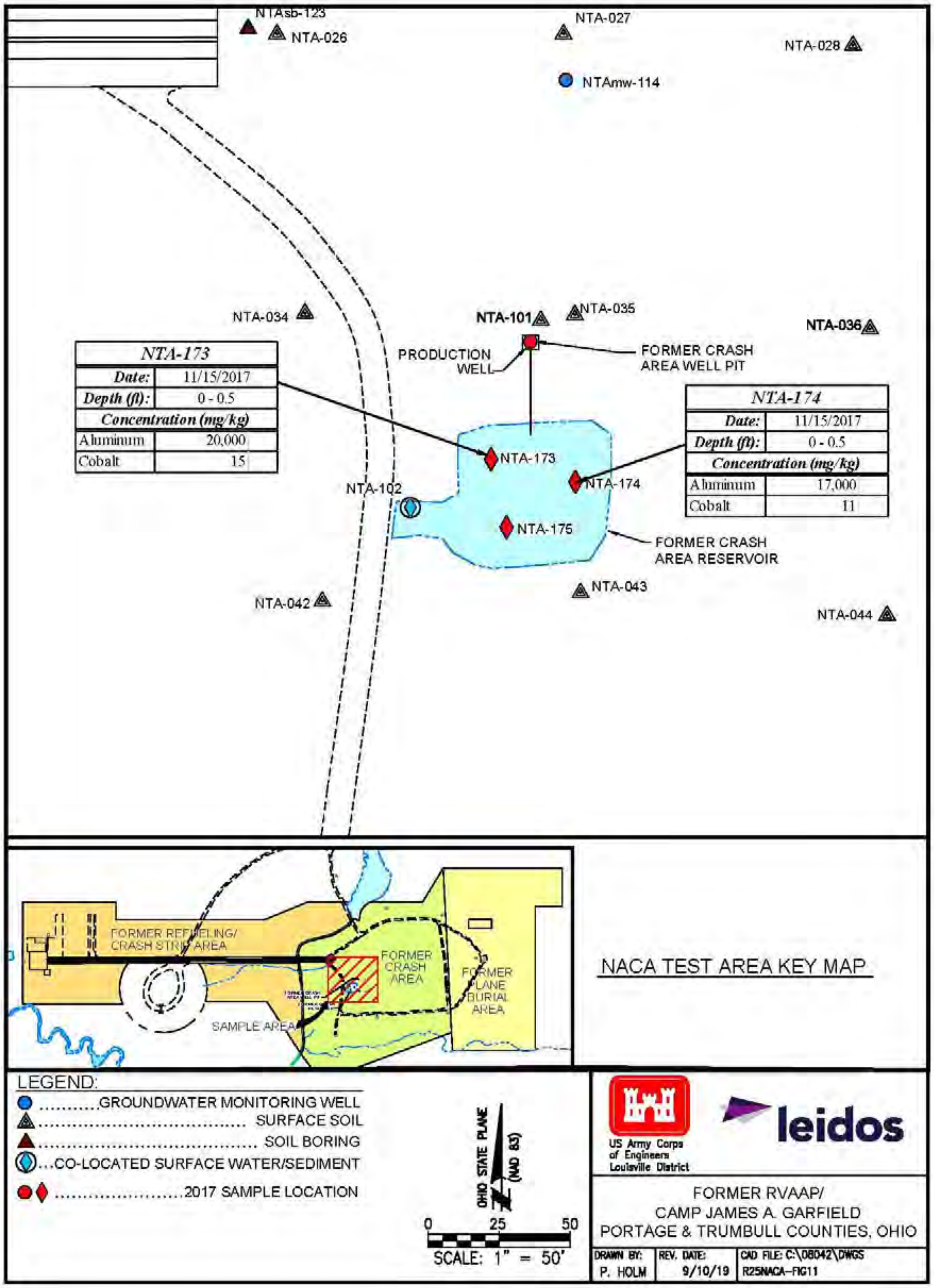


Figure 11. Exceedances of FWCUG (HQ of 0.1, TR of 1E-06) in Sediment – Former Crash Area Reservoir

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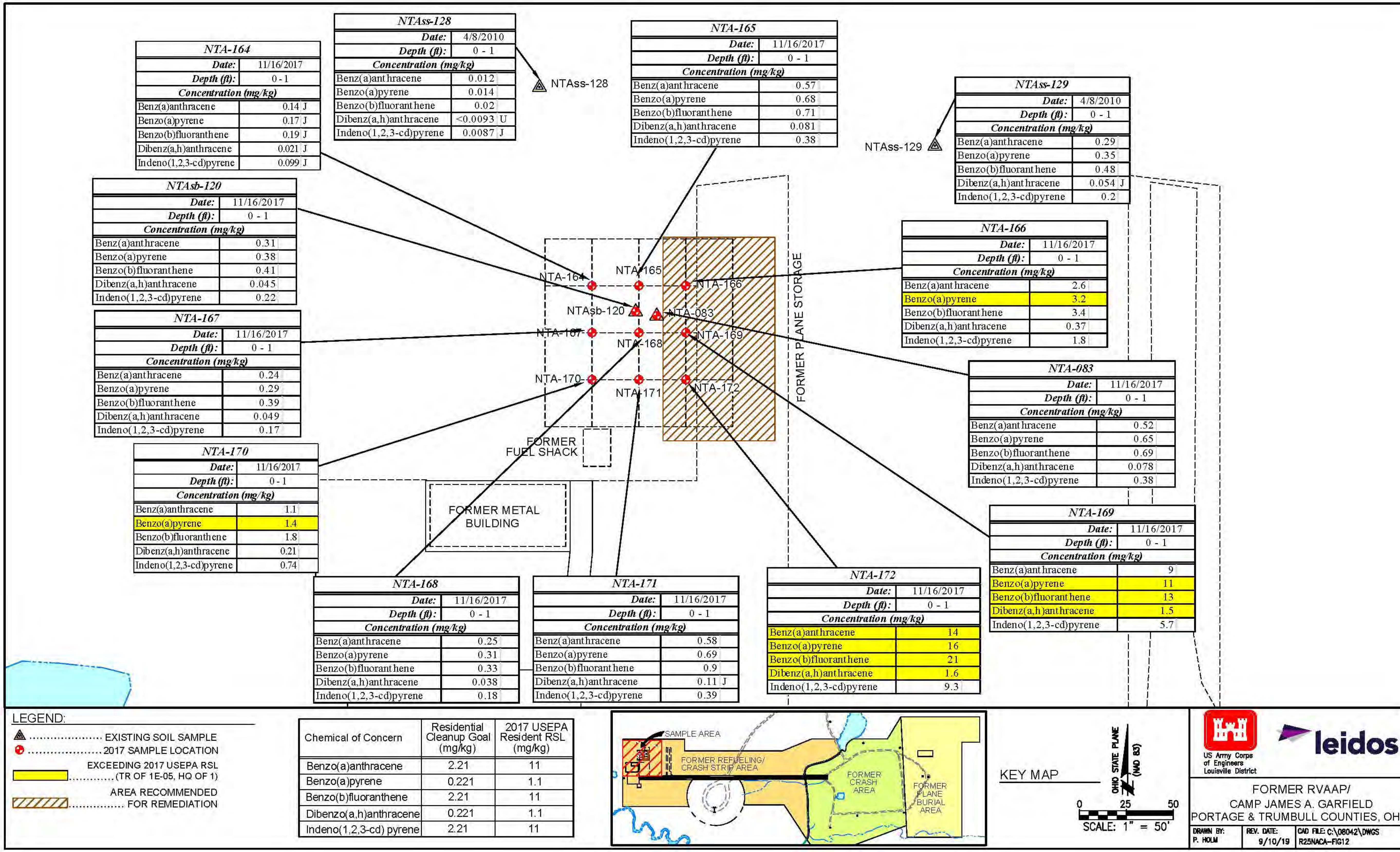

NTAss-128	
Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.012
Benzo(a)pyrene	0.014
Benzo(b)fluoranthene	0.02
Dibenz(a,h)anthracene	<0.0093 U
Indeno(1,2,3-cd)pyrene	0.0087 J

NTA-164	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.14 J
Benzo(a)pyrene	0.17 J
Benzo(b)fluoranthene	0.19 J
Dibenz(a,h)anthracene	0.021 J
Indeno(1,2,3-cd)pyrene	0.099 J

NTA-165	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.57
Benzo(a)pyrene	0.68
Benzo(b)fluoranthene	0.71
Dibenz(a,h)anthracene	0.081
Indeno(1,2,3-cd)pyrene	0.38

NTAss-129	
Date:	4/8/2010
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.29
Benzo(a)pyrene	0.35
Benzo(b)fluoranthene	0.48
Dibenz(a,h)anthracene	0.054 J
Indeno(1,2,3-cd)pyrene	0.2

NTAsb-120	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.31
Benzo(a)pyrene	0.38
Benzo(b)fluoranthene	0.41
Dibenz(a,h)anthracene	0.045
Indeno(1,2,3-cd)pyrene	0.22

NTA-166	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	2.6
Benzo(a)pyrene	3.2
Benzo(b)fluoranthene	3.4
Dibenz(a,h)anthracene	0.37
Indeno(1,2,3-cd)pyrene	1.8

NTA-167	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.24
Benzo(a)pyrene	0.29
Benzo(b)fluoranthene	0.39
Dibenz(a,h)anthracene	0.049
Indeno(1,2,3-cd)pyrene	0.17

NTA-083	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.52
Benzo(a)pyrene	0.65
Benzo(b)fluoranthene	0.69
Dibenz(a,h)anthracene	0.078
Indeno(1,2,3-cd)pyrene	0.38

NTA-170	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	1.1
Benzo(a)pyrene	1.4
Benzo(b)fluoranthene	1.8
Dibenz(a,h)anthracene	0.21
Indeno(1,2,3-cd)pyrene	0.74

NTA-169	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	9
Benzo(a)pyrene	11
Benzo(b)fluoranthene	13
Dibenz(a,h)anthracene	1.5
Indeno(1,2,3-cd)pyrene	5.7

NTA-168	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.25
Benzo(a)pyrene	0.31
Benzo(b)fluoranthene	0.33
Dibenz(a,h)anthracene	0.038
Indeno(1,2,3-cd)pyrene	0.18

NTA-171	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	0.58
Benzo(a)pyrene	0.69
Benzo(b)fluoranthene	0.9
Dibenz(a,h)anthracene	0.11 J
Indeno(1,2,3-cd)pyrene	0.39

NTA-172	
Date:	11/16/2017
Depth (ft):	0 - 1
Concentration (mg/kg)	
Benz(a)anthracene	14
Benzo(a)pyrene	16
Benzo(b)fluoranthene	21
Dibenz(a,h)anthracene	1.6
Indeno(1,2,3-cd)pyrene	9.3

Chemical of Concern	Residential Cleanup Goal (mg/kg)	2017 USEPA Resident RSL (mg/kg)
Benzo(a)anthracene	2.21	11
Benzo(a)pyrene	0.221	1.1
Benzo(b)fluoranthene	2.21	11
Dibenzo(a,h)anthracene	0.221	1.1
Indeno(1,2,3-cd) pyrene	2.21	11

Figure 12. PAH Exceedances of RSLs at NTA-083 and NTA-120

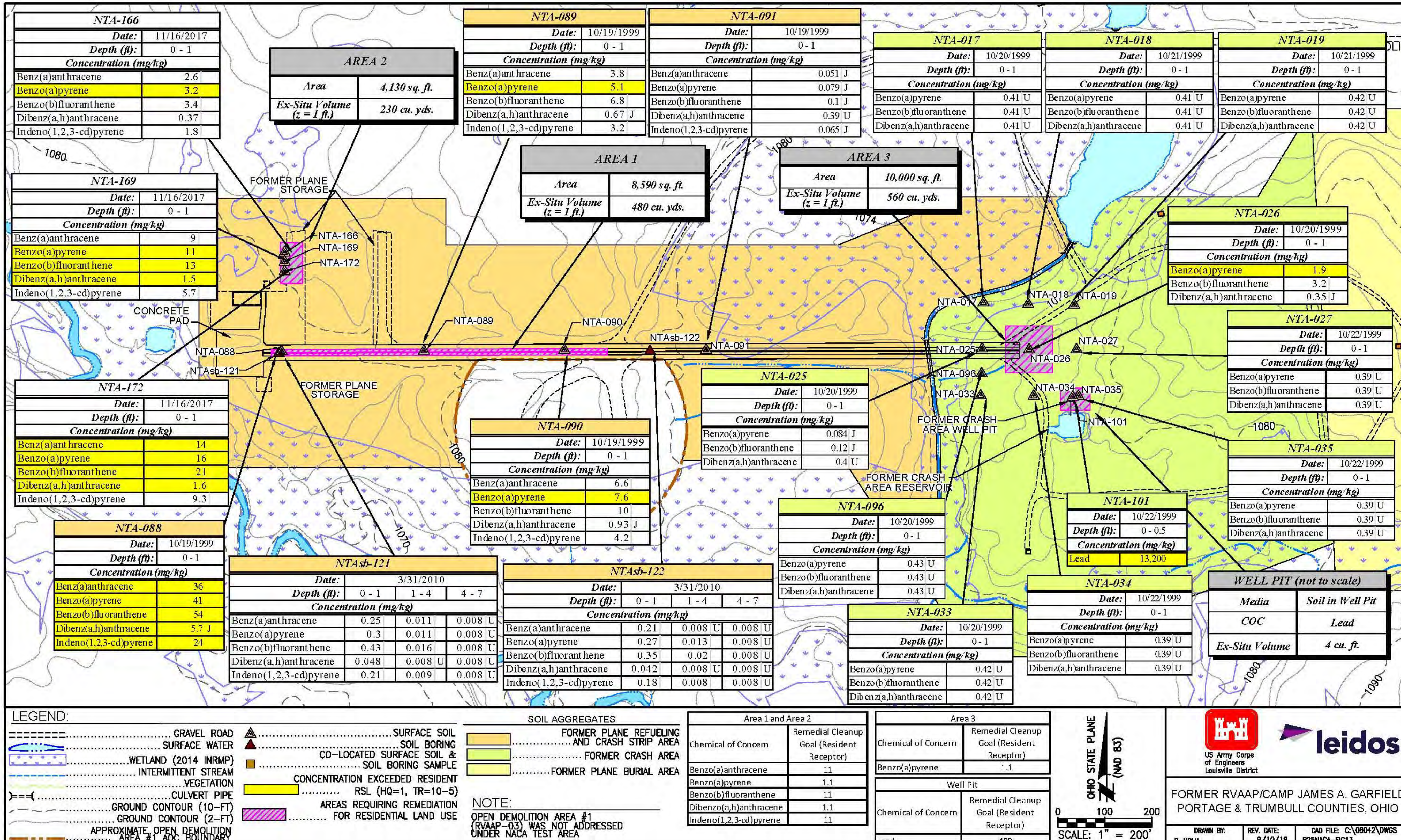

Figure 13. Estimated Extent of Soil Requiring Remediation to Attain Unrestricted (Residential) Land Use

APPENDIX A.

Applicable or Relevant and Appropriate Requirements (ARARs)

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Table A–1. Potential Action-Specific ARARs

Media and Citation	Description of Requirement	Potential ARAR Status	Standard
Prohibition of air pollution nuisances (e.g., fugitive dust) OAC Section 3745-15-07	These rules prohibit releasing nuisance air pollution that endangers health, safety, or welfare of the public or cause personal injury or property damage.	Applies to any activity that could result in the release of a nuisance air pollutant. This would include dust from excavation or soil management processes.	Any person undertaking an activity is prohibited from emitting nuisance air pollution.
Storm water requirements at construction sites 40 CFR Part 450	These rules require that storm water controls be employed at construction sites that exceed 1 acre.	Applies to any construction activity that exceeds 1 acre.	Persons undertaking construction activities (including grubbing and land clearing) at an AOC where the construction footprint is over 1 acre must design and implement erosion and runoff controls.
Hazardous Waste Determination OAC Section 3745-52-11	These rules require that a generator determine whether a material generated is a hazardous waste.	Applies to any material that is or contains a solid waste. Must be characterized to determine whether the material is or contains a hazardous waste.	Any person that generates a waste as defined must use prescribed methods to determine if waste is considered characteristically hazardous using the prescribed methods.
Management of contaminated soil or debris that is or contains a hazardous waste OAC Sections 3745-52-30 through 3745-52-34	These rules require that hazardous waste be properly packaged, labeled, marked, and accumulated on site pending on- or off-site disposal.	Applies to any hazardous waste, or media containing a hazardous waste that is generated from on-site activities.	All hazardous waste must be accumulated in a compliant manner that includes proper marking, labeling, and packaging in accordance with the specified regulations. This includes inspecting containers or container areas where hazardous waste is accumulated on site.
Acquisition and use of manifests for hazardous waste shipments to off-site treatment, storage or disposal facilities OAC Sections 3745-52-20 through 3745-52-23	These rules require that a Uniform Hazardous Waste Manifest be used for any off-site shipment of hazardous waste.	Applies to any shipment of hazardous waste to an off-site facility for treatment, storage, or disposal.	Requires a generator who transports or offers to transport hazardous waste for off-site treatment, storage, or disposal to prepare a uniform hazardous waste manifest.

Table A–1. Potential Action-Specific ARARs (continued)

Media and Citation	Description of Requirement	Potential ARAR Status	Standard
Soil contaminated with RCRA hazardous waste OAC Section 3745-270-49 OAC Section 3745-270-48 UTS	These rules prohibit land disposal of RCRA hazardous waste subject to them, unless the waste is treated to meet certain standards that are protective of human health and the environment. Standards for treating hazardous waste-contaminated soil prior to disposal are set forth in the two cited rules. Using the greater of either technology-based standards or UTS is prescribed.	LDRs apply only to RCRA hazardous waste. This rule is considered for ARAR status only upon generating a RCRA hazardous waste. If any soil is determined to be RCRA hazardous waste, and if it will be disposed of on site, this rule is potentially applicable to disposal of the soil.	All soil subject to treatment must be treated as follows: 1) For non-metals, treatment must achieve 90% reduction in total constituent concentration (primary constituent for which the waste is characteristically hazardous as well as for any organic or inorganic UHC), subject to item 3 below. 2) For the inorganic chemicals carbon disulfide, cyclohexanone, and methanol, treatment must achieve 90% reduction in constituent concentrations as measured in leachate from the treated media (tested according to the TCLP) or 90% reduction in total constituent concentrations (when a inorganic chemical removal treatment technology is used), subject to item 3 below. 3) When treating any constituent subject to achieve a 90% reduction standard would result in a concentration less than 10 times the UTS for that constituent, treatment to achieve constituent concentrations less than 10 times the UTS is not required. This is commonly referred to as “90% capped by 10xUTS.”

Table A–1. Potential Action-Specific ARARs (continued)

Media and Citation	Description of Requirement	Potential ARAR Status	Standard
Soil/debris contaminated with RCRA hazardous waste – variance OAC Section 3745-270-44	The Ohio EPA Director will recognize a variance approved by the USEPA from the alternative treatment standards for hazardous contaminated soil or for hazardous debris.	Potentially applicable to RCRA hazardous soil or debris that is generated and placed back into a unit and that will be disposed of on site.	A site-specific variance from the soil treatment standards that can be used when treatment to concentrations of hazardous constituents higher than those specified in the soil treatment standards and minimizes short- and long-term threats to human health and the environment. In this way, on a case-by-case basis, risk-based LDR treatment standards approved through a variance process could supersede the soil treatment standards.
Soil/debris that is contaminated but not a hazardous waste for disposal. OAC Section 3745-27-05	Establishes standard for disposing solid waste within the state of Ohio.	Potentially applicable to contaminated soil disposed of off site under state solid waste disposal requirements.	Establishes allowable methods of solid waste disposal and prohibits management by open burning or dumping.

AOC = Area of concern.
ARAR = Applicable or Relevant and Appropriate Requirement.
CFR = Code of Federal Regulations.
LDR = Land Disposal Restriction.
OAC = Ohio Administrative Code.
RCRA = Resource Conservation and Recovery Act.
TCLP = Toxicity characteristic leaching procedure.
UHC = Underlying Hazardous Constituent.
USEPA = U.S. Environmental Protection Agency.
UTS = Universal Treatment Standard.

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APPENDIX B.

Affidavits

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Affidavit of Publication, Tribune Chronicle, August 2, 2019

NOTICE OF DOCUMENT AVAILABILITY
Proposed Plans for National Advisory Committee for Aeronautics (NACA) Test Area, Landfill North of Winklepeck Burning Grounds (LNWBG), and Buildings F-15 and F-16 at the Former Ravenna Army Ammunition Plant (RVAAP)

The Proposed Plan for NACA Test Area presents a recommendation of Ex-situ Thermal Treatment of Contaminated Soil. The Proposed Plans for LNWBG and Buildings F-15 and F-16 present a recommendation of No Further Action. Each Proposed Plan provides the rationale for these recommendations. The Proposed Plans are available for public review from July 29, 2019 to August 27, 2019.

The Proposed Plans are available at:

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444

Reed Memorial Library
167 East Main Street
Ravenna, Ohio 44266

The Proposed Plans are also available at: www.rvaap.org

Please join us for an OPEN HOUSE and PUBLIC MEETING

The Army National Guard will host an informational open house and a public meeting to explain the recommendations in the Proposed Plans. Oral and written comments will be accepted at the meeting. Written comments may also be mailed to the Camp James A. Garfield Environmental Office 1438 State Route 534 SW, Newton Falls, OH 44444. Comments will be accepted during the public comment period from July 29, 2019 to August 27, 2019

The public meeting is scheduled for:
Thursday August 15, 2019
6:00 pm Open House
6:30 pm Public Meeting

at:
Shearer Community Center
(Paris Township Hall)
9355 Newton Falls Road
Ravenna, OH 44266

For more information or if you need special accommodations to attend, please contact Katie Tait at 614-336-6136.

#214-1T-August 2, 2019 #4203

PROOF OF PUBLICATION

STATE OF OHIO
TRUMBULL COUNTY SS CONNIE PACEK

BEING DULY SWORN, UPON OATH STATES THAT SHE IS AN AUTHORIZED REPRESENTATIVE OF THE TRIBUNE CHRONICLE, (A DIVISION OF EASTERN OHIO NEWSPAPERS INC). A DAILY NEWSPAPER PRINTED IN THE CITY OF WARREN, COUNTY OF TRUMBULL, STATE OF OHIO AND OF GENERAL CIRCULATION IN THE CITY OF WARREN, TRUMBULL COUNTY, OHIO AND IS INDEPENDENT IN POLITICS.

THAT THE ATTACHED ADVERTISEMENT WAS PUBLISHED IN THE TRIBUNE CHRONICLE EVERY FRIDAY FOR ONE CONSECUTIVE WEEKS AND THAT THE FIRST INSERTION WAS ON FRIDAY THE 2ND DAY OF August 2019

Connie Pacek

SWORN TO BEFORE ME AND SUBSCRIBED IN MY PRESENCE ON THIS 7TH DAY OF August 2019

[signature]
NOTARY PUBLIC

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LAWRENCE J. KOVACH, Notary Public
STATE OF OHIO
MY COMMISSION EXPIRES SEPTEMBER 23, 2022

ADVERTISING COST $ 301.59

Affidavit of Publication, Record-Courier, August 5, 2019

31193993

Proof of Publication
Record Publishing Company
1050 W. Main Street,
Kent, OH 44240
Phone (330) 541-9400
Fax (330) 673-6363

I, Matthew Dyer being first duly sworn depose and say that I am Advertising Clerk of
Record Publishing Company

30 Record-Courier a newspaper printed and published in the city of Kent, and of General circulation in the County of Portage, State of Ohio, and personal knowledge of the facts herein stated and that the notice hereto annexed was Published in said newspapers for 1 insertions on the same day of the week from and after the 5th day of August, 2019 and that the fees charged are legal.

Name of Account: Leidos
Ad Number: 12580840
No. of Lines: 28

Day(s) Published: 08/05.
Printers Fee: $115.20

Sworn to and subscribed before this 5th day of August, 2019.

Elizabeth McDaniel
Notary Public
Commission Expires June 19, 2021

Notice of Document Availability

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