

**Draft**

**Proposed Plan  
for Soil, Sediment, and Surface Water  
at RVAAP-13 Building 1200**

**Ravenna Army Ammunition Plant  
Ravenna, Ohio**

**Contract No. W912QR-04-D-0028  
Delivery Order No. 0001**

**Prepared for:**



**US Army Corps  
of Engineers®**

**United States Army Corps of Engineers  
Louisville District**

**Prepared by:**



**SAIC Engineering of Ohio  
8866 Commons Boulevard  
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**April 6, 2012**

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14. ABSTRACT This Proposed Plan for Building 1200 presents remedial alternatives and the preferred alternative for remedy of soil, sediment, and surface water within the Building 1200 AOC. The preferred remedial alternative (Alternative 2: Attain National Guard Training and Residential Land Use) involves the removal of shallow surface soil with chemical contamination above the cleanup goal for unrestricted (National Guard Training and Resident Farmer) land uses and disposal off-site at a licensed disposal facility. Removal will be conducted at locations B12ss-016M and B12ss-017M under this alternative. There are no chemicals of concern (COCs) in deep surface soil, subsurface soil, surface water, and sediment; therefore, no further action is recommended for these media.					
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**PLACEHOLDER FOR:**

**Documentation of Ohio EPA Approval of Final  
Document**

*(Documentation to be provided once approval is issued.)*

**Draft**

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600 Martin Luther King, Jr. Place  
Louisville, Kentucky 40202

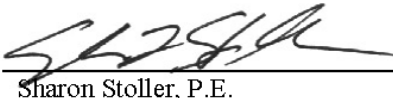
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April 6, 2012

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Science Applications International Corporation (SAIC) has completed the Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-13 Building 1200 at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing United States Army Corps of Engineers (USACE) policy.



Sharon Stoller, P.E.  
Study/Design Team Leader

3/4/11

Date



Jed Thomas, P.E.  
Independent Technical Review Team Leader

3/4/11

Date

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

Internal SAIC Independent Technical Review is conducted on the Preliminary Draft version of this document. Subsequent versions of this document (e.g., Draft and Final) incorporate changes based on the technical reviews of USACE, the Ohio Army National Guard, and the Ohio Environmental Protection Agency. Internal SAIC Independent Technical Review comments are recorded on a Document Review Record per SAIC quality assurance procedure QAAP 3.1. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader. As noted above, all concerns resulting from independent technical review of the project have been considered.



Jeff Dick, P.E.  
Principal w/ A-E firm

3/4/11

Date

**DOCUMENT DISTRIBUTION**  
**for the**  
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**for Soil, Sediment, and Surface Water**  
**at RVAAP-13 Building 1200**  
**Ravenna Army Ammunition Plant**  
**Ravenna, Ohio**

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NGB = National Guard Bureau  
OHARNG = Ohio Army National Guard  
REIMS = Ravenna Environmental Information Management System  
RVAAP = Ravenna Army Ammunition Plant  
SAIC = Science Applications International Corporation  
USACE = United States Army Corps of Engineers  
USAEC = United States Army Environmental Command

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**LIST OF ACRONYMS**

56 ACM Asbestos-containing Material

57 AOC Area of Concern

58 ARAR Applicable or Relevant and

59 Appropriate Requirement

60 bgs Below Ground Surface

61 CERCLA Comprehensive Environmental

62 Response, Compensation, and

63 Liability Act

64 COC Chemical of Concern

65 ERA Ecological Risk Assessment

66 FS Feasibility Study

67 GRA General Response Action

68 HHRA Human Health Risk Assessment

69 NCP National Oil and Hazardous

70 Substances Pollution Contingency

71 Plan

72 NFA No Further Action

73 O&M Operation and Maintenance

74 OHARNG Ohio Army National Guard

75 Ohio EPA Ohio Environmental Protection

76 Agency

77 PCB Polychlorinated Biphenyl

78 PP Proposed Plan

79 RAFLU Reasonable and Anticipated

80 Future Land Use

81 RAO Remedial Action Objective

82 RDX Hexahydro-1,3,5-trinitro-1,3,5-

83 triazine

84 RI Remedial Investigation

85 ROD Record of Decision

86 RVAAP Ravenna Army Ammunition Plant

87 SRC Site-related Contaminant

88 SVOC Semi-volatile Organic Compound

89 TNT 2,4,6-Trinitrotoluene

90 USACE United States Army Corps of

91 Engineers

92 VOC Volatile Organic Compound



1                   **1.0 INTRODUCTION**  
2

3 This Proposed Plan (PP) presents the preferred  
4 alternative to achieve a remedy for soil,  
5 sediment, and surface water within the  
6 Building 1200 Area of Concern (AOC) at the  
7 Ravenna Army Ammunition Plant (RVAAP)  
8 in Ravenna, Ohio (Figure 1). The Building  
9 1200 AOC is designated as RVAAP-12. This  
10 PP presents remedial alternatives developed in  
11 the *Remedial Investigation/Feasibility Study*  
12 *Report for Soil, Sediment, and Surface Water*  
13 *at RVAAP-13 Building 1200* (USACE 2012)  
14 and provides rationale for selecting the  
15 preferred alternative. Groundwater will be  
16 addressed in a separate decision under the  
17 RVAAP Facility-Wide Groundwater AOC  
18 (RVAAP-66).

19  
20 The U.S. Army, in consultation with the Ohio  
21 Environmental Protection Agency (Ohio EPA),  
22 issues this PP. This PP provides the public  
23 with information to comment upon the  
24 selection of an appropriate response action.  
25 The remedy will be selected for the Building  
26 1200 AOC after review and consideration of  
27 all comments submitted during the 30-day  
28 public comment period. Therefore, the public  
29 is encouraged to review and comment on all  
30 alternatives presented in this PP.

31  
32 The U.S. Army is issuing this PP as part of its  
33 public participation responsibilities under  
34 Section 117(a) of the Comprehensive  
35 Environmental Response, Compensation, and  
36 Liability Act (CERCLA) of 1980, as amended  
37 by the Superfund Amendments and  
38 Reauthorization Act of 1986 and  
39 Section 300.430(f)(2) of the National Oil and  
40 Hazardous Substances Pollution Contingency  
41 Plan (NCP) (40 *Code of Federal Regulations*  
42 300). Selection and implementation of a  
43 remedy will also be consistent with the  
44 requirements of the Ohio EPA *Director's*  
45 *Final Findings and Orders*, dated June 10,  
46 2004 (Ohio EPA 2004).

**Public Comment Period:**

Month XX, 2012, to Month XX, 2012

**Public Meeting:**

The U.S. Army will hold an open house and public meeting to present the preferred alternative and additional details presented in the *Remedial Investigation/Feasibility Study Report for Soil, Sediment, and Surface Water at RVAAP-13 Building 1200* (USACE 2012). Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for \_\_\_\_\_ PM, \_\_\_\_\_, 2012, at the **Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio 44444.**

**Information Repositories:**

Information used in selecting the preferred alternative is available for public review at the following locations:

**Reed Memorial Library**

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

Hours of operation:

9AM – 8PM Monday – Friday

9AM – 5PM Saturday

1PM – 5PM Sunday (between Labor Day and Memorial Day)

**Newton Falls Public Library**

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

Hours of operation:

10AM – 8PM Tuesday - Friday

9AM – 5PM Friday and Saturday

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

**RVAAP**

Building 1037  
8451 State Route 5  
Ravenna, Ohio 44266-9297  
(330) 358-7311

Fax: (330) 358-7314

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

1 This PP summarizes information that can be  
2 found in greater detail in the Remedial  
3 Investigation/Feasibility Study (RI/FS) Report  
4 (USACE 2012) and other documents contained  
5 in the Administrative Record file for the  
6 Building 1200 AOC. The U.S. Army  
7 encourages the public to review these  
8 documents to gain a more comprehensive  
9 understanding of the AOC and activities that  
10 have been conducted to date.

## 11 12 **2.0 RVAAP DESCRIPTION AND** 13 **BACKGROUND** 14

15 The current RVAAP consists of 1,260 acres  
16 scattered throughout the Ohio Army National  
17 Guard (OHARNG) Camp Ravenna Joint  
18 Military Training Center, hereafter referred to  
19 as Camp Ravenna. Camp Ravenna is in  
20 northeastern Ohio within Portage and  
21 Trumbull Counties, approximately 3 miles  
22 (4.8 km) east-northeast of the city of Ravenna  
23 and approximately 1 mile (1.6 km) northwest  
24 of the city of Newton Falls (Figure 1). The  
25 RVAAP portions of the property are located  
26 solely within Portage County. RVAAP and  
27 Camp Ravenna occupy a parcel of property  
28 approximately 11 miles (17.7 km) long and  
29 3.5 miles (5.6 km) wide bounded by State  
30 Route 5, the Michael J. Kirwan Reservoir, and  
31 the CSX System Railroad on the south;  
32 Garrett, McCormick, and Berry roads on the  
33 west; the Norfolk Southern Railroad on the  
34 north; and State Route 534 on the east  
35 (Figures 1 and 2). Camp Ravenna is  
36 surrounded by several communities: Windham  
37 on the north, Garrettsville 6 miles (9.6 km) to  
38 the northwest, Newton Falls 1 mile (1.6 km) to  
39 the southeast, Charlestown to the southwest,  
40 and Wayland 3 miles (4.8 km) to the south.

41  
42 When RVAAP was operational, Camp  
43 Ravenna did not exist, and the entire 21,683-  
44 acre parcel was a government-owned,  
45 contractor-operated, industrial facility. The  
46 RVAAP Installation Restoration Program  
47 encompasses investigation and cleanup of past  
48 activities over the entire 21,683 acres of the  
49 former RVAAP. References to RVAAP in  
50 this document indicate the historical extent of  
51 RVAAP, which is inclusive of the combined

52 acreages of the current Camp Ravenna and  
53 RVAAP, unless otherwise specifically stated.

54  
55 Former industrial operations at RVAAP  
56 consisted of 12 munitions-assembly facilities  
57 referred to as “load lines.” Load Lines 1  
58 through 4 were used to melt and load 2,4,6-  
59 trinitrotoluene (TNT) and Composition B into  
60 large-caliber shells and bombs. The operations  
61 on the load lines produced explosive dust,  
62 spills, and vapors that collected on the floors  
63 and walls of each building. Periodically, the  
64 floors and walls were cleaned with water and  
65 steam. Following cleaning, the wastewater,  
66 containing TNT and Composition B, was  
67 known as “pink water” for its characteristic  
68 color. Pink water was collected in concrete  
69 holding tanks, filtered, and pumped into  
70 unlined ditches for transport to earthen settling  
71 ponds. Load Lines 5 through 11 were used to  
72 manufacture fuzes, primers, and boosters.  
73 Potential contaminants in these load lines  
74 include lead compounds, mercury compounds,  
75 and explosives. From 1946 to 1949, Load  
76 Line 12 was used to produce ammonium  
77 nitrate for explosives and fertilizers prior to  
78 use as a weapons demilitarization facility.

79  
80 In 1950, the facility was placed on standby  
81 status and operations were limited to  
82 renovation, demilitarization, and normal  
83 maintenance of equipment, along with storage  
84 of munitions. Production activities were  
85 resumed from July 1954 to October 1957 and  
86 again from May 1968 to August 1972. In  
87 addition to production missions, various  
88 demilitarization activities were conducted at  
89 facilities constructed at Load Lines 1, 2, 3,  
90 and 12. Demilitarization activities included  
91 disassembly of munitions and explosives melt-  
92 out and recovery operations using hot water  
93 and steam processes. Periodic demilitarization  
94 of various munitions continued through 1992.

## 95 96 **3.0 BUILDING 1200 AREA OF** 97 **CONCERN DESCRIPTION AND** 98 **BACKGROUND** 99

100 The Building 1200 AOC is located in the  
101 eastern portion of RVAAP (Figure 2). From  
102 1941 to 1971, the AOC was used for

1 ammunition demilitarization, which consisted  
2 of disassembly and removal of the explosive  
3 charge using steam to melt-out the explosives.  
4 The primary operations building was Building  
5 1200, which was a 30 ft by 20 ft combined  
6 reinforced concrete and transite panel frame  
7 structure. The steam melt-out process  
8 generated explosives-contaminated wastewater  
9 (pink water), which discharged from the  
10 building via a pipe, through a crushed slag  
11 gravel bed, and into a ditch connected to a  
12 0.5-acre, unlined settling pond located  
13 approximated 415 ft northeast of Building  
14 1200. The depth of the settling pond is less  
15 than 3 ft. Overflow from the settling pond  
16 discharged directly to the ground surface  
17 southeast of the pond; there is no documented  
18 evidence of a discharge drainage ditch exiting  
19 the settling pond and flowing to a surface  
20 water body. The AOC is approximately  
21 7.7 acres in size.

22  
23 The Army demolished all buildings (Buildings  
24 1200, S-4605, and T-4602) at the AOC  
25 between November 2004 and August 2005.  
26 Demolition activities included the complete  
27 removal of buildings, floor slabs, and footers  
28 (MKM 2005). Additionally, asbestos-  
29 containing material (ACM) flat panel transite  
30 siding was removed and disposed off-site.

31  
32 Following building demolition activities,  
33 disturbed soil within the former building  
34 footprints was re-graded, seeded, and mulched  
35 to match neighboring contours. Remnant  
36 infrastructure consists only of the ditch from  
37 the former buildings to the former settling  
38 pond, the former settling pond, and the  
39 discharge area from the former settling pond.  
40 None of these areas were backfilled or re-  
41 graded during demolition activities. The area  
42 immediately surrounding the AOC is forested,  
43 with the exception of the access road  
44 (Ammunition Sectioning Road), a small,  
45 sparsely vegetated area around the former  
46 building footprints, and the former settling  
47 pond.

48  
49 The following environmental reports have  
50 been completed for the Building 1200 AOC:  
51

- 52 • *Preliminary Assessment for the*  
53 *Characterization of Areas of Contamination*  
54 *(USACE 1996);*  
55
- 56 • *Phase I Remedial Investigation Report for*  
57 *High-Priority Areas of Concern (USACE*  
58 *1998);*  
59
- 60 • *Characterization of 14 AOCs at the*  
61 *Ravenna Army Ammunition Plant (MKM*  
62 *2007); and*  
63
- 64 • *Remedial Investigation/Feasibility Study*  
65 *Report for Soil, Sediment, and Surface*  
66 *Water at RVAAP-13 Building 1200*  
67 *(USACE 2012).*

#### 4.0 AREA OF CONCERN CHARACTERISTICS

72 The AOC characteristics, nature and extent of  
73 contamination, and conceptual site model are  
74 based on the various investigations conducted  
75 from 1998 through 2010.

76  
77 Elevations across the Building 1200 AOC  
78 range from approximately 990 to 1,004 ft  
79 above mean sea level. Storm water runoff  
80 from former operational areas within the AOC  
81 generally follows surface topography and  
82 drains from north to south. The closest surface  
83 water outside the AOC, a tributary of Sand  
84 Creek, is located approximately 1,000 ft south  
85 of the former settling pond. The remaining  
86 surface features include the access road, the  
87 drainage ditch from the former buildings to the  
88 former settling pond, and the former settling  
89 pond and associated discharge area (Figure 3).

90  
91 Silty clay glacial sediment overlies sandstone  
92 bedrock at the Building 1200 AOC, except  
93 where disturbed by RVAAP activities. Soil  
94 borings show the unconsolidated glacial till is  
95 less than 3 ft thick.

96  
97 The general groundwater flow pattern in most  
98 of the AOC is to the northeast. The nearest  
99 downgradient location where groundwater may  
100 discharge to a surface stream is a tributary to

1 Eagle Creek, which is located 4,100 ft to the  
2 northeast of the AOC.

3  
4 Surface soil [0-1 ft below ground surface  
5 (bgs)] at the Building 1200 AOC contained the  
6 majority of the site-related contaminants  
7 (SRCs). The prevalent SRCs detected in  
8 surface soil were semi-volatile organic  
9 compounds (SVOCs), explosives, and  
10 inorganic chemicals. The highest  
11 concentrations of the SRCs occurred in the  
12 vicinity of the former Building 1200 location.  
13 The number and concentrations of SRCs in  
14 surface soil generally decreased with distance  
15 from the former Building 1200 location.  
16 Pesticides and polychlorinated biphenyls  
17 (PCBs) were not identified as SRCs in surface  
18 soil.

19  
20 Subsurface soil (>1 ft bgs) contained fewer  
21 detected SRCs than surface soil, and  
22 concentrations decreased with depth. One  
23 volatile organic compound (VOC), two  
24 SVOCs, one propellant, and five inorganic  
25 chemicals were identified as SRCs. Organic  
26 SRCs were detected in one subsurface soil  
27 sample collected near the former Building  
28 1200 footprint. The majority of the inorganic  
29 chemicals were detected in one sample within  
30 the former settling pond and one sample near  
31 the former Building 1200 location.  
32 Explosives, pesticides, and PCBs were not  
33 detected in subsurface soil.

34  
35 SRCs found in sediment were two VOCs, two  
36 SVOCs, one propellant, one pesticide, and  
37 seven inorganic chemicals. Sediment occurs in  
38 the section of the drainage ditch west of the  
39 former settling pond and within the pond. The  
40 occurrence of inorganic chemicals in sediment  
41 was generally sporadic, with the exception of  
42 cadmium. Organic SRCs were primarily  
43 detected in the eastern section of the drainage  
44 ditch near the former settling pond. No  
45 explosives were detected in sediment samples  
46 collected from the eastern section of the  
47 drainage ditch and within the former settling  
48 pond. The absence of detectable explosives in  
49 sediment indicates limited migration from  
50 surface soil within the former operations area

51 and the western section of the drainage ditch  
52 closest to the Building 1200 location.

53  
54 SRCs found in surface water were two VOCs,  
55 six SVOCs, four explosives, and five inorganic  
56 chemicals. Surface water, when present at the  
57 Building 1200 AOC, is intermittent and occurs  
58 mainly as storm water runoff or snow melt  
59 accumulation in the eastern section of the  
60 drainage ditch near the former settling pond  
61 and within the pond. Generally, the maximum  
62 detected concentration of SRCs occurred in the  
63 eastern section of the drainage ditch near the  
64 former settling pond. Manganese and  
65 explosive compounds were identified as SRCs  
66 in surface water but not in corresponding  
67 sediment samples.

68  
69 The potential for soil contaminants to migrate  
70 to groundwater was modeled and presented in  
71 the RI/FS report (USACE 2012). Modeling  
72 included evaluation of potential leaching of  
73 contaminants from soil to groundwater and the  
74 potential for contaminants to migrate from  
75 sources to a selected receptor location (e.g.,  
76 tributary to the Mahoning River). Modeling  
77 results indicate selenium and hexahydro-1,3,5-  
78 trinitro-1,3,5-triazine (RDX) could exceed  
79 screening criteria beneath the source area;  
80 however, no chemicals exceeded screening  
81 criteria at the selected receptor location.

## 82 83 **5.0 SCOPE AND ROLE OF** 84 **RESPONSE ACTION**

85  
86 The Reasonable and Anticipated Future Land  
87 Use (RAFLU) of the Building 1200 AOC is  
88 National Guard Training. Specifically, the  
89 AOC will be used for dismounted training,  
90 which may include some digging. The  
91 representative receptor for this RAFLU is the  
92 National Guard Trainee. The response action  
93 evaluated alternatives to attain this RAFLU for  
94 soil, sediment, and surface water. Although  
95 Residential Land Use is not anticipated at  
96 RVAAP or this AOC, the response action also  
97 evaluated an unrestricted land use. The  
98 National Guard Trainee and Resident Farmer  
99 (Adult and Child) were evaluated as  
100 representative receptors for unrestricted land  
101 use.

1 The preferred alternative for a groundwater  
2 remedy will be addressed under the RVAAP  
3 Facility-Wide Groundwater AOC as a separate  
4 decision. However, the selected remedy for  
5 soil, sediment, and surface water at the  
6 Building 1200 AOC must also be protective of  
7 groundwater.

## 8 9 **6.0 SUMMARY OF HUMAN AND** 10 **ECOLOGICAL RISKS**

11  
12 A human health risk assessment (HHRA) was  
13 performed to identify chemicals of concern  
14 (COCs) and provide a risk management  
15 evaluation to determine COCs requiring  
16 remediation based on potential risks to human  
17 receptors.

18  
19 The exposure units evaluated in the HHRA  
20 were shallow surface soil (0-1 ft bgs) and deep  
21 surface soil (1-3 ft bgs) for the National Guard  
22 Trainee, surface soil (0-1 ft bgs) and  
23 subsurface soil (1-3 ft bgs) for the Resident  
24 Farmer, surface water, and sediment.  
25 Subsurface soil is defined as 1-13 ft bgs for the  
26 Resident Farmer; however, bedrock is present  
27 at 3 ft bgs. Therefore, there is no soil exposure  
28 below 3 ft bgs. COCs were determined for  
29 each exposure unit based on guidance  
30 established in *Facility-Wide Human Health*  
31 *Cleanup Goals for the Ravenna Army*  
32 *Ammunition Plant* (USACE 2010).

33  
34 Manganese was the only COC identified in  
35 shallow surface soil (0-1 ft bgs) for both the  
36 National Guard Trainee and Resident Farmer in  
37 the HHRA (USACE 2012). No COCs were  
38 identified in deep surface soil for the National  
39 Guard Trainee, subsurface soil for the Resident  
40 Farmer, surface water, or sediment.

41  
42 Manganese is present above cleanup goals in  
43 shallow surface soil (0-1 ft bgs) in the vicinity  
44 of former Building 1200 for both the National  
45 Guard Trainee and Resident Farmer at  
46 locations B12ss-016M and B12ss-017M  
47 (Figure 3). Due to manganese concentrations  
48 at these two locations, evaluation of remedial  
49 alternatives was recommended in the FS.

50

51 The habitat at Building 1200 is dominated by  
52 forest and is large enough to support cover and  
53 food for small birds and mammals. The habitat  
54 to the east and around the former settling pond is  
55 intermittently flooded and recognized as a  
56 wetland. The cleared area in the western portion  
57 of the AOC continues to be maintained grounds  
58 surrounding the former buildings

59  
60 Currently, there are no federally listed species  
61 or critical habitats on RVAAP property. State-  
62 endangered, state-threatened, state species-of-  
63 concern, and state special-interest species have  
64 been identified at RVAAP. The Building 1200  
65 AOC has not been previously surveyed for rare  
66 species. Sightings of rare, threatened, or  
67 endangered species have not been documented  
68 at the AOC.

69  
70 The Level I Ecological Risk Assessment  
71 (ERA) determined important and significant  
72 ecological resources exist at the AOC,  
73 including a wetland and a special interest area.  
74 Chemical contamination in surface soil (0-1 ft  
75 bgs), sediment, and surface water at the AOC  
76 was present at sufficient levels to require a  
77 Level II assessment. The ERA evaluated the  
78 chemicals and resources in detail and  
79 demonstrated that no chemicals of potential  
80 ecological concern requiring remediation exist  
81 at the AOC. Consequently, the ERA for the  
82 Building 1200 AOC concluded with the Level  
83 II assessment and a recommendation of No  
84 Further Action (NFA) to protect ecological  
85 resources.

## 86 87 **7.0 REMEDIAL ACTION** 88 **OBJECTIVE**

89  
90 The remedial action objective (RAO) references  
91 cleanup goals that are considered protective of  
92 human health and the environment under current  
93 land use and the RAFLU. The RAO for this  
94 remedy is to prevent: National Guard Trainee  
95 exposure to COCs above cleanup goals in soil,  
96 sediment, and surface water; adverse ecological  
97 effects from previous AOC activities; and  
98 negative groundwater impacts from contaminant  
99 migration from source media (e.g., soil and  
100 sediment). Manganese was identified as a COC  
101 in shallow surface soil. A cleanup goal of

1 1,800 mg/kg was established for manganese  
 2 from the *Facility-Wide Human Health Cleanup*  
 3 *Goals for the Ravenna Army Ammunition*  
 4 *Plant* (USACE 2010). The cleanup goal for  
 5 manganese achieves the target risk and hazard  
 6 index levels for the National Guard Trainee,  
 7 and is also protective for the Resident Farmer.

8  
 9 The response action addresses manganese in  
 10 shallow surface soil at locations B12ss-016M  
 11 and B12ss-017M to protect the National Guard  
 12 Trainee and Resident Farmer, which will allow  
 13 for unrestricted land use. The HHRA  
 14 identified no COCs in deep surface soil,  
 15 subsurface soil, surface water, or sediment.  
 16 The visual inspection for ACM that was  
 17 performed as part of the RI/FS in 2011  
 18 identified a mound approximately 4 ft in height  
 19 near former Building T-4062. This mound will  
 20 undergo further investigation as part of the  
 21 remedial alternative.

22  
 23 Based on the results of the RI, shallow surface  
 24 soil extending to a depth of 1 ft bgs requires  
 25 remediation. No COCs exist below a depth of  
 26 1 ft bgs under current or future land use  
 27 scenarios. Remediation of surface water and  
 28 sediment is not necessary because no COCs  
 29 were identified for these media. Remediation  
 30 of soil or sediment to protect groundwater  
 31 resources is not necessary. Table 1 presents  
 32 the cleanup goals for shallow surface soil  
 33 under this remedy.

**Table 1. COCs and Cleanup Goals for Unrestricted  
 (National Guard Training and Residential) Land  
 Use at the Building 1200 AOC**

Media	COC	Cleanup Goal (mg/kg)
Shallow Surface Soil (0-1 ft bgs)	Manganese	1,800
Deep Surface Soil (1-3 ft bgs) <sup>a</sup>	None	None
Subsurface Soil (1-3 ft bgs) <sup>a</sup>	None	None
Sediment	None	None
Surface Water	None	None

<sup>a</sup>Bedrock was encountered at depths of 3 ft or less across the AOC; the depths of the deep surface soil and subsurface soil exposure units were adjusted accordingly

AOC = Area of Concern  
 bgs = Below Ground Surface  
 COC = Chemical of Concern

## 34 8.0 SUMMARY OF FEASIBILITY 35 STUDY ALTERNATIVES

36  
 37 The following general response actions  
 38 (GRAs) were considered in the FS for  
 39 remediation of contaminated soil at the  
 40 Building 1200 AOC:

- 41
- 42 • No action;
- 43 • Land use controls and five-year reviews;
- 44 • Removal;
- 45 • Treatment; and
- 46 • Disposal and handling.

47  
 48 Technologies under each GRA were screened  
 49 and selected for their ability to reduce  
 50 exposure to contaminants in soil. Because soil  
 51 contains chemical contamination above  
 52 cleanup goals, the technologies were evaluated  
 53 for their ability to remove or reduce  
 54 contaminants in the shortest timeframe.

55  
 56 Technologies selected under these GRAs were  
 57 combined into the following two alternatives  
 58 for detailed analysis. Costs were estimated for  
 59 each alternative.

### 60 8.1 Alternative 1 – No Action

61  
 62 *Cost: \$0*

63  
 64 This remedial alternative provides no further  
 65 remedial action and is required under the NCP  
 66 as a baseline for comparison with other  
 67 remedial alternatives. Under this alternative,  
 68 there is no reduction in toxicity, mobility, or  
 69 volume of contaminated soil. Access  
 70 restrictions and environmental monitoring  
 71 would be discontinued. The Building 1200  
 72 AOC would have no legal, physical, or  
 73 administrative land use controls.  
 74 Environmental monitoring would not be  
 75 performed. Five-year reviews would not be  
 76 conducted in accordance with CERCLA  
 77 121(c).

1 **8.2 Alternative 2 – Attain National Guard**  
2 **Training and Residential Land Uses**

3  
4 *Estimated Implementation Cost: \$123,271*  
5 *30-yr Operation and Maintenance (O&M)*  
6 *Cost: \$0*  
7 *Estimated Total Cost: \$123,271*

8  
9 Actions for each medium within the Building  
10 1200 AOC for this alternative are as follows:

- 11
- 12 • Shallow Surface Soil (0-1ft bgs) –
- 13 excavation with off-site disposal;
- 14 • Deep Surface Soil (1-3 ft bgs) – NFA;
- 15 • Subsurface Soil (1-3ft bgs) – NFA;
- 16 • Sediment – NFA; and
- 17 • Surface Water – NFA.

18  
19 This remedial alternative involves the removal  
20 of shallow surface soil with chemical  
21 contamination above the cleanup goal for  
22 unrestricted land use (represented by the  
23 National Guard Trainee and Resident Farmer)  
24 and off-site disposal at a licensed facility.  
25 There are no COCs in deep surface soil,  
26 subsurface soil, surface water, and sediment  
27 for the National Guard Trainee and Resident  
28 Farmer; therefore, NFA is recommended for  
29 these media.

30  
31 Under this alternative, shallow surface soil (0-  
32 1 ft bgs) will be excavated. Soil that exceeds  
33 the manganese cleanup goal at locations  
34 B12ss-016M and B12ss-017M will be  
35 removed (Figure 3) by mechanical equipment  
36 and disposed off-site. Confirmation samples  
37 will be collected along excavation sidewalls  
38 unless the excavation sidewalls coincide with  
39 previously sampled locations that are  
40 determined to not require remediation.  
41 Confirmation samples will not be collected  
42 from the excavation floor because there was no  
43 identified risk in the soil below 1 ft bgs. The  
44 excavated areas will be backfilled with clean  
45 soil and re-vegetated.

46  
47 The asbestos visual inspection performed as  
48 part of the RI/FS in 2011 did not identify any  
49 ACM on the ground surface at the AOC.  
50 However, the inspection recommended further

51 investigation of a 4 ft high mound near the  
52 footprint of former Building T-4062. The  
53 investigation of this mound will include  
54 sampling to see if ACM is present. If ACM is  
55 present within the mound and it is determined  
56 to be a risk requiring a remedy, the remedial  
57 design will be updated to address ACM  
58 removal, and the remedial activities will  
59 include removal and disposal of the mound.

60  
61 Successful implementation of this alternative  
62 will allow unrestricted future land use  
63 (represented by the National Guard Trainee  
64 and Resident Farmer). No O&M period  
65 following the remedial action is necessary  
66 because the alternative achieves unrestricted  
67 land use. The U.S. Army and OHARNG will  
68 not be required to develop and implement land  
69 use controls. Five-year reviews in accordance  
70 with CERCLA 121(c) will not be required  
71 following the remedy.

72  
73 **9.0 EVALUATION OF FEASIBILITY**  
74 **STUDY ALTERNATIVES**

75  
76 The alternatives were evaluated with respect to  
77 the nine comparative analysis criteria, as  
78 outlined by CERCLA (Table 2). The nine  
79 criteria are categorized into three groups:  
80 threshold criteria, primary balancing criteria,  
81 and modifying criteria. These criteria are as  
82 follows.

83  
84 Threshold Criteria – must be met for the  
85 alternative to be eligible for selection as a  
86 remedial option.

87  
88 Primary Balancing Criteria – used to weigh  
89 major trade-offs among alternatives.

90  
91 Modifying Criteria – may be considered to the  
92 extent information is available during  
93 development of the FS but can be fully  
94 considered only after public comment on this  
95 PP.

1  
2 **Table 2. 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 Applicable or Relevant and Appropriate Requirements (ARARs)** – considers how a remedy will meet all 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** – will be addressed in the Record of Decision (ROD) following a review of the public comments received on the remedial investigation (RI) report, focused feasibility study (FS) report, and the Proposed Plan (PP).

3

4 The comparative analysis evaluates the relative  
5 performance of Alternatives 1 and 2 with  
6 respect to each of the nine criteria. Identifying  
7 the advantages and disadvantages of each  
8 alternative, relative to one another, helps to  
9 identify the relative strengths of the preferred  
10 alternative. These strengths, combined with  
11 risk management decisions made by the U.S.  
12 Army and Ohio EPA, as well as input from the  
13 community, will serve as the basis for  
14 selecting the remedy.

15  
16 Table 3 summarizes the comparative analysis  
17 of remedial alternatives for the Building 1200  
18 AOC from the FS. Criterion 1, Overall  
19 Protectiveness of Human Health and the  
20 Environment, is rated as either protective or  
21 not protective. Criterion 2, Compliance with  
22 Applicable or Relevant and Appropriate  
23 Requirements, is rated as either compliant or  
24 not compliant. The remaining seven criteria  
25 are rated as high, medium, or low. A rating of  
26 high indicates the alternative performs the best,  
27 and a rating of low indicates the alternative  
28 performs the worst. An alternative with a high  
29 cost will be scored low under Criterion 7, Cost.

30  
31 Alternative 1, No Action, will provide no  
32 protection of human health or the environment  
33 from the AOC contaminants beyond current  
34 conditions. No effort will be taken to prevent or  
35 minimize human or ecological exposure to  
36 contaminated soil. Concentrations of  
37 contaminants could pose future risk to both the  
38 National Guard Trainee and Resident Farmer.

39  
40 Alternative 2, Attain National Guard Training  
41 and Residential Land Uses, provides a high  
42 degree of overall protectiveness and long-term  
43 effectiveness and permanence for the RAFLU  
44 by removing contaminated soil. Alternative 2  
45 is also protective for unrestricted land use.  
46 The mobility of COCs is reduced for  
47 Alternative 2 given the excavated soil is  
48 disposed of at an off-site facility equipped with  
49 engineering controls. Alternative 2 presents  
50 short-term risk to workers, the community, and  
51 the environment during excavation and  
52 transportation of soil. Alternative 2 can be  
53 readily and quickly implemented at a  
54 comparatively low cost.



1

**Table 3. Comparative Analysis of Remedial Alternatives**

<b>NCP Evaluation Criteria<sup>a</sup></b>	<b>Alternative 1 – No Action</b>		<b>Alternative 2 – Attain National Guard Training and Residential Land Uses</b>	
<b><i>Threshold Criteria</i></b>	<b><i>Result</i></b>		<b><i>Result</i></b>	
1. Overall Protectiveness of Human Health and the Environment	Not protective		Protective	
2. Compliance with ARARs	Compliant		Compliant	
<b><i>Balancing Criteria</i></b>	<b><i>Result</i></b>		<b><i>Result</i></b>	
3. Long-term Effectiveness and Permanence	Low	1	High	3
4. Reduction of Toxicity, Mobility, or Volume through Treatment	Low	1	Medium	2
5. Short-term Effectiveness	High	3	Medium	2
6. Implementability	High	3	Medium	2
7. Cost	High	3	Medium	2
<b><i>Balancing Criteria Score</i></b>	11		11	

<sup>a</sup>Criterion 1, Overall Protectiveness of Human Health and the Environment, is rated as either protective or not protective. Criterion 2, Compliance with ARARs, is rated as either compliant or not compliant. The remaining five criteria are rated as high (alternative that performs the best), medium (moderate alternative performance), or low (alternative that performs the worst)  
 Scoring for the Balancing Criteria is as follows: High = 3, Medium = 2, Low = 1  
 ARAR = Applicable or Relevant and Appropriate Requirement  
 NCP = National Oil and Hazardous Substances Pollution Contingency Plan

2

**10.0 PREFERRED FEASIBILITY  
STUDY ALTERNATIVE**

The U.S. Army, in consultation with Ohio EPA, recommends Alternative 2 (Attain National Guard Training and Residential Land Uses) is implemented as the remedial action at the Building 1200 AOC. Alternative 1 (No Action) was also evaluated. However, since the threshold criterion Overall Protectiveness of Human Health and the Environment is not met, Alternative 1 was eliminated from consideration.

Alternative 2 is protective for the RAFLU and is also protective for unrestricted land use. This alternative is cost effective and can be performed in a timely manner. Mitigation measures (e.g., dust control, storm water controls, site housekeeping activities, and covering and cleaning haul trucks) during excavation activities minimize and/or eliminate all potential risks to workers and the community. Based on the available risk assessment information, the preferred alternative will achieve the RAO. This recommendation is not a final decision. The U.S. Army, in consultation with Ohio EPA,

will select the remedy for the Building 1200 AOC after reviewing and considering all comments submitted during the 30-day public comment period.

**11.0 COMMUNITY PARTICIPATION**

**11.1 Community Participation**

Public participation is an important component of the remedy selection. The U.S. Army and Ohio EPA are soliciting input from the community on the preferred alternative. The comment period extends from     , 2012, to     , 2012. This period includes a public meeting at which the U.S. Army will present this PP as agreed to by Ohio EPA. The U.S. Army will accept both oral and written comments at this meeting.

**11.2 Public Comment Period**

The 30-day comment period is from     , 2012, to     , 2012, and provides an opportunity for public involvement in the decision-making process for the proposed action. The public is encouraged to review and

1 comment on this PP. All public comments will  
2 be considered by the U.S. Army and Ohio EPA  
3 before selecting a remedy. During the  
4 comment period, the public is encouraged to  
5 review documents pertinent to the Building  
6 1200 AOC.

7  
8 This information is available at the  
9 Information Repository and online at  
10 www.rvaap.org. To obtain further  
11 information, contact the RVAAP Facility  
12 Manager.

13

### INFORMATION REPOSITORIES

#### Reed Memorial Library

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

Hours of operation:

9AM – 8PM Monday – Friday

9AM – 5PM Saturday

1PM – 5PM Sunday (between Labor Day  
and Memorial Day)

#### Newton Falls Public Library

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

Hours of operation:

10AM – 8PM Tuesday - Friday

9AM – 5PM Friday and Saturday

14

15

### 11.3 Written Comments

16

17  
18 If the public would like to comment in writing  
19 on this PP or other relevant issues, please  
20 deliver comments to the U.S. Army at the  
21 public meeting or mail written comments  
22 (postmarked no later than \_\_\_\_\_, 2012).

### POINT OF CONTACT FOR WRITTEN COMMENTS

#### Facility Manager

#### Ravenna Army Ammunition Plant

Building 1037

8451 State Route 5

Ravenna, Ohio 44266-9297

Office: (330) 358-7311

Fax: (330) 358-7314

23

24

25

### 11.4 Public Meeting

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### 11.5 U.S. Army Review of Public Comments

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

**ADMINISTRATIVE RECORD FILE**

**RVAAP**

Building 1037  
8451 State Route 5  
Ravenna, Ohio 44266-9297  
(330) 358-7311  
Fax: (330) 358-7314

Note: Access is restricted to the Ravenna Army Ammunition Plant (RVAAP), but the file can be obtained or viewed with prior notice to RVAAP.

**GLOSSARY OF TERMS**

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**Administrative Record:** a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record represents the information used to select the preferred alternative. It is available for public review at the Ravenna Army Ammunition Plant, Building 1037; call (330) 358-7311 for an appointment.

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

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

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

**Exposure Point Concentration:** a value used in the HHRA and ERA to quantify exposures for all or part of an AOC.

38 **Exposure Unit:** a location or area where a  
39 receptor may move at random and come into  
40 contact with an environmental medium (e.g.,  
41 soil, surface water, and/or sediment).  
42

43 **Feasibility Study (FS):** a CERCLA document  
44 that reviews and evaluates multiple remedial  
45 technologies under consideration at a site. It  
46 also identifies the preferred remedial action  
47 alternative.  
48

49 **Human Receptor:** a hypothetical person,  
50 based on current or potential future land use,  
51 who may be exposed to an adverse condition.  
52 For example, a National Guard Trainee is  
53 considered to be the most sensitive human  
54 receptor under future restricted land use in this  
55 Proposed Plan.  
56

57 **National Oil and Hazardous Substances  
58 Pollution Contingency Plan (NCP):** the set  
59 of regulations that implement CERCLA and  
60 address responses to hazardous substances and  
61 pollutants or contaminants.  
62

63 **Record of Decision (ROD):** a legal record  
64 signed by the U.S. Army and Ohio EPA. It  
65 describes the cleanup action or remedy  
66 selected for a site, the basis for selecting that  
67 remedy, public comments, responses to  
68 comments, and the estimated cost of the  
69 remedy.  
70

71 **Remedial Action Objective (RAO):** these  
72 specific goals, developed from the evaluation  
73 of applicable or relevant and appropriate  
74 requirements, are to be protective of human  
75 health and the environment.  
76

77 **Remedial Investigation (RI):** CERCLA  
78 investigation that involves sampling  
79 environmental media, such as air, soil, and water,  
80 to determine the nature and extent of  
81 contamination and to calculate human health and  
82 environmental risks that result from the  
83 contamination.  
84

85 **Responsiveness Summary:** a section of the  
86 ROD where the U.S. Army documents and  
87 responds to written and oral comments

1 received from the public about the Proposed  
2 Plan.

3  
4 **Risk Assessment:** an evaluation that  
5 determines potential harmful effects, or lack  
6 thereof, posed to human health and the  
7 environment due to exposure to chemicals  
8 found at a CERCLA site.

9  
10 **Target Risk:** the Ohio EPA (2009) identifies  
11 1E-05 as a target for cancer risk for  
12 carcinogens and an acceptable target hazard  
13 index of 1 for non-carcinogens.

14

#### 15 REFERENCES

16

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26

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49

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55

56 USACE 2012. *Remedial Investigation/*  
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58 *and Surface Water at RVAAP-13 Building*  
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60 *Ravenna, Ohio.* March 2012.

61

1

## **FIGURES**

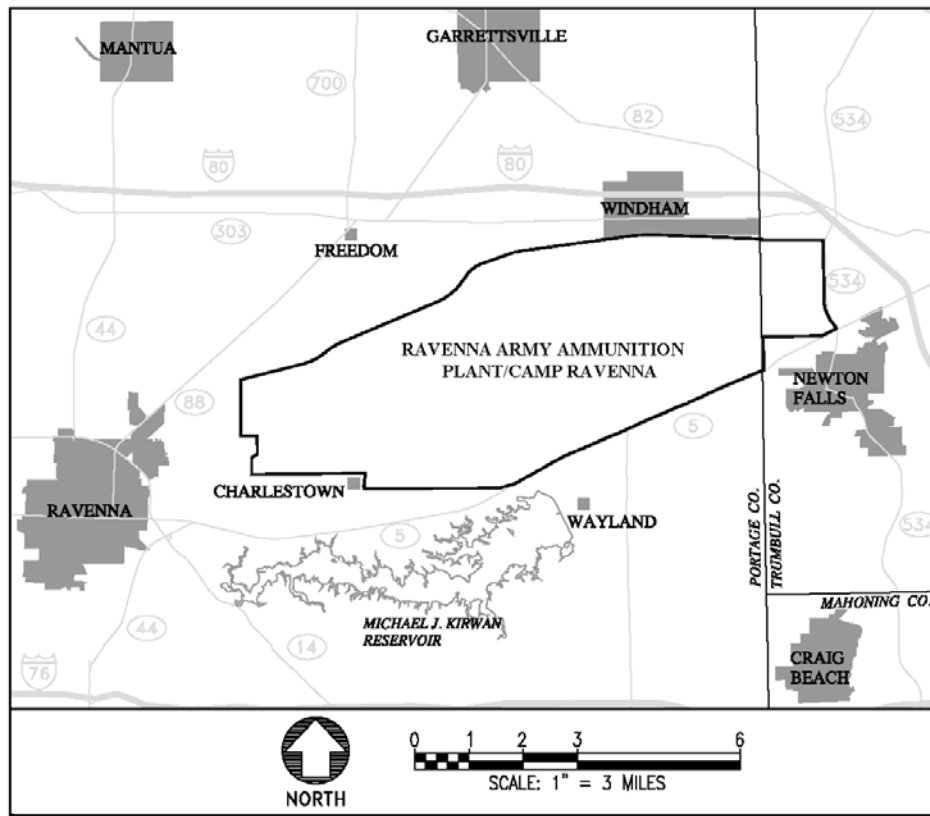
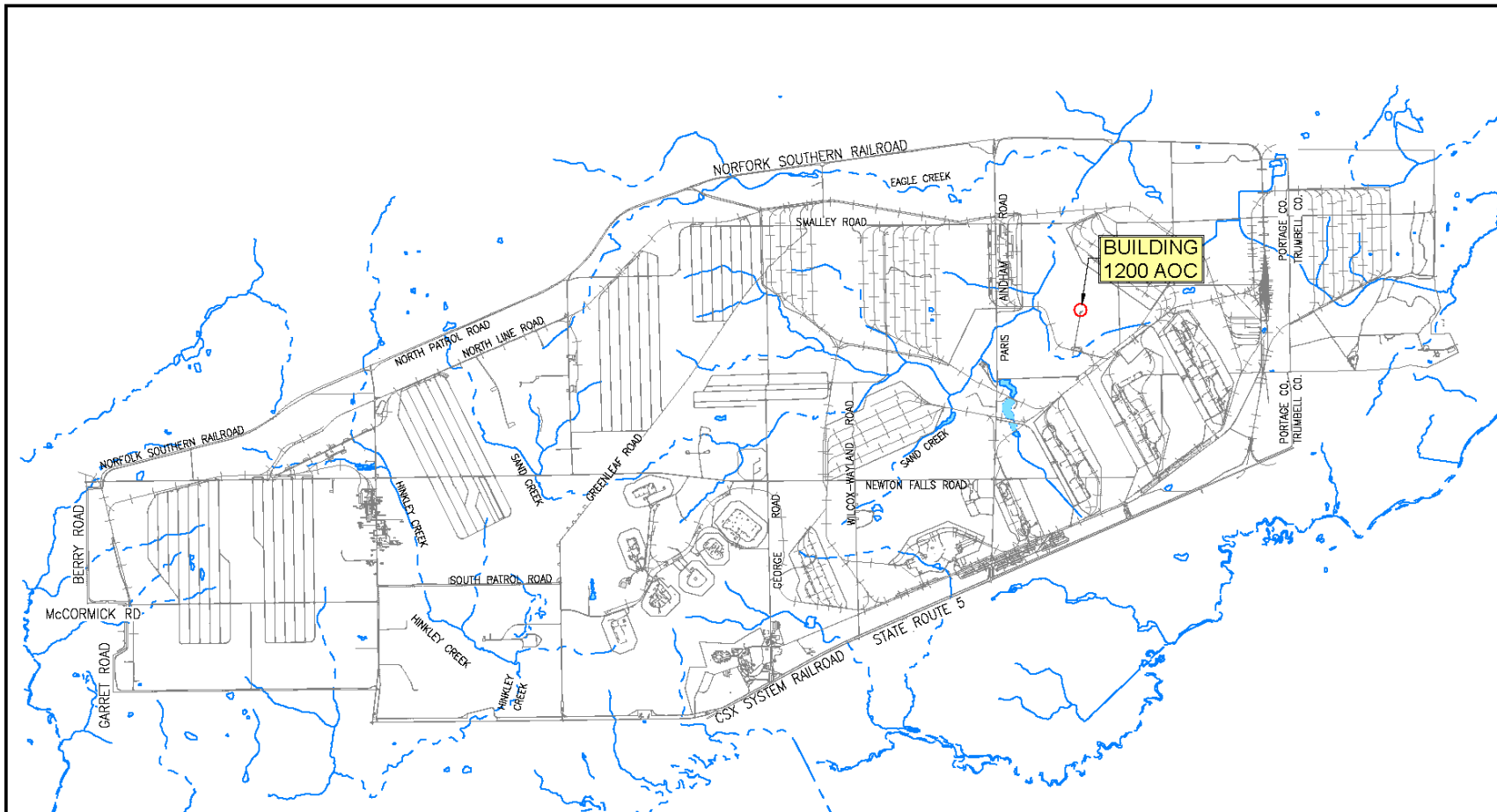


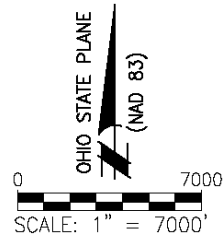
Figure 1. General Location and Orientation of RVAAP/Camp Ravenna

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2  
3



**LEGEND:**

- ===== ASPHALT ROAD
- RAILROAD TRACKS
- x-x-x- FENCE LINE
- ~~~~~ STREAMS



**SAIC**  
From Science to Solutions

**BUILDING 1200  
RAVENNA ARMY AMMUNITION  
PLANT - RAVENNA, OHIO**

DRAWN BY: P. HOLM	REV. NO./DATE: 0/02-28-11	CAD FILE: 08042/DWGS/K66B1200-FIG-2
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**Figure 2. RVAAP/Camp Ravenna Installation Map**

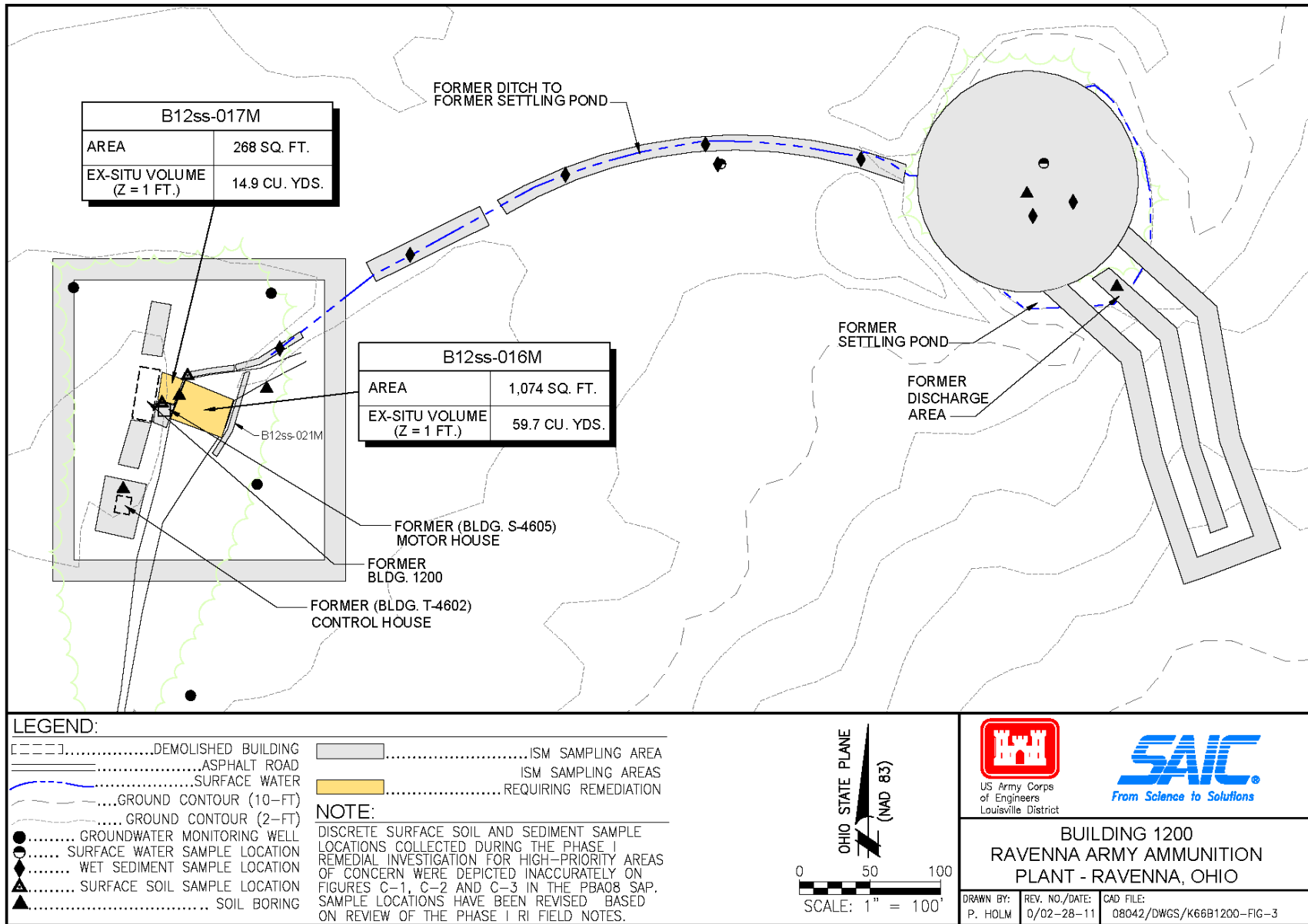


Figure 3. Building 1200 AOC Site Features