UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION 5

Statement of Basis

for

Radio Materials Corporation

Attica, IN

EPA ID NO. IND 005477021

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Acronyms and Short Forms

µg/L	Micrograms per Liter
amsl	Above Mean Sea Level
AOC	Area of Concern
AS	Air Sparging
bgs	Below Ground Surface
CAO	Corrective Action Objectives
cDCE	cis-1,2-dichloroethene
CIDCSL	IDEM 2021 Commercial/Industrial Direct Contact Screening Level
CIIASL	Commercial/Industrial Indoor Air Screening Level
CIGVESL	Commercial/Industrial Groundwater Vapor Exposure Screening Level
CISSSL	Commercial/Industrial Sub-Slab Screening Level
City	City of Attica
cm/s	Centimeters per Second
CMS	Corrective Measures Study
COC	Constituents of Concern
CRA	Conestoga-Rovers & Associates
CWTS	City Water Treatment System
DCE	Dichloroethene
DCSL	IDEM 2021 Direct Contact Screening Level
DOCC	Description of Current Conditions
EDCSL	IDEM 2021 Excavation Direct Contact Screening Level
ERC	Environmental Restrictive Covenant
ERO	Environmental Restrictive Ordinance
ESV	Ecological Screening Values
feet/day	Feet per Day
IDEM	Indiana Department of Environmental Management
IDNR	Indiana Department of Natural Resources
IM	Interim Measure
ISCO	In-Situ Chemical Oxidation
MCL	Maximum Contaminant Level
mg/kg	Milligrams per kilogram
MNA	Monitored Natural Attenuation
MTG	Migration to Groundwater
MTGSL	IDEM 2021 Migration to Groundwater Screening Level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
ORC®	Oxygen Release Compound®
O&M	Operation and Maintenance
OMM	Operation, Maintenance and Monitoring
PA/VSI	Preliminary Assessment/Visual Site Inspection
PCE	Tetrachloroethene
POC	Points of Compliance
PRB	Permeable Reactive Barrier
RCRA	Resource Conservation and Recovery Act
RDCSL	IDEM 2021 Residential Direct Contact Screening Level
RFI	RCRA Site Investigation

RGTSL	IDEM 2021 Residential Groundwater Tap Screening Level
RGVESL	IDEM 2021 Residential Groundwater Vapor Exposure Screening Level
RIASL	IDEM 2021 Residential Indoor Air Screening Level
RMC	Radio Materials Corporation
GHD	GHD Services Inc.
GWET	Groundwater Extraction and Treatment System
HFF	High Fracture Frequency
HHRA	Human Health Risk Assessment
Site	Radio Materials Corporation Facility - Attica, Indiana
SLERA	Screening-Level Ecological Risk Assessment
SMP	Soil Management Plan
SSD	Sub-Slab Depressurization
SVE	Soil Vapor Extraction
SWMU	Solid Waste Management Unit
TCE	Trichloroethene
TSD	Treatment Storage Disposal
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tanks
VIS	Vapor Intrusion Study
VOC	Volatile Organic Compound
ZVI	Zero-Valent Iron

SECTION 1: INTRODUCTION AND PURPOSE OF THE STATEMENT OF BASIS

1.1 Introduction

The primary purpose of this Statement of Basis ("SB") document is to invite written comments from the public on the approach being considered by the U.S. Environmental Protection Agency (EPA) to remediate and manage contaminated environmental media at the Radio Material Corporation Corrective Action Site ("RMC" or "Site") located at 1095 East Summit Street in Attica, IN. (See Figure 1 in Attachment 1). Historical operations and releases have contaminated the soil and groundwater in the northern and southern areas of the RMC Site. The migration of contamination beyond the boundary of the Site through groundwater flow potentially impacts the drinking water pathway and the indoor air inhalation pathway. The primary contaminants at the Site are chlorinated Volatile Organic Compounds (cVOCs)[1], chemicals known to be harmful to human health and the environment above certain concentrations.

The cleanup objective of the proposed remedy is to protect off-Site residents, future commercial or industrial workers, and trespassers on-Site. EPA's short-term remedial goal is to mitigate risk to people by reducing the cVOC levels in groundwater. The interim measures already implemented at the Site have achieved short-term goals at the point of exposure with ongoing operation and maintenance. It has been demonstrated through confirmation sampling after the installation of active treatment units that the indoor air of homes with those units located above the contaminated plume is safe and the drinking water in the City of Attica is free of volatile chemicals of concern. EPA's current proposal focuses on achieving EPA's long-term goals in a reasonable time frame, in alignment with Site cleanup objectives, using a combination of engineering controls and institutional controls. The summary of the proposed remedy is provided in Section 1.4. EPA invites written or electronic comments from the public on the proposed remedy during the commenting period.

Additionally, EPA will host a public meeting and receive additional comments for the public record. Public comments will be used to inform EPA's final decision regarding the remedy selection. After the close of the comment period, EPA will publish a Final Decision and Response to Comments (FD/RC) document conveying EPA's decision on how the Site will be remediated and whether and how the ongoing interim measures associated with the Site will be continued. See page 49 for instructions on how to provide comments to EPA on the SB and for the open comment period dates.

This document summarizes information that can be found in greater detail in the Corrective Measures Study Report (GHD, June 2022) and other documents contained in the administrative record index for this Site (see the attachment 3).

1.2 Corrective Action Order on Consent – 3008(h)

On March 1, 1999, EPA and the RMC entered into an Administrative Order on Consent ("Order") requiring that RMC investigate and clean up hazardous waste released at its property and establishing

[1] cVOCs are a class of chemicals that evaporate from groundwater and form a vapor in the air. VOC vapors can enter buildings and pose a potential risk to the health of occupants, an occurrence called "vapor intrusion" (VI). VI happens when VOC vapors from sources beneath buildings enter the indoor air through cracks and gaps.

EPA oversight of the investigation and remedial process. The Order was issued under the authority of Section 3008(h) of the Solid Waste Disposal Act (commonly referred to as the Resource Conservation and Recovery Act of 1976 ("RCRA")), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. § 6928(h)). U.S EPA docket No R8H-5-99-005.

The work completed by RMC and Kraft[2], which was overseen by EPA, was designed and implemented to protect human health and/or the environment. EPA oversees the cleanup of the Site under its RCRA Corrective Action program. The RCRA Corrective Action program is responsible for ensuring that facilities investigate and clean up releases of hazardous waste and hazardous constituents that pose a risk to human health and/or the environment at their properties, including any releases that have spread beyond the property boundaries. The selected remedies, or clean-up actions, are chosen based upon the current and next anticipated use of the property. Currently, the Site owner uses the Main Plant building located south of Summit Street, for general storage of equipment and supplies.

1.3 Interim measures (IMs)

IMs are defined as measures to control or abate threats to human health and/or the environment from releases and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued. These measures are completed by the company and/or responsible party in advance of EPA's final remedy selection. Since 2003, a multi-media investigation was conducted to determine what was released and where it may have traveled, as well as to determine the potential health risks and environmental effects of the contamination. Based on the potential risks associated with the exposure to these VOCs, EPA directed that several IMs be implemented at the Site. A city drinking water treatment system was installed and vapor mitigation systems were installed in many homes located over the contaminated southern plume to abate the imminent exposures. Contaminated soil and waste materials were managed through treatment or disposal. The source control measures implemented and operated from 2008 to 2018 at the Site have resulted in the removal of 8.7 tons of VOC vapors. A hydraulic containment and treatment system prevented the contaminated southern plume groundwater from moving beyond the property boundary. This system is currently being replaced by a permeable reactive barrier (PRB) system to optimize containment and treatment efficiency. All these exposure and migration controls implemented and operated since 2008 serve to meet the EPA's short-term goals of protecting human health and controlling of migration of contaminated groundwater beyond the property boundary. EPA continues to oversee the ongoing performance of these cleanup measures.

1.4 Proposed Remedy Summary

After reviewing the results of soil and groundwater sampling, past environmental practices, historical investigations, and interim measures, EPA is proposing a focused on-Site source treatment remedy, maintenance of optimized hydraulic containment and treatment (through a PRB) of the southern groundwater plume, continued off-Site vapor intrusion mitigation and drinking water treatment, and institutional controls to limit on-Site future land use. As most of the contamination from the Site has

[2] In 2003, following RMC's RFI phase I investigation (BSI 2000a), Kraft Foods North America, Inc. ("Kraft") representatives informed EPA that while they do not believe Kraft has any liability in relation to the Radio Material Site, Kraft intended to continue to carry out the responsibilities of the Radio Material Corporation under the March 1999 Order.

been contained, removed, or reduced through the IMs, the proposed remedy for the Site focuses on addressing the current and future risks associated with the remaining contaminants in soil, groundwater, and soil gas.

For a full explanation of the EPA's proposed remedies, see Section 7, Proposed Final Remedy and Evaluation of Alternatives. The proposed remedies are *b*ased on a comparative analysis of alternatives provided in the June 2022 *Corrective Measures Study* (CMS) report (GHD, June 2022). In October 2022, Kraft submitted an addendum reflecting changes to the CMS report based on the ongoing implementation of a permeable reactive barrier system (GHD, October 2022). The existing groundwater migration control system faced many challenges in the past few months from power outages and equipment shutdowns. In September 2022, EPA requested the implementation of PRB as an interim measure to prevent contaminated groundwater from migrating beyond the property boundary (EPA, September 2022).

EPA proposes the following remedy for public comment, which includes the collective use of institutional controls, treatment technologies, and monitoring measures to prevent potential unacceptable human exposure and the spread of impacted environmental media beyond the point of compliance (POC) boundaries. The POCs represent the boundaries of properties contiguous with the Site where institutional controls such as administrative and legal controls can be imposed to limit potential human exposure to Site-related constituents of concern (COCs).

On-Site Institutional Controls

Restrictive covenants are institutional controls on land use that are established by a private agreement between the property owner and a second party who, in turn, can enforce the controls. Environmental restrictive covenants (ERCs) are typically recorded in property records and serve to both restrict the use and inform interested persons that residual contamination remains on site. These types of controls can prohibit activities that may compromise the effectiveness of the response action or restrict activities or future resource use that may result in unacceptable risks to human health or the environment. The activities that EPA proposes to restrict on-Site include:

- Restricting land use to commercial/industrial use only
- Restricting the use of groundwater
- Restricting the use of buildings if they become occupied (allowing certain use only if vapor intrusion mitigation measures are implemented)
- Restricting the use of soils in the former RMC operational areas where soil impacts are present (allowing use pursuant to a Soil Management Plan or SMP contained in an ERC)

Off-Site Institutional Controls

Government controls are institutional controls that impose restrictions on land or resource use using the authority of a government entity. The off-Site government controls for the Site include the following measures:

- Groundwater-use restriction (City of Attica Environmental Restrictive Ordinance or ERO)
- Vapor intrusion mitigation system notification
- Building code requirement to require soil gas mitigation when new construction occurs in affected areas

Soil Components

SWMU 1 and 2

- Alternative 5 - Institutional controls, Access Controls, Passive Venting through existing soil vapor extraction system (SVE), On-Site Closure of *ex-situ* Soil Treatment Cell, and Soil/Vegetative Cover

SWMU 5

- Alternative 5B - Institutional controls, Access Controls, Focused *in-situ* chemical oxidation (ISCO), Passive Venting, Soil/Vegetative Cover

SWMU 11/AOC 2

- Alternative 3 - Institutional controls, Maintain Concrete Cap, Passive Venting

Passive venting technology will be used in Solid Waste Management Units (SWMUs) 1 and 2, SWMU 5, and SWMU 11/AOC 2 using existing SVE infrastructure. This technology will remove VOCs and introduce oxygen to promote the chemical and biological degradation of cVOCs. Focused ISCO at SWMU 5 is anticipated to reduce the remaining soil contamination in isolated areas after the implementation of interim measures. Pavement cover will be retained in SWMU 11/AOC 2 where the existing concrete building footprint is present.

Groundwater Components

Northern Plume

- Alternative 3 - Institutional controls, Monitored Natural Attenuation (MNA)

Southern Plume

- Alternative 4 - Institutional controls, Groundwater Monitoring and Operation of the City Water Treatment System (CWTS), and maintenance of a Permeable Reactive Barrier (PRB).

Monitoring will be used in the Northern Plume to ensure that natural attenuation mechanisms remain effective, and the plume remains within the POC boundaries. The plume behavior demonstration will include a higher monitoring frequency during the first 5 years to assess the characteristics of the Northern Plume. Following the plume behavior monitoring period, there would be ongoing long-term groundwater monitoring to further confirm the Northern Plume remains within the compliance boundaries.

The PRB which is currently being installed as an IM is expected to be more effective than the previously operated groundwater extraction and treatment (GWET) and Air Sparging (AS) and SVE systems at preventing the downgradient migration of VOCs in the southern groundwater plume beyond the Site boundary. Following the completion of PRB construction, a series of groundwater performance sampling events will be conducted at existing groundwater monitoring locations. Maintenance of the PRB as a final remedy measure to control the migration of contaminated groundwater is contingent upon the performance evaluation of this interim remedy.

Soil Vapor Components

On-Site

- ERCs

Off-Site

- Alternative 3 - Institutional controls, Operation & Maintenance (O&M) of VI Mitigation Solutions

VI mitigation solutions would be operated and maintained as appropriate until the cVOC concentrations in the shallow groundwater below this area fall below the state or federal cleanup standards.

Financial Assurance

The primary purpose of financial assurance requirements for corrective actions is to assure that funds will be available when needed to complete the proposed remedy and long-term monitoring measures. Under the terms of the 1999 Order, RMC must provide financial assurance within ninety (90) days of EPA's selection of the final corrective measure(s) for the Site. The Order details the acceptable types of financial assurance.

Long-Term Stewardship/Five-Year Remedy Review

EPA will require RMC to establish a long-term stewardship plan, including monitoring and reporting, for the duration of time contamination remains on-Site above unrestricted use levels. Within the first three years of the final remedy decision, remedy optimization and monitoring frequency decisions will be made based on the performance efficiency of the engineering controls and monitored data. After this period, as part of the long-term stewardship plan, every five years from the date of the EPA's final remedy decision, RMC will review the efficacy of all the above remedial and monitoring components.

SECTION 2: SITE BACKGROUND

2.1 Location and Setting

The RMC Site is located in west central Indiana at 1095 East Summit Street in the northeastern portion of the City of Attica, Fountain County, Indiana. Located in a residential-agricultural area, this Site occupies approximately 19.5 acres and is bordered on the northwest, north, and northeast by undeveloped land, to the south and southeast by residences, and to the south by Ravine Park.

2.2 Physical Setting and Site Characteristics

The main plant is located on relatively level ground at an elevation of 670 feet above sea level in an area that slopes gently toward the Wabash River. The Site is situated in the Wabash River Basin but lies outside the 100-year flood boundary of the Wabash River. The nearest surface water body is Riley Lake, a manmade pond used as a source of recreation, which is located about 300 feet northwest of the main RMC plant.

Other surface water bodies in the area include an unnamed intermittent stream located 1,000 feet south of the Site in Ravine Park and an unnamed intermittent stream located 3,600 feet northwest of the Site. A freshwater wetland area of the Wabash River floodplain is located about a one-half mile northwest of the Site. The Wabash River is approximately two-thirds of a mile northwest of the Site.

The RMC Site consists of the main plant of four interconnected buildings on the south side of Summit Street and six buildings and a former drum storage area on the north side of Summit Street. When operational, the main plant consisted of production areas, administrative offices, a laboratory, and storage areas for raw materials and finished products. The buildings on the north side of Summit Street were used for storage, warehousing, and maintenance. None of the buildings are currently occupied.

2.3 Ownership, Manufacturing, and Release History

In 1947, Mr. Joseph Riley, Sr. purchased the Site and in 1948 began the manufacture of ceramic capacitors in the Main Plant (located south of Summit Street). P.R. Mallory Company, Inc. purchased RMC in 1957 and owned it until 1978. The Riley Family repurchased the Site in 1978 and continued to manufacture ceramic capacitors. Manufacturing at the Site ceased in 2000. Currently, there are no active manufacturing operations at the Site. The Site buildings, including the Main Plant located south of Summit Street, are used for general storage of equipment and supplies.

RMC began operating at its Attica Site in 1948. Processes included the manufacture of television tubes and ceramic components such as capacitors and resonators for the electronics industry. Barium titanate-based ceramic powders were mixed with small amounts of other compounds and milled. The milled mixture was dried by spray drying, oven drying, or with a filter press to form a dielectric material. Some of this material was calcined, ground, and packaged to customer specifications for the manufacture of their electrical components. The remaining dielectric material was stored at the RMC plant to produce disc capacitors.

Manufacturing operations released cVOCs such as trichloroethene (TCE) and tetrachloroethene (PCE) to soils at the Site. Some of these contaminants reached groundwater and moved off the RMC property to the north and northwest.

2.4 RCRA Site History

RMC submitted a Resource Conservation and Recovery Act (RCRA) Treatment, Storage, and Disposal (TSD) Site Part A application to USEPA in November 1980. The USEPA commissioned a Preliminary Assessment/Visual Site Inspection (PA/VSI) in 1992, which described the operations at the Site and provided information about past releases and solid waste management areas. The USEPA identified nine SWMUs and one Area of Concern (AOC). The USEPA issued an RCRA 3008 (h) Consent Order to RMC that became effective on March 1, 1999. The Description of Current Conditions Report (DOCC, BSI 1999) indicated that manufacturing byproducts, including resin and chlorinated solvents, were historically placed in two open and unlined pits, now called SWMU 2 and SWMU 5. SWMU 2 is located east of Buildings 6 and 7 in the plant north of Summit Street and SWMU 5 is located southwest of the Main Plant (south of Summit Street). The DOCC Report identified three additional SWMUs and four additional AOCs beyond those identified in the revised Part A application, PA/VSI, and Consent Order. The DOCC Report stated that no further investigation was required for eight of the SWMUs (1, 3, 4, 6, 7, 8, 9, and 10) and two AOCs (1 and 4) that had been included within the PA/VSI and the Consent Order. Due to their proximity, the investigations of SWMUs 1 and 2 were combined.

2.5. Physiography and Topography

The Site is located within the Middle Wabash River Basin, which occupies 3,453 square miles within west central Indiana. The Wabash River is located approximately 3,500 feet northwest of the Site. The highest topography at the Site occurs near the intersection of East Summit Street and Avenue 6 where ground elevations approach 670 feet above mean sea level (amsl). The immediate area located around the main plant building at the Site is rather flat with a slight slope to the south. The sloping to the south increases gently beyond the Site toward an intermittent stream in Ravine Park (at an approximate elevation of 650 feet amsl). A steeper slope occurs to the west and northwest of the Site toward the Wabash River where

ground surface elevations are in the range of 500 to 510 feet amsl. The ground surface drops most steeply west of the Site along East Summit Street between Kentucky and Hollovy Streets.

2.6 Description of SWMUs and AOCs

Detailed descriptions of the SWMUs and AOCs are available in the Phase IIA RCRA Investigation Report (RFI) Report (CRA 2003a, CRA 2004) and Phase IIB RFI Report (CRA 2010a). A brief description of the SWMUs and AOCs is provided in this section. Figure 2 shows the location of the SWMUs and AOCs at this Site.

SWMU 1 (Former Outdoor Drum Storage Area)
SWMU 1 was an outdoor drum storage area located north of Summit Street and to the east of Buildings 6 and 7 and covers an area of 250 feet in length by 150 feet in width. The area within the footprint of SWMU 1 is currently grass-covered but not fenced. The footprint of SWMU 1 overlies the apparent (and older) footprint of SWMU 2 (Disposal Area A). Wastes managed at this location included halogenated and non-halogenated waste solvents, plating solutions, ferric chloride, barium titanate sludge, and phenolic resin. SWMU 1 (the former drum storage area) operated from 1981 to 1988, when closure activities began, and drums were transferred inside Building 6 (SWMU 3). As discussed in Section 4.1, IMs were implemented in the SWMU 1 and 2 area.

SWMU 2 (Disposal Area A)
SWMU 2 was operated as an open unlined pit located east of Buildings 6 and 7 from approximately 1963 to 1980 for Site-generated manufacturing byproducts. The dimensions of SWMU 2 were 40 feet long, 30 feet wide, and 6 feet deep. Materials reportedly placed in SWMU 2 contained PCE, TCE, acetone, alcohol, phenolic resin, and ceramic sludge. The former pit was covered by 2 to 3 feet of clayey soil. The DOCC Report (BSI 1999) and Phase I RFI report (BSI 2000a) indicated that the area was excavated to depths ranging from approximately 10 feet to 15 feet below the ground surface (bgs). Currently, SWMU 2 is an outdoor, vacant, and grass-covered area. Access to SWMU 2 is not controlled by a fence. As discussed in Section 4.1, IMs were implemented in the SWMU 1 and 2 area. This area now shares a common footprint with the SVE treatment area serving SWMU 1.

SWMU 3 (Temporary Drum Storage Area in Building 6)
SWMU 3 was a temporary drum storage area inside Building 6 that was activated in 1988, due to the relocation of drums from SWMU 1. SWMU 3 is located indoors at the east end of Building 6 (west of SWMU 1 and SWMU 2) and occupies an area of approximately 12 feet by 36 feet on a flat concrete floor with no floor drain. Materials historically stored in drums in this area reportedly included solvents, phenolic and epoxy resins, oil/water byproducts, and ceramic byproducts. No releases were reported during the operational history of SWMU 3.

SWMU 4 (Centrifuge Area)
The centrifuge area, with a footprint of 3 feet by 3 feet, was located in Building 2 during a brief operational life of two months in 1977. The unit was formally closed in 1988. Wasted managed in this unit included a mixture of PCE, silver, and ethyl acetate. The unit was located on a concrete floor in a room with no floor drains.

The centrifuge reportedly was operational in 1977 for a couple of months. Closure activities began in 1989 when the centrifuge was decontaminated under an IDEM-approved closure plan, which also included SWMU 1 and SWMU 3. On April 5, 1989, IDEM stated that SWMU 4 had been adequately

closed, but would not be granted closure by IDEM until the former outdoor drum storage area (now SWMU 1) achieved closure. The DOCC Report stated no further investigation is needed for SWMU 4.

SWMU 5 (Disposal Area B)
SWMU 5 was an open unlined pit that operated from about 1950 to 1963. It is currently a grass-covered area located 200 feet southwest of the southwestern corner of the Main Plant. The pit was used for the placement of Site-generated manufacturing byproducts in the 1950s and 1960s. The pit was 40 feet in diameter, of unknown depth, and was covered with 2 to 3 feet of clayey soil. The manufacturing byproducts reportedly placed in SWMU 5 contained chlorinated solvents, acetone, isopropyl alcohol, phenolic resins, ceramic byproduct, waxes, and paints. Approximately 7,000 cubic yards of contaminated soil were removed and disposed of by RMC from 1995-1996.

The excavation was 100 feet by 120 feet, and the maximum depth of the excavation was 20 feet. During the excavation, close to 6 inches of impacted granular soil was left in place, to protect the underlying clay layer that was thought to be a barrier to the vertical migration of contaminants. As discussed in Sections 3 and 4, additional investigation and IMs were implemented in the SWMU 5 area.

SWMU 6 (Eight 55 Gallon Drum Storage Area)
This unit was located on the east side of Building 2 in the main RMC plant near the raw material storage area. This unit occupied an area of approximately 10 feet by 5 feet. Wastes stored in this area include drums of ceramic waste stored on wooded pallets. No evidence of leaks or spills was observed.

SWMU 7 (Etching Room)
Located in Building 8, this unit measured approximately 10 feet by 25 feet. Wastes in this unit included ferric chloride sludge. This unit was operational between 1967 and 1989 when operations ceased. No additional investigations were conducted in this area as no releases were reported and the concrete flooring was found to be in good condition.

SWMU 8 (Phenolic Dip Area)
This unit was originally located in the west-central portion of Building 1 of the Main Plant and was moved to the chemical storeroom in Building 2 in March 1991. Within SWMU 8, RMC milled phenolic resin with Hoosier (a mixture of alcohol and acetone). RMC dipped the disc capacitors into this mixture and then allowed them to dry (alcohol and acetone evaporated). The former location of the phenolic dip unit was inspected and the DOCC Report (BSI 1999) stated that SWMU 8 did not appear to warrant further investigation.

SWMU 9 (Epoxy Coating Room)
This unit was located in the south-central portion of Building 1, just east of SWMU 8. The unit measured approximately 12 feet by 15 feet. Epoxy resin waste was managed in this unit from the 1970s to 1999. Based on the PA/VSI no further investigation was required due to the lack of documented releases at this unit.

SWMU 10 (Original Phenolic Dip Area)
This unit was located northeast of the epoxy coating room in Building 1 of the Main Plant. The operations at SWMU 10 were substantially the same as discussed for SWMU 8. The area of SWMU 10 was approximately 20 feet by 22 feet. Based on the PA/VSI and the DOCC Report no additional investigation was required SWMU 10.

SWMU 11 (PCE Vapor Degreaser)
This unit was located in the north-central portion of Building 1 of the Main Plant. The area of SWMU 11 was approximately 22 feet by 7 feet and was located on a wooden floor that was underlain by concrete. This degreasing unit, where PCE was vaporized to remove the flux from soldered capacitor discs, was in operation from the early 1970s to 1986. As discussed in Sections 3 and 4, additional investigation and IMs were implemented in the SWMU 11 area.

SWMU 12 (Dynamite Disposal Area)
SWMU 12 was the burial site for three cases of dynamite (reportedly totaling approximately 260 pounds) that were left over from blasting activities at the Riley Airfield (1961) and were previously contained within two padlocked drums. The dynamite (nitroglycerin mixed with diatomaceous earth) was placed in an unlined trench, located approximately 80 feet south of Building 6 and north of the gravel pit area and covered with sand and gravel to the ground surface on April 28, 1986. The trench dimensions were reported to be 4 feet deep and 8 feet long. SWMU 12 is currently grass-covered, and metal fence posts mark the location. As shown in table 4, the dynamite was removed in 2008.

AOC 1 (Flux/Molten Solder Area)
AOC 1 was located in the former Building 1 of the Main Plant. Operations performed in this area included soldering tinplated copper wire onto silvered capacitor discs and cleaning the discs with PCE. AOC 1 had a concrete floor with no floor drains. The flux/molten solder operations were moved to Building 3 and were inspected on April 29, 1999, during the PA/VSI. Based on the PA/ VSI and DOCC Report (BSI 1999), no additional investigation was required in AOC 1.

AOC 2 (underground storage tanks, USTs)
The PA/VSI identified AOC 2 to be three 6,000-gallon underground storage tanks (USTs), known as USTs J through L, located on the east side of the Main Plant south of Summit Street and between Buildings 1 and 2. The DOCC Report expanded AOC 2 to include 11 former USTs (USTs A through I, and USTs M and N), which are located north of Summit Street and south of Building L.

This area was located outside the RMC main plant, between Buildings 1 and 2 on the east side of the buildings. The area consisted of three USTs, each with a capacity of 6000 gallons. Installed in 1965, the tanks were used to store heating oil, acetone/alcohol, and tetrachloroethylene. Subsequently, the second and third tanks were cleaned in 1991 and converted to heating oil storage. The PA/VSI was unclear as to whether these tanks contained any leak detection system. In addition, one heating oil tank (1,000 gallons) south of building 1 was excavated and removed in 1992. As part of the tank removal, soils contaminated with heating oil were also removed. In addition, a heating oil tank north of the building was removed in 1992. The surrounding soils were not found to be contaminated; therefore, no soil excavation was required. AOC 2 is addressed in this CMS as part of SWMU 11, except for the petroleum releases discussed above that fall under the purview of IDEM's State Cleanup Program.

AOC 3A and AOC 3B (Outfalls)
AOC 3A is an outfall pipe that discharges at the southern Site property boundary at Ravine Park and the associated drainageway. The pipe outfall is at the headwall of a drainageway that trends southwesterly into Ravine Park.

The Riley Lake Outfall discharges to a wooded area to the south of the Site within Ravine Park (AOC 3A). A connection between one sink in Building 5 to a drainage ditch on the east side of Building 5 (just north of Summit Street) was observed during the PA/VSI. The AOC 3B discharge area (drainage ditch) located

east of Building 5 is covered with vegetation (trees, shrubs, and grass). Presently, only limited stormwater is conveyed on an intermittent basis by this drainage feature, which terminates at a former gravel pit located south of Building 6. As discussed in Sections 3 and 4, additional investigation and an IM was completed in AOC 3B.

AOC 4 (Housekeeping Issue)

AOC 4 includes several on-Site areas where raw materials and manufactured byproducts were not properly stored, organized, and/or contained. These areas included Building 4B (raw product storage not organized), Building 5 (contained chemicals brought from the Chicago RMC Site), an open treatment cell of construction debris near the gravel pit south of Building 6, a treatment cell of inert ceramic discs to the east of Building 6, and miscellaneous metal debris scattered over RMC property to the north of Summit Street. As indicated in the DOCC Report, a scrap metal company removed scrap metal items from the RMC property north of Summit Street. Based on the DOCC Report (BSI 1999), no additional investigation was required in SWMU 4.

In 2007, an inventory of the chemical materials stored at the Site estimated that about 4,300 containers of raw materials were present. In 2016, EPA required Mr. Riley, the owner of the RMC, to conduct an interim measure to address the container/material management/storage concerns at the Site. As described in section 4, RMC completed the waste characterization and off-site disposal of the stored materials in 2018.

AOC 5 (Site Potable Water Supply Wells 1 and 2)

AOC 5 consisted of two former on-Site potable water supply wells, Production Well 1 (PW-1) and Production Well 2 (PW-2) which were installed in 1948 and 1953 respectively. PW-1 was located within the Main Plant by the water tower in 1948, and PW-2 was located adjacent to the east side of Riley Lake near the northern property line (along Summit Street). PW-1 and PW-2 were drilled into bedrock to depths of approximately 217 and 317 feet bgs, respectively. These wells were closed in 2008 following Indiana Department of Environmental Management (IDEM) regulations of well abandonment.

2.7 Geology

Local Overburden Geology

The Site is located at the edge of Wabash River Basin on a local topographic high on relatively level ground at an elevation of approximately 670 feet amsl. From this local high, there is a gentle slope to the south toward the intermittent stream (approximately 650 feet amsl) in Ravine Park and a steeper slope to the northwest toward the Wabash River (approximately 500 feet amsl). At the Site, the thickness of the unconsolidated overburden deposits is related to the regional topography and bedrock topography. South of Summit Street in the Main Plant area, the typical lithological profile consists of alternating cohesive and granular units that overlie shale bedrock. In general, the upper 20 to 30 feet consists primarily of silt with interbedded sand and occasional clay. Below a depth of 30 feet, bgs is a relatively thick, poorly graded sand unit that becomes coarser with depth. The sand unit extends to bedrock, and bedrock is generally encountered at approximately 60 feet bgs. North of Summit Street, the surface elevations are lower, and the overburden deposits are much thinner. The typical lithological profile for unconsolidated deposits in the vicinity of SWMUs 1 and 2 (north of Summit Street) consists of a native silt layer ranging in thickness from less than 1 foot to several feet, underlain by a fine- to medium-grained sand that overlies bedrock present at between less than 10 to 20 feet bgs.

Off-Site to the west and northwest, the overburden deposits thicken substantially. Near the Wabash River, the overburden deposits approach 150 feet in thickness, as shown in Figure 4.

Local Bedrock Geology

The depth to bedrock varies from less than 10 feet bgs on Site near the SWMU 1 and 2 area to 150 feet bgs approaching the Wabash River. The depth at which bedrock was encountered at the Site ranged from less than 10 feet bgs to approximately 60 feet bgs. The depth to bedrock increases between the Site and the Wabash River and becomes significantly steeper towards the west and northwest of the Site due to the presence of the infilled bedrock valley (the Attica Trough), which is the most prominent feature of the bedrock. The elevation of the top of bedrock at the Site decreases rapidly as the Wabash River is approached as shown in Figure 4.

Localized GW Flow Direction

Regional groundwater flow is generally toward the Wabash River, which is located to the west and northwest of the Site. Two groundwater production wells operated by the City of Attica are located approximately 4,000 feet to the west-northwest of the Site. The third production well is not currently operated due to its damaged condition.

2.8 Surface Water and Ecology

The Site is located within the Middle Wabash River Basin, which occupies 3,453 square miles within west-central Indiana. The Wabash River is located approximately 3,500 feet northwest of the Site as shown in Figure 3. A minor surface water body is the intermittent stream located south and west of the Site in the adjacent Ravine Park. This intermittent stream flows west towards the Wabash River. A wetland, located within the Wabash River flood plain, is present approximately 2,400 feet northwest of the Site.

The most significant surface water body in the area of the Site is the Wabash River, which is located 3,500 feet northwest of the Site boundary. The Wabash River serves as the primary point of regional groundwater discharge in the area. Riley Lake and Ravine Creek are also surface water features in the Site vicinity. Ravine Creek is a minor intermittent surface water stream running toward the Wabash River located 1,000 feet south of the main plant in Ravine Park. It is normally dry with groundwater elevations below the bottom of the streambed, indicating that this stream does not have any significant hydraulic impact on groundwater in the Site vicinity. Riley Lake is an on-Site approximately 1.8-acre manmade pond located 300 feet west-northwest of the main plant. The bottom of Riley Lake consists of compacted clay materials, which are relatively impermeable, limiting the hydraulic connection between the lake and groundwater in the area.

2.9 Water Supplies and Groundwater Use

There is no current exposure to groundwater through the ingestion pathway since there is a restrictive groundwater ordinance in the City of Attica (prohibiting the installation and use of new water supply wells, except for groundwater monitoring and remediation activity, within the city limits) and there is no current groundwater use on the Site or on land currently controlled by the Riley family (Riley Land). The CWTS IM implemented in 2010 is effective at treating the City water supply to levels that are below the IDEM Residential Groundwater Tap Screening Levels.

SECTION 3: SUMMARY OF ENVIRONMENTAL INVESTIGATION

The purpose of a RCRA Facility Investigation, or RFI, is to determine whether hazardous waste or hazardous constituents were released into the environment at a Site and if so, to evaluate the significance of the releases in terms of risk to human health and the environment. The investigation is governed by a Conceptual Site Model (CSM) which illustrates the Site's physical characteristics, sources of contaminants, their fate and transport affected environmental media, and potentially exposed people (in categories such as office and construction workers) and ecological receptors (plants and animals).

During the investigation phases[3], environmental media such as soil, groundwater, surface water, sediments, soil gas, and indoor air are sampled and analyzed for contamination. Where contaminated media are found, subsequent sampling is usually completed to refine the CSM and define the extent of contamination (how far it may have traveled and how deeply) and collect enough information for analysis of exposure effects in risk assessments. After each sampling event or investigation phase, EPA evaluates the CSM to determine the adequacy of the data to support decision-making. If found to be inadequate, additional data collection is necessary.

Numerous groundwater, surface water, soil, sediment, soil vapor, sub-slab vapor, and indoor air samples were collected on and off-Site during the RFI phases. Table 1 below provides a list of SWMUs and AOCs investigated during the different phases of the RFI. Figure 2 in attachment 1 of this document identifies the locations of the investigated waste management units at the Site. Other investigations completed during the Phase IIB RFI included on and off-Site groundwater; on-Site potable water supply; Riley Lake; Riley Land; and vapor intrusion (VI) to the east, west, and northwest of the Site.

Table 1: List of Investigated Units

Unit	Description
SWMU 1	Former Drum Storage Area
SWMU 2	Past Disposal Area
SWMU 3	Temporary Drum Storage Area
SWMU 5	Past Disposal Area B
SWMU 11	PCE Vapor Degreaser
AOC 2	Underground Storage Tanks
AOC 3A	Discharge Location to Creek
AOC 3B	Discharge Location to Ditch
AOC 4	Stored Chemicals in the main building

3.1 On-Site Subsurface Soil

Due to the absence of release from the unit operations, the DOCC Report identified no additional investigation or remediation for the following areas: SWMUs 4, 6, 7, 8, 9, and 10, and AOCs 1 and 4. The

[3] Investigation at the site proceeded in multiple phases. Phase I investigation report was submitted in 2000. Phase IIA investigation was conducted in 2003. Phase IIB investigation that included off-site investigation spanned from 2003 to 2017. EPA received many supplemental investigation reports during this period.

following sections summarize the results of the investigations of the remaining areas (SWMUs 1 and 2, 5, 11, and AOCs 2, 3A, and 3B). Detailed descriptions of the investigations are available in the various documents cited in the administrative record Index. IDEM has calculated Default Closure Levels (DCLs) to protect human health and the environment from contaminants present in industrial and residential settings. The residual contaminant levels below these DCLs do not pose an unacceptable risk to people or the environment if exposure to the contaminated media occurs through the following pathways:

– Incidental ingestion;
– Incidental dermal contact; and
– Inhalation of dust/volatiles.

The acceptable target risk level for the IDEM DCLs has been set at 1x10-5 excess cancer risk (meaning one in one hundred thousand persons may experience an additional lifetime cancer risk) and at a hazard quotient value of 1 for non-cancer health risks. These target levels are derived from a combination of default exposure parameters, chemical/physical properties of contaminants, toxicological data, and other relevant screening levels to evaluate the impact of chemicals on human health. IDEM's DCL risk level is at the midpoint of EPA's acceptable risk range.

EPA evaluated IDEM's screening levels (SLs) and determined that they were comparable to the SLs developed by EPA and appropriate to use for screening and as the media cleanup standards for this Site.
Based on the current and future use of the land and resources, the following environmental standards apply to this site:

1. EDCSL: Excavation Direct Contact Screening Level
2. CIDCSL: Commercial/Industrial Direct Contact Screening Level
3. MTGSL: Migration to Groundwater Screening Level
4. RIASL: Residential Indoor Air Screening Level
5. RGVESL: Residential Groundwater Vapor Exposure Screening Level
6. RSSSL: Residential Sub-Slab Screening Level
7. RGTSL: Residential Groundwater Tap Screening Level
8. CIIASL: Commercial/Industrial Indoor Air Screening Level
9. CIGVESL: Commercial/Industrial Groundwater Vapor Exposure Screening Level
10. CISSSL: Commercial/Industrial Sub-Slab Screening Level
11. MCL: Maximum Contaminant Level

*These screening levels are based on IDEM Remedial Closure Guidance (IDEM RCG), (https://www.in.gov/idem/cleanups/resources/technical-guidance-for-cleanups/idem-screening-and-closure-level-tables/) and EPA's drinking water standards, also known as maximum contaminant levels (MCLs) (https://www.epa.gov/ground-water-and-drinking-water/national-primary-drinking-water-regulations).

Based on the results of the phased RFI and the risk evaluation of the impacted media, extensive Interim Control Measures were implemented. These measures were implemented to control or abate threats to human health and to prevent or minimize the further spread of contamination while long-term remedies were pursued. The cVOCs were found to be the main contaminants of concern in soil, groundwater, and soil vapor due to the historic manufacturing activities at the Site. cVOCs differ from petroleum hydrocarbons in that they do not readily biodegrade in the subsurface (U.S. EPA, 2012b).

Because they do not easily biodegrade, they can travel through the subsurface with water over extended times and distances, resulting in long plumes and a significant mass of dissolved and adsorbed chlorinated compounds sequestered in fine-grained soils.

After the implementation of soil treatment technologies, confirmation soil samples were collected in SWMUs 1 and 2, SWMU 5, and SWMU 11/AOC 2 during the implementation of IMs in these areas. Additionally, post-excavation confirmatory samples were collected from AOC 3B following IM implementation. Where progress soil samples were co-located (i.e., collected at locations and depth intervals that correspond to Phase IIB RFI soil samples) or post-excavation confirmatory soil samples were collected, the more recent soil sample analytical results were substituted for the RFI analytical results and used for screening comparisons and statistical computations. Due to their proximity, the investigations of SWMUs 1 and 2 were combined. Section 4.0 of this report provides a summary and the performance evaluation of the interim measures implemented at the RMC Site and the neighborhood to the northwest of the Site. The screening level risk evaluation of the remaining constituents in soil and groundwater is covered in section 5.0 of this report. A list of chemicals of concern and a comprehensive risk evaluation summary with the proposed remedy is provided in Table 1 of Attachment 2.

3.2 Groundwater

An extensive, multi-phase, and multi-media RCRA Site Investigation has been completed at the Site and surrounding area (CRA 2013a). Numerous overburden monitoring wells, bedrock monitoring wells, and piezometers have been installed and monitored frequently to determine hydrogeological conditions at the Site. Results of the extensive hydrogeological investigations performed from 2003 to 2017 demonstrate that there are two separate and distinct dissolved cVOC plumes originating from the Site, one located to the north and the other to the south of Summit Street (Northern Plume and Southern Plume, respectively). The Northern and the Southern Plumes do not commingle. The primary VOCs detected in groundwater included several related chlorinated VOCs including PCE, TCE, cDCE, and to a more limited extent, vinyl chloride. The groundwater analytical results have demonstrated that the concentrations of metals and semi volatile organic chemicals in groundwater were below both the IDEM's Residential Groundwater Tap Screening Levels (RGTSLs). Further discussion of the two cVOC plumes originating from the Site is provided below.

The Southern Plume originates from the area of SWMUs 5 and 11 and extends west-northwest into the City of Attica. Groundwater flow in the overburden and shallow bedrock has been determined to be towards the northwest, which is consistent with the regional topography, which slopes toward the Wabash River located northwest of the Site. The bedrock groundwater downgradient of SWMU 5 does not exhibit the same composition of chlorinated VOCs as was observed in the overburden groundwater. Primarily, it is dissolved cDCE observed in bedrock groundwater downgradient of SWMU 5. Dissolved cDCE comprises 70 percent or more of the total VOC concentration in bedrock groundwater. Additionally, vinyl chloride is detected more frequently and at higher concentrations in the bedrock groundwater than it is detected in the overburden monitoring wells downgradient of SWMU 5. These data indicate that the parent compounds (TCE and, to a lesser extent, PCE) are undergoing reductive dechlorination in the bedrock with depth and distance downgradient of SWMU 5.

Figures 5 and 6 show the VOCs detected above the 2021 IDEM RGTSLs in the overburden and bedrock groundwater, respectively, in the four monitoring rounds which occurred between November 2015 and July 2021. The RDCLs are equivalent to the MCL promulgated under the Federal Safe Drinking Water Act. Analytes found in shallow groundwater from the overburden aquifer were compared to IDEM's vapor intrusion screening levels.

The Northern Plume originates from the area of SWMUs 1 and 2, extends generally northwest, and terminates on Riley Land. The northern overburden chlorinated VOC plume is comprised primarily of dissolved PCE and TCE. Elevated concentrations of chlorinated VOCs were detected in proximity to the buried waste deposits formerly present in the SWMU 1 and 2 area and appear to be the primary contributor to dissolved chlorinated VOCs in the overburden groundwater in this area. As compared to the area south of Summit Street, the overburden is much thinner in this area (less than 20 feet thick). The Northern Plume extends towards the northwest, parallel to groundwater flow beneath an agricultural field and the former Riley Airport landing strip located to the northwest. The results for all analytes in overburden wells indicate a decreasing trend or no trend demonstrating that the Northern Plume is stable, and the soil IMs implemented in SWMUs 1 and 2 were effective at reducing chlorinated VOC leaching to the groundwater.

3.3 Hydrogeology

The Wabash River follows a buried bedrock valley (the Attica Trough) containing an approximately 150-foot-thick overburden unit comprised predominantly of sand and gravel. The Wabash River is a regional groundwater discharge feature. Consistent with the expected regional flow patterns, local groundwater flow observed in the RFI monitoring wells in both the overburden and the bedrock is generally toward the northwest towards the Wabash River.

Overburden Aquifer

The *Aquifer Testing Report* (CRA, 2008) outlines the hydraulic conductivity values estimated for the Overburden that were based on results of single well response testing and longer-term pumping tests. The hydraulic conductivity of the Overburden ranged from 0.03 feet/day (9.41 × 10-6 centimeters per second [cm/s]) to 56.69 feet/day (2 × 10-2 cm/s) with a geometric mean of 2.58 feet/day (9.1 × 10-4 cm/s).

Bedrock Aquifer

Groundwater in bedrock flows through bedrock porosity and interconnected fracture networks called high fracture frequency (HFF) zones. These HFF zones are expected to provide greater transmission of groundwater through portions of bedrock. Based on aquifer testing results at bedrock monitoring wells open to the upper HFF zone (i.e., BW-01 through BW-11 and BW-13) the hydraulic conductivity of the weathered bedrock ranges from 0.56 feet/day (1.98 ×10-4 cm/s) to 115.65 feet/day (4.08 ×10-2 cm/s). Single well response tests conducted at BW-16 indicate that the geometric mean hydraulic conductivity for the deeper competent bedrock above the deeper HFF zones is 4.7 ×10-3 feet/day (1.66 × 10-6 cm/s).

On-Site potential source areas have been addressed by implementing several IMs including targeted excavation and off-Site disposal, in-situ chemical oxidation, and SVE. Geologic and hydrogeologic conditions at and near the Site have been characterized in detail and the groundwater analytical data have been evaluated extensively. Groundwater IMs installed during the phased RFI included an extraction and treatment system and an AS/SVE system, which were designed to capture, contain, and treat impacted groundwater.

3.4 Surface Water

The groundwater seeps from the Site which are located northwest of Riley Lake are not impacting the surface water downslope of the seeps above any IDEM or U.S. EPA human health or ecological exposure

levels. Even with highly conservative assumptions that would overestimate the potential TCE discharge to the Wabash River, the potential impact on the Wabash River from groundwater discharge is negligible. Thus, groundwater discharge, if any, to the Wabash River is not impacting surface water above any TCE-related human health or ecological exposure levels.

Riley Lake

During the Phase IIB RFI, two surface water and two sediment samples were collected from Riley Lake and analyzed for metals and VOCs. The surface water and sediment samples were obtained from the northwestern and southeastern portions of Riley Lake. VOCs were not detected in the surface water samples obtained from Riley Lake. Sediment samples contained methylene chloride and metals. These were evaluated as part of the ecological screening evaluation completed for the Site.

3.5 Riley Land

Although not identified as an SWMU or AOC by the USEPA, a flowing artesian well was observed in an undeveloped portion of land located to the northwest of the current owner's residence located north of Summit Street. The artesian well was closed in accordance with Indiana Department of Natural Resources regulations (312 IAC 13-10-2). The soil samples taken on the Riley Land near the artesian well did not show any exceedance of VOCs above the RDCLs.

3.6 Drinking Water

Historically, low levels of TCE were detected in the City's water supply above IDEM's RGTSL and U.S. EPA's MCL. To address this situation, the CWTS IM was implemented to treat the City's water at the point of extraction CRA 2009b). The CWTS continues to be operated by the City of Attica and, while operating, the CWTS has reliably maintained the TCE concentrations to levels below detection limits in the City's water. Additionally, the City of Attica passed a restrictive groundwater use ordinance (No. 2-2013) that prohibits the installation and use of new water supply wells (except for groundwater monitoring and remediation activity) within the city limits.

Two former on-Site RMC production wells were closed voluntarily in April 2011. A licensed well driller properly abandoned the on-Site production wells. Residents formerly connected to the former on-Site potable water wells were connected to the City of Attica's public water distribution system.

3.7 Indoor Air- Northwest Residential Area

RMC evaluated multiple lines of evidence that are relevant to determining whether there is a potential for significant vapor intrusion, consistent with the USEPA's 2015 VI Technical Guide and based on extensive soil vapor and VI sampling at residences (CRA 2005a, CRA 2005c, CRA 2015). To date, 1,176 residential VI samples have been collected from 132 residences located in and around the Vapor Intrusion Study (VIS) Area located to the northwest of the RMC plant, where the VI pathway was determined to be of potential concern based on several factors, including the presence of a chlorinated VOC groundwater plume, depth to water table from the ground surface, and analytical data in soil gas and indoor air. Tables 2 and 3 provided below summarize the maximum concentrations of the VI-related cVOCs observed in the entire residential VI sample dataset and compare these concentrations with the 2021 IDEM indoor air, crawlspace, and sub-slab screening levels.

Table 2: Screening Level Evaluation of Indoor Table Air and Crawlspace Air Samples

Analyte	Residential Indoor Air/Crawlspace Screening Level (RIASL) (µg/m3)	Maximum Observed Concentration (µg/m3)	Potential Exceedance Noted?
1,1 DCE	300	0.14	No
cDCE	NA	6.8	NA
PCE	42	**95**	Yes
TCE	2.1	**110**	Yes
VC	1.7	0.68	No

Table 3: Screening Level Evaluation of Sub-slab Vapor Samples

Analyte	Residential Sub-slab Screening Level (RSSSL) (µg/m3)	Maximum Observed Concentration (µg/m3)	Potential Exceedance Noted?
1,1 DCE	10,000	Not detected	No
cDCE	NA	99	NA
PCE	1400	**8000**	Yes
TCE	70	**1200**	Yes
VC	57	0.20	No

Notes:
1,1 DCE-1,1 Dichlorethlylene
cDCE – cis-Dichloroethylene
PCE- Perchloroethylene/Tetra chloroethylene
TCE- Trichloroethylene
VC- Vinyl Chloride

All of the residences within the VIS Area where access was granted either have been tested and, where necessary (and access was granted), mitigated following the USEPA-approved plans. Vapor mitigation was completed at 60 residences consistent with the *Vapor Intrusion Mitigation Interim Measures Design Program* (CRA, March 25, 2010b). Section 4 further discusses the vapor mitigation solutions installed at residences in the VIS Area. After the discovery of the migration of groundwater cVOCs into the northwest residential neighborhood, EPA and RMC informed the community of the extent of the vapor

intrusion investigation area and the proposed cleanup activities to address drinking water contamination, vapor intrusion, groundwater migration, and contaminated soil source areas.

3.8 Elmdale Subdivision Area

Off-Site VI investigations were also conducted at the Elmdale subdivision, located east of the Site and south of Summit Street (CRA 2011). The VI investigation in this area included the installation and sampling of eleven soil vapor probes immediately east of the Site adjacent to subsurface utility corridors. Additionally, indoor air, crawlspace, and sub-slab vapor samples were collected from four residences located on Avenue 6 to the east of and close to the RMC Main Plant building. Access was not granted at a fifth residence to perform sampling. The analytical results from indoor air, sub-slab, and crawlspace testing of residences within the Elmdale subdivision did not reveal concentrations above IDEM screening levels. Multiple lines of evidence, including soil gas, sub-slab vapor, and groundwater analytical results, demonstrate that there is not a completed vapor transport pathway from the RMC Site to the residences east of the Study Area boundary.

SECTION 4: SUMMARY OF INTERIM MEASURES

Interim measures (IM) are defined by the USEPA as measures to control or abate threats to human health and/or the environment from releases and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued. To date, extensive IMs have been implemented at the Site, addressing soil, groundwater, vapor intrusion, and groundwater.
An IMs Work Plan dated July 25, 2006 (CRA), was submitted to the USEPA and proposed IMs for soil in the following areas of the Site:

– SWMUs 1 and 2
– SWMU 5
– SWMU 11/AOC 2 (specifically, the UST J, K, and L area)
– SWMU 12
– AOC 3B
– AOC 5

The objectives of the soil IMs proposed were to reduce the cVOCs and lead concentrations in soil in order to minimize potential human exposure and leaching to groundwater. The USEPA-approved work plan (CRA 2006) described the implementation of the SVE IM in SWMUs 1 and 2, and implementation of SVE and ISCO IMs in SWMU 5, SWMU 11, and AOC 2. In addition, groundwater IMs addressed the Southern Plume and the City's Supply Wells Nos. 1 and 2. The Southern Plume IMs were implemented at the Site boundary to reduce the concentrations of VOCs migrating west and northwest of the Site. A VI mitigation IM was implemented in the northwest neighborhood VIS Area (CRA 2009a). The City of Attica obtained a permit to construct the drinking water treatment system from IDEM (Permit No. WS 10302) in 2009. The City's water air-stripper-based treatment system, installed in 2010, has reliably maintained the TCE concentrations to levels below detection limits in the City's water.

The two on-Site production wells (AOC 5) were removed from service and properly closed in November 2008, and the residences were connected to the City of Attica's water supply network. A summary of the IMs in the contaminated areas, and the performance evaluation is summarized below in Table 4.

4.1 On-Site Soil Source Areas (SWMU 1 and 2, SWMU 5 and SWMU 11/AOC 2

IMs were implemented to address the waste material and VOC-impacted soil in several areas. In the SWMU 1 and 2 area, waste materials were addressed through limited excavation and on-Site treatment using ex-Situ and in-situ SVE. Activities related to the excavation of waste and visibly impacted soil commenced on February 22, 2008 and were completed on March 6, 2008 (CRA 2007a). The treatment using ex-situ involved the construction of a lined ex-situ soil treatment cell, placement of excavated soil in the lined ex-situ soil treatment cell, and connection of the treatment cell to the SVE system. Once the ex-situ soil treatment cell was filled and covered, installation of the in-situ SVE system proceeded. Due to the relatively shallow water table in the treatment area, horizontal drilling was used to install the SVE extraction wells. All horizontal wells were installed between 6 and 10 feet bgs.

In 2011, the SWMUs 1 and 2 SVE IM reached asymptotic levels and a progress sampling investigation was conducted to evaluate the effectiveness of the IM according to the sampling plan. The SWMU 1 and 2 SVE system was effective, with a VOC removal efficiency of over 94 percent based on a comparison of concentrations in initial versus progress soil samples. The SVE system was shut down in 2014 with the approval of the USEPA, but the SVE system components are still present at the Site. The ex-situ soil treatment cell remains in the area. As noted in table 4, 0.54 tons of total cVOCs were removed equivalent to a removal efficiency of over 94% of cVOC in soil.

Table 4: Impacted Media, Interim Measures and Performance Evaluation

SWMU, AOC or Other Description	Contaminants of Concern	Impacted Media	Mass of VOCs/source media removed	Interim measures Treatment Technology	Period of IM Operation	Performance Effectiveness/mass removed
SWMU -1 and 2 Former Drum Storage and disposal Area	TCE, PCE, Cis 1,2 DCE	Soil and Vadose zone pore space	1000 tons of impacted soil and ex-situ SVE	Excavation and SVE	2008-2014	0.54 tons of total cVOCs were removed equivalent to a removal efficiency of over 94% of cVOC in soil.
SWMU-5, SWMU 11 and AOC 2	TCE, PCE, Cis 1,2 DCE	Soil and Vadose zone pore space	7000 cubic yards	Excavation, ISCO and SVE	2008-2018	8.6 tons of total VOCs were removed from soil and soil gas. Total VOCs were reduced from 42% to 99% in monitoring wells located within the source areas.
SWMU 12-Dynamite Burial Site	Dynamite	Dynamite buried in soil	80 pounds of dynamite in half-pound sticks	Excavation and off-Site incineration	2008	Confirmation sampling did not identify residuals of dynamite.
AOC 3B-North Outfall	Lead	Soil	351 tons of lead impacted soil	Excavation and off-Site disposal	2008	Confirmation samples did not show exceedance of lead over IDEM RDCL.
AOC4-House Keeping Issues	Stored containers with hazardous, non-hazardous and	RMC Building Floor	548 tons of solid waste, 6.9 tons of liquid waste and 1.28 tons of radio-active waste.	Characterization and off-Site disposal following	2018	Buildings floors were wet washed. Radiation survey results after disposal did not require special cleaning of the building indoor areas.

SWMU, AOC or Other Description	Contaminants of Concern	Impacted Media	Mass of VOCs/source media removed	Interim measures Treatment Technology	Period of IM Operation	Performance Effectiveness/mass removed
	radioactive materials			disposal regulations.		
AOC 5 - On-Site Supply Wells	TCE, PCE, Cis 1,2 DCE, VC	Groundwater	n/A	Decommissioned; users connected to municipal well supply	2008	N/A
Artesian wells	TCE, PCE, Cis 1,2 DCE, VC	Groundwater	n/A	Closed Wells	2008	n/A
Groundwater -Southern Plume	TCE, PCE, Cis 1,2 DCE, VC	Groundwater	Approximately 525 million gallons treated to date	Groundwater extraction and treatment, air sparging and SVE system Permeable Reactive Barrier	2010-2022 October 2022	Most of the monitoring wells in the source area and the downgradient area show a declining trend for cVOCs in overburden and bedrock aquifer. Performance efficiency will be monitored 30, 60, 90 and 180 days following the installation of the PRB system.
Groundwater – City of	TCE	Groundwater	1000 pounds were estimated to be	Air Stripping	2010-current	cVOC levels are below detection limits in the City's drinking water supply.

SWMU, AOC or Other Description	Contaminants of Concern	Impacted Media	Mass of VOCs/source media removed	Interim measures Treatment Technology	Period of IM Operation	Performance Effectiveness/mass removed
Attica Supply Wells 1 and 2			removed from 2010 to date.			
Northwest Residential Area	TCE, PCE, Cis 1,2 DCE, VC	Indoor Air	Sub-slab soil gas removed through the mitigation system	Passive or Active Sub - Slab or sub-membrane depressurization system.	2009 to current	Post mitigation monitoring of indoor air data do not show exceedance of VOCs above IDEM RIASLs.

IMs were also implemented in SWMU 5 and SWMU 11/AOC 2 including in-situ treatment of soil using ISCO and SVE. USEPA approved the ISCO and SVE work plans in 2007 (CRA 2007b). ISCO is used to treat soil and groundwater contamination in the source area where contaminants were originally released. The source area generally contains contaminants attached to soil particles that have not yet dissolved into groundwater. This approach uses *wells* or pipes to pump the treatment mixture into the ground under gentle/adequate pressure. Once the oxidant is pumped down the wells, it spreads into the surrounding soil and groundwater where it mixes and reacts with contaminants. ISCO can produce rapid and complete contaminant destruction of contaminants in a short period of time. See *A Citizens Guide to In Situ Chemical Oxidation* here.

Three rounds of ISCO injections were performed in SWMU 5 and SWMU 11 at specific depth intervals in a few locations where dense non-aqueous phase liquid (otherwise known as free product) was indicated to be present. As shown in Table 4, 8.6 tons of total VOCs were removed from soil and soil gas. Total VOCs were reduced from 42% to 99% in monitoring wells located within the source areas. The installation of the SVE wells in the SWMU 11 and AOC 2 area were completed in October 2007.

The SWMU 5 SVE system was shut down in December 2011 due to the failure of the blower motor. The SWMU 11/AOC 2 SVE system was reconfigured to extract vapors from the SWMU 5 area in addition to the SWMU 11/AOC 2 area in February 2012. In November 2013, due to the reduced VOC extraction rate, the system operation was changed to a zoned operation where, on a month-to-month basis, extraction was conducted in certain zones while the other zones rested, to try and maximize VOC extraction. This operation continued in this manner until January 2018, when the SWMU 11/AOC 2 blower motor also failed. Progress soil sampling was completed in the SWMU 5 and SWMU 11/AOC 2B areas in 2013, and the system was optimized in response to the findings as described in the letter dated February 14, 2014. Additionally, it was noted that the VOC concentrations decreased significantly in groundwater samples collected from monitoring wells located near SWMU 5 and SWMU 11/AOC. These data confirmed the effectiveness of the soil IMs at minimizing the potential for leaching of VOCs from soil to groundwater. Figure 7 in attachment 1 shows the layout of the SVE system in SWMU 5.

4.2 Southern Plume Groundwater IMs

IMs implemented to address the Southern Plume included GWET and AS/SVE systems installed on the Riley-controlled land and a downgradient City Water Treatment System to treat the water extracted from the City of Attica potable wells for TCE, to ensure the levels remain below the RGTSL and MCL. As explained below, separate technologies for the IMs on the Riley Land were warranted by differences in the hydrogeology of the areas confirmed through aquifer testing in 2008 (CRA 2008).

The GWET system, also known as a groundwater pump and treat system is a common method for cleaning up groundwater contaminated with dissolved chemicals, including industrial solvents, metals, and fuel oil. Groundwater is pumped from wells to an above-ground treatment system that removes the contaminants. Pump and treatment systems also are used to *contain* the contaminant plume. Containment of the plume keeps it from spreading by pumping contaminated water toward the wells. This pumping helps keep contaminants from reaching particular areas including drinking water wells, wetlands, streams, and other natural resources. See *A Citizens Guide to Pump and Treat* here.

The GWET system installed south of Summit Street at the Site has been operating since 2010 and continues operating. A total of 16 groundwater extraction wells pump water to the treatment system (Figure 8). The extracted VOC contaminants in the groundwater are removed through an air stripper. The treated groundwater is

then gravity discharged to Riley Lake, under National Pollutant Discharge Elimination System (NPDES) permit IN0063657.

The AS/SVE system installed north of Summit Street at the Site is divided into two sections, referred to as the north and south legs. Air is sparged into the base of the overburden aquifer in each trench cell through perforated horizontal air sparge piping designed to provide equal distribution of air along the length of the pipe. The sparge air travels up from the base of the trench through the saturated backfill and strips VOCs from the water column within the trench. The sparge air containing the stripped VOCs travels upwards and enters the unsaturated portion of the trench where it is removed by the SVE system and vented into the atmosphere at the treatment building. The treated groundwater exits the downgradient portion of the treatment trench. See *A Citizen's Guide to Soil Vapor Extraction and Air Sparging* here.

The current GWET and AS/SVE systems installed in 2010 are currently not reliable due to the electrical failures and the need for regular replacement of the operating components. To ensure the continued protection of human health and the control of migration of contaminated groundwater beyond the property boundary, EPA requested the installation of a PRB as an interim measure. A PRB is considered a presumptive remedy by EPA due to its proven efficiency at many of the contaminated groundwater sites across the country. See *A Citizen's Guide to Permeable Reactive Barriers* here.

The goal of the PRB as an IM at the Site will be to accelerate the decline of groundwater VOC levels which will allow for the discontinuance of the vapor intrusion mitigation system at the residential properties downgradient of the Site. The installation details for the PRB system are provided below. The GWET and the AS/SVE systems will be turned off to prevent mobilizing the injected treatment medium during the PRB installation. As described below and in Figure 19, four separate segments (A through D) are installed to cover the southern plume groundwater migration at the property boundary:

1. An approximately 500 feet long segment located north of Summit Street and closest to the western Site boundary at a depth of 8-20 ft bgs
2. An approximately 350 feet long segment located west of Riley Lake at a depth of 50-70 ft bgs
3. An approximately 700 feet long segment located immediately west of SWMU 5 at a depth of 50-70 ft bgs
4. An approximately 400 feet long segment located along the south edge of SWMU 5 adjacent to the southern Site Boundary at a depth of 40-65 ft bgs

The treatment mixture for the reactive barrier contains an injection suite of PlumeStop™, S-Micro ZVI® HRC T, BDI+® to treat the COCs before migrating downgradient. PlumeStop works by capturing target contaminants via sorption. Once sorbed, the contaminants can be consumed by the local microbial community (or microbial amendments), freeing up sorption sites for further remediation. Crucial to its performance, PlumeStop does not lose significant sorptive capacity over time, making it a viable long-term solution. The chlorinated VOCs are degraded via enhanced reductive dechlorination from the bacteria and abiotically from the S-Micro ZVI®. The abiotic breakdown of chlorinated VOCs reduces the generation of toxic daughter products (i.e. vinyl chloride) during the degradation process. Hydrogen Release Compound (HRC™) is a controlled release of hydrogen that can persist for periods of up to two years. Dehalogenating bacteria in the subsurface use the generated hydrogen to degrade the contamination through enhanced reductive dechlorination. HRC will be injected in PRB segments C and D as previous groundwater sampling events showed daughter products at these locations. The HRC injections will degrade the daughter products and allow the other injection application suite to break down the parent compounds. Bio-Dechlo INOCULUM Plus® (BDI+®) consists of bacteria that naturally occurs in the subsurface. *Dehalococcoides* is a known dehalogenating bacteria that rapidly decreases solvents in sufficiently anaerobic environments. When paired with the intended application suite described above it will create an

environment where the *Dehalococcoides* can thrive using the generated hydrogen to help degrade the solvent COCs through enhanced reductive dichlorination.

As described in the PRB Installation Workplan (October 2022 b), FluxTracer Study and the Clear Water Injection Test were completed in July 2022 to design the injection spacing, slurry mixture composition, and volume at each spacing location. The PRBs will be spaced on approximate four-foot centers. The original design had 5-foot centers but based on the clear water injection study, the initial spacing has been reduced to four-foot centers. Verification sampling will be conducted to confirm the injection design assumptions.

4.3 City Water Drinking Water Treatment System

Historically, low-level concentrations of TCE were detected in the City of Attica's Supply Wells No. 1 and 2, generally at concentrations below the IDEM's RGTSLs and the USEPA MCL, both currently set at 5 micrograms per liter (µg/L). Occasional detections of TCE at concentrations slightly above the RGTSL and MCL have occurred, but not during consecutive sampling rounds. The purpose of the CWTS is to treat the water extracted from the City of Attica potable wells for TCE to ensure the levels remain below the RGTSL and MCL. The CWTS consists of an air stripper and associated components. The City funds the maintenance of the treatment system through a trust fund established by RMC/Kraft.

4.4 Vapor Intrusion (VI) Mitigation Solutions

Based on the analytical data obtained during the residential VI sampling efforts described in Section 3.7, VI mitigation solutions were installed at 61 residences. VI mitigation solutions installed at the residences were of two types: active mitigation systems (i.e., sub-slab depressurization [SSD] or submembrane depressurization [SMD]) or passive mitigation systems (i.e., sealing existing cracks, joints, utility penetrations or other features that might serve as potential diffusion routes into a building). Active vapor mitigation systems were installed in 46 residences where indoor air concentrations were detected above screening levels within the VIS Area. Fifteen residences were fitted with passive mitigation systems following sub-slab vapor or crawlspace air detections above screening levels and indoor air concentrations below screening levels. [redacted]

Confirmatory indoor air sampling completed following installation demonstrates that the mitigation solutions are effective at reducing indoor air concentrations below the IDEM 2021 RAISLs. Currently, annual inspections are performed at each of the residences where mitigation systems have been installed, and repairs to the systems are made as necessary where access is granted by the property owners and residents**.**

SECTION 5: SUMMARY OF RISK EVALUATION

5.1 Human Health Risk Evaluation

The information and data collected in the RFI are used to determine whether the contamination presents an unacceptable risk to human health. IDEM has calculated Default Closure Levels (DCLs) to protect human health and the environment from contaminants present in industrial and residential settings. The residual contaminant levels below these DCLs do not pose an unacceptable risk to people or the environment if exposure to the contaminated media occurs through the following pathways: incidental ingestion; incidental dermal contact; and inhalation of dust/volatiles.

The acceptable target risk level for the IDEM DCLs has been set at 1x10-5 excess cancer risk (meaning one in one hundred thousand persons may experience an additional lifetime cancer risk) and at a hazard quotient value of 1 for non-cancer health risks. These target levels are derived from a combination of default exposure parameters, chemical/physical properties of contaminants, toxicological data, and other relevant screening levels to evaluate the impact of chemicals on human health. All on-Site risk assumptions used for evaluating the conditions at the Site are based upon RMC's status as an industrial or a warehouse based on historic and current land use, respectively. The main building at this Site is anticipated to be a warehouse in the foreseeable future. The rest of the buildings adjoining the main building are not currently fit to be occupied or used as a warehouse.
The purpose of the Human Health Risk Assessment (HHRA is to evaluate the potential human health risks posed by Site related chemicals under current and potential future Site conditions, assuming no additional remedial actions are taken at the Site. For the HHRA, the SWMUs and AOCs were combined to form four on-Site potential exposure areas and three off-Site exposure areas (see Figure 10). The four on-Site exposure areas included are:

– Area 1: Includes the area north of the gravel pit, extending east of Airport Road to the Site boundary and incorporates SWMU 1, SWMU 2, SWMU 3, and SWMU 12.
– Area 2: Includes the area north of Summit Street, south of the former UST area, extending east of Airport Road to the Site boundary, and incorporates SWMU 7, AOC 3B, and part of AOC 2.
– Area 3: Includes the area south of Summit Street, north of Ravine Park, extending west of 6th Avenue to the Site boundary, and incorporates SWMU 4, SWMU 5, SWMU 6, SWMU 11/AOC 2.
– Riley Lake

The four off-Site exposure areas included are:
– Riley Land – Includes the area north of Summit Street, east of Riley Park, east of the residential properties along Kentucky Street, North Street, and Edgewood Drive, and south of the Railroad tracks. Riley Land surrounds Areas 1 and 2.
– Off-Site Northwest Residential Area – the residential area located northwest of the Site
– Off-Site Ravine Park – located south of Area 3 (incorporates AOC 3A)
– Off-Site Elm dale Subdivision – the residential area located directly east of Area 3

Data obtained during the Phase IIA RFI (CRA 2003a) and Phase IIB RFI (CRA, 2005 and 2010a) were used to prepare the HHRA for the Site and the area surrounding the Site. A Screening Level Ecological Risk Assessment (SLERA) was conducted for the Site that followed guidelines as outlined in USEPA Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessment (USEPA 1997). A detailed discussion of the HHRA and SLERA is provided in the Phase IIB RFI Report (CRA 2010a). The HHRA report noted exceedances of 1.0E-05 carcinogenic risk or a Hazard Index (HI) greater than 1.0 due to soil contamination in SWMU 1 and 2, SWMU 5, SWMU 11/AOC 2, AOC 3B, and groundwater contamination in the Southern Plume beyond the property boundary. All other identified on-site areas and off-site areas do not pose risk concerns to human health through any of the exposure pathways.

Between 2008 and 2010, the IMs were implemented in all the areas identified to exceed the acceptable human health risk. As the purpose of the final corrective measures for the Site is to assess the risk associated with residual contaminants present at the site after IM, the COCs were identified by screening the analytes from different media against applicable 2021 IDEM screening levels. The following sections provide a screening-level evaluation of the remaining chemicals in the impacted media, the trend analysis of chemicals in groundwater, potential exposure pathways, and the associated risk.

Soil
The surface soil at the Site did not show any exceedances for worker contact. Subsurface soil at the SWMUs indicated in table 1 showed exceedance for limited contaminants of concern for worker contact. PCE concentration as high as 360 mg/Kg, and TCE concentration as high as 3,200 mg/Kg is present in on-Site soil that is not covered by concrete or other protective caps. Exposure to contaminated subsurface soil is potentially a complete pathway for construction workers. A focused ISCO treatment is recommended as a proposed remedy to address the high level of cVOCs present in the soil. Table 5 shows the analytes that exceed the screening levels in the soil column of the impacted SWMUs and AOCs in the on-Site areas. The bold numbers indicate the exceedance of the contaminants of concern above the identified IDEM screening levels.

Distinct locations or soil contamination hot spots remain at the Site following the injection of chemical oxidants and the soil vapor extraction operation as part of the interim measures. Up to ninety percent of the volatile chemicals were reduced during the soil source removal interim measures. The soil-to-groundwater migration screening levels (MTG) is based on default EPA MCLs or tap water RSLs adjusted to a dilution attenuation factor of 20. Based on this data screening, concentrations of arsenic, PCE, TCE, and vinyl chloride in one or more soil boring locations exceed the soil screening levels protective of groundwater.

Groundwater
Analytes detected in groundwater at concentrations above the IDEM's 2021 drinking water screening levels and inhalation screening levels. Table 6A and Table 6B identify COCs present at concentrations above the screening levels in groundwater in the Northern and Southern Plumes investigated at the Site during the July 2021 and March 2022 groundwater sampling event. The bold numbers indicate the exceedance of the COCs above the appropriate screening levels.

The statistical evaluation of the recent groundwater data indicates that chemical concentration trends are not increasing under or downgradient of SWMU-5 and SWMU-11/AOC 2. These results suggest that the SVE IMs, which removed over 8 tons of cVOC mass from the vadose zone (or unsaturated zone) during the 10 years of operation, have significantly removed the cVOCs from the vadose zone. Now that the source of cVOCs in groundwater has been addressed, the residual concentrations in groundwater are being treated on-Site through the existing GWET IM and will be remediated long-term through the implementation of an injected PRB which is proposed as a groundwater treatment optimization remedy for the Site.

Drinking-Water
There is no current exposure to groundwater through the ingestion pathway since there is a restrictive groundwater ordinance in the City of Attica (prohibiting the installation and use of new water supply wells, except for groundwater monitoring and remediation activity, within the city limits) and there is no current groundwater use on the Site or Riley Land. The CWTS IM was implemented in 2010 and is effective at treating the City water supply to levels that are below the IDEM Residential Groundwater Tap Screening Levels.

5.1.1 Potential Exposure and Risk Evaluation

Groundwater and on-Site subsurface Soil are found to be contaminated above the health-protective levels as shown in tables 6a and 6b. The current and future health risks of workers and residents are covered in the following paragraphs.

On-Site Worker Exposure
The subsurface soil in SWMU11/AOC 2 below and within the footprint of the main building of the RMC Site exceeds the industrial indoor air screening levels. The Site is currently inactive, and the main building is used only

for commercial (storage) purposes. There is no electricity or running water within the warehouse area. The buildings connecting the main building cannot be occupied at this time due to improper maintenance. Under current conditions, vapor intrusion is not a pathway of concern due to the lack of exposure. Occupancy of these buildings in the future warrants installation of an active vapor intrusion mitigation system.

Construction Worker Exposure

Construction workers are not expected to come in contact with soil or groundwater through the ingestion or dermal contact pathway. The water table at the southern plume is deeper than 20 ft (below ground surface or bgs) and at the northern plume, it is deeper than 10 ft bgs. The cVOCs in the soil areas of SWMU 5 and SWMU 11/AOC 2 that exceed the worker contact screening levels are at depths greater than 20 feet bgs. The RMC plant is closed with no active manufacturing operations at the Site and the property is largely unused – only the main building is being used for storage purposes. Construction activities are not planned currently. The risk to construction or excavation workers that are potentially associated with the inhalation pathway of soil or groundwater is negligible. SMPs will become active once an ERC is filed and will restrict certain actions during any environmental investigation or remediation work.

Resident Exposure

Currently, the interim measures implemented in and around the Site are effective in preventing the exposure of residents to the chemicals of concern in groundwater, drinking water, and indoor air. Environmental media investigations indicate that further remedial actions are warranted for soil and groundwater to eliminate the potential for future vapor intrusion of VOCs into residential structures in the VIS Area and to attain the long-term goal of restoring the aquifer to meet the drinking water standards.

Confirmatory indoor air sampling completed following installation demonstrates that the mitigation solutions are effective at reducing indoor air concentrations below the IDEM Residential Indoor Air Screening Levels. Currently, annual inspections are performed at each of the residences where mitigation systems have been installed, and repairs to the systems are made as necessary where access is granted by the property owners and residents. cVOC levels in ambient (outdoor) air were found to be below the health-protective EPA outdoor air screening levels.

5.2 Hydrogeological Model

A comprehensive assessment of the fate and transport of cVOCs in groundwater was modeled in three dimensions in 2012 and 2014 and subsequently updated in 2018 (GHD 2018). The groundwater flow model represents the existing hydrologic, geologic, hydrogeologic, and chemical conditions. The model provides a reasonable match to groundwater elevations and groundwater flow directions observed at the Site during three sets of synoptic groundwater elevation monitoring events. The monitoring events consisted of average groundwater flow conditions before the start-up of the groundwater IMs in 2010 observed groundwater flow conditions following the start-up of the groundwater IMs in February 2014 and observed groundwater flow conditions during relatively high pumping conditions occurring in May 2017.

Table 5: Screening Level Evaluation of Subsurface Soil Data

Unit	*Compounds of Concern*	*Maximum Concentration (mg/Kg)*	*95% UCL of the Mean (mg/Kg)*	*IDEM* EDCSL *(mg/Kg)*	*IDEM CIDCSL (mg/Kg)*	*IDEM MTGSL (mg/Kg)*	*Location of Max.Conc (Depth interval in bgs)*
SWMUs 1 and 2	Arsenic	74	11.63	920	30	5.9	B-103 (4-6)
SWMU 5	PCE	**340**	30.86	170	170	0.045	B-518 (18-20)
SWMU 5	TCE	**3200**	**218.45**	5.7	34	0.036	B-524 (22-24)
SWMU 11/AOC2	PCE	**360**	68.09	170	170	0.045	B-1110 (24-26)
SWMU 11/AOC2	TCE	**420**	62.61	5.7	34	0.036	B-1103 (18-20)
SWMU 11/AOC2	VC	**2.7**	0.25	0.83	17	0.014	B-1102 (18-20)

-PCE Tetrachloroethylene, TCE-Trichloroethylene; VC- Vinyl Chloride
-Bold Numbers indicate exceedance over the direct contact screening levels (EDCSL) for a construction worker who is performing excavation, as the contamination is found deeper than 4 feet at these areas.
- *IDEM* Indiana Department of Environmental Management
-*CIDCSL* Commercial/ Industrial Direct Contact Screening Level
-MTGSL Migration to Groundwater Screening Level

Table 6a: Evaluation of Analytical Data in the Northern Groundwater Plume

Groundwater Constituent	*Maximum Conc. (ppb) in Bedrock aquifer*				*IDEM RDCL (ppb)*	*Maximum Conc. (ppb)in Overburden aquifer*		*IDEM VI Screening levels*
	On Site	*Trend*	*Off Site*	*Trend*		*OnSite*	*OffSite*	
Monitoring well	BW-04		BW-09			OB-28	OB-38	
Cis 1,2 DCE	**1610**	No Trend	**1000**	No Trend	70	ND	ND	N/A
TCE	**870**	No Trend	**91.8**	No Trend	5	5	ND	8.2
PCE	**112**	No Trend	**137**	Decreasing	5	11.1	ND	97.2
Vinyl chloride	**55.5**	No Trend	**27.7**	Decreasing	2	ND	ND	1.9

Table 6b: Evaluation of Analytical Data in the Southern Groundwater Plume

Groundwater Constituent	*Maximum Conc. (ppb) in Bedrock aquifer*		*IDEM RDCL (ppb)*	*Maximum Conc.(ppb) in Overburden aquifer*				*IDEM VI Screening levels(ppb)*
	OnSite	*OffSite*		*OnSite*	*Trend*	*OffSite*	*Trend*	
Monitoring well	BW-14	BW-7		OB-6		OB-36		
Cis 1,2 DCE	ND	ND	70	264	No Trend	ND	Compliant	N/A
TCE	ND	ND	5	**120**	No Trend	**15.1**	Increasing	8.2
PCE	ND	ND	5	ND	Compliant	24	Decreasing	97.2
Vinyl chloride	**2.9**	**7.4**	2	**11.7**	No Trend	ND	Compliant	1.9

ppb- parts per billion or ug/L
N/A – No available toxicity data
ND- Not detected at the appropriate reporting limits
Bold Numbers indicate exceedance over the appropriate screening levels
Bedrock GW COC levels are compared to drinking water screening levels and Overburden GW COC levels are compared to vapor intrusion screening levels

Particle tracking simulations using the calibrated model were employed to ensure that the model reasonably represented the groundwater flow directions demonstrated by the orientation of the observed groundwater plumes emanating from the Site. A calibrated groundwater flow model then was used to calibrate contaminant transport mechanism values in the four naturally occurring transport mechanism zones (i.e., Upland Overburden Area, Alluvial Valley Overburden Area, Northern Plume Bedrock Area, and Southern Plume Bedrock Area). A fate and transport model was used to conduct contaminant transport simulations of potential future migration under the continued operation of the groundwater IMs to meet the following two objectives:

1. Predict the time required for cVOC concentrations in groundwater to decrease to levels below the IDEM RGVESLs within the top 10 feet of the water table in the VIS Area; and
2. Predict the time required for cVOC concentrations to decrease below the IDEM RGTSLs near the City of Attica municipal water supply wells.

Based on the contaminant transport simulation results (Figures 11, 12, 13, and 14), TCE concentrations in the upper 10 feet of the water table will decrease to below the RGVEGSL over the bulk of the VIS Area in approximately 10 years (i.e., by 2030 based on the model depictions in 2010). PCE and vinyl chloride levels are currently below the RGVESLs in the VIS Area. There is no VEGWSL for cDCE. Based on the contaminant transport simulation results, simulated TCE levels within 500 feet of the municipal supply wells will decrease to below this level in approximately 30 years (Figure 14). PCE, cDCE, and vinyl chloride currently do not reach within 500 feet of the municipal water supply wells and are not simulated to do so in the future. While the hydrogeological model development incorporated the operation of current groundwater IMs for the Southern Plume (i.e., the GWET and AS/SVE systems), the ability of the model to meet the above two objectives does not presume the implementation of any specific groundwater corrective measure at the downgradient Site boundary. Rather, the model only requires that any on-Site groundwater corrective measures that are implemented will be effective at minimizing the off-Site migration of VOCs beyond the downgradient Site boundary. There are no groundwater IMs implemented for the Northern Plume and the hydrogeological model assumptions and resultant predictions did not include any provisions for groundwater IMs for the Northern Plume.

5.3 Summary of Ecological Risk

An ecological risk assessment was completed for the RMC Site and documented in the February 2013 Baseline Ecological Risk Assessment Technical Memorandum (CRA, 2013). To facilitate the ecological risk assessment, the Site was partitioned into six assessment areas based on the type of environmental media evaluated and the historical use of the areas. The six assessment areas are SWMUs 1 and 2, SWMU 5, AOC 3A, AOC 3B, Riley Lake, and the Artesian Well on a private property northwest of the Site. Based on the initial screening results, it was concluded that several chemical chemicals are of potential ecological concern (COPEC). A constituent was identified as a COPEC if the maximum concentration in a medium (i.e., soil, sediment, or surface water) within a SWMU, AOC, Riley Lake, or the vicinity of the former Artesian Well exceeded its ecological screening value (ESV). A constituent was also retained as a COPEC if it was not detected, but the limit of detection (LOD) was higher than its ESV.

The SLERA identified a total of 43 chemical constituents as COPECs for soil, sediment, and/or surface water. These COPECs consist of 10 volatile organic compounds (VOCs), 12 semi-volatile organic compounds, three polycyclic aromatic hydrocarbons (PAHs), and 18 metals.

Based on the results of the initial screening, a baseline ecological risk assessment (BERA) was completed for

constituents with the potential to pose an unacceptable risk. BERA evaluated risk based on a combination of alternative benchmarks, food chain models, and realistic/Site-specific exposure factors and concluded that there are no unacceptable risks to ecological receptors for any media (soil, surface water, and sediment) for any of the six assessment areas. Based on this evaluation no corrective action is necessary to protect the ecological receptors at the RMC Site.

SECTION 6: POINTS OF COMPLIANCE AND CORRECTIVE ACTION OBJECTIVES

6.1 Points of Compliance (POCs)

The POCs represent the boundaries of properties contiguous with the Site where institutional controls (i.e., ERCs) can be imposed to limit potential human exposure to Site-related COCs. Figure 15 shows a POC boundary map. Properties located within the POC boundary are controlled by the Riley Family (Riley Land). It is expected that for Riley Family properties located within the POC limits, ERCs will be imposed that prevent unacceptable exposure to impacted environmental media.

The purpose of this SB is to evaluate the corrective action objectives (CAOs) and recommend appropriate Corrective Measures to be implemented at the Site. The CAOs are based on relevant USEPA guidance, human health, and environmental screening levels, information gathered during the RFI, and considerations of applicable federal statutes.

6.2 Corrective Action Objectives (CAOs)

EPA's short-term goals for the Site are:

1. Control all current human exposures to contamination at and from the Site for which there are complete risk/exposure pathways by eliminating significant or unacceptable exposures for all media known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above risk-based levels; and,

1. Stabilize migration of contaminated groundwater at and from the Site. The migration of all groundwater known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels must be stabilized to remain within any existing areas of contamination. In addition, any discharge of groundwater to surface water must not pose an unacceptable risk or be currently acceptable according to an appropriate interim assessment of surface water.

Both of EPA's short-term goals have already been achieved. On August 14, 2022, EPA determined that the Site met the screening levels for Human Exposures Under Control (CA725), superseding EPA's prior "No" determination made in 2008. The updated determination was based on a combination of available indoor air sampling data, and the elimination of exposure pathways through SSD systems and the local groundwater ordinance.

In 2014, EPA determined that the Site met the screening levels for Groundwater Migration Under Control (CA 750), superseding EPA's prior "incomplete" determination made in 2008. The revised "Complete" determination was based on a combination of interim measures such as on-Site soil source removal, groundwater extraction and treatment, city water treatment system, and the local groundwater ordinance.
EPA's long-term goals for the remedy being proposed for final remedy selection are the following:

a. Protect human health and the environment through long-term stewardship of the Site by monitoring the effectiveness of the final remedy.
b. Attain the applicable media (e.g., groundwater, air) cleanup standards in order to protect future users of the Site as well as users of neighboring properties.
c. Control the sources of the releases to the extent practicable so that the expectations in CA725 and CA750 continue to be met.
d. Manage all remediation waste in compliance with applicable standards.

Current groundwater and soil contamination conditions at the Site indicate that the following potential exposure and migration pathways exist based on the exceedance of the applicable IDEM cleanup screening levels: 1) hypothetical groundwater ingestion pathway if the CTWS fails (on-Site and off-Site); 2) the on-Site non-residential vapor intrusion pathway; 3) the off-Site residential vapor intrusion pathway if the vapor mitigation solutions fail; 4) the on-Site construction worker volatile chemical inhalation pathway; and 5) the on-Site soil to groundwater migration (above off-Site residential vapor intrusion) pathway. EPA has selected the following remedy components for the Site.

Final corrective measures for the RMC Site must ensure that:

1. Soil and groundwater contamination on-Site will neither endanger human health nor continue to migrate off-Site at levels that represent a continuing potential concern for residential vapor intrusion and drinking water.
2. Contamination that has migrated off-Site by transport in groundwater must be reduced in concentration, so it does not endanger human health or require land use restrictions for off-Site properties.
3. Institutional and engineered controls to protect human health and the environment on-Site will be recorded as ERCs in the property deed and will be binding on all future owners of the Site property, to ensure that those who work at the property will be protected from unacceptable exposure to contamination, including unacceptable exposure to vapor-phase COCs in indoor air within buildings.
4. Construction workers who may perform excavations in areas with remaining contamination will be protected from unacceptable exposure to that contamination and will properly handle contaminated soil in accordance with applicable State and Federal regulations via an SMP contained in an ERC, and,
5. Contamination is reduced to a level that promotes the natural degradation of contamination, leading to the eventual long-term restoration of the aquifer.

CAOs and reference values are designed to protect human health and the environment and are based upon residential, commercial/industrial, and environmental exposure screening levels, EPA guidance, Site data analysis, and applicable state and federal regulations. Based on the above long-term goals and the objectives of the final corrective measures, the media-specific cleanup objectives are covered in the following sub-section.

6.2.1 Soil CAOs and Reference Values

Soil CAOs for the Site and Riley Land were developed to address the following concerns:

- Prevent potential human exposure within the POC or property boundary through ingestion, inhalation, or direct contact, with soil containing COCs at concentrations above IDEM's 2021 CIDCSLs
- Reduce leaching of COCs from SWMU/AOC areas to groundwater
- Prevent potential on-Site direct contact by construction workers conducting excavation work with COCs at concentrations exceeding IDEM's 2021 EDCSLs

As discussed in Section 4, soil IMs already were implemented in SWMU 1 and 2, SWMU 5, SWMU 11 and AOC 2, and AOC 3B.

6.2.2 Groundwater CAOs and Reference Values

Groundwater CAOs were developed to address the following concerns:

- Prevent potential on- and off-Site residential groundwater ingestion exposure to COCs at concentrations above IDEM's 2021 RGTSL
- Prevent migration of COCs that exceed the IDEM's 2021 RGVESLs beyond the POC.
- Reduce the concentrations of COCs in the groundwater beyond the POC to concentrations below IDEM's 2021 RGVESLs

In developing the groundwater CAOs, consideration was given to the following:

Overburden and bedrock groundwater currently is not used as a potable water resource in any contaminated area. The on-Site water supply wells were closed, and residents that received potable water from these wells were connected to the Attica water supply network in 2008.

- Downgradient of the Site, groundwater use is restricted by the City of Attica through an ERO.
- The Attica City water supply is obtained from two water supply wells located adjacent to the Wabash River downgradient of the Site. As discussed in Section 4.3, these wells were fitted with a CWTS as an IM that is operated and maintained by the City of Attica. Additionally, groundwater IMs operating from 2010 to date through GWET and AS/SVE systems have reduced VOC concentrations in the groundwater downgradient of these systems. The replacement of these systems with the installation and maintenance of a PRB is expected to further optimize the containment and treatment of the southern plume.
- As discussed in Section 5.2, contaminant transport simulation results indicate that the TCE concentrations in the upper 10 feet of the water table decrease to below the RGVESL over the bulk of the VIS Area by approximately 2035. PCE and vinyl chloride levels are currently below the RGVESLs in the VIS Area. There is no RGVESL for cDCE. Similarly, simulated TCE levels within 500 feet of the municipal supply wells decrease to below the IDEM RGTSLs in approximately 25 years. PCE, cDCE, and vinyl chloride currently do not reach within 500 feet of the municipal water supply wells and are not simulated to do so in the future.

6.2.3 Vapor CAOs and Reference Values

Soil vapor CAOs were developed to address the following concerns at the Site:

- Prevent potential exposure to VOCs in residences at concentrations above IDEM's 2021 Residential Indoor Air Screening Levels (RIASLs)
- Prevent potential exposure to VOCs in existing on-Site buildings, should they become occupied in the future, and future buildings within the POC boundary at concentrations above IDEM's 2021 Commercial/Industrial Indoor Air Screening Levels (CIIASLs) and Commercial/Industrial Sub-Slab Screening Levels (CISSSL)

As discussed in Section 4.4, vapor mitigation solutions were installed at 61 residences located downgradient of the Site in the VIS Area. Currently, annual inspections are performed at each of the residences where mitigation systems have been installed, and repairs to the systems are made as necessary where access is granted by the property owners and residents.

SECTION 7: PROPOSED FINAL REMEDY AND EVALUATION OF ALTERNATIVES

Although current exposure conditions are controlled through the implementation of IMs and through the continued operation of the remedial systems, soil and groundwater cVOC concentrations remain above the cleanup goals addressing the ingestion and inhalation pathway. The proposed Final Remedy lays out the cleanup objectives to ensure that groundwater leaving RMC Site is below VISLs as a short-term objective. The long-term objective is to clean groundwater to at or below the MCLs for drinking water. Additionally, the long-term cleanup

objective for the soil is to reduce the level of VOCs impacting the groundwater and prevent contact by a construction worker conducting excavation through an SMP in an ERC.

EPA uses general threshold and balancing criteria to determine the applicability of each remedial alternative in relation to the specific circumstances of the impacts defined at the Site. It is not required that each of the balancing criteria be applied in the evaluation. However, each remedial alternative besides the No-Action Alternative (used as a baseline for comparison purposes) must meet the three Threshold Criteria.

The three remedial Threshold Criteria are the following:

1. Protect human health and the environment based on reasonably anticipated land use(s), both now and in the future
2. Achieve media cleanup objectives appropriate to the assumptions regarding current and reasonably anticipated land use(s), and current and potential beneficial uses of water resources
3. Control the sources of releases to achieve elimination or reduction of any further releases of hazardous wastes or hazardous constituents that may threaten human health and the environment

The Balancing Criteria are the following:

1. Compliance with waste management standards
2. Long-term reliability and effectiveness (long-term effectiveness should consider reasonably anticipated future land uses)
3. Reduction of toxicity, mobility, and volume of waste
4. Short-term effectiveness
5. Implementability (technical feasibility and availability of services and materials)
6. Cost

The purpose of the CMS was to identify, develop, screen, and evaluate potential corrective measure alternatives based on which EPA could propose the final remedy for the Site. Corrective measures alternatives developed for the Site make use of individual technologies or various combinations of technologies to determine which of the candidate technologies are suitable for the Site. Based on the initial screening of technologies and evaluation of alternatives, a number of remedial alternatives were evaluated for each Site-impacted area.

Tables 14 through 16 of the CMS report (GHD, 2022) summarize how these alternatives comply with the nine evaluation criteria specified in the NCP §300.430(f)(5)(i). The No Action Alternative for each media is not considered further in the comparative analysis of alternatives as it cannot meet the threshold criteria or address risks at the Site. Based on information currently available, EPA's preferred media-specific alternatives provide the best balance of tradeoffs among the alternatives with respect to the evaluation criteria. The results of the screening indicate that no single technology would be effective in addressing all media and COCs to meet and maintain CAOs. Therefore, a combination of technologies and institutional controls was considered to be optimal for attaining CAOs.

The EPA proposed remedy for the Site includes institutional controls, access controls, and monitoring in addition to the implementation of passive and active control technologies referenced in sections 7.1.2 through 7.3.6.

7.1. Land Use Controls

Land Use Controls (LUCs) include engineering and physical barriers, such as fences and security guards, as well as Institutional Controls (ICs).

7.1.2 Institutional Controls

IC are generally administrative and legal tools that do not involve construction or physically changing a site. ICs are generally divided into four categories:

1) Government Controls- Governmental controls impose restrictions on land or resource use using the authority of a government entity. Typical examples of governmental controls include zoning; building codes; state, tribal, or local groundwater use regulations; and commercial fishing bans and sports/recreational fishing limits posed by federal, state and/or local resources and/or public health agencies;

2) Proprietary Controls-Proprietary controls refer to controls on land use that are considered private in nature because they tend to affect a single parcel of property and are established by private agreement between the property owner and a second party who, in turn, can enforce the controls. Common examples include easements that restrict use (also known as negative easements) and restrictive covenants.;

3) Enforcement Tools- include documents that require individuals or companies to conduct or prohibit specific actions (e.g., environmental cleanup consent decrees, unilateral orders, or permits); and,

4) Informational Devices- include deed notices or public advisories that alert and educate people about a site.

The remedy would include the creation and implementation of an IC Implementation and Assurance Plan (ICIAP) designed to systematically: (a) establish and document the activities necessary to implement and ensure the long-term stewardship of ICs; and (b) specify the persons and/or organizations that will be responsible for conducting these activities.

On-Site and off-Site areas which contain contaminated media will be addressed with ICs.

7.1.2.1 On-Site Institutional Controls

The on-Site ICs would include the following measures:

- **Environmental Restrictive Covenant (ERC)**: to cover the Riley Land, which includes the former manufacturing and support areas, to limit use as follows:
    - **Land use** would be limited to commercial/industrial or agricultural use. Such uses would specifically exclude residential development (single or multi-family), daycare centers, recreational centers, and schools.
    - **Soil use** would be limited such that prior to disturbing the impacted the soil in the former operational areas depicted in Figure 16, an SMP must be developed to ensure any disturbed impacted soil is properly handled and disposed of. The SMP must summarize the nature of the impacts and include the existing analytical data, describe the nature of the disturbance and the area that is affected, describe the procedures to be followed to address the safety and health of Site workers, including construction workers, prevent potential exposure by the surrounding population to Site-related chemicals, and describe the steps to be taken to properly manage the soil consistent with Federal and State regulations including soil characterization and disposal, if applicable. Any supplemental investigation of soil and groundwater must follow applicable IDEM guidance.
    - **Groundwater use** would be limited to commercial/industrial use. Such use would specifically exclude construction and use of water wells for potable or irrigation water supply
    - **Building use** would be limited

- **new structures** may not be built above or within 100 feet of the groundwater VOC plume without installing and operating vapor intrusion mitigation systems prior to occupancy; and
- **existing structures** may not be occupied in the future without installing and operating vapor intrusion mitigation systems capable of preventing the flow of soil vapors potentially containing VOCs originating from beneath the buildings from entering occupied Site buildings, including through potential preferential pathways such as utility lines and pipes.

– **Governmental Controls**: The City of Attica has an ERO that prohibits the installation and use of private wells within the City Limits. Some of the Riley Land is located within the limits of the City of Attica.

7.1.2.2 Off-Site Institutional Controls

Off-Site areas to be addressed with ICs are areas beyond the POC boundaries depicted in Figure 15 and would include the following measures:

– **Governmental Controls**:
  - **Groundwater** - The City of Attica has an ERO that prohibits the installation and use of private wells within the City Limits. A current map depicting the city boundaries near the Site where this local ordinance is in effect is provided in Figure 15.
  - **Vapor Intrusion -** As discussed in section 4.4, vapor intrusion mitigation solutions have been implemented as an IM in the residential VIS Area located to the west and northwest of the Site [redacted]. The VIS Area IM includes both active and passive technologies at residences where testing during the RFI demonstrated evidence of vapor intrusion. Currently, O&M includes an annual inspection of the vapor intrusion mitigation systems installed within the VIS Area including periodic repairs and replacement of system components. A mechanism will be developed in cooperation with the City of Attica to provide notifications to residents within the VIS Area that these systems must be monitored and maintained, and that any new construction within the VIS Area must include the installation of a vapor intrusion mitigation system. Such a notification could be implemented through an ERO or a local building permit requirement. Additionally, the ICIAP for off-site vapor intrusion would include:
  - The routine long-term operation, maintenance, and monitoring (OMM) of the vapor intrusion system;
  - the requirements for and frequency of vapor intrusion system inspections, maintenance, and monitoring for each building;
  - all of the relevant performance verification measures to ensure that the vapor intrusion system is effective at preventing the flow of soil vapors.
  - The operation and maintenance of the vapor intrusion system until such time as the government agency conducting oversight determines they are not necessary.

7.1.3 Engineering/Physical Barriers

The physical access controls would include on-Site fencing and signage. At the Site, this would include the construction of 8-foot-high chain-link fencing constructed around areas of impacted soil including SWMUs 1 and 2 and SWMU 5 to restrict unauthorized access. Signs would be placed on the fence spaced 20 to 25 feet apart to warn people of the presence of contaminated subsurface soil within the area and to minimize any disturbance to soil present within the fenced area. Fencing and signage also might serve to protect any remedy components implemented within the fenced areas from accidental damage. This remedy would include periodic inspections

for potential breaches and damage caused by invasive vegetation. Periodic maintenance would include cutting vegetation and repair of any damage to fencing and signage.

7.2 Monitoring

Monitoring involves the collection of environmental media samples to assess the effectiveness of corrective actions. Monitoring also would include comprehensive inspections and reporting activity designed to ensure the effectiveness of the corrective actions. Monitoring is an essential tool to ensure that media concentrations are achieved at the POCs, that implemented corrective actions remain effective in the long term, and when the implemented corrective action goals have been achieved. The specific scope and frequency of monitoring, inspection, and reporting would be included in a long-term monitoring plan that would be developed following the selection of the final remedy for the Site. Contingency plans will be developed based on the monitoring data to ensure the optimal performance efficiency of the existing remedies.

7.3 Identification and Screening of Corrective Action Alternatives

A summary of the technologies evaluated for the Site is listed below, with the EPA proposed remedies shaded in grey. More information about these remedial options can be found in the final Corrective Measures Study report (GHD, June 2022).

7.3.1 SWMU 1 and 2

EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU 1and 2.

- Alternative 1 - No Action
- Alternative 2 – Institutional Controls
- Alternative 3 – Institutional and Access Controls
- Alternative 4 – Institutional Controls, Access Controls, Passive Venting
- Alternative 5 – Institutional Controls, Access Controls, Passive Venting, On- Site Closure of Ex-Situ Soil
- Treatment Cell, Soil/Vegetative Cover
- Alternative 6 - Institutional Controls, Access Controls, Passive Venting, On-Site Closure of Ex-Situ Soil
- Treatment Cell, Asphalt Pavement Cover
- Alternative 7 - Institutional Controls, Access Controls, Passive Venting, Off-Site Closure of Ex-Situ Soil
- Treatment Cell, Soil/Vegetative Cover
- Alternative 8 - Institutional Controls, Access Controls, Passive Venting, Off-Site Closure of Ex-Situ Soil
- Treatment Cell, Asphalt Pavement Cover

There is no exposure to impacted soil in the SWMU 1 and 2 area based on current land use. The surface soil does not exceed any IDEM DCSL. Subsurface soil exhibit exceedances of RDCLs and IDCSLs for arsenic but all are contained on Riley Land.

EPA Proposed Final Remedy: Alternative 5 *(Institutional Controls, Access Controls, Passive Venting, On-Site Closure of Ex-Situ Soil Treatment Cell, Soil/Vegetative Cover) meets all the balancing screening levels but does so in a cost-effective manner. Figure 17 in attachment 1 shows the access control and exposure barrier area.*

7.3.2 SWMU 5 (Past Disposal Area B)

At SWMU 5, IMs (ISCO and SVE) were implemented and were successful at significantly reducing the mass of VOCs in soil. EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU5.

- Alternative 1 – No Action
- Alternative 2 – Institutional Controls
- Alternative 3 – Institutional Control and Access Controls
- Alternatives 4A/B – Institutional Controls, Access Controls, Passive Venting with Focused ISCO Option
- Alternatives 5A/B – Institutional Controls, Access Controls, Passive Venting with Focused ISCO Option, Soil/Vegetative Cover
- Alternatives 6A/B - Institutional Controls, Access Controls, Passive Venting, Passive Venting with Focused ISCO Option, Asphalt Pavement Cover
- Alternatives 7A/B - Institutional Controls, Access Controls, Passive Venting, Passive Venting with Focused ISCO Option, Recommission SVE IM, Soil/Vegetative Cover

EPA Proposed Final Remedy: Alternative 5B *(Institutional Controls, Access Controls, Passive Venting with focused ISCO, Soil/Vegetative Cover) meets all the balancing screening levels but does so in the most cost-effective manner. Figure 18 in attachment 1 shows the access control and exposure barrier area.*

The total areal treatment extents for the focused ISCO option include an area of 3,500 square feet in SWMU where the soil concentration exceeds 1,000 mg/Kg of VOCs. The implementation would involve a single injection event using direct push technology to distribute a three percent potassium permanganate solution. The post-injection monitoring would consist of groundwater monitoring and would be accomplished by the existing groundwater monitoring program proposed for the southern plume.

7.3.3 SWMU 11/AOC 2

At SWMU 11/AOC 2, IMs (ISCO and SVE) were implemented and were successful at significantly reducing the mass of VOCs in soil. EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU 11/AOC 2. EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU 1 and 2.

- Alternative 1 - No Action
- Alternative 2 – Institutional Controls, Maintain Concrete Cap
- Alternatives 3A/B – Institutional Controls, Maintain Concrete Cap, Passive Venting
- Alternatives 4A/B – Institutional Controls, Maintain Concrete Cap, Recommission SVE IM

EPA Proposed Final Remedy: Alternative 3 *(Institutional Controls, Maintain Concrete Cap, Passive Venting) meets all the balancing* criteria *but does so in the most cost-effective manner. The alternative that uses the SVE technology is not recommended due to the high costs and doubtful mass reduction and cost-effectiveness. Figure 18 in attachment 1 shows the extent of the existing concrete cap area.*

7.3.4 Northern Plume

Although groundwater containing VOCs above IDEM's RGTSLs extends to the northwest of SWMUs 1 and 2, the following mitigating circumstances exist:

1. The Northern Plume dissipates along its flow path to concentrations below IDEM's RGTSLs beneath an agricultural field and the former Riley Airport landing strip located to the northwest of SWMUs 1 and 2 and is limited to the Riley Land as depicted in Figure 15.
2. Soil IMs were implemented in SWMUs 1 and 2, the historical source of the VOCs in the Northern Plume, which were effective at reducing VOC mass in vadose zone soils and thus potential leaching to the groundwater.
3. Nearly 10 years of semiannual RFI groundwater monitoring data demonstrate that there is no evidence of the expansion of the footprint of the Northern Plume.
4. Fate and transport modeling indicate that the Northern Plume will not extend beyond the point of compliance during the 35-year timeframe considered, and where groundwater and vapor mitigation institutional controls will be implemented. This modeling is consistent with the fact that the operational history of SWMUs 1 and 2 indicate that the Northern Plume likely has been present for up to 60 years at the Site and has not expanded past its current footprint on Riley Land.

Given the information above, EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU 1 and 2.

- Alternative 1 - No Action
- Alternative 2 – Institutional Controls
- Alternative 3 – Institutional Controls, MNA Groundwater Monitoring

EPA Proposed Final Remedy*: Alternative 3* *(Institutional Controls, MNA) meets all the threshold and balancing* criteria *in a cost-effective manner.*

7.3.5 Southern Plume

The Southern Plume extends towards the west-northwest, parallel to groundwater flow. In the Southern Plume Area, groundwater VOC impacts, primarily consisting of dissolved PCE, TCE, and cDCE, appear to be comingled originating primarily from SWMU 5 and, to a lesser extent, SWMU 11/AOC 2. IMs implemented to address the Southern Plume included GWET and AS/SVE systems installed on the Riley-controlled land and the CWTS to treat the water extracted from City of Attica potable wells for TCE to ensure the levels remain below the RGTSL and MCL. These systems continue to be operated and maintained. Additionally, the City of Attica has adopted a restrictive groundwater ordinance to prevent exposure to impacted groundwater downgradient of the Site. There is no current groundwater usage at the Site. In addition to the existing interim corrective measures, a treatment option using a PRB was also evaluated. PRBs have been selected or are being used at more than 30 Superfund Sites across the country. A PRB is usually built by digging a long, narrow trench in the path of contaminated groundwater flow. The trench is filled with a reactive material, such as iron and carbon to clean up contamination. The reactive materials placed in PRBs are not harmful to groundwater or people. Contaminated groundwater is cleaned up underground, so treatment does not expose workers or others on-Site to contamination. For more information, visit the EPA's website here.

Given the information above, EPA evaluated the following alternatives proposed for the RMC Site to address the on-Site contamination observed in SWMU 5, SWMU 11 and AOC 2.

- Alternative 1 - No Action
- Alternative 2 – Institutional Controls, Continuation of the CWTS
- Alternative 3 - Institutional Controls, Monitoring, Continuation of CWTS

- Alternative 4 - Institutional Controls, Monitoring, Continuation of CWTS, Continuation of IMs (GWET and AS/SVE)
- Alternative 5 – Institutional Controls, Monitoring, Operation and maintenance of CWTS and IM (Permeable Reactive Barrier)

EPA Proposed Final Remedy: Alternative 5 *(Institutional Controls, Groundwater Monitoring, Continuation of CWTS, Permeable Reactive Barrier) meets all the balancing criteria cost-effectively. Groundwater treatment at the POC boundaries provides an effective backstop against potential advective transport of VOCs originating from SWMU 5 and SWMU11/AOC2. Figure 19 in attachment 1 shows the groundwater permeable reactive barrier segments.*

The PRB which is currently being installed is expected to be more effective than the GWET and AS/SVE systems at preventing the downgradient migration of VOCs in the southern groundwater plume beyond the compliance boundary. Unlike the GWET, the PRB is not susceptible to power or mechanical failures that result in downtime and is less costly to maintain over the long term. Following the PRB installation, a series of groundwater performance sampling events will be conducted at existing groundwater monitoring locations. A sampling program is designed to verify the effectiveness of the PRB at the monitoring well locations depicted in Figure 19. The sampling events will occur approximately 30, 90, and 180-days post PRB implementation. The continuation of the PRB as a final remedy measure to control the migration of contaminated groundwater is contingent upon the performance evaluation of this interim remedy.

7.3.6 Corrective Action Alternatives for Vapor Intrusion

As discussed in Section 4.4, VI mitigation solutions have been implemented as an IM in the residential VIS Area located to the west and northwest of the Site. The VI AOC IM includes both active and passive technologies at residences where testing during the RFI demonstrated evidence of vapor intrusion. Structures on Riley Land have been fitted with VI mitigation solutions. Currently, no VI mitigation solutions have been installed in on-Site buildings, but these structures are not regularly occupied.

EPA evaluated three groundwater CAAs for the soil vapor from the technologies summarized in section 9 of the CMS report.

- Alternative 1 – No Action
- Alternative 2 - Institutional Controls
- Alternative 3 - Institutional Controls, Operation and Maintenance of VI Mitigation Solutions

EPA Proposed Final Remedy*:* Alternative 3*, meets the balancing criteria requirements.* [redacted]

7.4 Remedial Alternatives Evaluation

The components of the EPA proposed remedy satisfy the following threshold and balancing criteria. The evaluation described in this Statement of Basis demonstrates that the engineered and institutional controls prescribed by the remedy, along with past remedial efforts, will be effective in preventing further off-Site releases above the media cleanup standards or other allowable exposure limits, and achieving this threshold and balancing criteria. All of the proposed alternatives are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the Site through the treatment of soil and groundwater contaminants, engineering controls, and/or institutional controls. The proposed remedies for soil and groundwater directly contribute to the protection of human health and the environment. By implementation of

the selected remedy, the toxicity and volume of contaminated soil and groundwater left in place will be contained or reduced. Ecological risks are considered to be de minimis based on results from the BERA. Financial assurance will ensure that the controls remain in place. EPA will evaluate community acceptance of the proposed remedy during the public comment period, and it will be described in the Final Decision and Response to Comments. The criteria evaluation is discussed below:

Criteria 1 and 7 (Overall protection of human health and environment and short-term effectiveness) will be achieved by the implementation of the EPA proposed remedies for soil and groundwater. The proposed remedies will further protect human health and the environment by reducing contamination to acceptable levels and by preventing exposure to residual contamination. Maintenance of engineering controls and implementation of institutional controls will effectively control risks. Short-term effectiveness will be measured through monitoring activities, and the proposed technologies have been demonstrated to be effective. Therefore, these screening levels will be adequately addressed.

Criteria 2, 3, and 6 (attainment of media cleanup standards, controlling the sources of releases, and reduction of toxicity, mobility, or volume of wastes) will be achieved by installing surface caps, implementing focused in-situ chemical oxidation soil treatment, passive soil gas venting and installing a PRB groundwater treatment system. These remedies will allow conditions at the RMC Site to meet criterion 6 by reducing the volume and mobility of wastes, removing sources of contamination, and attaining media cleanup standards. The remediation of the source area using focused ISCO will result in a reduction of contamination. Continued operation of the PRB system will reduce the contamination and eliminate the vapor intrusion risks in the northwest neighborhood. Because the PRB is effective at treating a high range of VOC concentrations in the groundwater, this technology provides an effective “backstop” in that it still will be protected against potential unexpected conditions that might enhance the leaching of VOCs into the groundwater. Additionally, groundwater cleanup using PRB minimizes energy requirements, air emissions, water requirements, and impacts on water resources, material consumption, waste generation, and impacts long-term stewardship of a Site.

Criterion 4 (compliance with waste management standards) will be met by a combination of past Interim Measures for hazardous and radioactive waste removal at AOC 4 and by complying with the RC, the SMP contained in an ERC which will be activated prior to excavation within the areas of contaminated soil, and with State and Federal regulations related to the handling and management of wastes. Contaminated soil, vapor, and wastes were removed from the Site following the waste management standards during the interim corrective action activities.

Criterion 8 (implementability) is met since the past Interim Measures at the Site were implemented successfully and other components of the proposed remedies can be easily implemented based on their extensive history of use in environmental cleanups. The existing SVE infrastructures within the areas of soil contamination provide for easy implementation of the proposed passive soil gas venting.

Criteria 5 and 9 (long-term reliability and effectiveness and cost) are met because the remedies proposed are proven, cost-effective and implementable technologies with long-term effectiveness. All retained CAAs are effective at preventing potential unacceptable human exposures through the implementation of institutional controls. Soil remedies at the Site include physical access controls and warning signs to better prevent potential unacceptable human exposure to impacted subsurface soil through direct contact routes.

Criterion 9 (Cost) is met because of the cost-effective options for the PRB to treat the groundwater in the southern plume area. It is expected to be a better treatment solution for groundwater than the current GWET and AS/SVE systems because it does not rely on external power and mechanical components to operate thus

eliminating downtime from power outages and equipment failure. Operating costs would include periodic replenishments of the reactive material and annual groundwater monitoring. Overall, EPA's proposed remedy is cost-effective. The estimated total cost of the proposed remedy is $5,339,000. This includes the source area treatment at SWMU 5, with an estimated cost of $75,000, and the southern plume with an estimated cost of $3,580,000. The southern plume cost includes the continued operation and maintenance of the drinking water treatment system, groundwater treatment system and the vapor intrusion mitigation systems.

Table 7: Estimated Total Costs for the proposed Remedy

Remedial Area	***EPA Proposed Alternative Number***	***EPA Proposed Alternative Description***	***Cost ($)***
SWMU 1 &2 Soil Remedy	5	Institutional Controls, Access Controls, Passive Venting, On-Site Closure of Ex-Situ Soil Treatment Cell, Soil/Vegetative Cover	**338,000**
SWMU 5 Soil Remedy	5B	Institutional Controls, Access Controls, Passive Venting with Focused ISCO Option, Soil/Vegetative Cover	**528,000**
SWMU-11/AOC2 Soil Remedy	3	Institutional Controls, Maintain Concrete Cap, Passive Venting	**112,000**
Northern Plume Groundwater Remedy	3	Institutional Controls, MNA Groundwater Monitoring	**781,000**
Southern Plume Groundwater Remedy	5	Institutional Controls, Monitoring, Continuation of CWTS and Permeable Reactive Barrier	**3,580,000**
		Total	**5,339,000**

7.5 Financial Assurance

As part of the Final Remedy, the responsible party under section XXII of the 3008(h)AOC, RMC[4], must demonstrate the financial ability to implement the corrective measures required at the Site, including constructing the proposed remedy, monitor Site conditions following remedy construction (as needed), maintaining the City of Attica drinking water treatment system, and maintaining the vapor mitigation systems which have been installed in off-Site homes and on-Site buildings by securing the appropriate financial instrument(s). The responsible party will provide financial assurance for the implementation of corrective measures within ninety days of the EPA's selection of the final corrective measures.

[4] As noted above, Kraft representatives have informed EPA that while they do not believe Kraft has any liability in relation to the Radio Material Site, Kraft intends to continue to carry out the responsibilities of the RMC under the March 1999 Order ("Order").

The responsible party may use any of the following financial mechanisms to make the demonstration: financial trust, surety bonds, letters of credit, insurance, and/or qualification as a self-insurer (corporate guaranty) utilizing a financial test. After completing the construction phase of the remedy, the responsible party may request that EPA reduce the amount of the financial assurance to the amount necessary to cover the remaining costs of the remedy, including any yearly operation and maintenance costs. The responsible party may make similar requests to EPA as the operation and maintenance phase of the remedy proceeds and ceases.

7.6 Long-Term Stewardship

EPA will require the responsible party to establish a long-term stewardship plan, including monitoring and reporting, for the duration of time contamination remains on-Site above unrestricted-use levels. Long-term stewardship will be addressed in separate documents, the Post-Remedy Implementation Plan, and an ICIAP. The Post-Remedy Implementation Plan will include a detailed description of planned monitoring activities following remedy construction, including monitoring frequency and threshold conditions used to determine whether additional corrective actions are needed. EPA also requires that performance monitoring approaches be proposed in the remedial design documents. The final monitoring plans can be proposed in the Post-Remedy Implementation Plan.

The responsible party must ensure all controls and long-term remedies are maintained and operate as intended. The responsible party will submit an annual certification that all institutional controls are in place and remain effective. In addition, long-term remedies will be reviewed and inspected on a five-year basis to ensure the remedy is functioning as intended, the exposure assumptions, toxicity data, cleanup levels, and CAOs are still valid, and any information that comes to light that could call into question the protectiveness of the remedy is considered.

If any five-year review indicates that changes to the selected remedy are appropriate, EPA will determine whether the proposed changes are non-significant, significant, or fundamental changes to the remedy are needed. EPA may approve non-significant changes without public comment. EPA will inform the public about any significant or fundamental changes to the remedy.

7.7 Land Use Institutional Control

To limit exposure to remaining contaminants, EPA will require that the responsible party establishes the following enforceable institutional controls:

On-Site ICs:

– **Environmental Restrictive Covenant (ERC)**: to cover the Riley Land, which includes the former manufacturing and support areas, to limit **land use**, **soil use**, **groundwater use**, and **building use.**

– **Governmental Controls**: The City of Attica has an ERO that prohibits the installation and use of private wells within the City Limits.

Off-Site ICs

– **Governmental Controls**:

- **Groundwater** - The City of Attica has an ERO that prohibits the installation and use of private wells within the City Limits.
- **Vapor Intrusion -** A mechanism will be developed in cooperation with the City of Attica to provide notifications to residents within the VIS Area that these systems must be monitored and

maintained, and that any new construction within the VIS Area must include the installation of a vapor intrusion mitigation system.

ERCs are generally drafted and implemented collaboratively with EPA and the State. The draft ERC submittal can follow remedy construction.

SECTION 8. PUBLIC PARTICIPATION AND INFORMATION REPOSITORY

As part of the public participation efforts, two public meetings were conducted in 2005 and 2014 to inform the community about the extent of contamination and the completion of Interim Measures. Three factsheets and five newsletters were distributed to the community during the various phases of interim remedy implementation and completion. EPA requests feedback from the community on this proposal to remediate soil and groundwater using the chemical treatments described above at the RMC Site. The public comment period will last thirty (30) calendar days, from October 25 to November 24, 2022. On October 20, 2022, EPA placed an announcement in the Fountain County Neighbor to notify the public of the availability of this Statement of Basis document.

EPA project contacts will host an in-person meeting on the Statement of Basis on November 2, 2022, from 5-6 p.m. at the Attica City Hall in 305. E. Main Street in Attica, IN. A formal public hearing will follow at 6 p.m. COVID-19 protocols will be followed during the event, which is subject to change without notice. EPA invites you to submit your comments in one of the following ways:

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- By website, directly at: https://www.epa.gov/publicnotices/public-comment-proposed-cleanup-plan-radio-materials-corporation-rmc-attica-indiana
- By confidential voicemail at (312)-886-7613
- By email to Arcaute.Francisco@epa.gov
- By mail to: Francisco Arcaute at
  U.S. EPA Region 5
  External Communications Office
  77 W. Jackson Blvd, EC-19J
  Chicago, IL 60604-3590

We encourage community members to submit any comments regarding the proposed remedy in writing by November 24, 2022. Following the 30-day public comment period, EPA will prepare a Final Decision and Response to Comments document that will identify the selected remedy for the Site. The Response to Comments document will address all significant comments sent to the EPA. EPA will make the Final Decision and Response to Comments document available to the public. If public comments or other relevant information cause EPA to propose significant changes to the currently proposed remedy, EPA will seek additional public comments on any proposed revised remedy.

The Site Record contains all information considered when making this proposal and will include the Response to Comments document. The Site Record may be reviewed at the EPA website at: https://www.epa.gov/hwcorrectiveactioncleanups/hazardous-waste-cleanup-radio-materials-corporation-facility-attica

If you have any additional questions, contact EPA's external communication office at the contact information provided above.

8.1 Next Steps

Following the issuance of the Final Decision and Response to Comments document, the responsible party will prepare for EPA review and approval of a Corrective Measures Implementation Work Plan. The Plan will identify any additional data collection needed to implement the corrective measures, along with the specifications for completing the selected corrective measures. The Work Plan will provide a detailed construction schedule. Based on the proposed corrective measures, it is anticipated that the majority of the remedial measures can be completed within two years of the Final Decision.

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34. USEPA 2007. Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessment.
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36. USEPA 2009. ProUCL Technical Guidance Document.
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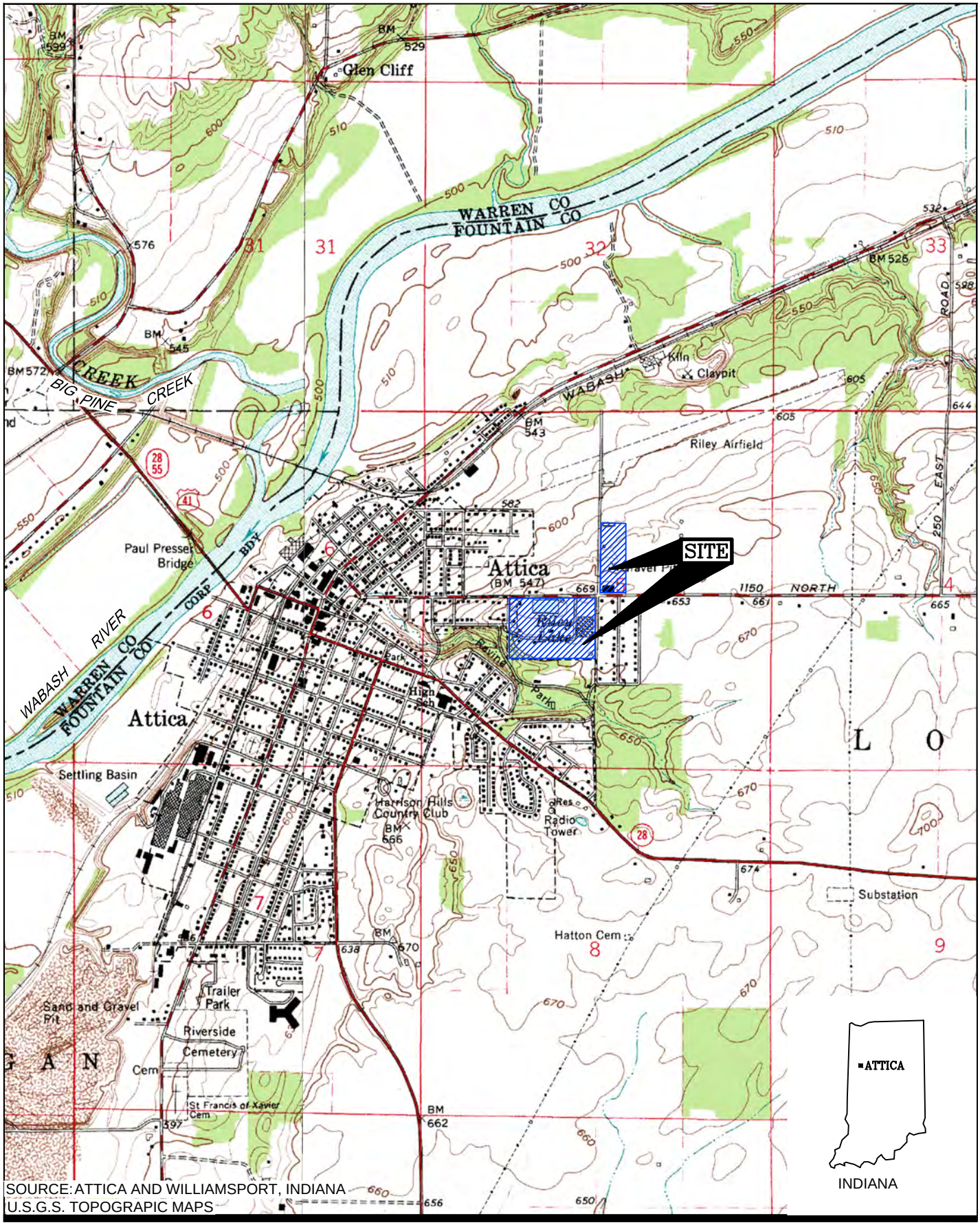
Attachments

Attachment 1
Figures



SOURCE: ATTICA AND WILLIAMSPORT, INDIANA U.S.G.S. TOPOGRAPIC MAPS

0 1000 2000 ft

1" = 2000 ft

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

Project No. **11228736**
Date **February 2022**

SITE LOCATION

FIGURE 1

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Plot Date: 04 February 2022 11:59 AM

SWMUs AND AOCs

SWMU 1 - FORMER DRUM STORAGE AREA

SWMU 2 - PAST DISPOSAL AREA 'A'

SWMU 3 - TEMPORARY DRUM STORAGE AREA

SWMU 4 - CENTRIFUGE AREA

SWMU 5 - PAST DISPOSAL AREA 'B'

SWMU 6 - EIGHT 55-GALLON DRUM STORAGE AREA

SWMU 7 - ETCHING ROOM

SWMU 8 - PHENOLIC DIP AREA

SWMU 9 - EPOXY COATING ROOM

SWMU 10 - ORIGINAL PHENOLIC DIP AREA

SWMU 11 - PCE VAPOR DEGREASER

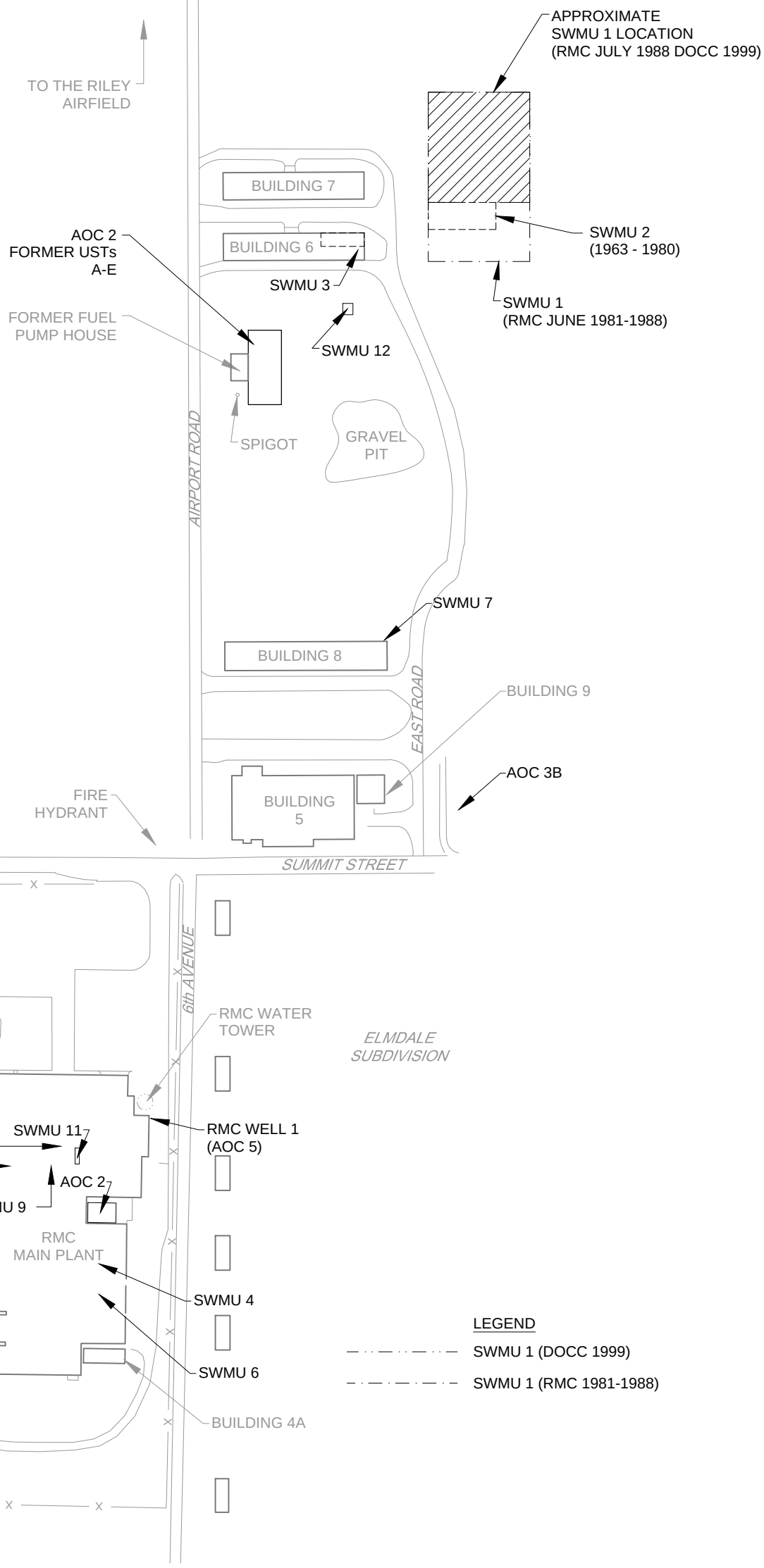
SWMU 12 - DYNAMITE BURIAL AREA

AOC 3A - DISCHARGE LOCATION TO CREEK

AOC 3B - DISCHARGE TO DRAINAGE DITCH

AOC 2 - UNDERGROUND STORAGE TANKS

AOC 5 - POTABLE WATER SUPPLY WELLS



NOTE:

SWMU 1 APPEARS TO HAVE VARIED IN SIZE FROM THE EXTENTS SHOWN IN RMC DRAWINGS (1981 TO 1988) TO THE DOCC REPORT (1999)

SOURCE: PHASE I RFI (2000)

0 100 200 ft

1" = 200 ft

Coordinate System: <INSERT HERE>

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

SOLID WASTE MANAGEMENT UNITS (SWMUs) AND AREAS OF CONCERN (AOCs)

Project No. **11228736**
Date **February 2022**

FIGURE 2

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0102_DE-001.DWG
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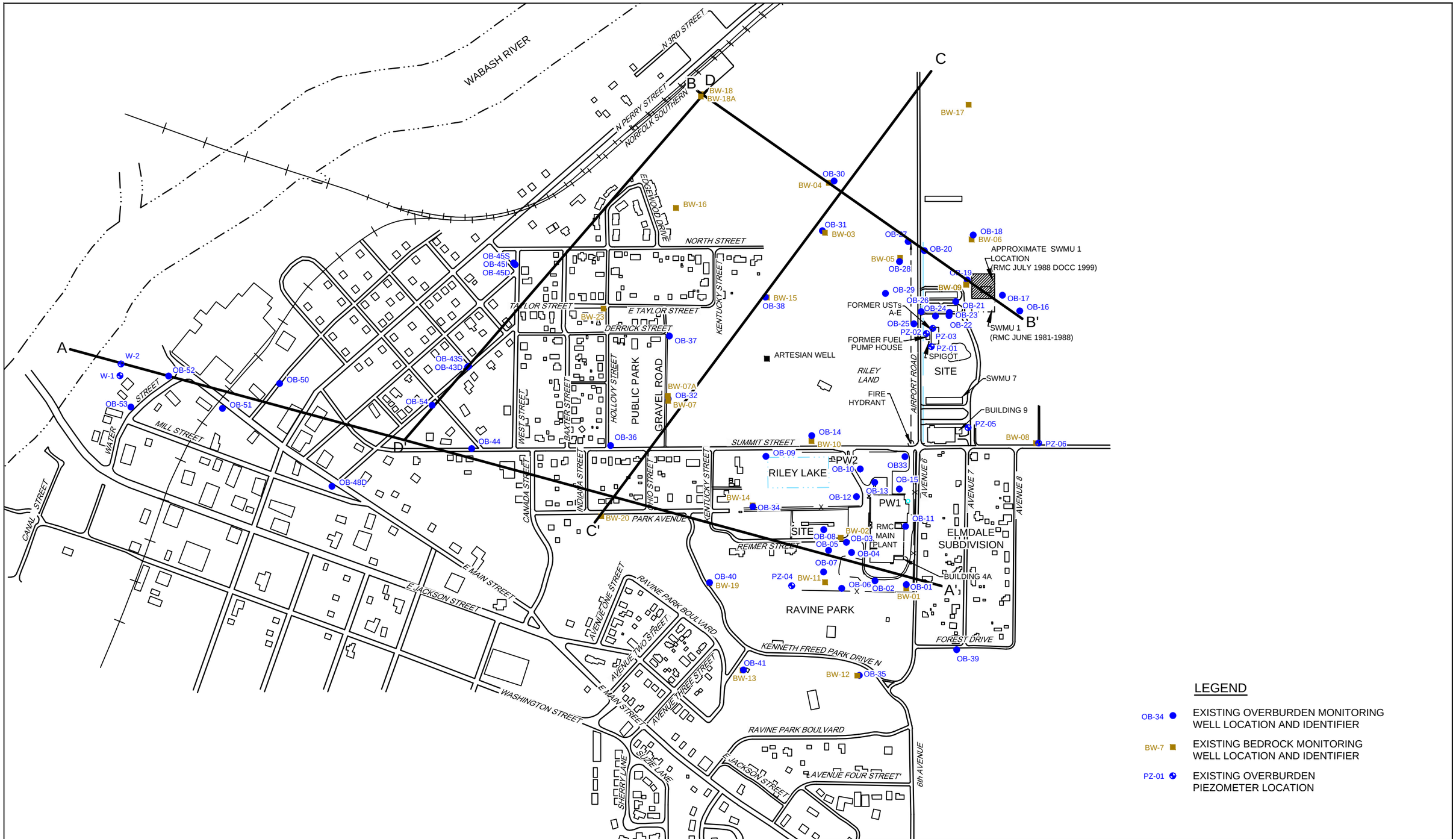

LEGEND

- OB-34 ● EXISTING OVERBURDEN MONITORING WELL LOCATION AND IDENTIFIER
- BW-7 ■ EXISTING BEDROCK MONITORING WELL LOCATION AND IDENTIFIER
- PZ-01 ◓ EXISTING OVERBURDEN PIEZOMETER LOCATION

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

GEOLOGIC CROSS SECTION LOCATION PLAN

Project No. **11228736**
Date **February 2022**

FIGURE 3

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0105_DE-001.DWG
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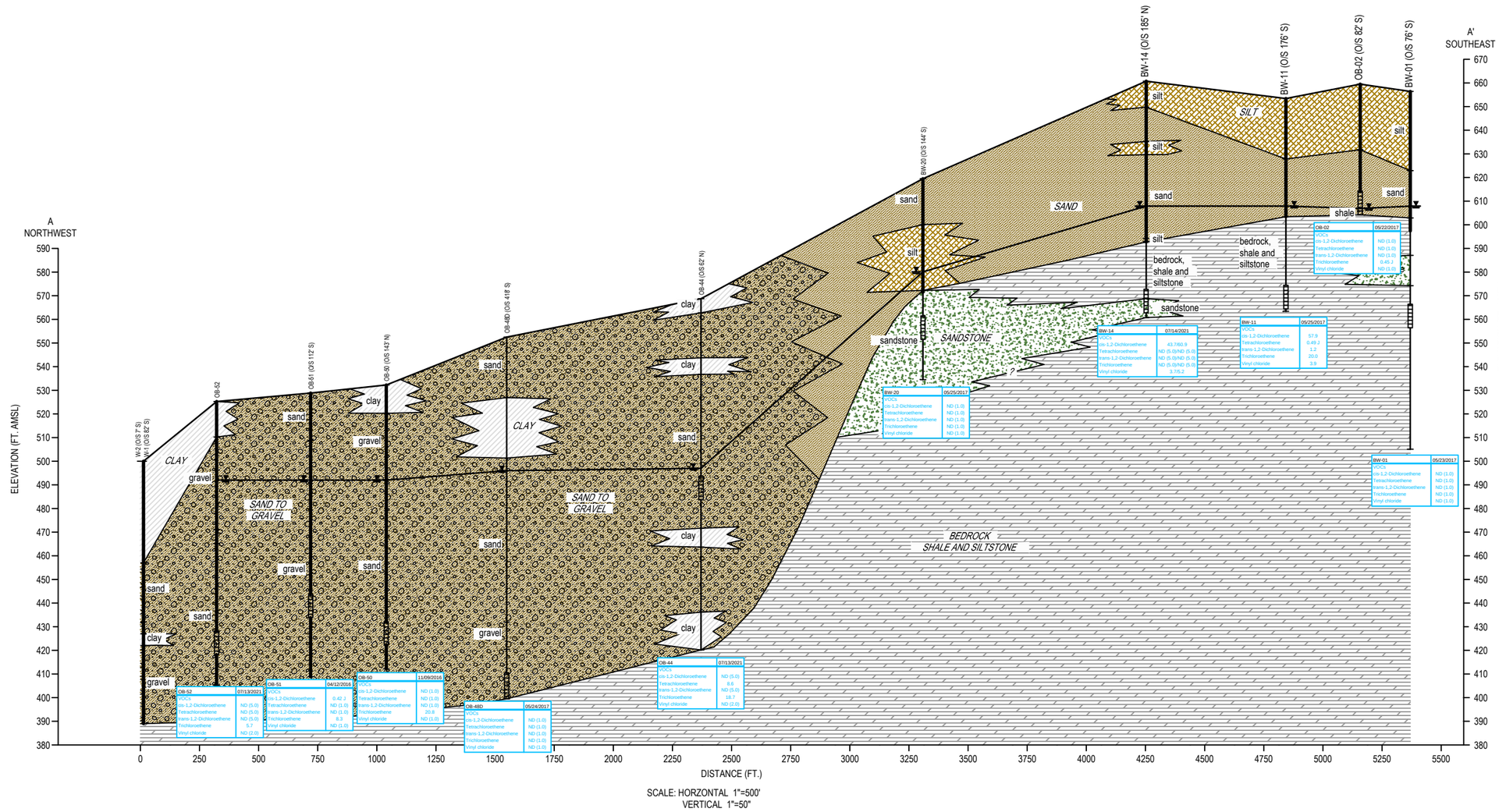

SCALE: HORZONTAL 1"=500'
VERTICAL 1"=50"

LEGEND

BW-18 — WELL ID
GROUND SURFACE
OVERBURDEN WELL
WATER LEVEL
BEDROCK WELL
SCREEN

CLAY
GRAVEL
LIMESTONE
SAND
SANDSTONE AND SILTSTONE
SHALE AND SILTSTONE
SILT

SAMPLE DATE
PARAMETER
CONCENTRATION (ug/L)

OB-44	07/13/2021
VOCs	
cis-1,2-Dichloroethene	ND (5.0)
Tetrachloroethene	8.6
trans-1,2-Dichloroethene	ND (5.0)
Trichloroethene	18.7
Vinyl chloride	ND (2.0)

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

GEOLOGIC CROSS SECTION A-A'

Project No. **11228736**
Date **February 2022**

FIGURE 4

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT-CMS\11228736-GHD-0000-RPT-EN-0101_DE-CSM.DWG
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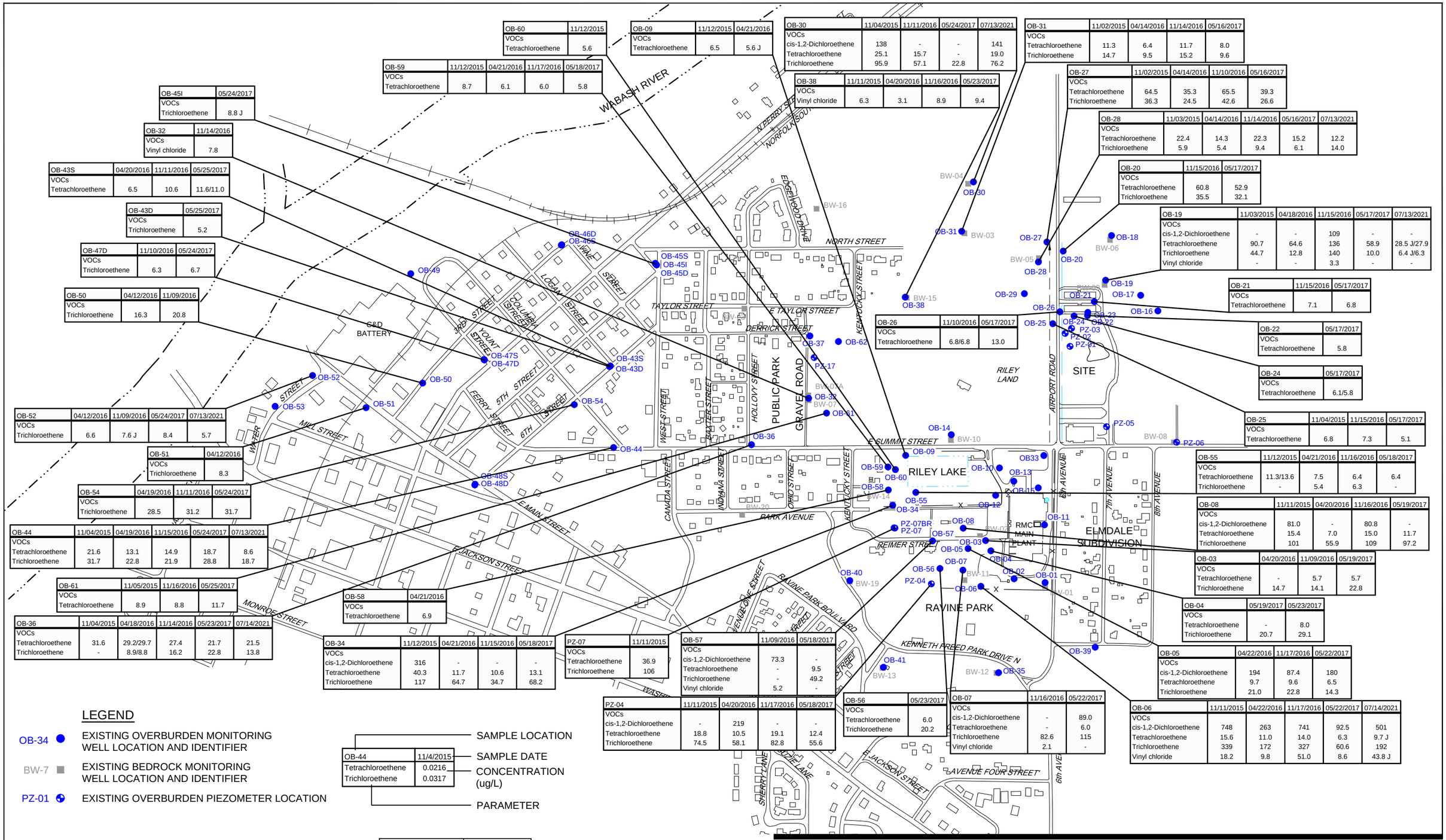

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BW-04	04/14/2016	11/11/2016	05/16/2017	07/13/2021
VOCs				
cis-1,2-Dichloroethene	1250	1240	1210	790
Tetrachloroethene	73.0	82.1	82.9	21.2 J
Trichloroethene	762	804	718	298 J
Vinyl chloride	54.6	51.9	56.7	29.6

BW-06	11/03/2015	04/18/2016	11/10/2016	05/17/2017	07/14/2021
VOCs					
cis-1,2-Dichloroethene	1460	2080	1360	1730	1860
Tetrachloroethene	32.5	27.2	27.4	32.3	-
Trichloroethene	346	399	266	312	32.9 J
Vinyl chloride	156	112	117	171	145 J

BW-05	11/03/2015	04/14/2016
VOCs		
Trichloroethene	14.4	11.0/9.9
Vinyl chloride	3.1	-

BW-09	11/03/2015	04/18/2016	11/15/2016	05/16/2017	07/13/2021
VOCs					
cis-1,2-Dichloroethene	975	1060	842	927	1190
Tetrachloroethene	253	149	117	166	48.6 J
Trichloroethene	231	186	136	190	98.3 J
Vinyl chloride	66.5	46.8	55.3	57.8	57.5

BW-07	11/04/2015	04/20/2016	05/25/2017	07/14/2021
VOCs				
Vinyl chloride	9.4	5.1/7.1	9.2	7.4

BW-10	11/05/2015	04/21/2016	11/15/2016	05/23/2017
VOCs				
Vinyl chloride	3.1	2.2	3.0	2.7/2.9

BW-14	11/12/2015	04/21/2016	11/15/2016	05/18/2017	07/14/2021
VOCs					
cis-1,2-Dichloroethene	250	342	-	429	-
Trichloroethene	6.1	19.9	5.8/6.2	20.9	-
Vinyl chloride	36.5	34.6	4.9/5.2	59.2	3.7/5.2

PZ-07BR	11/11/2015
VOCs	
cis-1,2-Dichloroethene	129
Vinyl chloride	86.1

BW-02	11/06/2015	04/20/2016	05/19/2017
VOCs			
cis-1,2-Dichloroethene	81.3	76.5	90.0
Trichloroethene	5.1	-	-
Vinyl chloride	-	2.6	3.5

BW-11	11/11/2015	04/20/2016	11/16/2016	05/25/2017
VOCs				
Trichloroethene	19.5	17.6	16.1	20.0
Vinyl chloride	3.8	2.8	2.4	3.9

LEGEND

- OB-34 ● EXISTING OVERBURDEN MONITORING WELL LOCATION AND IDENTIFIER
- BW-7 ■ EXISTING BEDROCK MONITORING WELL LOCATION AND IDENTIFIER
- PZ-01 ◔ EXISTING OVERBURDEN PIEZOMETER LOCATION

BW-14	11/12/2015
cis-1,2-Dichloroethene	0.25
Trichloroethene	0.0061
Vinyl chloride	0.0365

SAMPLE LOCATION; SAMPLE DATE; CONCENTRATION (ug/L); PARAMETER

J ESTIMATED CONCENTRATION

Chemical (ug/L)	2021 IDEM TAP WATER
cis-1,2-Dichloroethene	70
Tetrachloroethene	5
Trichloroethene	5
Vinyl chloride	2

0 300 600 ft

1" = 600 ft

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

SUMMARY OF VOC DETECTIONS ABOVE THE 2019 IDEM RESIDENTIAL GROUDWATER TAP SCREENING LEVELS IN THE BEDROCK AQUIFER (NOVEMBER 2015 TO JULY 2021)

Project No. **11228736**
Date **February 2022**

FIGURE 6

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT-CMS\11228736-GHD-0000-RPT-EN-0106_DE-CSM.DWG
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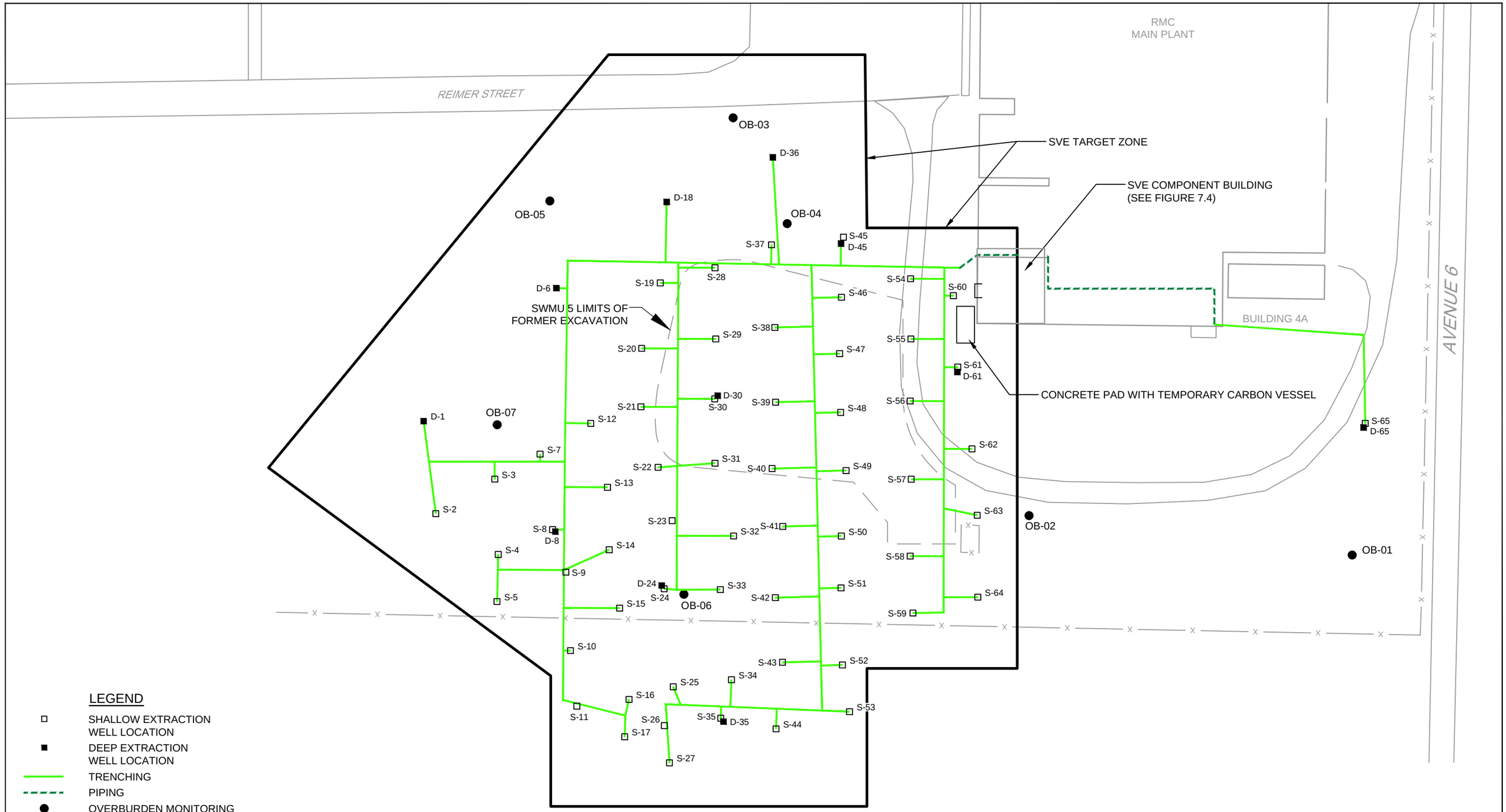


LEGEND

- SHALLOW EXTRACTION WELL LOCATION
- DEEP EXTRACTION WELL LOCATION
- TRENCHING
- PIPING
- OVERBURDEN MONITORING WELL LOCATION
- OVERHEAD DOOR

NOTES:

1.) 61 SHALLOW WELLS WITH 28 PAIRED PIPING RUNS AND 5 SINGLE WELL PIPING RUNS.

2.) 11 DEEP WELLS WITH 3 PAIRED PIPING RUNS AND 5 SINGLE WELL PIPING RUNS.

0 30 60 ft
1" = 60 ft

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

AS-BUILT SVE WELLS AND TRENCHES IN SWMU 5

Project No. **11228736**
Date **February 2022**

FIGURE 7

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0126_DE-001.DWG
Plot Date: 08 February 2022 12:55 AM

LEGEND

AS/SVE REMEDIAL TRENCH

OVERBURDEN EXTRACTION WELL

BEDROCK EXTRACTION WELL

EW-01 WELL ID
(8.3) AVERAGE EXTRACTION RATE (GPM)

N

0 200 400ft

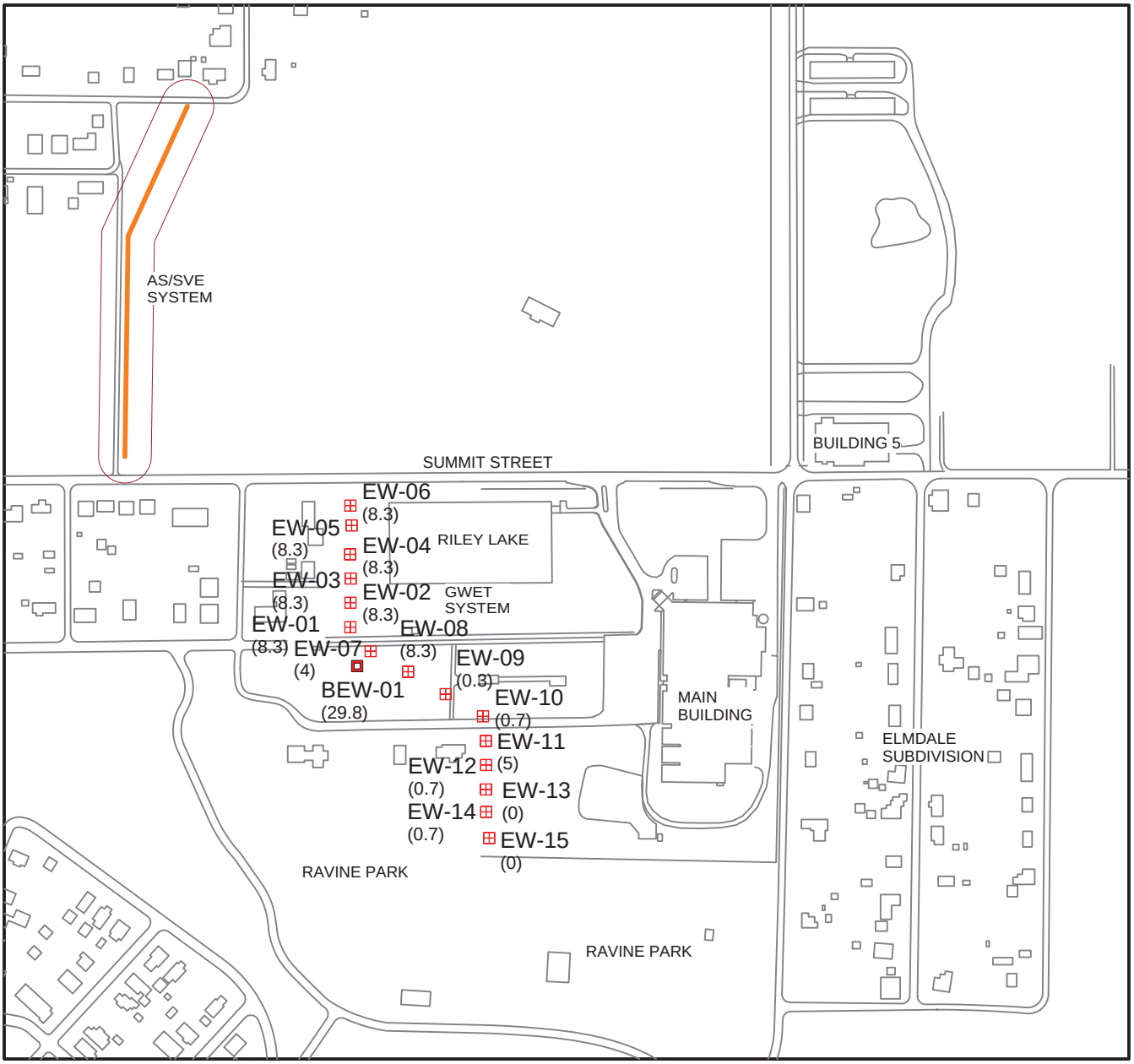
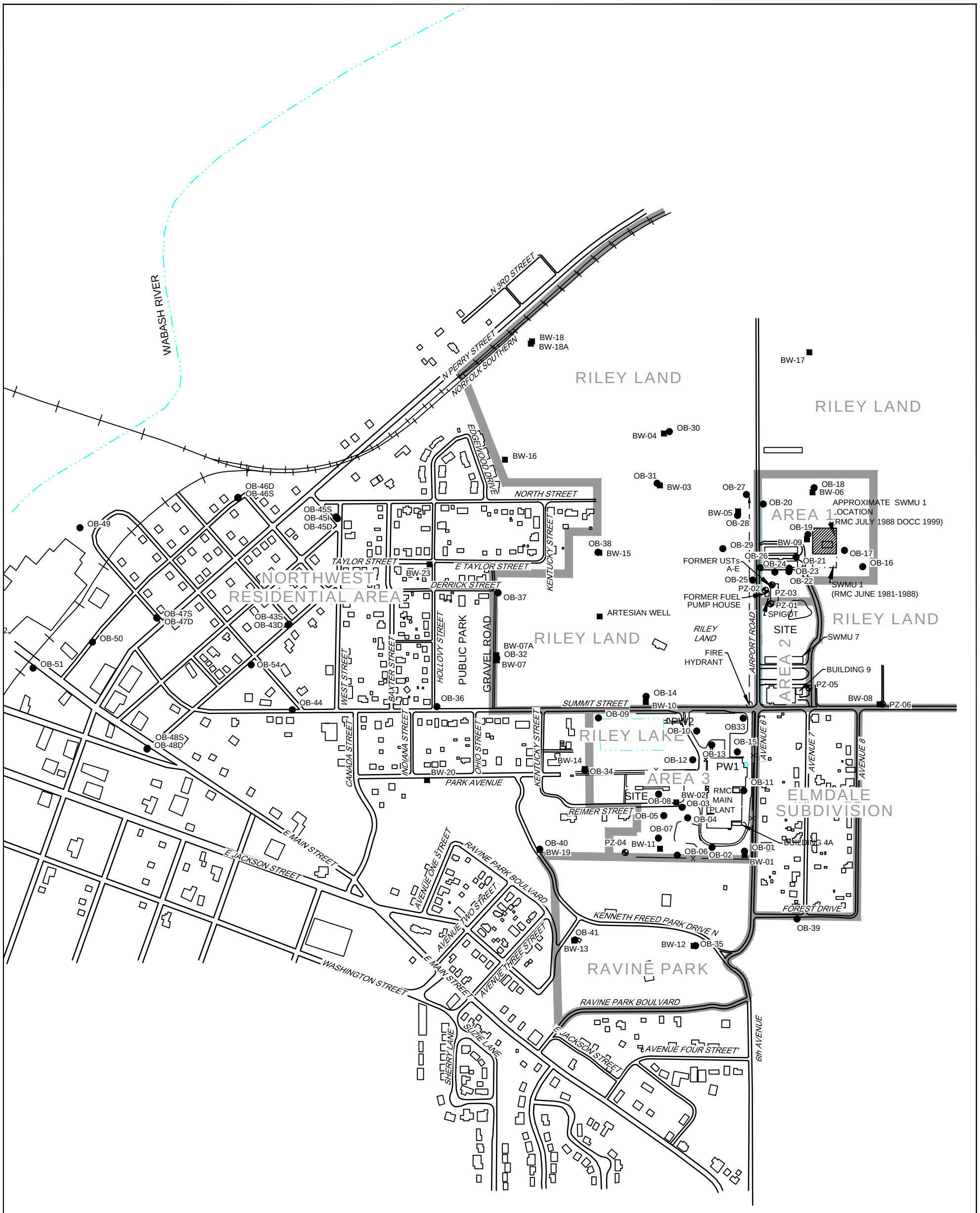


FIGURE 8

GROUNDWATER INTERIM CORRECTIVE MEASURES
RADIO MATERIALS CORPORATION
Attica, Indiana



LEGEND

OB-34 ● EXISTING OVERBURDEN MONITORING WELL LOCATION AND IDENTIFIER

BW-7 ■ EXISTING BEDROCK MONITORING WELL LOCATION AND IDENTIFIER

▬ POTENTIAL EXPOSURE AREA BOUNDARY

0 300 600 ft

1" = 600 ft

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

RISK ASSESSMENT POTENTIAL EXPOSURE AREAS

Project No. **11228736**
Date **February 2022**

FIGURE 10

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0130_DE-001.DWG
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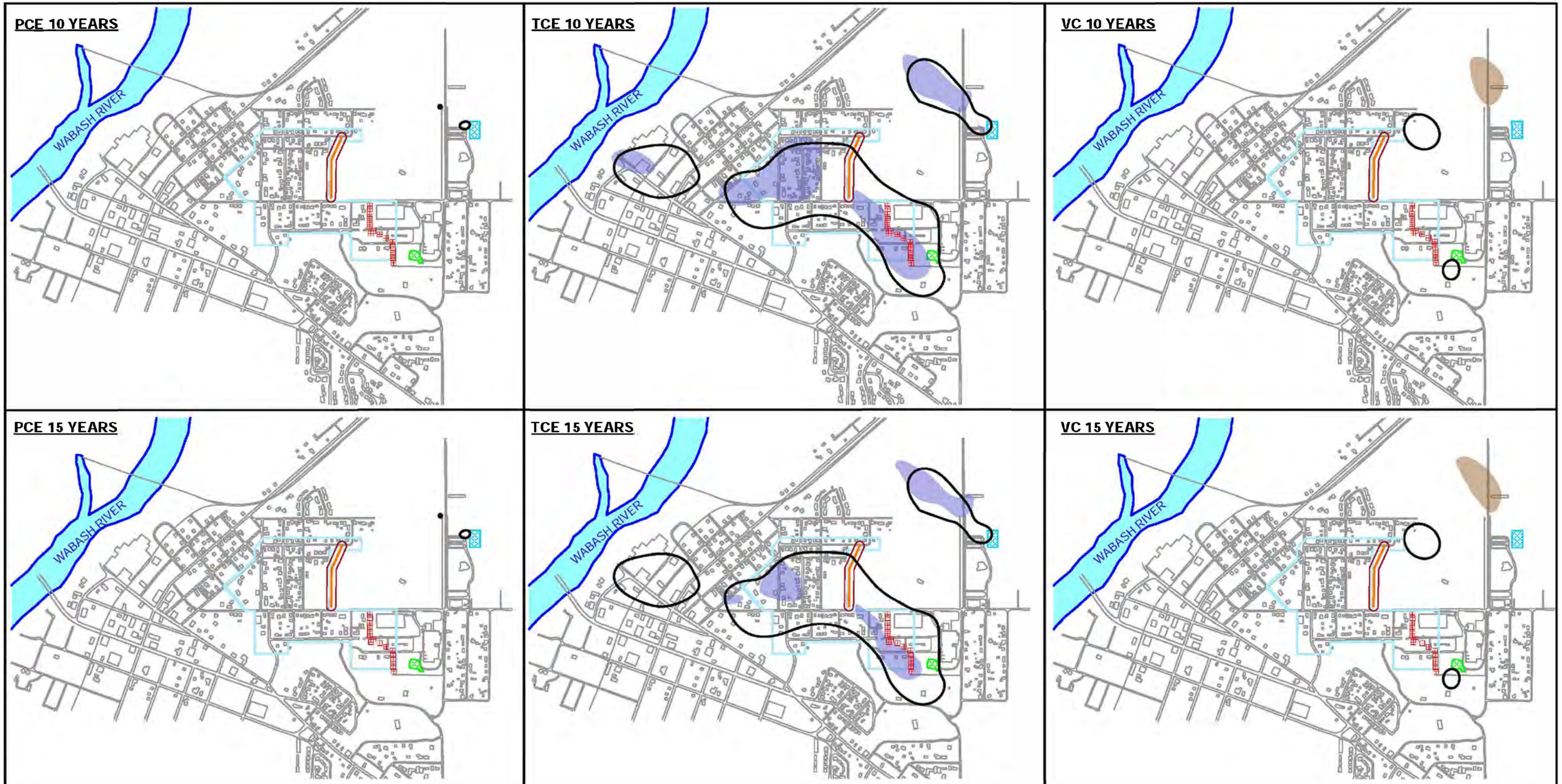


LEGEND

- SWMU 5
- SWMU 1/2
- VAPOR INTRUSION STUDY AREA

GROUNDWATER INTERIM CORRECTIVE MEASURES

- AS/SVE REMEDIAL TRENCH
- EXTRACTION WELL

- SIMULATED PCE (110 µg/L)
- SIMULATED TCE (9.1 µg/L)
- SIMULATED VC (2.1 µg/L)
- INITIAL 2010 OVERBURDEN GROUNDWATER CONCENTRATIONS AT CORRESPONDING VEGWSL

0 750 1,500ft

GHD

FIGURE 11

SIMULATED PCE, TCE, AND VC GROUNDWATER PLUMES
WITHIN THE TOP 10 FEET OF THE WATER TABLE
(10 AND 15 YEARS)
RADIO MATERIALS CORPORATION
Attica, Indiana

019190-40(062)GN-WA-HYD (Z:\HEG\19190\2017_MOD_UPDATE\DOCUMENTATION\RPT\RPT62\FIGURES\Top10_10 AND 15 YEARS.srf) Nov 8/2018

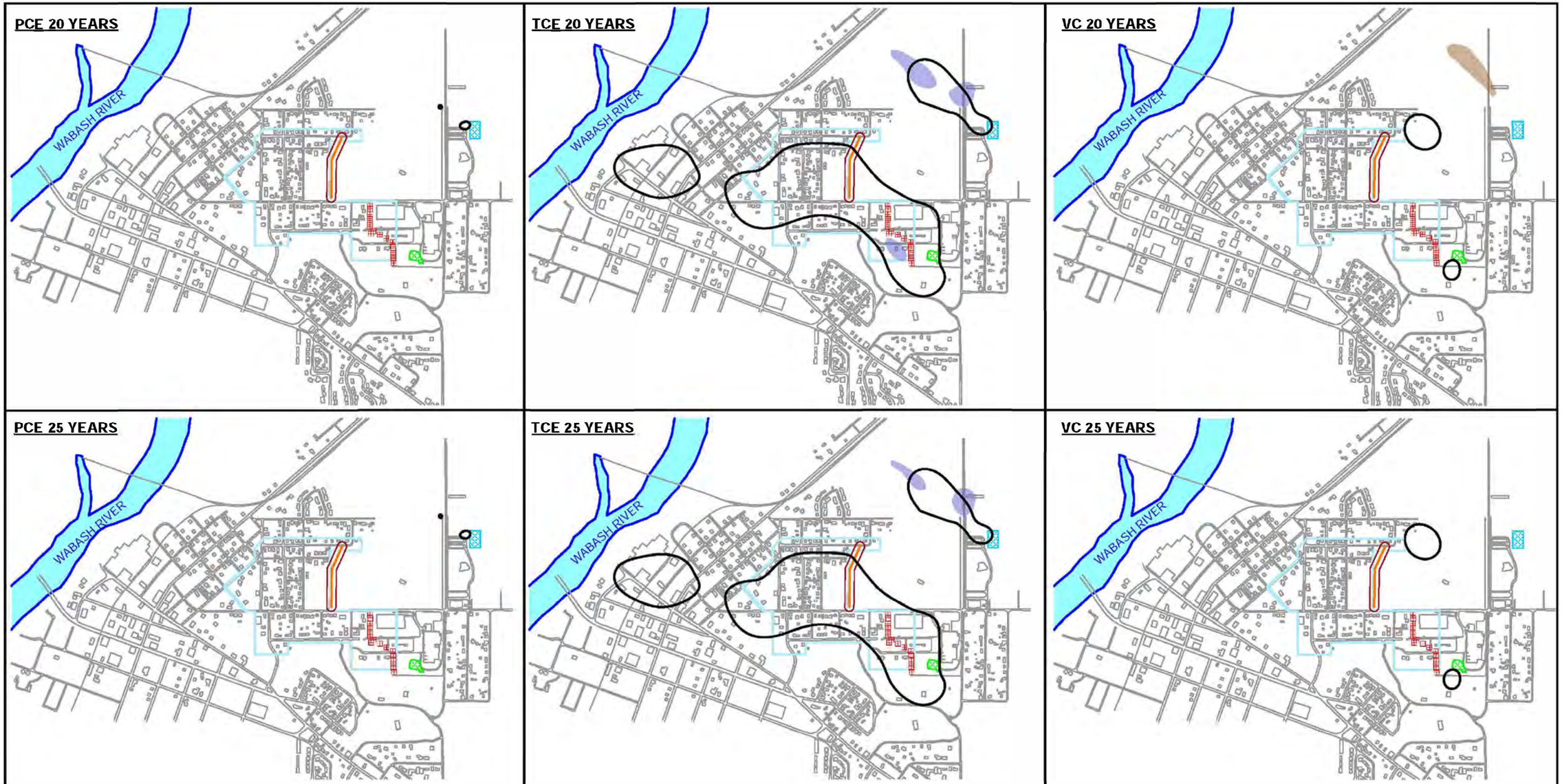


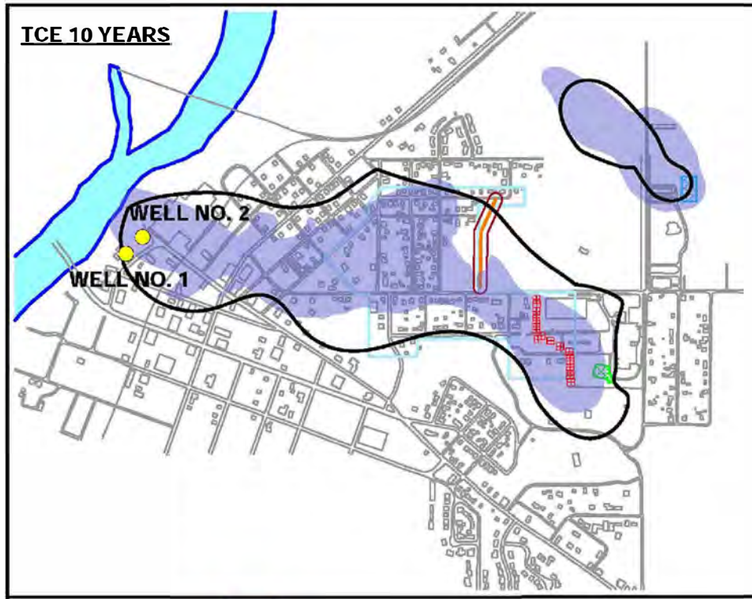
FIGURE 12

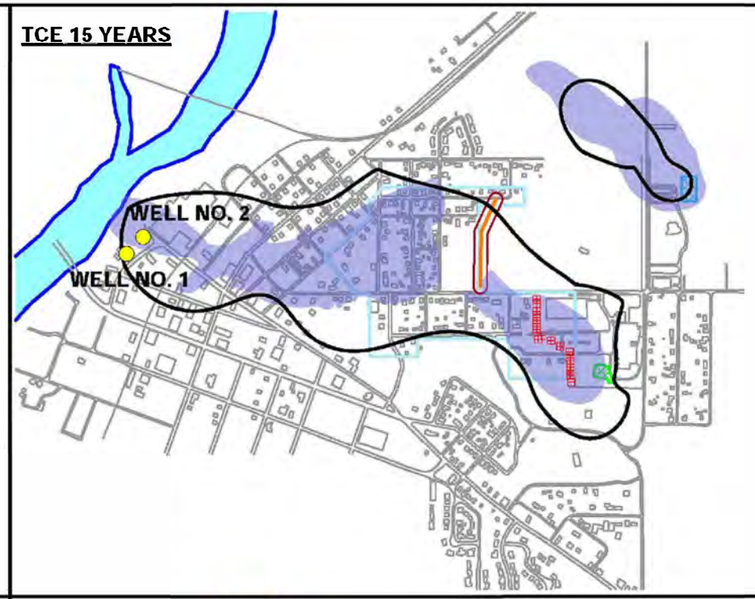
SIMULATED PCE, TCE, AND VC GROUNDWATER PLUMES
WITHIN THE TOP 10 FEET OF THE WATER TABLE
(20 AND 25 YEARS)
RADIO MATERIALS CORPORATION
Attica, Indiana

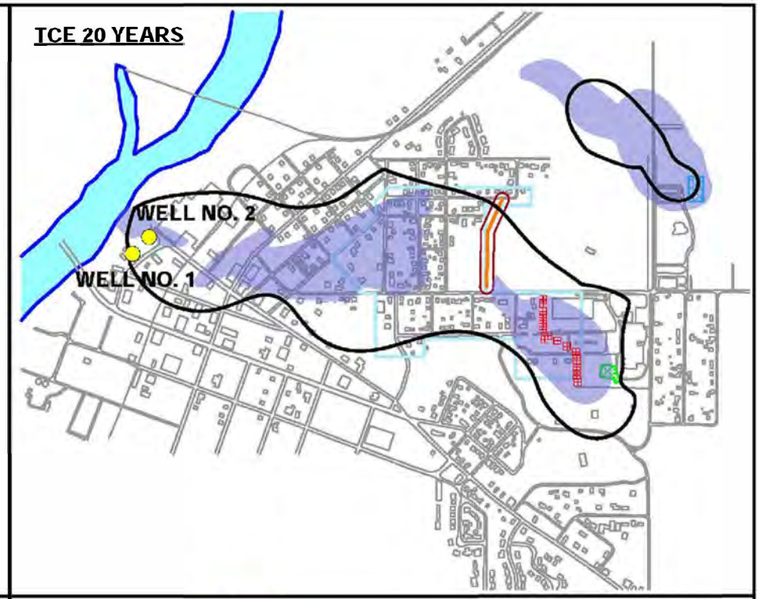
FIGURE 13

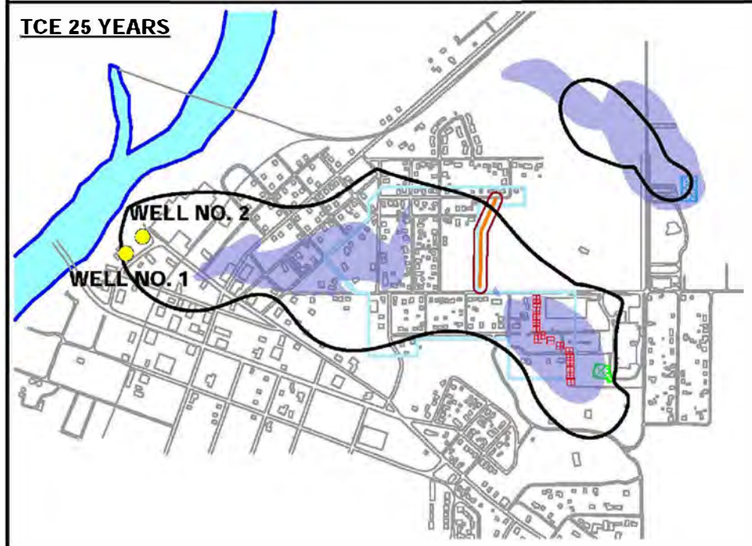
SIMULATED PCE, TCE, AND VC GROUNDWATER PLUMES
WITHIN THE TOP 10 FEET OF THE WATER TABLE
(30 AND 35 YEARS)
RADIO MATERIALS CORPORATION
Attica, Indiana

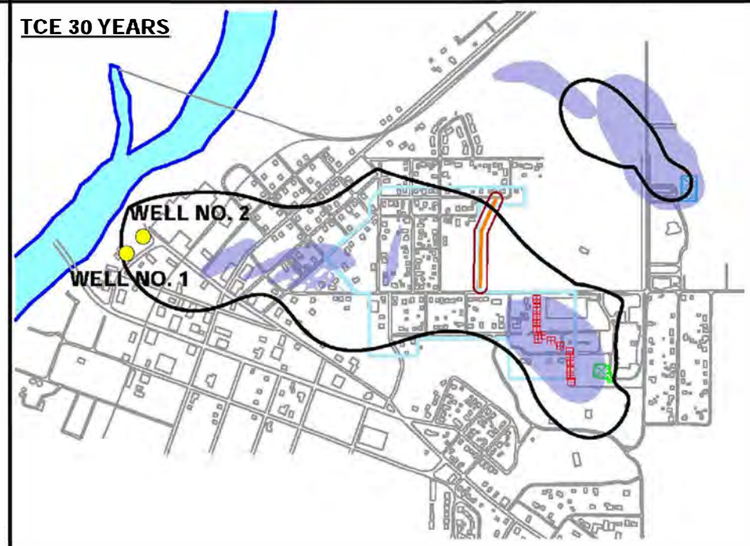
019190-40(062)GN-WA-HYD (Z:\HEG\19190\2017_MOD_UPDATE\DOCUMENTATION\RPT\RPT62\FIGURES\Top10_30 AND 35 YEARS.srf) Nov 8/2018

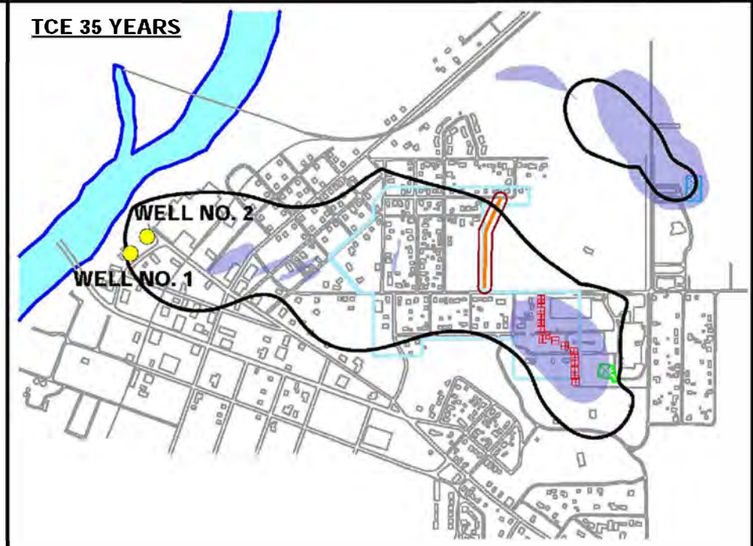












LEGEND

- SWMU 5
- SWMU 1/2
- VAPOR INTRUSION STUDY AREA

GROUNDWATER INTERIM CORRECTIVE MEASURES

- AS/SVE REMEDIAL TRENCH
- EXTRACTION WELL
- SIMULATED TCE (5 µg/L)
- INITIAL 2010 OVERBURDEN GROUNDWATER CONCENTRATION PLUME EXTENT (5 µg/L)
- WELL NO. 1 MUNICIPAL SUPPLY WELL IDENTIFICATION
- MUNICIPAL SUPPLY WELL LOCATION

GHD

N

0 750 1,500ft

FIGURE 14

FULL DEPTH MAXIMUM TCE
GROUNDWATER CONCENTRATIONS (10 TO 35YEARS)
RADIO MATERIALS CORPORATION
Attica, Indiana

019190-40(062)GN-WA-HYD (Z:\HEG\19190\2017_MOD_UPDATE\DOCUMENTATION\RPT\RPT62\FIGURES\FULL_DEPTH_MAX_TCE_10 THROUGH 35 YEARS.srf) Nov 8/2018

LEGEND

- RILEY-CONTROLLED PROPERTY AND COMPLIANCE BOUNDARY LIMITS
- BOUNDARY BETWEEN CITY OF ATTICA AND AND FOUNTAIN COUNTY
- PARCEL LINE
- 5 — OVERBURDEN TCE CONCENTRATION CONTOUR (µg/L)

SWMUs AND AOCs

SWMU 1 - FORMER DRUM STORAGE AREA

SWMU 2 - PAST DISPOSAL AREA 'A'

SWMU 3 - TEMPORARY DRUM STORAGE AREA

SWMU 5 - PAST DISPOSAL AREA 'B'

SWMU 11 - PCE VAPOR DEGREASER

SWMU 12 - DYNAMITE BURIAL AREA

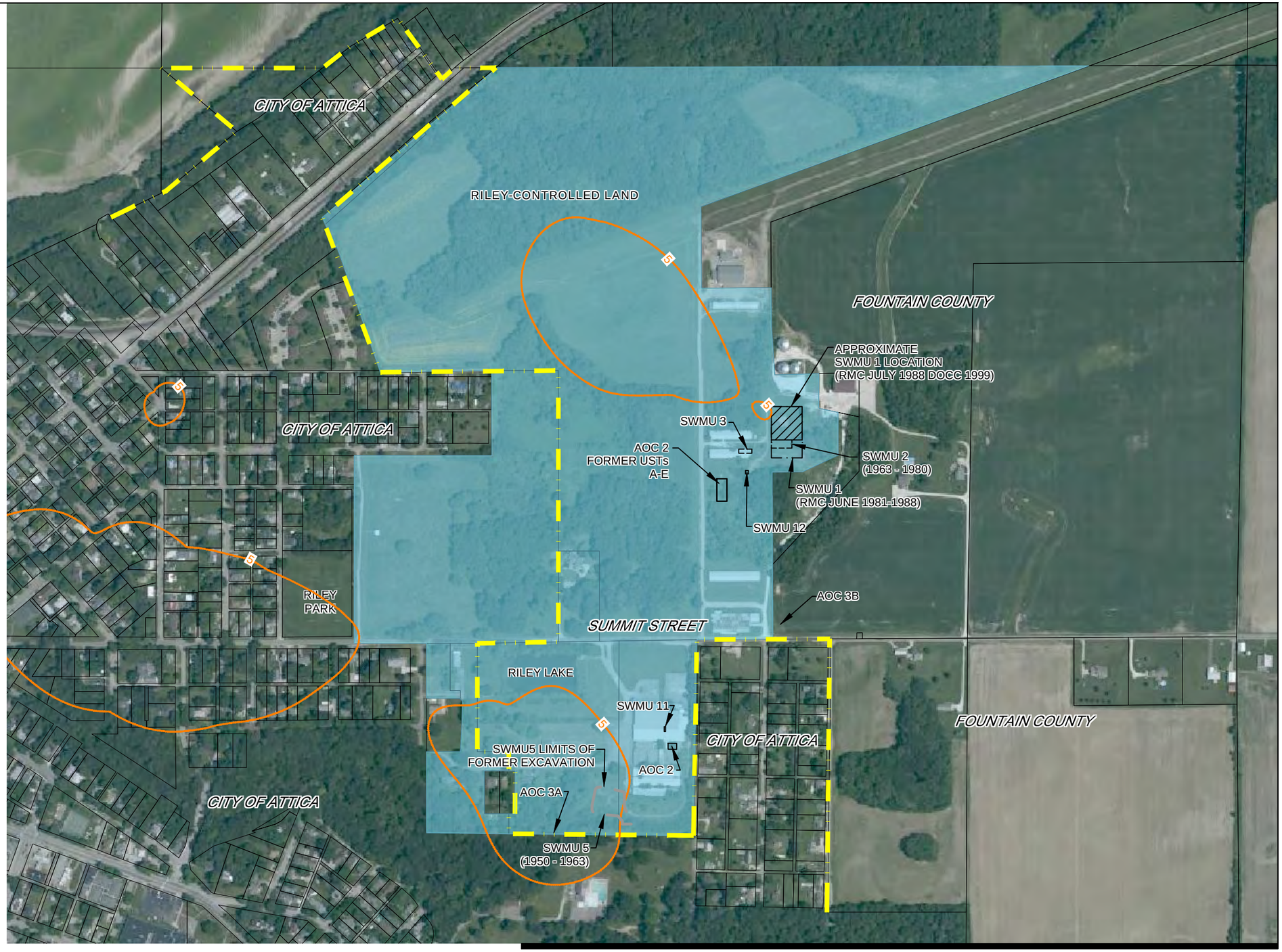
AOC 3A - DISCHARGE LOCATION TO CREEK

AOC 3B - DISCHARGE TO DRAINAGE DITCH

AOC 2 - UNDERGROUND STORAGE TANKS

SWMU 1 (DOCC 1999)

SWMU 1 (RMC 1981-1988)



SOURCES:
Aerial: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date [unknown], Accessed: 2022;
Parcel Fabric provided by Indiana Department of Homeland Security (IDHS): Land Parcels maintained by County Agencies in Indiana, Publication Date 2015 12 17.

0 250 500 ft
1" = 500 ft

N

GHD

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

COMPLIANCE BOUNDARIES WITH 2017 GROUNDWATER PLUMES

Project No. **11228736**
Date **February 2022**

FIGURE 15

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0132_DE-001.DWG
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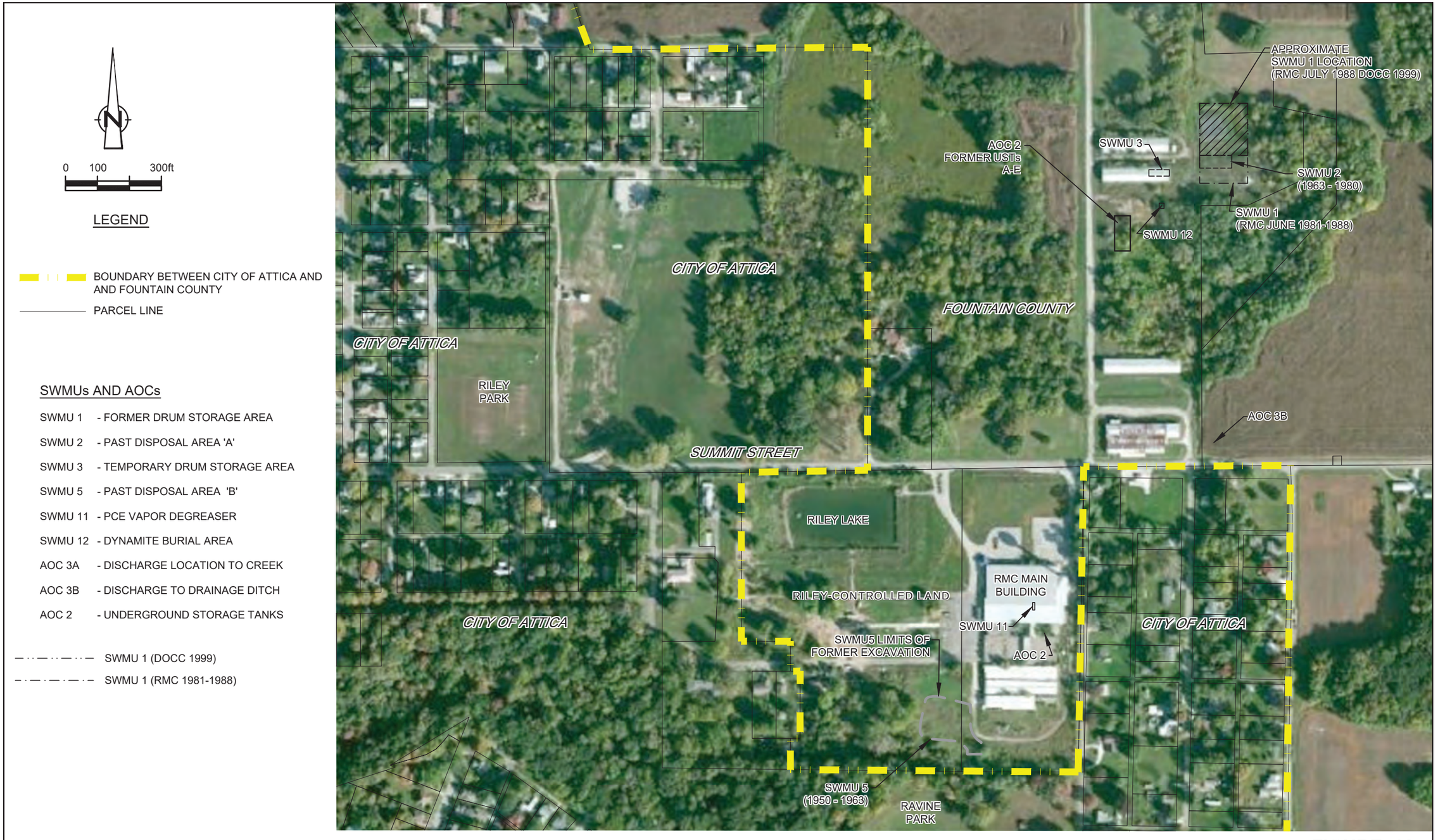

FIGURE 16

SOIL MANAGEMENT PLAN AREAS AND COMPLIANCE BOUNDARIES
RADIO MATERIALS CORPORATION
Attica, Indiana

SOURCES:
Aerial: Microsoft Product Screen Shot(s) Reprinted with permission from Microsoft Corporation, Acquisition Date [unknown], Accessed: 2018; Parcel Fabric provided by Indiana Department of Homeland Security (IDHS): Land Parcels maintained by County Agencies in Indiana, Publication Date 2015 12 17.

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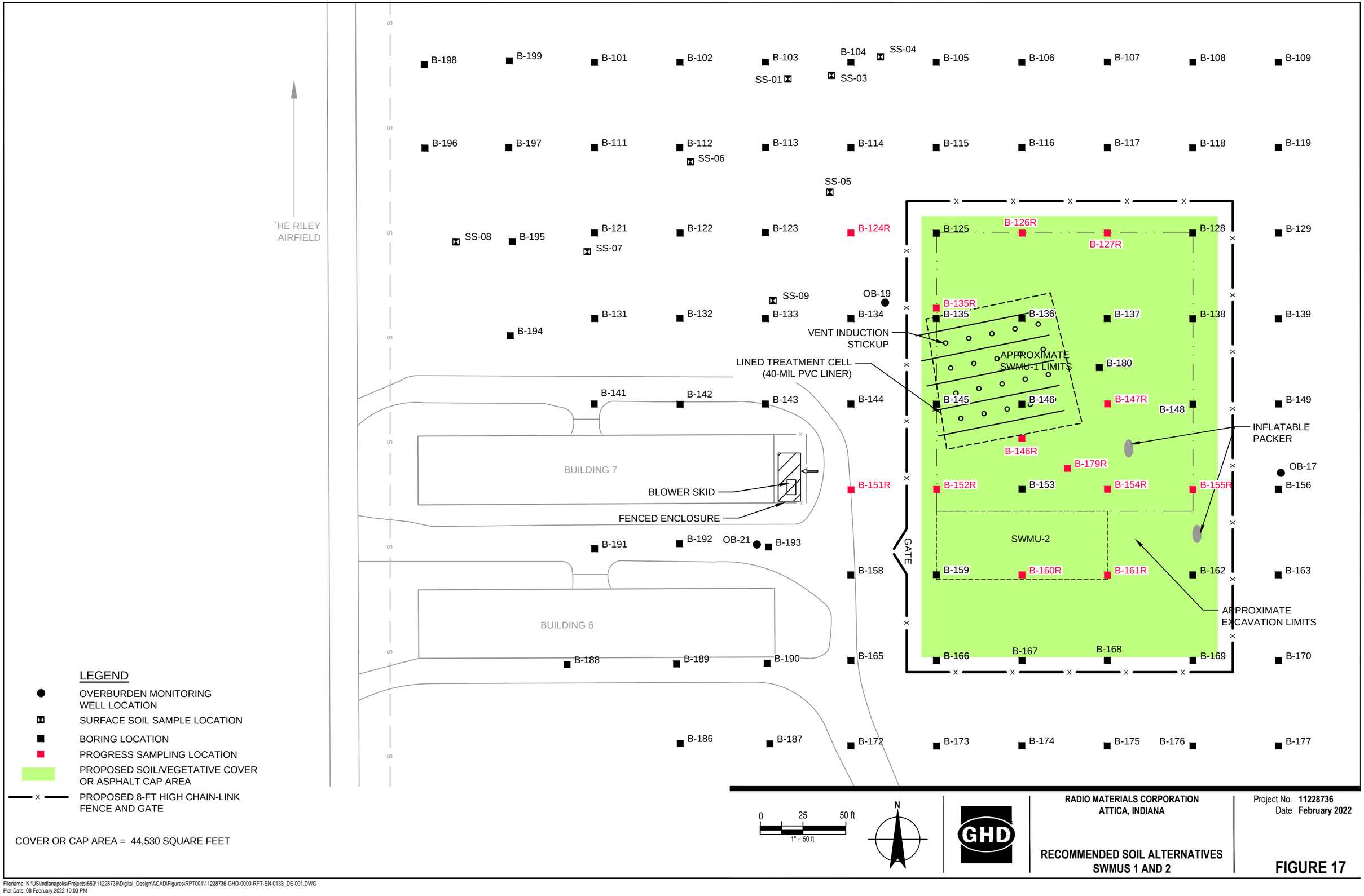

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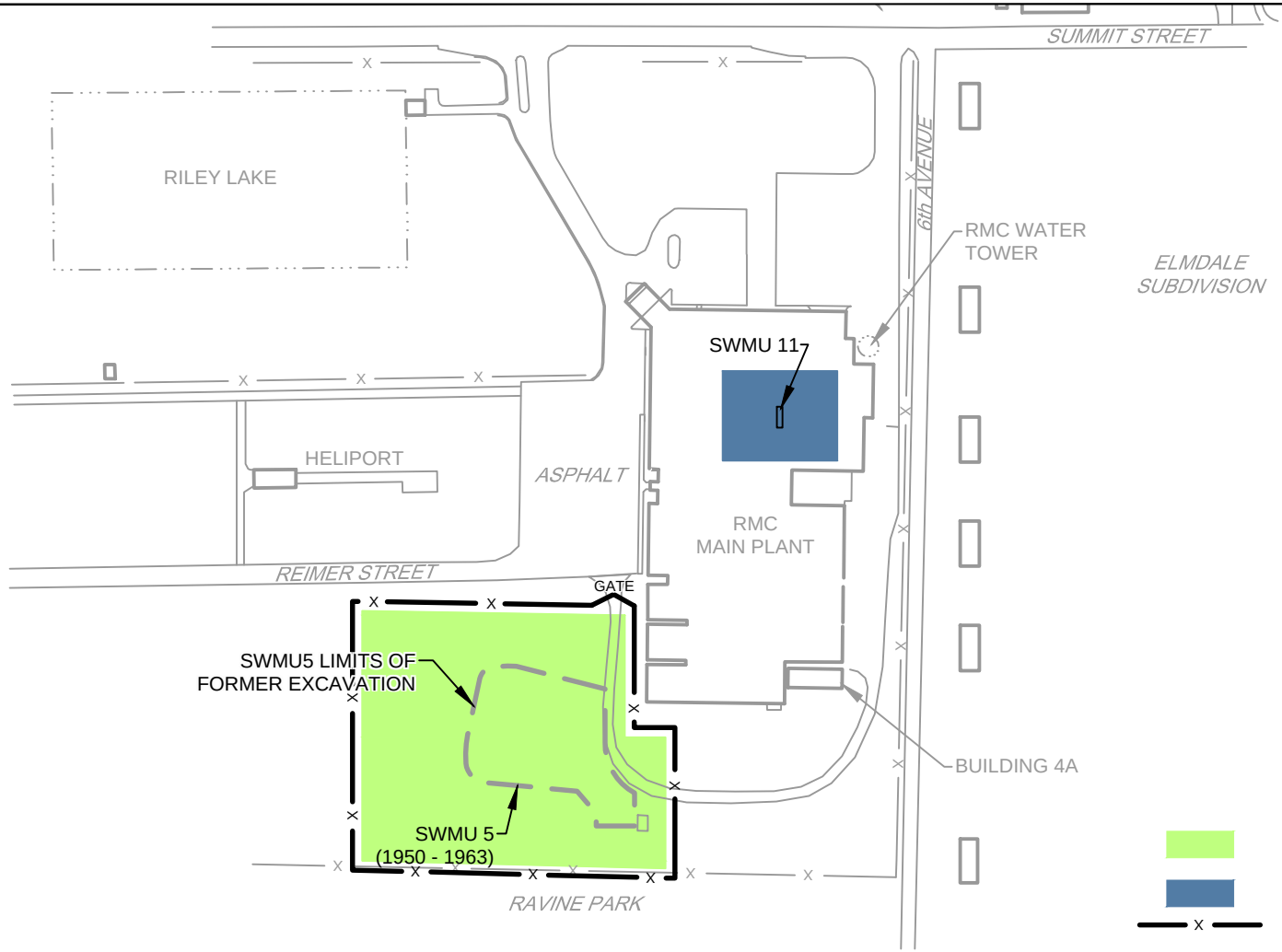


LEGEND

- PROPOSED SOIL/VEGETATIVE COVER OR ASPHALT CAP AREA
- PROPOSED CONCRETE CAP AREA
- PROPOSED 8-FT HIGH CHAIN-LINK FENCE AND GATE

SWMU 5 COVER OR CAP AREA = 91,106 SQUARE FEET
SWMU 11 CONCRETE CAP AREA (PRESERVE EXISTING CONCRETE CAP) = 13,122 SQUARE FEET

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

Project No. **11228736**
Date **February 2022**

RECOMMENDED SOIL ALTERNATIVES - SMWU 5 AND SWMU 11

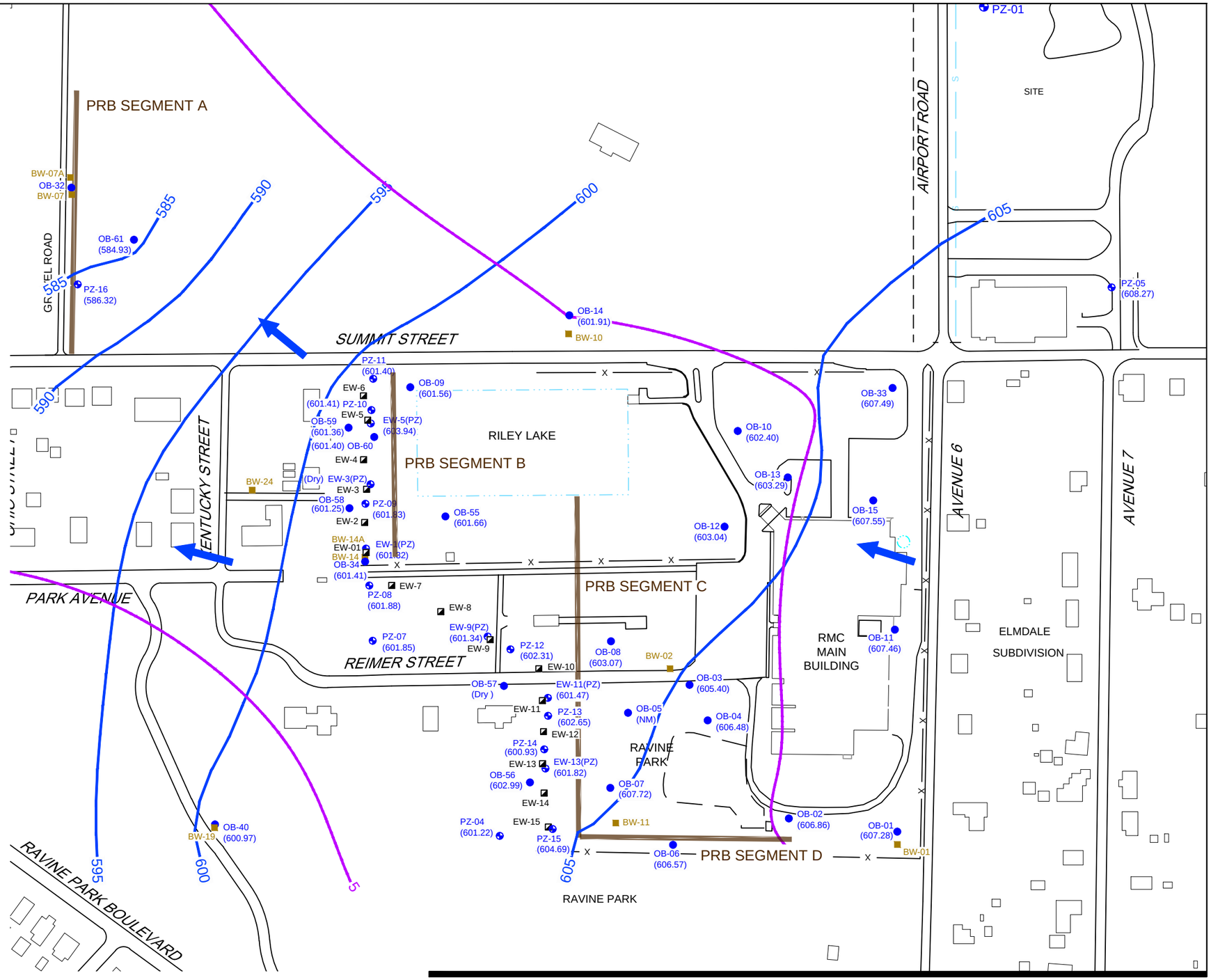
FIGURE 18

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0134_DE-001.DWG
Plot Date: 08 February 2022 10:18 PM

LEGEND

- OB-34 — EXISTING OVERBURDEN MONITORING WELL LOCATION AND IDENTIFIER
- BW-7 — EXISTING BEDROCK MONITORING WELL LOCATION AND IDENTIFIER
- PZ-01 — EXISTING OVERBURDEN PIEZOMETER LOCATION
- EW-6 — EXISTING OVERBURDEN EXTRACTION WELL LOCATION AND IDENTIFIER
- CONCEPTUAL PRB INSTALLATION
- 5 — OBSERVED TCE CONCENTRATION CONTOUR (µg/L)
- (602.52) — GROUNDWATER ELEVATION (FT AMSL)
- 605 — GROUNDWATER ELEVATION CONTOUR (FT AMSL)
- GROUNDWATER FLOW DIRECTION

APPROXIMATE PRB SEGMENT LENGTHS
SEGMENT A = 500 FEET
SEGMENT B = 350 FEET
SEGMENT C = 700 FEET
SEGMENT D = 400 FEET



RADIO MATERIALS CORPORATION
ATTICA, INDIANA

Project No. **11228736**
Date **February 2022**

CONCEPTUAL GROUNDWATER PRB - SOUTHERN PLUME

FIGURE 19

Filename: N:\US\Indianapolis\Projects\563\11228736\Digital_Design\ACAD\Figures\RPT001\11228736-GHD-0000-RPT-EN-0135_DE-001.DWG
Plot Date: 08 February 2022 11:32 PM

Attachment 2

Tables

Table 1: Exposure Pathways, Risk and Corrective Action Objectives

Area of Interest	Media	Analytes	Potential Risk Components			Potentially Completed Exposure Pathway [5]?		Interim Corrective Measures (ICM) Implemented?	How the proposed remedy addresses potential completed exposure pathways	Potential Exposure Pathways After CM Completion
			Exceedance of IDEM SL?	HHRA Excess Risk?[7]	Potential Receptors [6]	Current Use	Future use			
Area 1 [1] Primary Source Areas (SWMU 1&2)	Surface Soil	Select VOCs, SVOCs and Metals	No	Yes- Due to background levels of Arsenic	**Current Use** - Trespasser (SWMU 1 and 2 only) **Future Use** - Site Users6	No	No	No	Not Applicable (cleanup levels are not at concentrations below natural background levels)	Incomplete
	Subsurface soil	Select VOCs, SVOCs and Metals	Yes	Yes	**Current Use** - None **Future Use** - Site Users - Construction Workers	No	**Yes**	Yes Excavation and in-situ SVE	1. Engineered barrier (cap/grading) 2. Physical barriers (fencing/signage) 3. ERC (land-use restrictions) 4. SMP	Incomplete
Area 2 [2]	Soil AOC 3B Drainage Soil	Lead	No	Not applicable	**Current Use** - Trespasser **Future Use** - Site Users4	No	No	Yes, Soil Excavated	Not Applicable	Incomplete
Riley Land	Surface and Subsurface soil	Select VOCs and Metals	Yes	Yes (Due to background Arsenic levels)	**Current Use** - Trespasser - Resident **Future Use** - Site User[6]	No	Yes	No	1. ERC (land-use restriction) 2. SMP	Incomplete
Area 1, Area 2 and Riley Land (Northern	Overburden Ground water	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Site Users - Construction Workers	No	**Yes**[8]	No	1. ERC (groundwater-use restriction) 2. Groundwater monitoring	Incomplete

Area of Interest	Media	Analytes	Potential Risk Components			Potentially Completed Exposure Pathway [5]?		Interim Corrective Measures (ICM) Implemented?	How the proposed remedy addresses potential completed exposure pathways	Potential Exposure Pathways After CM Completion
			Exceedance of IDEM SL?	HHRA Excess Risk?[7]	Potential Receptors [6]	Current Use	Future use			
									g/MNA	
	Bedrock Ground water	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Site Users	No	**Yes**[8]	NO	1. ERC (groundwater-use restriction) 2. Groundwater monitoring/MNA	Incomplete
	Subsurface Vapor	Select VOCs	Yes	No	**Current Use** - None **Future Use** - Site Users - Construction Workers	**No**[8]	**Yes**[8]	NO	ERC (land-use restriction and VIMS for occupied structures)	Incomplete

Area of Interest	Media	Analytes	Potential Risk Components			Potentially Completed Exposure Pathway [5]?		Interim Corrective Measures (ICM) Implemented?	How the proposed remedy addresses potential completed exposure pathways	Potential Exposure Pathways After CM Completion
			Exceedance of IDEM SL?	HHRA Excess Risk?[7]	Potential Receptors [6]	Current Use	Future use			
Area 3 [3]Primary Source Areas- SWMU 5, SWMU 11 and AOC 2 (Southern Plume)	Surface Soil	Select VOCs	Yes	Yes	**Current Use** - Trespasser - Resident **Future Use** - Site User6	No	No	Yes- Excavation	Not Applicable	Incomplete
	Subsurface soil	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Site User **Construction Worker**	No	**yes**[8]	Yes- Excavation ISCO and SVE	1.Focused ISCO 2. ERC (land-use restriction) 3. SMP	Incomplete
	Overburden Ground water	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Site Users - Construction Workers	No	**yes**[8]	Yes- migration Control through GWET	1. ERC (groundwater-use restriction) 2. Groundwater monitoring/MNA	Incomplete
	Bedrock Ground water	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Site Users	No	**yes**[8]	No	1. ERC (groundwater-use restriction) 2. Groundwater monitoring/MNA	Incomplete
	Subsurface Vapor	Select VOCs	Yes	No	**Current Use** - None **Future Use** - Site Users - Construction Workers	No	**yes**[8]	No	ERC (land-use restriction and VIMS for occupied structures)	Incomplete

Northwest Residential Area [4] (Southern Plume)	Overburden Ground water	Select VOCs	Yes	Yes	Current Use - None **Future Use** - Resident5 - Construction Worker6	No	yes	Yes- GWET	Maintain VIM Groundwater monitoring	Incomplete
	Bedrock Ground water	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Resident	No	yes	No	1. Existing ERC (restrictive groundwater ordinance) 2. Groundwater monitoring	Incomplete
	Subsurface Vapor	Select VOCs	Yes	Yes	**Current Use** - None **Future Use** - Resident	No	**yes**[8]	Yes- VIM Measures	1. Environmental Use Restriction 2. Operation, maintenance, and monitoring of VIMS	Incomplete
Elmdale Sub Division	Soil/ Groundwater	Select VOCs	Yes	No	**Current and Future Use** - Resident	No	No	Not Applicable	Not Applicable	Incomplete
Riley Lake	Surface water/Sediment	No	No	No	**Current** - Trespasser **Future** - Site users	No	No	Not Applicable	Not Applicable	Incomplete
Ravine Park	Bedrock and Overburden Groundwater	Select VOCs	yes	No	**Current Use** - None **Future Use** - Resident - Park User	No	No	No	1. Existing ERC (restrictive groundwater ordinance) 2. Groundwater monitoring	Incomplete

General Notes:

1. See Figure 6.1 for Risk Assessment Potential Exposure Areas

Footnotes:

1. Risk Assessment Area 3 include SWMUs 5 and 11 and AOC 2 (Underground Storage Tanks [USTs] J, K, and L). USTs J, K, and L to be closed under IDEM's UST Program. The Riley Lake Exposure Area also is included in this table due to its geographical footprint within Area 3.
2. Consistent with the U.S. Environmental Protection Agency's Risk Assessment Guidance for Superfund (U.S. EPA, 1989), all four risk elements must be present for there to be a potentially completed exposure pathway.
3. Excess risk defined as Hazard Index (HI) greater than 1.0 and excess cancer risk greater than 1EE-05 as identified in the Human Health Risk Assessment in the Phase IIB RFI Report (CRA 2005, updated in 2010).
4. Potential human receptor as identified in the Human Health Risk Assessment in the Phase IIB RFI Report (CRA 2005, updated in 2010).

5 The HHRA determined that 100 percent of the excess risk for surface soil in Area 3 was attributable to background levels of arsenic.
6. Potential Future Site Users include residents and industrial/commercial workers.
7. Includes potential worker exposure to environmental media during excavation activities.
8. ***Bold/italics text*** indicates a changed pathway complete determination after corrective measures implementation versus the current condition
9. Assumed based on shallow overburden groundwater concentrations.

Abbreviations:
IDEM - Indiana Department of Environmental Management
SMP - Soil Management Plan
SL - IDEM 2021 Direct Contact (Soil), Ingestion (Groundwater), or Vapor Screening Level
VOCs - Volatile Organic Compounds
SVOCs – Semi volatile Organic Compounds
ERC - Environmental Restrictive Covenant
HHRA - Human Health Risk Assessment
ft bgs - feet below ground surface
VIMS - Vapor Intrusion Mitigation Solutions

Table 2: Cost Comparison of Evaluated Remedy Alternatives

Remedial Area	*Alternative Number*	*Alternative Description*	*Cost ($)* *(EPA Proposed Alternative and Cost Bolded)*
SWMU 1 &2 5 Soil Remedy *Administrative Controls, Access Controls, Passive Venting -All these apply to all of these alternatives*	**5**	**On-Site Closure of Ex Situ Soil Treatment Cell, Soil/Vegetative Cover**	**338, 000**
	6	Site Closure of Ex Situ Soil Treatment Cell, Asphalt Pavement Cover	527,000
	7	Off Site Closure of Ex Situ Soil Treatment Cell, Soil/Vegetative Cover	413,000
	8	Off Site Closure of Ex Situ Soil Treatment Cell, Asphalt Pavement Cover	602,000
SWMU 5 Soil Remedy *Administrative Controls, Access Controls, Passive Venting -All these apply to all of these alternatives*	5A	Administrative Controls, Access Controls, Passive Venting with Focused ISCO Option, Soil/Vegetative Cover	453,000
	5B	**Administrative Controls, Access Controls, Passive Venting, Passive Venting with Focused ISCO Option, Asphalt Pavement Cover**	**528,000**
	6A		776,000
	6B		851,000
	7	Administrative Controls, Access Controls, Passive Venting, Passive Venting with Focused ISCO Option, Recommission SVE ICM, Soil/Vegetative Cover	956,000
	8		970,000
SWMU-11/AOC2 Soil Remedy *Administrative Controls*	2	Maintain Concrete Cap	20,000

	3	**Administrative Controls, Maintain Concrete Cap, Passive Venting**	**112,000**
	4	Administrative Controls, Maintain Concrete Cap, Recommission SVE ICM	481,000
Northern Plume *Groundwater Remedy*	2	Administrative Controls,	20,000
	3	**Administrative Controls, MNA Groundwater Monitoring**	**781,000**
Southern Plume *Groundwater Remedy Administrative Controls, Monitoring, Continuation of CWTS*	4	Continuation of ICMs (GWET and AS/SVE)	9,065,000
	5	**Continuation of CWTS and Permeable Reactive Barrier**	**3,580,000**
		Total Cost of EPA Proposed Remedies	**5,339,000**

Attachment 3
Administrative Record Index

U.S. ENVIRONMENTAL PROTECTION AGENCY

ADMINISTRATIVE RECORD INDEX
RADIO MATERIALS CORPORATION - ATTICA, IN
1095 E. SUMMIT STREET
ATTICA, FOUNTAIN COUNTY, INDIANA
EPA ID: IND 005 477 021
ORIGINAL
OCTOBER 20, 2022
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	2004780	03/01/1999	U.S. EPA	File	Attachment I Interim Measures Scope of Work	93
2	2004779	03/01/1999	U.S. EPA	File	RCRA 3008 (h) Consent Order for Radio Materials Corporation	172
3	2004839	02/17/2003	Conestoga-Rovers & Associates	U.S. EPA	Report - Regarding: Phase II RCRA Facility Investigation Report	402
4	2004786	04/11/2003	Sundar, B., U.S. EPA	Riley, J., Radio Materials Corporation	Letter - Regarding: Phase IIB Work plan Approval	8
5	2004787	06/16/2003	Sundar, B., U.S. EPA	Riley, J., Radio Materials Corporation	Letter - Regarding: Phase IIB Work Plan Revision	1
6	2004788	08/12/2004	Sundar, B., U.S. EPA	Riley, J., Radio Materials Corporation	Letter - Regarding: Interim Data Transmittal and Supplemental Phase IIB RFI Scope of Work	8
7	2004789	06/10/2005	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Proposed Supplemental Field Investigation	8
8	2004790	07/05/2005	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Work Plan for Additional Site Investigations	2
9	2004830	07/19/2005	Grady. S., Conestoga-Rovers & Associates	Simonson, K., IDEM	Letter - Regarding: Site Activity Update Requesting No Further Action	104

10	2004791	10/31/2005	Wanner, S., Conestoga-Rovers & Associates	Jean, R., City of Attica Public Works	Letter - Regarding: Groundwater Analytical Data	41
11	2004792	12/07/2005	Simonson, K., IDEM	Grady. S., Conestoga-Rovers & Associates	Letter - Regarding: No Further Action and ERC Request	1
12	2004793	03/27/2006	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Additional Groundwater Investigation	6
13	2004794	08/27/2006	Sundar, B., U.S. EPA	Riley, J., Radio Materials Corporation	Letter - Regarding: Interim Corrective Measures Work Plan	2
14	2004801	12/05/2006	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Email - Regarding: Subslab Vapor Monitoring Work Plan [Redacted]	2
15	2004795	12/05/2006	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Sub- Slab Vapor Sampling Work Plan [Redacted]	6
16	2004866	02/28/2007	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: Interim Corrective Measures Excavation Work Plan SWMUs 1 and AOC 3B	57
17	2004796	03/19/2007	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Interim Corrective Measures Excavation Work Plan, SWMUs 1,2,12 and AOC 3B	1
18	2004797	05/30/2007	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Memo - Regarding : Proposed Vapor Intrusion Investigation	3
19	2004798	11/20/2007	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding : Aquifer Testing Work Plan	30
20	2004799	12/03/2007	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Email - Regarding: Approval of Aquifer Testing Work Plan	4

21	2004800	12/05/2007	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Monitoring Well Installation for Vertical Aquifer Screening	4
22	2004803	02/04/2008	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Memo - Regarding : Proposed Modification to Aquifer Pumping Test	36
23	2004782	03/03/2008	U.S. EPA	File	News Letter - Regarding: Environmental Investigation and Clean-up Activities at the Radio Materials Corporation Site	2
24	2004802	03/11/2008	Wilkie, J., Environ	Sundar, B., U.S. EPA	Memo - Regarding: Response to U.S. EPA Comments on the Draft Indoor Air Sampling and Vapor Intrusion Mitigation System Installation Work Plan	6
25	2004804	03/13/2008	Wilkie, J., Environ	Sundar, B., U.S. EPA	Letter - Regarding: Approval of Indoor Air Sampling and Vapor Intrusion Mitigation System	1
26	2004805	04/29/2008	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding : Modification to SVE and Excavation Interim Corrective Measures Work Plan for SWMU 1 and 2	9
27	2004807	05/01/2008	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Approval of Modifications to SVE and Excavation Interim Corrective Measures Work Plan for SWMU 1 and 2	4
28	2004806	05/01/2008	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Modifications to SVE Interim Corrective Measures Work Plan for SWMU 1 and 2	8
29	2004783	07/01/2008	U.S. EPA	General Public	News Letter - Regarding: Environmental Investigation and Clean-up Activities at the Radio Materials Corporation Site	3

30	2004781	07/19/2008	U.S. EPA	General Public	Fact Sheet - Regarding: U.S. EPA Clean-up at the Radio Materials Corporation Site	32
31	2004849	09/25/2008	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: City Water Treatment System Interim Corrective Measures Work Plan	246
32	2004864	10/02/2008	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: Interim Corrective Measures AOC 3B Excavation Completion Report	364
33	2004784	11/03/2008	U.S. EPA	General Public	News Letter - Regarding: Indoor Air Sampling Activities at the Radio Materials Corporation Site	3
34	2004808	04/16/2009	Sundar, B., U.S. EPA	Warner, S., Conestoga-Rovers & Associates	Letter - Regarding: Request for an Interim Measures Work Plan	2
35	2004809	06/15/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Memo - Regarding: ICM for Vapor Intrusion Mitigation for Residential Neighborhood	7
36	2004810	06/18/2009	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Report - Regarding: Technical Review of the Groundwater Interim Corrective Measures Work Plan	9
37	2004811	07/24/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Groundwater ICM Work Plan Transmittal	14
38	2004812	08/03/2009	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Interim Corrective Measures for Vapor Intrusion Mitigation for Residential Neighborhood	11
39	2004813	08/17/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Confirmation of Submittal Date Vapor Intrusion Mitigation ICM Work Plan	1
40	2004814	09/08/2009	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Radio Materials Facility - Request for Information om Access Issues for Vapor Intrusion Investigation	2

41	2004852	09/08/2009	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates Riley, J., Radio Materials Corporation	Letter - Regarding: Residential Access for VI Investigation	2
42	2004850	10/05/2009	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: Vapor Intrusion Mitigation Interim Measures Work Plan	497
43	2004815	11/23/2009	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Radio Materials Facility - Vapor Intrusion Mitigation ICM Work Plan	6
44	2004816	11/25/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: CRA Response to U.S. EPA Comments	7
45	2004817	11/30/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Vapor Intrusion Study Work Plan Addendum	3
46	2004818	12/28/2009	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Response to U.S. EPA Comments on Vapor Intrusion Mitigation Interim Corrective Measures Work Plan	8
47	2004819	01/05/2010	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Vapor Intrusion Study Work Plan Addendum	2
48	2004820	01/27/2010	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Request for Extension of Submittal Date	1
49	2004822	04/08/2010	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Approval of Semi-Annual Monitoring Frequency of Groundwater	1
50	2004823	05/21/2010	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Phase IIB RCRA Facility Investigation Report	2

51	2004824	05/24/2010	Sundar, B., U.S. EPA	Wanner, S., Conestoga-Rovers & Associates Riley, J., Radio Materials Corporation	Letter - Regarding: Approval of City Water Treatment System Interim Corrective Measures Work Plan	2
52	2004865	10/11/2010	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: Groundwater Interim Corrective Measures Design Plans and Specifications	555
53	2004825	02/03/2011	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: Revised SWMU 1 and 2 Progress Sampling Plan	24
54	2004826	04/19/2011	Davis, S., Conestoga-Rovers & Associates	Naddy, J., IDEM	Letter - Regarding: Response to IDEM Comments on Contained-In Determination for Contaminated Soil and Groundwater	2
55	2004827	04/27/2011	Naddy, J., IDEM	Davis, S., Conestoga-Rovers & Associates	Letter - Regarding: Contained-In Determination for Contaminated Soil and Groundwater	2
56	2004826	05/13/2011	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: RFI Addendum VI Study of Offsite Investigational Area	141
57	2004828	06/10/2011	Wanner, S., Conestoga-Rovers & Associates	Sundar, B., U.S. EPA	Letter - Regarding: SWMU 1 and 2 Progress Sampling Report	36
58	2004841	09/10/2013	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: RFI Addendum 3 Groundwater Investigation Update	157
29	2004840	09/10/2013	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: RFI Addendum 2 Supplemental Vapor Intrusion Investigation and Mitigation Work Plan [Redacted]	30
60	2004777	09/10/2013	Conestoga-Rovers & Associates	Radio Materials Corporation	Report - Regarding: RFI Addendum 2 Supplemental Vapor Intrusion Investigation and Mitigation Work Plan [Redacted]	101

61	2004854	04/03/2014	U.S. EPA		File	Documentation - Regarding: Environmental Indicator Determination - Migration of Contaminated Groundwater Under Control	20
62	2004829	04/08/2014	Sundar, B., U.S. EPA		Wanner, S., Conestoga-Rovers & Associates	Letter - Regarding: Approval of SVE System Shutdown Proposed Decommissioning of SWMU 1 and 2 SVE System	1
63	2004785	12/03/2014	U.S. EPA		File	Fact Sheet - Regarding: RMC Sampling Continues Near Former Plant	2
64	2004838	08/21/2015	U.S. EPA		File	Report - Regarding: Corrective Action Measures Evaluation Report	102
65	2004831	07/10/2015	GHD		Radio Materials Corporation	Report - Regarding: March 2015 Semi-Annual Groundwater Monitoring Event	82
66	2004848	05/17/2016	Sundar, B., U.S. EPA		Riley, J., Radio Materials Corporation	Letter - Regarding: Identification of New Interim Measure - Container/Material - Management/Storage	4
67	2004834	08/22/2016	Wanner, S.,	GHD	Sundar, B., U.S. EPA	Report - Regarding: Spring 2016 Semi-Annual Groundwater Monitoring Event	98
68	2004778	02/17/2017	Wanner, S.,	GHD	Sundar, B., U.S. EPA	Report - Regarding: RFI Addendum 5 Transmittal	272
69	2004835	04/04/2017	Wanner, S.,	GHD	Sundar, B., U.S. EPA	Report - Regarding: Fall 2016 Semi-Annual Groundwater Monitoring Event	92
70	2004842	01/22/2018	GHD		Radio Materials Corporation	Report - Regarding: Hydrogeologic Modeling Report	125
71	2004851	02/15/2018	Sundar, B., U.S. EPA		Riley, J., Radio Materials Corporation	Letter - Regarding: Approval of New Interim Measures Project - Approval of Amendment to the September 2016 Quality Assurance Project Plan and Work Plan	2

72	2004843	07/03/2018	Sundar, B., U.S. EPA	Wanner, S., GHD	Letter - Regarding: Approval of RCRA Facility Investigation Reports	2
73	2004837	12/28/2018	Heritage Interactive Services	U.S. EPA	Report - Regarding: Appendices for the New Interim Corrective Measures Work Plan	840
74	2004836	12/28/2018	Heritage Interactive Services	U.S. EPA	Report - Regarding: Work Plan Final Report	57
75	2004833	03/11/2022	GHD	Sundar, B., U.S. EPA	Report - Regarding: Fall 2015 Semi-Annual Groundwater Monitoring Event	71
76	2004833	06/10/2022	GHD	Radio Materials Corporation	Report - Regarding: Corrective Measures Study - Final	709
77	2004853	07/01/2022	U.S. EPA	File	Documentation - Regarding: Environmental Indicator Determination	16
78	2004863	07/07/2022	Sundar, B., U.S. EPA	Radio Materials Corporation	Letter - Regarding: Approval of Final Corrective Measures Study Report	2
79	2004859	09/21/2022	Patel, S., U.S. EPA	Radio Materials Corporation	Letter - Regarding: Interim Measure for Southern Plume Groundwater Migration	2
80	2004860	10/07/2022	GHD	Radio Materials Corporation	Report - Regarding: Interim Corrective Measures Work Plan - Permeable Reactive Barrier	444
81	2004861	10/07/2022	Sundar, B., U.S. EPA	Radio Materials Corporation	Letter - Regarding: Approval of Interim Corrective Measures Work Plan - Permeable Reactive Barrier	2
82	977600	10/20/2022	U.S. EPA	File	Fact Sheet - Regarding: Statement of Basis Released: Public Comment Period Open	4
83	977601	10/20/2022	GHD	Sundar, B., U.S. EPA	Report - Regarding: Corrective Measures Study Addendum	4

84	977602	10/25/22	U. S. EPA	General Public	Statement of Basis - Radio Materials Corporation - Attica, IN	90