

1 **Draft**  
2 **No Further Action Record of Decision for**  
3 **RVAAP-032-R-01 40mm Firing Range Munitions Response Site**  
4 **Version 1.0**

5 **Former Ravenna Army Ammunition Plant**  
6 **Portage and Trumbull Counties, Ohio**

7 **Contract No. W912DR-15-D-0016**  
8 **Delivery Order No. 0001**

9 **Prepared for:**



10 **US Army Corps  
of Engineers®**

11 **U.S. Army Corps of Engineers**  
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20 **March 11, 2019**

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<b>13. SUPPLEMENTARY NOTES</b> None					
<b>14. ABSTRACT</b> The U.S. Department of the Army (U.S. Army) is presenting this No Further Action (NFA) Record of Decision to document the No Further Action determination for the former Ravenna Army Ammunition Plant, RVAAP-032-R-01, 40mm Firing Range Munitions Response Site (MRS), in Portage and Trumbull Counties, Ohio. This NFA Record of Decision presents the U.S. Army's No Further Action determination, Ohio EPA. Investigations have found no munitions and explosives of concern or concentrated areas of munitions debris, and no potential source of munitions constituents exists at the MRS. Therefore, there is no source material or impacted environmental media resulting from historical U.S. munitions-related activities at the MRS.					
<b>15. SUBJECT TERMS</b>					
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<b>a. REPORT</b>	<b>b. ABSTRACT</b>	<b>c. THIS PAGE</b>			Kimberly Vaughn
U	U	U	SAR	50	<b>19b. TELEPHONE NUMBER (Include area code)</b> 512-658-6828

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**PLACEHOLDER PAGE FOR:**

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

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*(Documentation to be provided once concurrence is issued)*

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**DISCLAIMER STATEMENT**

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


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**CONTRACTOR’S STATEMENT OF INDEPENDENT TECHNICAL REVIEW**

36 HydroGeoLogic, Inc. has completed the *Draft No Further Action Record of Decision for RVAAP-*  
37 *032-R-01 40mm Firing Range Munitions Response Site, Version 1.0*, at the former Ravenna Army  
38 Ammunition Plant, Portage and Trumbull Counties, Ohio. Notice is hereby given that an  
39 independent technical review has been conducted that is appropriate to the level of risk and  
40 complexity inherent in the project. During the independent technical review, compliance with  
41 established policy principles and procedures, utilizing justified and valid assumptions, was  
42 verified. This included review of data quality objectives, technical assumptions; methods,  
43 procedures, and materials to be used; the appropriateness of data used and level of data obtained;  
44 and reasonableness of the results, including whether the product meets customer’s needs consistent  
45 with law and existing United States Army Corps of Engineers policy.

Reviewed/Approved by:  \_\_\_\_\_ Date: March 11, 2019  
Timothy Leahy, PG, PMP  
Project Manager  
APTIM Federal Services

Reviewed/Approved by:  \_\_\_\_\_ Date: March 11, 2019  
Kimberly Vaughn  
Project Manager

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Gail Harris, RVAAP Administrative Record Manager	1	1

73  
74 ARNG – Army National Guard  
75 COR – Contracting Officer’s Representative  
76 IED – Installation and Environment Division  
77 OHARNG – Ohio Army National Guard  
78 RVAAP – Former Ravenna Army Ammunition Plant  
79 USACE – United States Army Corps of Engineers

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## ACRONYMS AND ABBREVIATIONS

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128	amsl	above mean sea level
129	Army	U.S. Department of the Army
130	ARNG	Army National Guard
131	Camp Ravenna	Camp Ravenna Joint Military Training Center
132	CB&I	CB&I Federal Services, LLC
133	CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act</i>
134	CJAG	Camp James A. Garfield Joint Military Training Center
135	CSM	Conceptual Site Model
136	DFFO	<i>Director's Final Findings and Orders</i>
137	DMM	Discarded Military Munition
138	DoD	Department of Defense
139	e <sup>2</sup> M	engineering-environmental Management, Inc.
140	ERA	ecological risk assessment
141	FS	Feasibility Study
142	HA	hazard assessment
143	HE	high explosives
144	HGL	HydroGeoLogic, Inc.
145	HHRA	human health risk assessment
146	HRR	<i>Historical Records Review</i>
147	ISM	Incremental Sampling Methodology
148	MC	munitions constituents
149	MD	munitions debris
150	MEC	munitions and explosives of concern
151	mm	millimeter
152	MMRP	Military Munitions Response Program
153	MRS	munitions response site
154	MRSPP	Munitions Response Site Prioritization Protocol
155	NFA	No Further Action
156	NFA Proposed Plan	<i>Final No Further Action Proposed Plan for RVAAP 032-R-01 40mm Firing Range</i>
157		<i>MRS</i>
158	OHARNG	Ohio Army National Guard
159	Ohio EPA	Environmental Protection Agency
160	RDX	Research Department Explosives
161	RI	Remedial Investigation
162	ROD	Record of Decision
163	RVAAP	Ravenna Army Ammunition Plan
164	SI	Site Inspection
165	SI Report	<i>Final Site Investigation Report</i>

## ACRONYMS AND ABBREVIATIONS (continued)

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166	TNT	2,4,6-Trinitrotoluene
167	USACE	U.S. Army Corps of Engineers
168	USP&FO	U.S. Property and Fiscal Officer
169	UXO	unexploded ordnance

170 **PART I: DECLARATION**

---

171 **A. SITE NAME AND LOCATION**

172 The Army National Guard (ARNG) developed this No Further Action (NFA) Record of Decision (ROD)  
173 for the RVAAP-032-R-01 40 millimeter(mm) Firing Range Munitions Response Site (MRS) located at the  
174 former Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio (**Figure 1**). The former RVAAP is  
175 now known as Camp James A. Garfield Joint Military Training Center (CJAG). The 40mm Firing Range  
176 MRS is located in the northeastern portion of CJAG (**Figure 2**). CJAG was previously known as Camp  
177 Ravenna Joint Military Training Center (Camp Ravenna) and that name will be used in some historical  
178 reports.

179 CJAG is 21,683 acres and is federally owned. The facility is located in Portage and Trumbull Counties,  
180 Ohio, approximately 3 miles east-northeast of the City of Ravenna (**Figure 1**). Administrative  
181 accountability for CJAG was transferred to the U.S. Property and Fiscal Officer (USP&FO) for Ohio (the  
182 property owner) in multiple transfers the last being in September 2013. The facility is licensed to the Ohio  
183 Army National Guard (OHARNG) for use as a military training facility (Federal Facility ID No.  
184 OH213820736).

185 To maintain a distinction between historical operations and current activities, the term “RVAAP” will be  
186 used for historical discussions and “CJAG” will be used when referring to the current facility activities.

187 **B. STATEMENT OF BASIS AND PURPOSE**

188 The ARNG is the lead federal agency for environmental response actions at CJAG. The ARNG in  
189 consultation with the Ohio Environmental Protection Agency (Ohio EPA), determined that NFA is the  
190 selected remedy for the 40mm Firing Range MRS at the CJAG. The NFA determination meets the  
191 requirements of the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA)  
192 of 1980, as amended by the *Superfund Amendments and Reauthorization Act* of 1986 and the *National Oil*  
193 *and Hazardous Substances Pollution Contingency Plan*. The Army’s decision is based on information  
194 contained in the Administrative Record file for the 40mm Firing Range MRS.

195 The Ohio EPA, the supporting state regulatory agency, reviewed and concurred with the *Final No Further*  
196 *Action Proposed Plan for RVAAP-032-R-01 40mm Firing Range Munitions Response Site* (NFA Proposed  
197 Plan; HydroGeoLogic, Inc. [HGL], 2018b) and their concurrence letter is included at the beginning of this  
198 ROD. The NFA Proposed Plan presented the Army’s preferred remedy for addressing the 40mm Firing  
199 Range MRS and invited public involvement during the comment period (October 25, 2018 through  
200 December 1, 2018) and public meeting (November 1, 2018). No U.S. Department of Defense (DoD)  
201 military munitions (i.e., unexploded ordnance [UXO], discarded military munitions, or munitions  
202 constituents [MC]-related contamination) originating from historical activities associated with the 40mm  
203 Firing Range MRS have been found at the MRS throughout the CERCLA process. The NFA determination  
204 under CERCLA at the 40mm Firing Range MRS satisfies the requirements of the *Director’s Final Findings*  
205 *and Orders* (DFFO) (Ohio EPA, 2004), specifically by documenting the Ohio EPA’s concurrence with the  
206 closeout of the Military Munitions Response Program (MMRP) investigation conducted for this MRS under  
207 Section XII, paragraph 26.

208 **C. DESCRIPTION OF THE SELECTED REMEDY**

209 No DoD military munitions confirmed to be munitions and explosives of concern (MEC) were encountered  
210 at the MRS during the Remedial Investigation (RI) field work, and only munitions debris (MD) were found.  
211 The results of the RI did not indicate the presence of MC-related contamination at the MRS. Therefore,

212 NFA is the selected remedy for the 40mm Firing Range MRS under the MMRP pursuant to CERCLA  
213 requirements.

214 **D. STATUTORY DETERMINATION**

215 The results of the RI fieldwork for the 40mm Firing Range MRS support the determination that no risks  
216 associated with exposure to DoD military munitions and MC-related contamination exist at the MRS.  
217 Because no risks have been identified at the MRS, the ARNG has determined that NFA is necessary for  
218 DoD military munitions and MC-related contamination at the 40mm Firing Range MRS. NFA is protective  
219 of human health and the environment and meets the statutory requirements for cleanup standards  
220 established in Section 121 of CERCLA. Because there are no risks to human health or the environment  
221 associated with DoD military munitions and MC-related contamination at the MRS, five-year reviews are  
222 not required. No other remedial action is necessary to ensure protection of human health and the  
223 environment.

224 **E. AUTHORIZING SIGNATURE**

225

226 Approve:

227

228

---

William M. Myer  
COL, GS  
I&E, Army National Guard

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Date

229

230 **PART II: DECISION SUMMARY**

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231 **A. SITE NAME, LOCATION, AND DESCRIPTION**

232 The RVAAP, now known as the Camp James A. Garfield Joint Military Training Center (CJAG) is located  
233 in northeastern Ohio within Portage and Trumbull Counties and is approximately 3 miles east-northeast of  
234 the city of Ravenna. The facility is federally owned and is approximately 11 miles long and 3.5 miles wide.  
235 The facility is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad  
236 to the south; Garret, McCormick, and Berry Roads to the west; the Norfolk Southern Railroad to the north;  
237 and State Route 534 to the east (**Figure 1**). CJAG is surrounded by the communities of Windham,  
238 Garrettsville, Newton Falls, Charlestown, and Wayland.

239 Administrative accountability of the 21,683-acre facility has been transferred to the USP&FO, which  
240 subsequently licensed CJAG to the OHARNG for use as a training site. The restoration program for the  
241 facility involves the remediation of areas affected by military activities when the RVAAP was in operation.

242 The 40mm Firing Range MRS is an 8.55-acre parcel located in the southern-central portion of CJAG within  
243 Portage County (**Figure 2**). The MRS is northeast of the intersection of Fuze and Booster Spur Road and  
244 Fuze and Booster Road (CB&I Federal Services LLC [CB&I], 2015). **Figure 3** presents the current  
245 boundaries of the MRS.

246 The 40mm Firing Range MRS was investigated under the MMRP, which was established under the Defense  
247 Environmental Restoration Program to address DoD military munitions located on current and former  
248 defense sites. Sites that are eligible under the MMRP are non-operational ranges where military munitions  
249 are known or suspected to be present. The 40mm Firing Range MRS was determined to be eligible under  
250 the MMRP.

251 **B. SITE HISTORY AND ENFORCEMENT ACTIVITIES**

252 The RVAAP was constructed in 1940 and 1941 for the assembly/loading and depot storage of ammunition.  
253 While serving as an ammunition plant, the RVAAP was a U.S. Government-owned and contractor-operated  
254 industrial facility. The ammunition plant consisted of 12 munitions assembly facilities, referred to as “load  
255 lines.” Load Lines 1 through 4 were used to melt and load 2,4,6-Trinitrotoluene (TNT) and Composition B  
256 (a mixture of TNT and Research Department Explosive [RDX]) into large-caliber shells and bombs.  
257 Operations on the load lines produced explosive dust, spills, and vapors that collected on the floors and  
258 walls of each building. Periodically, the floors and walls were cleaned with water and steam. After cleaning,  
259 the “pink water” wastewater, which contained TNT and Composition B, was collected in concrete holding  
260 tanks, filtered, and pumped into unlined ditches for transport to earthen settling ponds. Load Lines 5 through  
261 11 manufactured fuzes, primers, and boosters. From 1946 to 1949, Load Line 12 produced ammonium  
262 nitrate for explosives and fertilizers; subsequently, it was used as a weapons demilitarization facility.

263 In 1950, the facility was placed on standby status, and operations were limited to renovation,  
264 demilitarization, normal maintenance of equipment, and munitions storage. Production activities resumed  
265 from July 1954 to October 1957 and again from May 1968 to August 1972. Demilitarization and production  
266 activities were conducted at Load Lines 1, 2, 3, and 12. Demilitarization activities included disassembling  
267 munitions and melting out and recovering explosives using hot water and steam processes. These activities  
268 continued through 1992.

269 In addition to production and demilitarization activities at the load lines, other activities conducted at the  
270 RVAAP included the burning, demolition, and testing of munitions. The locations used as burning and  
271 demolition grounds consisted of large, open areas and abandoned quarries. Other areas of concern

272 associated with the RVAAP include a landfill, an aircraft fuel tank testing area, and various industrial  
273 support and maintenance facilities (CB&I, 2015).

274 The 40mm Firing Range MRS is the location of a former 40mm firing range that operated between 1969  
275 and 1971. The area of the MRS consists of the 8.55 acres former firing range itself and the overshoot area  
276 the furthest location a 40mm grenade could have travelled from the firing point. The former firing range  
277 was used to perform acceptance tests that included muzzle velocity measurements and impact function  
278 tests. Munitions reportedly fired at the former firing range included the M407A1-series 40mm practice  
279 grenade and the M406-series high explosive (HE) 40mm grenade. The M406- and M407A1-series grenades  
280 were designed to be fired from 40mm grenade launchers attached to rifles. The 40mm practice grenades  
281 contained yellow marker dye, M9-series propellant, and RDX booster pellets (Army, 1977). The M9-series  
282 propellant consisted of nitrocellulose, nitroglycerin, potassium nitrate, ethyl centralite, and graphite. The  
283 M406-series HE 40mm grenades contained Composition B explosive, which is a mixture of RDX and TNT  
284 (engineering-environmental Management, Inc. [e<sup>2</sup>M], 2007). According to the *Final Installation*  
285 *Assessment of RVAAP Report No. 132* (U.S. Army Toxic and Hazardous Materials Agency, 1978), each of  
286 the approximately 2,500 rounds fired on this range was accounted for.

287 The furthest possible target distance for the 40mm grenades reported to have been fired at the former test  
288 range is 350 meters from the firing point (Army, 2003). The target impact area was well-defined with a  
289 berm that has since been removed. The firing point was situated at the eastern portion of the former test  
290 range. Remnants of the firing point location still remain and include a small wooden structure believed to  
291 be the former storage shed, gun mount foundation, and chronograph foundation (CB&I, 2015).

292 The MRS is mostly forested with thick vegetation and ground cover. An approximate 1.5-acre open area  
293 with tall grasses remains at the eastern portion of the MRS, near the location of the former firing point. A  
294 steep slope exists to the west of the former impact area and slopes downward toward the Fuze and Booster  
295 Quarry ponds. There are no wetlands, waterways, or sensitive area at the MRS (CB&I, 2015). The MRS is  
296 shown in **Figure 3**.

297 There have been no CERCLA enforcement actions related to the 40mm Firing Range MRS.

### 298 **C. COMMUNITY PARTICIPATION**

299 Using the RVAAP community relations program, ARNG and the Ohio EPA have interacted with the public  
300 through news releases, public meetings, reading materials, and a website. Specific items of the community  
301 relations program include the following:

- 302 • **Restoration Advisory Board:** A Restoration Advisory Board was established in 1996 to promote  
303 community involvement in DoD environmental cleanup activities and allow the public to review  
304 and discuss the progress with decision makers. Board meetings are generally held two to three times  
305 per year and are open to the public.
- 306 • **RVAAP Restoration Program Community Relations Plan:** The *Final Community Relations*  
307 *Plan for the Ravenna Army Ammunition Plant Restoration Program in Portage and Trumbull*  
308 *Counties, Ohio* (U.S. Army Corps of Engineers [USACE], 2017) was prepared to establish  
309 processes to keep the public informed of activities being conducted as part of the RVAAP  
310 restoration program.
- 311 • **RVAAP Restoration Program Website:** A website was established in 2004 for the RVAAP  
312 Restoration Program. The website provides information on the history of the RVAAP, areas of  
313 potential contamination, the cleanup program being implemented, current activities, and a schedule  
314 of upcoming events. This website is accessible to the public at [www.rvaap.org](http://www.rvaap.org).

315 In accordance with Section 117(a) of CERCLA, Section 300.430(f)(2) of the *National Oil and Hazardous*  
316 *Substances Pollution Contingency Plan*, and the *Final U.S. Army Military Munitions Response Program*  
317 *Munitions Response, Remedial Investigation/Feasibility Study Guidance* (Army, 2009) the ARNG released  
318 the NFA Proposed Plan for the 40mm Firing Range MRS (HGL, 2018b) in October 2018. The NFA  
319 Proposed Plan and other project-related documents were made available to the public as part of the  
320 Administrative Record maintained at CJAG and in the two Information Repositories at Reed Memorial  
321 Library in Ravenna, Ohio and Newton Falls Public Library in Newton Falls, Ohio. The notice of availability  
322 for the NFA Proposed Plan was sent to the Tribune Chronicle and Record Courier, as specified in the  
323 Community Relations Plan (USACE, 2017). The notice of availability initiated the 30-day public comment  
324 period which began on October 25, 2018, and ended on December 1, 2018.

325 The ARNG held a public meeting on November 1, 2018, at the Shearer Community Center, 9355 Newton  
326 Falls Road, Ravenna, Ohio 44266, to present the NFA Proposed Plan to the public. At this meeting,  
327 representatives of the ARNG provided information specific to the 40mm Firing Range MRS history,  
328 investigations, current site conditions, and proposed NFA. The representatives of the ARNG were also  
329 available to answer questions about the results of the MMRP-related investigations at the 40mm Firing  
330 Range MRS. Responses to the comments received at this meeting and during the public comment period are  
331 included in the Responsiveness Summary, which is Part III of this ROD.

332 The ARNG considered the input received on the NFA Proposed Plan when determining that NFA for DoD  
333 military munitions and MC-related contamination is appropriate for the 40mm Firing Range MRS.

#### 334 **D. SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION**

335 The overall goal of the MMRP at RVAAP is to address risks to human health and the environment posed  
336 by DoD military munitions (i.e., unexploded ordnance (UXO) and discarded military munitions (DMM))  
337 and MC-related contamination. Investigations conducted by the ARNG have determined that no  
338 unacceptable risk is posed by DoD military munitions at the 40mm Firing Range MRS. The ARNG has  
339 also determined there is no potential source for MC-related contamination. For this reason, the ARNG has  
340 determined that there is no source material or impacted environmental media resulting from historical DoD  
341 military munitions-related activities at the MRS. The NFA determination is protective of the receptors  
342 associated with future land use at the 40mm Firing Range MRS. No other investigations are ongoing at the  
343 MRS under the MMRP.

#### 344 **E. SITE CHARACTERISTICS**

345 This section provides a brief overview of the 40mm Firing Range MRS that includes the physical  
346 characteristics, previous investigations completed under the MMRP, the nature and extent of contamination,  
347 and the most current conceptual site model (CSM).

##### 348 **E.1 Physical Characteristics**

349 The physical characteristics such as topography, geology, hydrogeology, and ecological characteristics that  
350 contributed to identifying potential transport pathways, receptors and exposure scenarios used to evaluate  
351 health and ecological risks are presented in the following subsections.

##### 352 **E.1.1 Topography/Physiography**

353 CJAG is located within the Southern New York section of the Appalachian Plateaus physiographic province  
354 characterized by rolling hills, incised streams, and dendritic drainage patterns. Past glacial activity created  
355 bogs, lakes, and other wetland areas. The topography at the 40mm Firing Range MRS is relatively flat with  
356 topography ranging from 1,150 feet above mean sea level (amsl) at the eastern portion of the former range,  
357 where the former firing point was located, to 1,170 feet amsl at the central portion of the MRS where the

358 impact area was located. The topography at the western portion of the MRS dips to an elevation low of  
359 approximately 1,130 feet amsl. There are no natural streams or ponds located within the MRS and the MRS  
360 is not located within a flood plain (CB&I, 2015).

### 361 ***E.1.2 Soils and Geology***

362 CJAG is located atop Mississippian- and Pennsylvanian-age bedrock strata that are overlain by  
363 unconsolidated glacial deposits of varying thickness. The 40mm Firing Range MRS is located  
364 predominantly over the Homewood Sandstone Member. The eastern portion of the MRS is located over the  
365 Mercer Member. The bedrock elevation across the MRS is relatively flat at 1,150 feet amsl. Depth to  
366 bedrock ranges from just below ground surface at the west, south, and east portions of the MRS to  
367 approximately 25 feet below ground surface at the northern portion of the MRS.

368 The native soil types at the 40mm Firing Range MRS include the Mitiwanga silt loam with 0 to 2 percent  
369 slopes and the Mahoning silt loam with 2 to 6 percent slopes. The western portion of the MRS abuts soils  
370 characterized as pits and quarries associated with the former Fuze and Booster Quarry (CB&I, 2015).

### 371 ***E.1.3 Surface Water***

372 CJAG is located within the Ohio River Basin with a major surface stream running adjacent to the western  
373 portion of the facility flowing to the Mahoning River before joining the Michael J. Kirwan Reservoir. After  
374 leaving the reservoir, the west branch joins the Mahoning River east of the facility.

375 Surface water drainage at the central portion of the MRS generally flows to the east-southeast or to the west  
376 following the topography. The nearest surface water drainage features are the ponds associated with the  
377 Fuze and Booster Quarry to the west of the MRS. No wetlands, bogs, kettle lakes, or kames have been  
378 identified as being present within the MRS and the MRS is not located in a floodplain. (CB&I, 2015).

### 379 ***E.1.4 Hydrogeology***

380 Although groundwater recharge and discharge areas have not been delineated at CJAG, it is assumed that  
381 the extensive uplands areas at the facility, primarily located at the western portion of the facility, are  
382 regional recharge zones. Sand Creek, Hinkley Creek, and Eagle Creek are presumed to be major  
383 groundwater discharge areas. The 40mm Firing Range MRS is not situated in the upland areas that are  
384 considered to be regional recharge zones.

385 No groundwater monitoring wells have been specifically installed for the 40mm Firing Range MRS and  
386 the depth to the unconsolidated aquifer beneath the MRS is unknown. Based on the facility groundwater  
387 data collected for the Facility-Wide Groundwater Monitoring Program, the groundwater elevation at the  
388 MRS and the immediate vicinity appears to be at a potentiometric high of approximately 1,100 feet amsl.  
389 Therefore, the depth to groundwater at the 40mm Firing Range MRS may be as deep as 50 feet. The  
390 groundwater appears to flow in all directions from this higher formation (CB&I, 2015).

### 391 ***E.1.5 Ecology***

392 CJAG is home to a range of vegetation and habitat resources. The vegetation community present at the  
393 40mm Firing Range MRS is categorized as the “Dry Midsuccessional Cold-Deciduous Shrubland  
394 Alliance.” This shrubland alliance is associated with relatively open areas characterized by shrub species  
395 covering more than 50 percent of the area, with relatively few large trees. This alliance often is found within  
396 previously disturbed areas, and is dominated by gray dogwood, northern arrow-wood, blackberry,  
397 hawthorn, and multiflora rose.

398 The Camp Ravenna Integrated Natural Resources Management Plan and U.S. Fish and Wildlife Service  
399 (USFWS) Threatened and Endangered Species List indicate that one federally-listed threatened species, the



400 Northern Long-eared Bat, is known to reside within CJAG (OHARNG, 2014) (USFWS, 2018). In  
401 additional, the Ohio Department of Natural Resources has identified several state-listed threatened and  
402 endangered plant and animal species. Twelve state listed endangered species (1 mammal, 1 fish, 1 insect,  
403 8 bird, and 1 plant species) and ten state listed threatened species (5 bird, 1 insect, 4 plants species) are  
404 included on the Rare Species List. No confirmed sightings of these species within the 40mm Firing Range  
405 MRS have been reported and no critical habitats are present within the MRS (CB&I, 2015).

## 406 **E.2 Site Investigations**

407 This section summarizes the CERCLA investigations that were completed at the 40mm Firing Range MRS  
408 under the MMRP.

### 409 ***E.2.1 Historical Records Review***

410 In 2007, the ARNG prepared a *Historical Records Review* (HRR) under the MMRP for RVAAP restoration  
411 program that included the 40mm Firing Range MRS. The HRR described the 40mm Firing Range MRS as  
412 an approximate 5.17-acre area surrounded by forest. A wooden structure believed to be the former storage  
413 shed, gun mount foundation, and chronograph foundation located at the firing point were the only remnants  
414 of the range, as the impact area berm had been removed. The HRR reported that facility personnel had  
415 identified UXO beyond the impact area, on the slope that leads down to the Fuze and Booster Quarry MRS.  
416 However, the HRR did not identify the type or disposition of the UXO reported by the facility personnel  
417 (e<sup>2</sup>M, 2007).

### 418 ***E.2.2 Site Inspection***

419 In 2007, the ARNG completed an MMRP Site Inspection (SI) at the former RVAAP that included the  
420 40mm Firing Range MRS. At the time of the SI, the size of the 40mm Firing Range MRS was approximately  
421 5.17 acres that included an open field surrounded by forest. As part of the SI activities, a meandering path  
422 magnetometer and metal detector assisted surveys for pieces of DoD military munitions were completed at  
423 the down-range target impact area, overshoot area, and firing point portions at the MRS.

424 Various items were found on the ground surface during the SI at the target impact area and 100 feet beyond.  
425 The DoD military munitions were evaluated by UXO-qualified personnel, determined as safe, and  
426 considered to be MD. The MD consisted of aluminum 40mm grenade nose caps and casings. Although  
427 DoD military munitions that were suspected to be MEC had been reportedly previously observed by facility  
428 personnel beyond the impact area, the presence of MEC was not verified during the SI field activities. No  
429 DoD military munitions were observed at the firing point or in the area between the firing point and impact  
430 area.

431 No samples for MC-related contamination were collected as part of the SI field activities.

432 The impact and overshoot areas where the MD was found encompassed 1.27 acres and became the revised  
433 MRS following the SI (e<sup>2</sup>M, 2008). **Figure 4** presents the impact and overshoot area at the MRS and the  
434 results of the SI field work.

### 435 ***E.2.3 Remedial Investigation***

436 During planning for the RI field work, the previous findings of MD were evaluated and it was determined  
437 that the area between the firing point and the furthest possible target distance for the 40mm grenades  
438 reported to have been fired at the former 40mm Firing Range (350 meters from the firing point) required  
439 further investigation for DoD military munitions. The revised RI area was determined to be 8.55 acres that  
440 was inclusive of the 1.27-acre MRS identified during the SI. The combined area was referred to as the  
441 “Investigation Area” in the Final RI Report (CB&I, 2015). Numerous fragments of DoD military munitions

442 were encountered on the ground surface and in subsurface soils. The items were evaluated by UXO-  
443 qualified personnel, determined to be safe, and considered MD. The MD were associated with the 40mm  
444 practice grenades that are known to have been discharged at the former firing range. No DoD military  
445 munitions confirmed to be MEC were identified at the 40mm Firing Range MRS during the RI field  
446 activities.

447 Sampling for MC-related contamination was conducted during the RI at predetermined locations at the  
448 former impact area and 100 feet beyond as well as the location of the former firing point. In all, a total of  
449 three surface soil samples, not including quality control samples, were collected during the RI using the  
450 Incremental Sampling Methodology (ISM). Two ISM surface soil samples, each comprising 0.63 acres,  
451 were collected at the impact area and 100 feet beyond. A third ISM sample was collected at the 0.05-acre  
452 firing point at the east end of the former firing range. All three ISM samples were collected at depths  
453 between 0 and 0.5 feet. The soil sample locations were based on locations where the MD was identified  
454 and where MC-related contamination associated with historical activities were expected. The MC-related  
455 contamination sampling locations are presented in **Figure 5**.

456 The analytes detected during the RI sampling event consisted of nitroguanidine at the firing point and  
457 aluminum and lead at the former down range impact area. Nitroguanidine was detected at a very low  
458 concentration and is not an MC-related contaminant associated with the 40mm practice rounds fired at the  
459 former test range. Therefore, nitroguanidine was removed from further consideration as an MC-related  
460 contaminant at the MRS. The concentrations for both aluminum and lead were all below the background  
461 values and were not retained as MC-related contamination. Because no detected analytes were identified as  
462 MC-related contamination during the RI field activities, a Human Health Risk Assessment (HHRA) and  
463 Ecological Risk Assessment (ERA) were not required for inclusion in the Final RI Report.

464 Following the RI, the MRS boundary was expanded to encompass the 8.55-acre Investigation Area where  
465 the MD was found (CB&I, 2015). **Figure 5** depicts the current MRS boundaries, the site features associated  
466 with the historical activities that occurred at the MRS, and the locations where MD were found during the  
467 RI field work.

468 To date, no DoD military munitions confirmed to be MEC have been found at the 40mm Firing Range  
469 MRS. The RI fieldwork confirmed the results of previous investigations at the MRS; therefore, an explosive  
470 hazard is not present at the MRS. As a result, no MEC hazard assessment was required. The results of the  
471 RI did not indicate the presence of MC-related contamination at the MRS. The MRS was assigned a  
472 Munitions Response Site Prioritization Protocol (MRSP) priority of 5 (CB&I, 2015). MRSP scores  
473 range from 1 (highest priority sites) to 8, which is the lowest priority rating that a site can score.

#### 474 ***E.2.4 Feasibility Study***

475 Following the RI, a Feasibility Study (FS) was conducted to develop, evaluate, and perform a detailed  
476 analysis of potential remedial alternatives for the 40mm Firing Range MRS, as well as to Remedial Action  
477 Objectives and allow the DoD to select and propose an appropriate remedy. Based on further evaluation of  
478 the RI results, the project team concluded the 40mm Firing Range MRS be recommended for NFA. No  
479 explosive hazards were found during the RI; therefore, no MEC hazard assessment was required  
480 (HGL, 2018a). The MRSP tables were updated during the FS in accordance with the MRSP Primer and  
481 the revised MRSP priority is “No Longer Required”.

482 ***E.2.5 Proposed Plan***

483 The Proposed Plan was completed for 40mm Firing Range MRS by the ARNG in 2018. The Proposed Plan  
484 recommended NFA as no risks have been identified at the MRS. The overall recommendation of NFA  
485 under the MMRP was considered protective of receptors that may be present at the MRS (HGL, 2018b).

486 **E.3 Nature and Extent of Contamination**

487 Data gathered by the ARNG during the SI and subsequent RI for the 40mm Firing Range MRS effectively  
488 characterized the nature and extent of DoD military munitions and MC-related contamination at the MRS.  
489 Based on the information presented in Part II, Sections A through E, it can be concluded that no further  
490 investigation is necessary at the MRS. As outlined in the RI Report, no evidence of intact DoD military  
491 munitions was identified at the MRS; there are no explosive hazards; and, no current sources for a release  
492 of MC-related contamination. In addition, ISM samples from the RI did not detect any past releases of MC-  
493 related contamination. Therefore, there is no explosive hazard or unacceptable risk due to MC-related  
494 contamination at the 40mm Firing Range MRS (CB&I, 2015).

495 **E.4 Conceptual Site Model**

496 The CSM discussion includes sources of contamination, release mechanisms, migration pathways, and  
497 potential receptors identified for the 40mm Firing Range MRS in support of the HHRA and ERA.

498 ***E.4.1 Primary and Secondary Contaminant Sources and Release Mechanisms***

499 The 40mm Firing Range MRS is the location of a former 40mm firing range that operated between 1969  
500 and 1971. Prior to the SI, it was reported that facility personnel identified UXO beyond the impact point on  
501 the slope that leads down to the Fuze and Booster Quarry MRS (e<sup>2</sup>M, 2007); however, it should be noted  
502 that item was not identified, and the finding itself could not be confirmed. Parts and pieces of 40mm  
503 grenades were found on the ground surface during the SI at the target impact area and 100 feet beyond. The  
504 items were confirmed to be MD and no MEC were found. Prior to the RI, MEC was still considered  
505 potentially present and a primary source of potential explosive hazards at the MRS. The associated  
506 secondary source of contamination was the potential release of MC-related contamination from any MEC  
507 on or just below the ground surface (e<sup>2</sup>M, 2008). The RI did not identify any DoD military munitions and  
508 only MD was found. The Final RI Report (CB&I, 2015) concluded that MC-related contamination was not  
509 detected at the MRS. The exposure pathways considered during the RI included the potential for human  
510 encounters with MEC on and just below the ground surface. Freeze/thaw cycling throughout the MRS and  
511 erosion at the steeper areas were evaluated since these physical processes have the potential to expose  
512 subsurface MEC (CB&I, 2015).

513 ***E.4.2 Contaminant Migration Pathways***

514 The lack of DoD military munitions identified by the ARNG during SI and RI field activities is evidence  
515 that no explosive hazard is present in the surface or subsurface soils at the 40mm Firing Range MRS. The  
516 RI concluded that all exposure pathways for surface and subsurface soils were incomplete (CB&I, 2015).

517 ***E.4.3 Potential Human Receptors and Ecological Receptors***

518 The likely human receptors identified for the 40mm Firing Range MRS include the Industrial Receptor as  
519 described in the FS. The NFA determination is protective of other potential future human receptors (such  
520 as residential receptors); however, there are no current plans for the MRS to change from an industrial land  
521 use to a residential land use. There are no unacceptable risks to a potential future residential receptor from  
522 explosive hazards (HGL, 2018b).

523 Environmental receptors (biota) identified for the MRS include earthworms, voles, shrews, robins, foxes,  
524 and hawks (CB&I, 2015).

## 525 **F. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

526 Current activities at the 40mm Firing Range MRS include maintenance and natural resource management  
527 activities (CB&I, 2015). The future land use at the 40mm Firing Range MRS will include maintenance and  
528 natural resource management activities. It will also include military training and most likely construction  
529 activities as part of military use (HGL, 2018a).

## 530 **G. SUMMARY OF SITE RISKS**

531 The basis for NFA at the 40mm Firing Range MRS, including rationale for why a MEC Hazard Assessment  
532 (HA), HHRA, and ERA were not required, are provided in the following subsections.

### 533 **G.1 MEC Hazard Assessment**

534 The MEC HA methodology addresses human health and safety concerns associated with potential exposure  
535 to MEC at an MRS. The ARNG found no intact DoD military munitions or MEC at the 40mm Firing Range  
536 MRS during the MMRP SI or RI field activities, indicating that no source of explosive safety hazards is  
537 present. Therefore, the ARNG determined that the calculation of a MEC HA score was not warranted for  
538 the MRS (CB&I, 2015).

### 539 **G.2 Human Health and Ecological Risk Assessment**

540 The purpose of the HHRA is to document whether chemical contaminants (MC) may pose a risk to current  
541 or future human receptors and to identify which, if any, MRS conditions need to be addressed further in the  
542 CERCLA process. An ERA evaluates the potential for adverse effects posed to ecological receptors from  
543 the release of MC-related contamination at a MRS.

544 Soil samples were collected during the RI for analysis at three locations where MC-related contamination  
545 was suspected based on the locations where MD was found (impact area) and where the firing of the  
546 munitions occurred (firing area). The analytical results indicated that no known or suspected risks  
547 associated with MC-related contamination exist at the MRS, including evaluation for the Unrestricted  
548 (Residential) Receptor (CB&I, 2015).

## 549 **H. DOCUMENTATION OF NO SIGNIFICANT CHANGE**

550 The NFA Proposed Plan (HGL, 2018b) for the 40mm Firing Range MRS was released for public comment  
551 on October 25, 2018. The NFA Proposed Plan (HGL, 2018b) recommended NFA under the MMRP and  
552 pursuant to CERCLA requirements for the 40mm Firing Range MRS. After the public comment period, no  
553 significant changes regarding the selected remedy, as originally identified in the NFA Proposed Plan  
554 (HGL, 2018b), were necessary or appropriate.

555 **PART III: RESPONSIVENESS SUMMARY FOR PUBLIC COMMENTS ON THE**  
556 **PROPOSED PLAN FOR RVAAP-032-R-01 40MM FIRING RANGE MRS**

557 **A. Overview**

558 In October 2018, the ARNG released the NFA Proposed Plan. On November 1, 2018, ARNG held a public  
559 meeting at the Shearer Community Center on 9355 Newton Falls Road, Ravenna, Ohio for the 40mm Firing  
560 Range MRS. ARNG, Ohio EPA, US EPA were present for the meeting, and approximately 20 members  
561 of the community attended the meeting. The 30-day public comment period was held from October 25,  
562 2018 to December 1, 2018.

563 **B. Summary of Stakeholder Issues and Lead Agency Responses**

564 No site-specific verbal comments were received during the public meeting. Members of the public were  
565 interested in the future use of CJAG as a whole. They had no questions or comments about the sites  
566 presented, or the NFA determination.

567 **B.1 Oral Comments from Public Meeting**

568 No oral comments or questions were received from members of the public at the November 2018 public  
569 meeting.

570 **B.2 Written Comments from Public Meetings**

571 No written comments or questions were received from members of the public at the November 2018 public  
572 meeting.

573 **B.3 Telephone Comments from Public**

574 No telephone comments were received from members of the public following publication of the news  
575 releases through the duration of the public comment period.

576 **C. Technical and Legal Issues**

577 There were no technical or legal issues raised during the public comment period.

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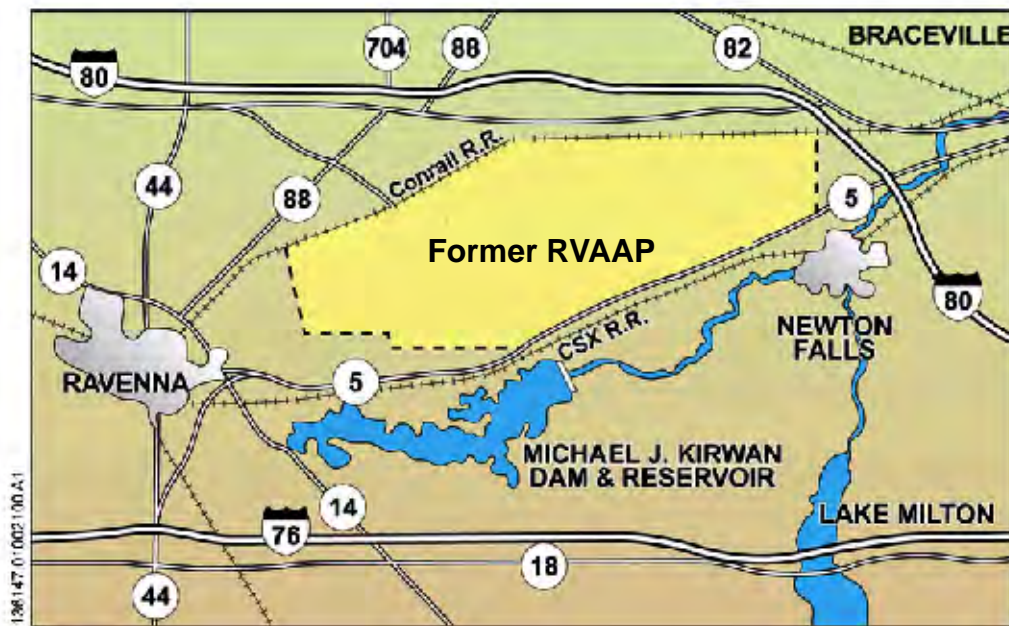
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**FIGURES**

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 001\_Fig\_1\_SiteLoc.mxd  
 12/10/2018 JWR  
 Source Aptim

**Legend**

 Former RVAAP




**Figure 1**  
**Location Map**  
**Former RVAAP**  
**Portage/Trumbull**  
**Counties, Ohio**



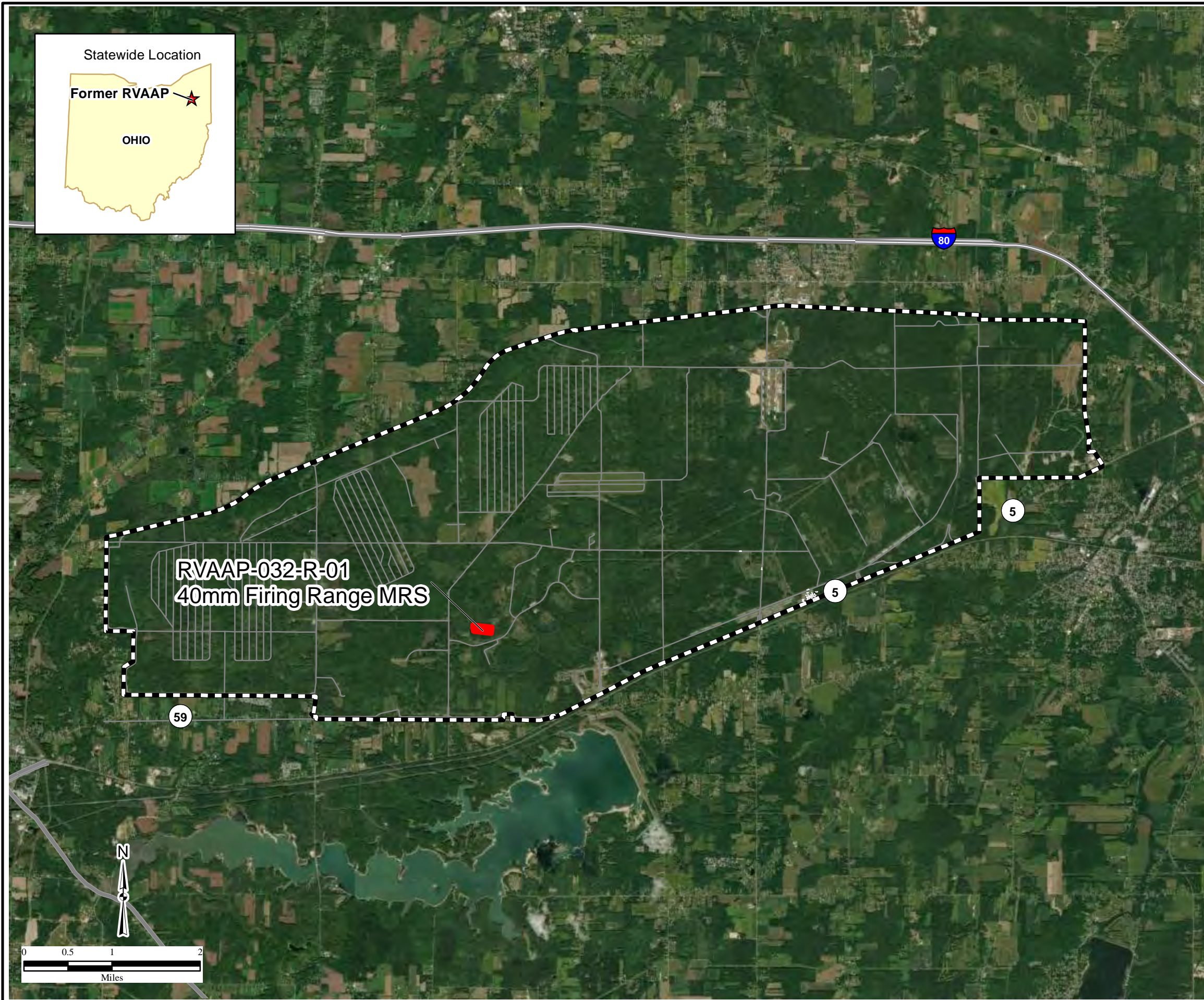
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**Figure 2**  
**Location Map**  
**40mm Firing Range MRS**  
**Former RVAAP**  
**Portage/Trumbull Counties, Ohio**

Legend

-  MRS Boundary
-  Facility Boundary
-  Road

Notes:  
MRS=munitions response site  
RVAAP=Ravenna Army Ammunition Plant



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Source APTIM



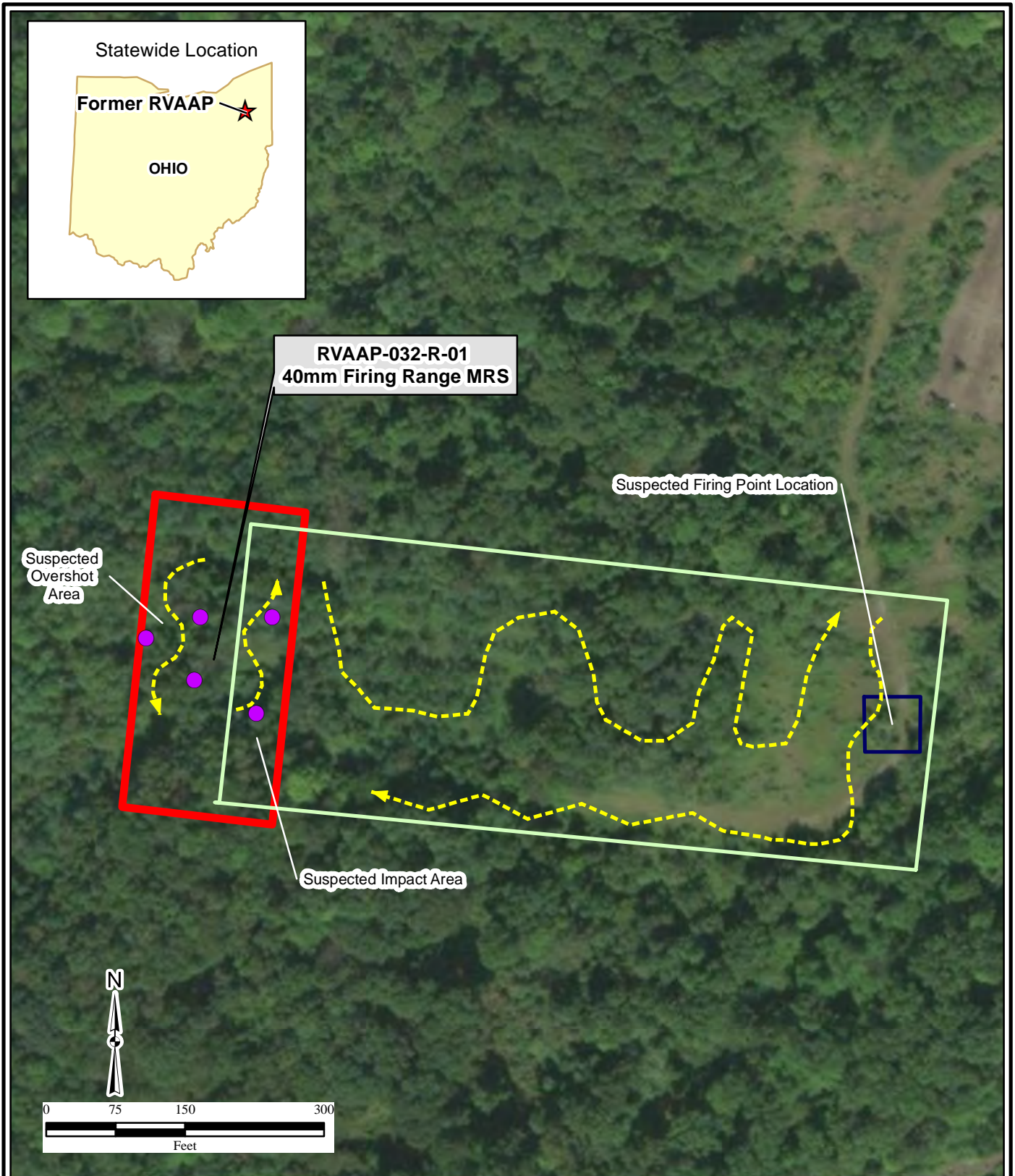
Legend

-  Historical Records Review MRS Boundary
-  SI Recommended MRS Boundary
-  Suspected Firing Point Location

**Figure 3**  
**MRS MAP**  
**40mm Firing Range MRS**  
**Former RVAAP**  
**Portage/Trumbull Counties, Ohio**

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 Source APTIM

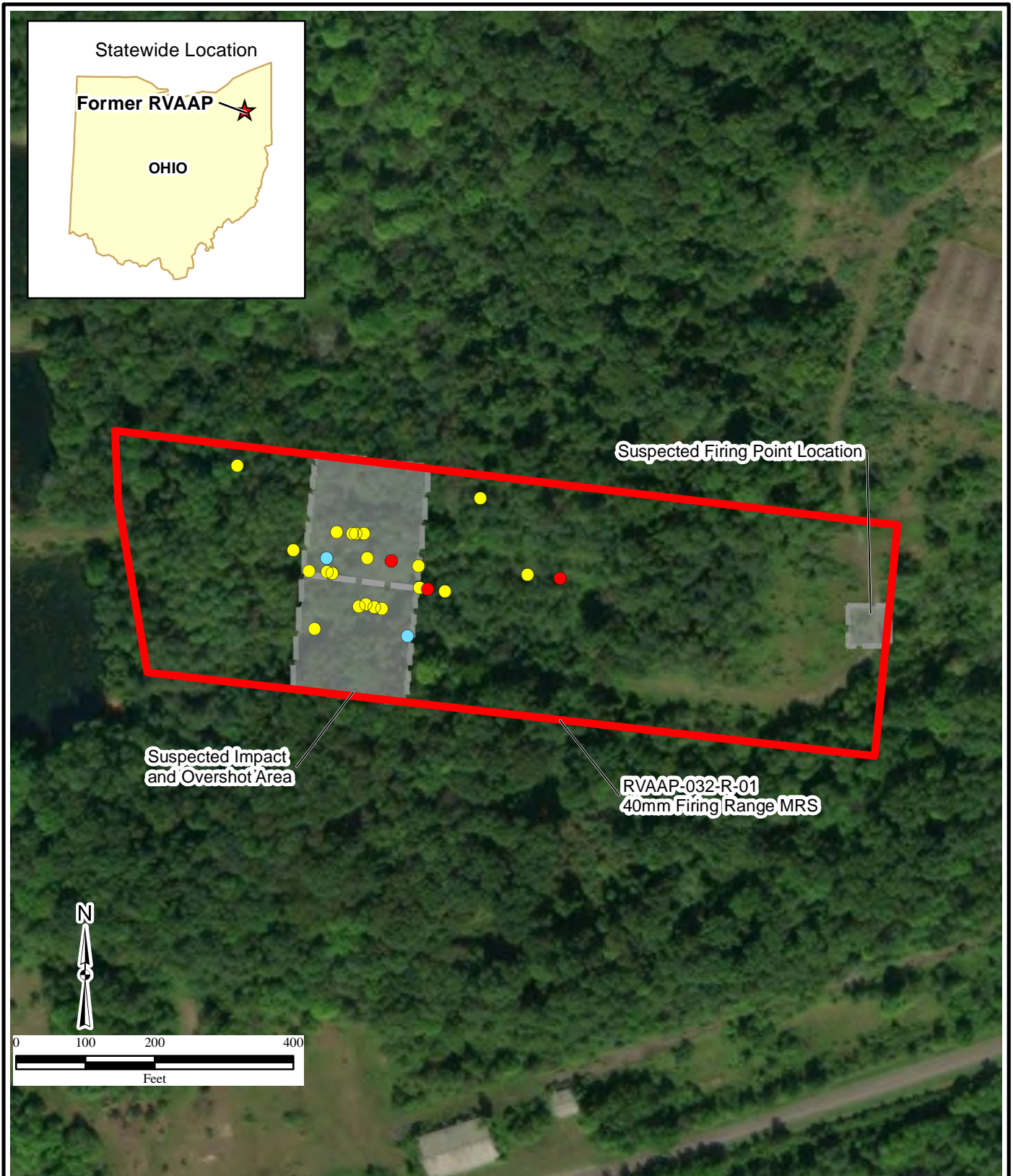
**Legend**

- Historical Records Review MRS Boundary
- SI Recommended MRS Boundary
- Suspected Firing Point Location
- Meandering Path Survey Area
- Munitions Debris Location

**Figure 4**  
**2007 Site Inspection Results**  
**40mm Firing Range MRS**  
**Former RVAAP**  
**Portage/Trumbull Counties, Ohio**



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 \_Fig5\_2011\_Remedial\_Investigation\_Results.mxd  
 02/14/2019 JWR  
 Source APTIM

**Legend**

- Concentrated Subsurface MD Location
  - Individual Subsurface MD Location
  - Surface MD Location
  - 40mm Firing Range MRS Boundary
  - MC ISM Area
- MD denotes Munitions Debris  
 MC denotes Munitions Constituents

**Figure 5**  
**2011 Remedial Investigation Results**  
**40mm Firing Range MRS**  
**Former RVAAP**  
**Portage/Trumbull Counties, Ohio**



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**Appendix A**  
**Notice of Availability of the Proposed Plan**

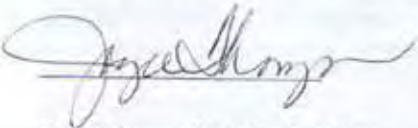
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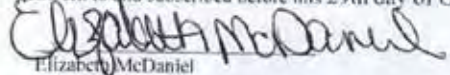
30 Record-Courier a newspaper printed and published in the city of Kent, and of General circulation in the County of Portage, State of Ohio, and personal knowledge of the facts herein stated and that the notice hereto annexed was Published in said newspapers for 2 insertions on the same day of the week from and after the 21st day of October, 2018 and that the fees charged are legal.



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Day(s) Published: 10/21, 10/28.  
Printers Fee: \$432.00

Sworn to and subscribed before this 29th day of October, 2018.



Elizabeth McDaniel  
Notary Public  
Commission Expires June 19, 2021



**PUBLIC NOTICE**

**Camp Ravenna Joint Military Training Center**  
Camp Ravenna Environmental Office  
1438 State Route 534 SW - Newton Falls, OH 44444  
614-336-6136

**Public meeting to be held Thursday, November 1, 2018  
for Army National Guard Release of Proposed Plans  
for two Munitions Response Sites  
at the Former Ravenna Army Ammunition Plant:  
Fuze and Booster Quarry  
40mm Firing Range**

**Ravenna** – The Army National Guard, in consultation with the Ohio Environmental Protection Agency, submits for public review and comment two (2) Proposed Plans for two Munitions Response Sites at the former Ravenna Army Ammunition Plant (RVAAP) in Portage and Trumbull counties, Ohio.

The Fuze and Booster Quarry and 40mm Firing Range are Munitions Response Sites (MRSs) within the former RVAAP (now known as Camp Ravenna) in Portage and Trumbull Counties, Ohio. These MRSs are being addressed under the Military Munitions Response Program (MMRP) in accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The Proposed Plans present the current status and information regarding the MRSs. The Proposed Plans detail the recommendation for No Further Action at both MRSs and provide the rationale for these recommendations.

On Thursday November 1, 2018, a public meeting will be held at the Shearer Community Center (Paris Township Hall) at 9355 Newton Falls Road, Ravenna, Ohio 44266 beginning at 6:00 p.m., with an informal open house when technical staff will be available to answer questions. At 8:30 p.m., the Army National Guard will briefly describe the assessment of the MRSs, present the No Further Action recommendation, and then request verbal comments from the public. Written comments regarding this recommendation may be submitted to the Army National Guard during the 30-day comment period from October 25, 2018 to December 1, 2018. All written comments should be addressed to Camp Ravenna Environmental Office, 1438 State Route 534 SW, Newton Falls, OH 44444 or sent via email to [Kathryn.s.tait.nfg@mail.mil](mailto:Kathryn.s.tait.nfg@mail.mil).

In accordance with CERCLA, the No Further Action recommendation presented in the Proposed Plans was summarized and also presented in earlier remedial investigation and feasibility study reports. All reports are now available for public review at the RVAAP Restoration Program Information Repositories at the Reed Memorial Library (167 East Main Street, Ravenna) and the Newton Falls Public Library (204 South Canal Street, Newton Falls). The reports are also available online at [www.rvaap.org](http://www.rvaap.org).

The final remedy for the MRSs will be selected based, in part, on public comments. In coordination with Ohio Environmental Protection Agency, the Army National Guard will select a final remedy after reviewing and considering all public comments submitted during the 30-day public comment period from October 25, 2018 to December 1, 2018. The Army National Guard encourages the public to review and comment on the recommendation presented in this document.

For more information or to participate in the review, please visit the RVAAP Restoration Program website ([www.rvaap.org](http://www.rvaap.org)) or call Kathryn Tait at 614-336-6136.



**PUBLIC NOTICE**  
 Camp Ravenna Joint Military Training Center  
 Camp Ravenna Environmental Office  
 1438 State Route 534 SW - Newton Falls, OH 44444  
 614-336-6136

Public meeting to be held Thursday, November 1, 2018  
 for Army National Guard Release of Proposed Plans  
 for two Munitions Response Sites  
 at the Former Ravenna Army Ammunition Plant:  
 Fuze and Booster Quarry  
 40mm Firing Range

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#294-2T-October 21 & 28, 2018 #WDH2046311

**PROOF OF PUBLICATION**

STATE OF OHIO  
 TRUMBULL COUNTY                      SS: PAMELA EAZOR

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:  
SUNDAY FOR (2) TWO  
 CONSECUTIVE WEEKS AND THAT THE FIRST INSERTION WAS  
 ON SUNDAY THE 21st DAY  
 OF OCTOBER 2018

*Pamela Eazor*  
 \_\_\_\_\_

SWORN TO BEFORE ME AND SUBSCRIBED IN MY PRESENCE ON THIS  
31st DAY OF October 2018

*[Signature]*  
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