October 2020

VEOLIA FACILITY

RCRA STATEMENT of BASIS
Veolia ES Technical Solutions LLC

U.S. EPA ID# OHD093945293
4301 Infirmary Road
West Carrollton, Montgomery County, Ohio 45449

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Acronyms

AOI	Area of Investigation
BGS	Below Ground Surface
CA	Corrective Action
cis-1,2-DCE	Cis-1,2-Dichloroethene
cm/sec	Centimeters Per Second
CMS	Corrective Measures Study
CMI	Corrective Measures Implementation
COCs	Contaminant of Concern
CWMRR	Chemical Waste Management Resource Recovery
1,1-DCA	1,1-Dichloroethane
DERR	Division of Environmental Response and Revitalization
DOIR	District Office Investigation Report
F	Fahrenheit
Ft.	Feet
HHRA	Human Health Risk Assessment
HVDPE	High Vacuum Dual Phase Extraction
HSWA	Hazardous and Solid Waste Amendments
IMs	Interim Measures
JRWA	Jefferson Regional Water Authority
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
msl	Mean Sea Level
NPDES	National Pollutant Discharge Elimination System
NRB	Northern Retention Basin
ODNR	Ohio Department of Natural Resources
Ohio EPA	Ohio Environmental Protection Agency
ONYXES	Onyx Environmental Services, LLC
OSHA	Occupational Safety and Health Administration
PR/VSI	Preliminary Review/Visual Site Inspection

PCE	Tetrachloroethene
PW	Production Well
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RSL	Regional Screening Levels
SERA	Screening Ecological Risk Assessment
SOB	Statement of Basis
SWMU	Solid Waste Management Unit
SVOCs	Semi-Volatile Organic Compounds
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethene
THF	Tetrahydrofuran
THQ	Target Hazard Quotient
TPH	Total Petroleum Hydrocarbon
TR	Target Risk
µg/kg	microgram per kilogram
µg/L	microgram per liter
UST	Underground Storage Tank
U.S. EPA	United States Environmental Protection Agency
VISL	Vapor Intrusion Screening Level
VOCs	Volatile Organic Compounds
WMU	Waste Management Unit

STATEMENT OF BASIS

Veolia ES Technical Solutions LLC
West Carrollton, OHIO

U.S. EPA #OHD093945293

Prepared by:
The Ohio Environmental Protection Agency
October 2020

Solicitation of Comments

Ohio EPA solicits comments from the community on the proposed remedial action at Veolia ES Technical Solutions LLC (Veolia). Written comments may be submitted before the end of the comment period. The comment period may be extended by Ohio EPA if a specific request for a comment period extension is received within the original comment period. All persons, including Veolia, may submit comments relating to this matter. Written comments are to be submitted by email to Ohio EPA at Publiccomment@epa.ohio.gov or directly to Brian Marlatt at brian.marlatt@epa.ohio.gov. When submitting written comments, please indicate the comments concern the Veolia Statement of Basis.

The public was informed of the Statement of Basis (SOB) and all documents are available for public review. Links to the critical documents used to select the remedies may be found in the references in Section 6.0. If significant public interest is shown, the Ohio EPA may offer a public meeting during the public comment period. In addition, virtual public hearings and meetings are a permissible tool for Ohio EPA to use as part of public participation for permitting, remedy selection, and similar regulatory actions conducted under federal environmental statutes. After considering the comments received, Ohio EPA will summarize the comments and its responses in a response to comments document. This document will be incorporated into the Administrative Record.

1.0 INTRODUCTION

The SOB resents a summary of investigation findings and interim corrective actions that have been completed at the Veolia facility at 4301 Infirmary Road in West Carrollton, Ohio. The Veolia facility maintains an Ohio Hazardous Waste Renewal Permit, which was most recently renewed by the Ohio Environmental Protection Agency (Ohio EPA) on December 31, 2013. Resource Conservation and Recovery Act (RCRA) Corrective Action (CA) is a requirement of the facility's Permit. After interim measures (IMs) were completed following an explosion in 2009, Veolia completed a RCRA Facility Investigation (RFI) that concluded current site conditions do not pose unacceptable risk to human health and the environment and no additional corrective measures are necessary with implementation of land use restrictions and a ground water monitoring plan (Cox-Colvin, 2019). Ohio EPA will make a final determination on the status of the RFI and the need for corrective measures after the public comment period has ended and those comments, if any, have been considered.

This SOB is being issued by Ohio EPA as part of its public participation responsibilities under RCRA. This document summarizes information that can be found in greater detail in numerous documents in the Ohio EPA file. A list of the available documents is provided in Section 6.0 of this SOB. Ohio EPA encourages the public to review these documents in order to gain a more comprehensive understanding of the environmental investigation and interim action activities conducted at the Veolia facility.

2.0 FACILITY BACKGROUND

The Veolia facility, which occupies approximately 30.1 acres, is located at 4301 Infirmary Road in West Carrollton, Montgomery County, Ohio (Figure 1). The property is bounded to the north by wooded area and commercial properties, to the east by Infirmary Road and wooded, agricultural, industrial, and residential properties, to the west by a gas pipeline right-of-way and vacant wooded land, and to the south by commercial properties. A large inactive sand and gravel quarry is located to the southwest of the facility.

Veolia is a commercial waste management facility engaged in reclamation of industrial solvents, blending and marketing of hazardous waste fuels, and storage and transfer of waste not processed at the facility. Figure 2 provides a layout of the facility. Major facility structures include an administrative building, a maintenance and utility buildings, a laboratory building, several container storage buildings, tank farms, truck loading and unloading bays, and a process area. Additional information regarding operations can be found in either the Facility Background Report (Cox-Colvin, 1999) or the Permit application.

2.1 Facility History

The facility began CA under the authority of United States Environmental Protection Agency (U.S. EPA). At the time the facility was owned and operated by Chemical Waste Management Resource Recovery (CWMRR). An initial RCRA Facility Assessment (RFA) was conducted at the facility in February 1990. The results of the RFA were compiled into a March 1990 Preliminary Review/Visual Site Inspection (PR/VSI) report (A.T. Kearney, 1990). U.S. EPA

Region V identified five solid waste management units (SWMUs) for further investigation as follows:

SWMU No. 1 – Truck Loading Bays,
SWMU No. 2 – Concrete Pad,
SWMU No. 3 – Container Storage Building,
SWMU No. 4 – French Drains, and
SWMU No. 5 – Septic Systems.

Following the issuance of the federal permit, U.S. EPA eliminated SWMU No. 3 and SWMU No. 5 from further investigation. SWMU No.3 was eliminated based on the PR/VSI and the integrity of the unit, and a 1997 Release Assessment Report demonstrated that a release had not occurred in SWMU No. 5 (Cox-Colvin, 1997). The three remaining SWMUs were combined into the Operations Area of Investigation (AOI) due to their proximity, the similarity of wastes managed, and the nearly identical migration and exposure pathways during development of the conceptual site model and subsequent investigation.

Onyx Environmental Services, LLC. (ONYXES) purchased the facility in 1999. ONYXES began investigation activities in May 1999. The Phase I RFI Report (Cox-Colvin, 2000a) and the Phase II Scope of Work Document (Cox-Colvin, 2000b) were submitted to U.S. EPA and Ohio EPA in August 2000. U.S. EPA and Ohio EPA did not comment on the Phase I Report or the Phase II Scope of Work document and no significant RCRA CA activities occurred at the facility until Ohio EPA issued the facility's Permit on September 30, 2003.

Upon issuance of the Permit on September 30, 2003, Ohio EPA assumed authority for conducting regulatory oversight of RCRA CA activities required at the facility. Ohio EPA uses the term waste management unit (WMU) to be generally synonymous with SWMU. For consistency with the Permit, the term WMU will be used in place of SWMU for the remainder of this document.

Despite the temporary lack of CA activity, voluntary ground water monitoring has been conducted at the site since 1998. Due to a regional change in ground water flow direction toward previously unmonitored areas, two monitor wells were installed with Ohio EPA approval in October 2002, prior to beginning the Phase II RFI. In October 2002, the first sampling event detected trichloroethylene (TCE) and cis-1,2-dichloroethene (cis-1,2-DCE) in monitoring well MO-17, with the TCE concentration approaching its Maximum Contaminant Level (MCL) for drinking water. As a result of TCE near its MCL at the property boundary in MO-17, semiannual monitoring was increased to quarterly. To address the source of volatile organic compounds (VOCs) beneath the former Operations AOI, voluntary IMs were implemented as proposed in detail in the April 2003 RFI Phase II Scope of Work Addendum (Cox-Colvin, 2003).

Phase II of the RFI and the collection of additional data to meet the IM-specific objectives were conducted in 2003. Pilot testing of interim remedial technologies was conducted in 2004, followed by the development and selection of interim remedial alternatives in a November 17, 2004 IM Work Plan (Cox-Colvin, 2004). The selected IMs consisted of an in-situ biological treatment curtain for treatment of ground water in the Upper Outwash (Cox-Colvin, 2005a) and a high vacuum dual phase extraction (HVDPE) system for treatment of soil and perched ground water in the Upper/Middle Till (Cox-Colvin, 2005b). Both systems were installed and began operating in 2005. Essential construction completion information, as-built drawings, and operation and maintenance procedures were provided in the October 2005 IM Construction Completion/Operation and Maintenance Manual (Cox-Colvin, 2005c).

On July 1, 2006 the facility changed its name to Veolia and modified its Permit accordingly. Veolia submitted the RFI Final Report on June 29, 2007 (Cox-Colvin, 2007). Ohio EPA provided comments on the Final RFI Report in an October 2008 letter. Through the letter, Ohio EPA requested additional investigation of the Lower Outwash. Lower Outwash monitor wells were installed and sampled in 2008. Results indicated the Lower Outwash has not been affected by waste management activities at the facility and any potential future impact was very unlikely based on the site hydrogeologic conditions and low concentrations.

On May 4, 2009 around midnight, an explosion and fire (incident) occurred at the facility. The incident resulted in extensive damage to the Operation AOI, the Decant Building, also known as the Container Storage Building (WMU No. 3), and the HVDPE remediation system. A release also occurred to a storm water retention basin called the Northern Retention Basin (NRB), which is located to the southeast of the Operations AOI. Based on the impact of the release caused by the incident, the potential for contamination of drinking water resources, and Ohio EPA's preference to quickly address the contamination, Veolia implemented IMs at the Operations AOI, the Decant Building, and the NRB as documented in the June 8, 2011 IMs Completion Report (Cox-Colvin, 2011). The IMs implemented in these areas as a result of the 2009 incident are discussed further in Section 3.0 below.

2.2 Environmental Setting

The sections below describe the environmental setting of the site, including topography, climate, surface-water drainage, and geologic and hydrogeologic characteristics.

2.2.1 Topography

Veolia is in Montgomery County on the edge of the Great Miami River Valley, with the relatively flat surface topography of the buried valley to the south and variable higher elevations to the north and northwest. This change in elevation is clearly visible on both a regional scale (Figure 1) and at the site scale (Figure 3). Elevations at the Veolia site range from approximately 775 to 730 ft. mean sea level (msl). The northwestern quarter of the site is the highest area of the facility and slopes downward to the southeast from an elevation of 775 ft. to 745 ft. msl. The southern half of the Veolia site is relatively flat with elevations ranging from about 745 to 734 ft. msl. The northeast quarter of the Veolia property slopes from the northeast to the southwest toward an unnamed tributary to Opossum Creek.

2.2.2 Climate

The climate of Montgomery County is classified as humid temperate. Annual precipitation averages 36 to 40 inches with the precipitation in the spring and summer (March-August) slightly exceeding the precipitation in the autumn and winter (September-February). Average annual temperature for the area is 54 degrees Fahrenheit (F), with an average maximum of 87.5 degrees F, and an average minimum of 22.2 degrees F.

2.2.3 Surface Water Drainage

An unnamed, intermittent stream flows across the northeast quarter of the site (Figure 3). This unnamed tributary to Opossum Creek originates northwest of the facility and flows under Infirmary Road just north of the entrance to the Veolia facility after exiting the property. The tributary then flows southeast into Opossum Creek about 1,100 ft. southeast of the facility. Veolia maintains a general National Pollutant Discharge Elimination System (NPDES) permit for storm water associated with industrial activity and discharges stormwater from areas outside of secondary containment or non-process areas of the facility to the unnamed tributary at three locations. Surface water in Opossum Creek flows primarily from north to south in the vicinity of the site and empties into the Great Miami River less than one mile from the facility. The facility is located outside of both the 100- and 500-year flood plains of the Great Miami River.

2.2.4 Surface Soils

Surface soil at the site is comprised of Ockley soils, Miamian series, Corwin and Ross series, and fill. Ockley soils are well drained soils formed in loess and loamy glacial outwash, underlain by sand and gravel. They are nearly level to gently sloping and occur on terraces in valleys of major streams. Miamian series consist of well-drained soils that formed either wholly or partly in calcareous glacial till. They are nearly level to very steep and occupy upland areas of till plains and moraines. Corwin soils consist of dark colored, moderately well drained soils that formed in calcareous loam glacial till. They are nearly level to gently sloping and occupy upland areas. Ross soils consist of dark colored, well-drained soils that formed in recent alluvium on flood plains of major streams and their tributaries. While these soil series were present throughout the Veolia facility prior to the IMs, much of the surface soil within the property consists of fill material as a result of IMs and reconstruction. Fill materials at the site generally consist of gravel and compacted clay. Shallow gravel bedding and pea gravel are associated with foundations, utility trenches, and concrete slabs. A significant portion of the shallow fill and native material has been excavated and backfilled with compacted clay within the Operations AOI, Decant Area, and the NRB.

2.2.5 Geologic and Hydrogeologic Characteristics

The Veolia facility is located along the northwestern margin of the Teays buried bedrock valley system. The general stratigraphy of the site consists of approximately 175 ft of unconsolidated Pleistocene-aged glacial outwash and till deposits overlying Silurian-age shale and limestone bedrock. Sand and gravel outwash deposits are the predominant material within the buried valley system. Surficial unsorted glacial till of varying thickness overlies bedrock in upland areas to the north and west of the site and along the sides of the valley. The site is located at the margin between the upland tills and the outwash materials of the valley floor. A complex intertwining of the till and outwash occurs at the contact between the till and the outwash, resulting in the presence of both small-scale localized and regional unconsolidated hydrogeologic units beneath the site.

Six unconsolidated hydrogeologic units have been identified at the site. These units are identified as Upper Till, Upper Outwash, Middle Till, Middle Outwash, Lower Till, and Lower Outwash. The relationship between these units is very complicated within approximately 30 ft. of the ground surface. For ease of understanding, the site has been divided into four distinct hydrogeologic areas as shown in Figure 4. In Area 1, the shallow subsurface consists of the undifferentiated Upper/Middle Till underlain by the Middle Outwash. Much of Area 2 was removed through excavation following the 2009 incident, however, an Upper Outwash is present between the Upper and Middle Till in the portion not impacted by the IMs. In Area 3, the Upper Till is underlain directly by the Middle Outwash. The Middle Outwash is not present in Area 4, and the Upper/Middle and Lower Till are generally undifferentiated. Figure 5 presents a conceptual site hydrogeologic model that shows the relationships between the site hydrogeologic units before and after IMs were completed.

Upper Till and Undifferentiated Upper/Middle Till

The Upper Till, which is the uppermost naturally occurring hydrogeologic unit at the facility, is described as a moist to wet; soft to firm, plastic, yellow to dark brown, silty clay and clayey silt with traces of sand and gravel and occasional lenses and thin beds of sand and silt. In most areas, the thickness of the Upper Till ranges from approximately 5 to 12 ft. This unit was removed within the footprint of the IM excavation and partially removed within the stormwater retention basins. The Upper Till is positioned upon the Middle Till where the Upper Outwash is absent in the northern portions of the facility (Areas 1 and 4). The Upper Till is underlain by the Upper Outwash in Area 2, and it is underlain by the undifferentiated Upper/Middle Outwash in Area 3.

The areal extent of residual saturation in the Upper Till is estimated to be approximately 250 square feet (0.006 acres). Ground water in this saturated zone fluctuates between approximately 731 and 735 ft msl, correlating to the quantity of recent precipitation. The saturated area fluctuates seasonally as water becomes trapped, evaporates, and/or infiltrates through the vadose zone to the underlying Middle Outwash. Consistent with the Upper Outwash, this residual saturation does not represent a sustainable or sufficient yield of ground water to be classified as a potential drinking water source.

Upper Outwash

The Upper Outwash is present as a perched water-bearing unit only within the central portion of the facility. Much of the Upper Outwash was removed by the IMs. Where it still exists, it is described as a dry to wet; brown to gray; loosely compacted; moderately sorted and stratified silty sand with a trace of gravel. The thickness of the remaining Upper Outwash ranges from less than 1 ft. to 10 ft. At the southern and eastern margins of Area 2, (beyond the edge of the Middle Till), the Upper Outwash and the Middle Outwash merge and are considered one hydrogeologic unit.

The areal extent of saturation in the Upper Outwash totals approximately 2,400 square-ft. (0.055 acres). The localized areas of saturation likely represent depressions in the surface of the Middle Till in which water infiltrating from limited areas of grass cover has ponded. Based on the limited yields of this saturated zone, it was concluded that the areas of residual saturation do not represent a sustainable or sufficient yield of ground water to be classified as a potential drinking water source. Rather, these areas are more like vadose zone soils through which limited quantities of infiltrating waters pass or become trapped.

Middle Till

The Middle Till overlies the Middle Outwash in Areas 1 and 2. The Middle Till is a moist to wet, firm to hard, olive green to dark gray brown clayey silt, with traces of sand and gravel to a sandy, clayey, silt with a trace of gravel. The Middle Till can contain lenses and thin beds of sand and silt. In Area 2, the Middle Till serves as the lower permeability unit upon which the Upper Outwash is perched. In Areas 1 and 4, where the Upper Outwash is absent, the Upper Till rests upon the Middle Till and the contact is difficult to discern. The Middle Till is missing in the southern portion of the property (Area 3). A significant portion of the Middle Till and overlying units have been excavated and backfilled with compacted clay as part of the IM activities. The thickness of the Middle Till beneath the Upper Outwash ranges from zero to 13 ft., with the greatest thickness occurring in the western and northern edges of Area 2.

Middle Outwash

The Middle Outwash is present beneath the entire site, except for the northwest corner of the site. It represents the uppermost laterally continuous aquifer at the site. The Middle Outwash is described as yellow, tan, or brown; loosely compacted; fine to medium sand with medium to coarse gravel and occasional silt. In some areas, IM excavation extended into, but not through, the Middle Outwash (Figure 5). The water table of the Middle Outwash occurs at depths of approximately 20 to 55 ft. below ground surface (bgs). Ground water flow direction within the Middle Outwash has changed through time. Prior to December 1999, the flow direction was predominantly toward the south and southeast with deviations east and southwest. Since December 1999 and currently, ground water flow is towards the south and southwest as shown in an April 2020 map (Figure 6). The hydraulic gradient in the Middle Outwash is relatively flat with an average gradient of 0.001 ft./ft. The flat gradient is the primary reason for the variable flow direction in the Middle Outwash. The average ground water flow rate for the Middle Outwash aquifer is estimated to be approximately 5.0 ft./day throughout most of the site and 0.3 ft./day in the south-central portion of the site.

Lower Till

The Lower Till separates the Lower Outwash from the Middle Outwash and acts as the confining unit for the Lower Outwash. The Lower Till consists of gray to brown, dense, dry, gravelly lean clay. The top of the Lower Till beneath the site ranges from an elevation of 735 ft. to 652 ft. msl and slopes steeply from northwest to southeast. Thickness of the Lower Till ranges from 101 ft. where the Middle Outwash is absent to 31 ft., with the unit thinning to the southeast.

Lower Outwash

The regional Lower Aquifer of Norris and Spieker (1966) is identified as the Lower Outwash at the site. Four wells, including three monitoring wells and a former production well (PW-02), encountered the Lower Outwash. The three monitoring wells were completed in the upper 15 ft. of the Lower Outwash, which is described as primarily sand with up to 10 percent silt. Based on the elevation at which the monitoring wells encountered the Lower Outwash, the surface of this unit appears to be relatively flat across the site. The former production well (PW-02), which was located near the center of the facility, was completed to 173 ft. bgs. Based on the depth of PW-02, the thickness of the Lower Outwash beneath the Veolia facility is at least 50 ft. thick and may be as great as 100 ft. thick. Ground water flow direction in the Lower Outwash beneath the facility is to the southeast with and estimated flow rate of approximately 0.00042 centimeters per second (cm/sec) (0.6 ft./day).

Bedrock

No soil borings or monitoring wells installed during RFI activities reached the bedrock surface beneath unconsolidated hydrogeologic units. The bedrock surface is present at approximately 550 ft. msl (between 185 and 225 bgs) and slopes to the south into the axis of the buried valley based on the Ohio Department of Natural Resources (ODNRs) Bedrock Topography Map of the Miamisburg, Ohio Quadrangle.

2.3 Current Conditions

The site can be divided into four broad land use categories. This includes the operations area (approximately 15.8 acres or 52.5%), the administrative building area (approximately 4.4 acres or 14.6%), the southern storage area (approximately 7.1 acres or 23.6%), and a small forested area which includes the unnamed tributary to Opossum Creek (approximately 2.8 acres or 9.3%). The operations area includes the process area, utility building, tanks farms, the emission control unit, fire water tower and pump house, trailer staging areas, the decant and drum storage building, the non-haz building, laboratory building, and employee parking area (Figure 2). The operations area was newly constructed following the 2009 incident except the utility building, the drum storage building, and the lab building. The operations area is primarily under roof, within containment, and/or pavement-covered. However, grass-covered areas are present sporadically within the operations area as well as surrounding three sides of the operations area. Four stormwater retention basins are within the grass-covered areas. A concrete drive connects the operations area to the administrative building area to the north. The administrative building area is also north of the tributary to Opossum Creek. The southern storage area is located to the south of the operations area and includes the maintenance building, an equipment storage pole barn, and empty trailer parking. The ground surface in this area is both concrete and grass covered.

Table 1 provides a summary of background levels of metals in soil and ground water. There are no aquatic use designations for the unnamed tributary to Opossum Creek, but both Opossum Creek and the Great Miami River are designated as warm water habitat with designated agricultural and industrial water supply uses and primary contact recreational use.

Opossum Creek is also designated as a state resource water. There are no surface water community water supply intakes located within 2 miles of the Veolia facility.

Figure 7 shows the potable wells nearest to the site. The nearest community water supplies are the City of West Carrollton (2 miles), the Pineview Estates Mobile Home Court (1 mile), and the Jefferson Regional Water Authority (JRWA) (1.7 miles). Each of these water supplies use ground water from the Lower Outwash. However, the Great Miami Valley Aquifer, which is a soil source aquifer, serves as the principal source of drinking water for people living in the Miami Valley river basin. The buried valley aquifer system is divided into Class I and Class II aquifers, based on hydrogeologic characteristics, and Veolia is located over the Class I aquifer, near the Class II boundary.

TABLE 1 SOIL AND GROUND WATER BACKGROUND LEVELS

	Soil (mg/kg)	Ground water		
		Upper Middle Till (mg/L)	Middle Outwash (mg/L)	Lower Outwash (mg/L)
Antimony	1.821	0.011	0.013	NA
Arsenic	20.621	0.00562	0.013	ND-0.029
Barium	317.441	0.181	0.062	ND-1.2
Beryllium	1.281	0.0053	0.0053	NA
Cadmium	0.491	0.0192	0.0023	NA
Chromium	46.711	0.00252	0.00253	NA
Cobalt	13.72	0.053	7.13	NA
Copper	39.441	0.0253	0.01252	NA
Lead	19.52	0.0033	17.313	NA
Mercury	0.151	0.00023	0.213	NA
Nickel	46.821	0.043	15.013	NA
Selenium	0.712	0.00892	0.683	NA
Silver	0.583	0.0053	0.683	NA
Thallium	1.481	0.013	1.43	NA
Tin	7.121	0.13	13.63	NA
Vanadium	91.261	0.053	22.723	NA
Zinc	102.521	1.01	0.052	NA

3.0 INTERIM CORRECTIVE MEASURES

Following the 2009 incident, an emergency response and IMs were completed to address the resulting release of VOCs and semi-volatile organic compounds (SVOCs) to soil, ground water, and to a lesser degree, surface water. Access to the unnamed tributary (which is present within the northeast portion of the facility property) was granted to Veolia by emergency services personnel at approximately 7:00 AM on May 4, 2009. To limit off-site migration via surface water, spill booms and pads were placed in the tributary and the outfalls to the tributary were plugged at individual catch basins. As a precaution, the use of spill booms and pads continued well after the incident, and the storm water outfalls remained plugged for an extended period. Liquid waste materials within the concrete containment areas, tanks, and other containers were removed as quickly as access was granted and safety issues could be addressed. Veolia systematically removed the waste from the containment areas over a 6 to 8 week period in a manner that maximized worker safety and minimized threat to the environment. Details of the emergency response can be found in the District Office Investigation Report (DOIR) (Ohio EPA, 2009).

Based on the impact of the release caused by the incident, the potential for further contamination of drinking water resources, and Ohio EPA's preference to quickly address the contamination, Veolia implemented IMs at the Operations AOI, Decant Area, and the NRB. IM activities for the NRB were conducted separately, while IM activities for the Operations AOI and Decant Area coincided. Veolia and Ohio EPA maintained frequent and open lines of communication (including weekly conference calls) throughout planning and implementation of the IMs to facilitate sharing updates and information, which provided opportunities for discussing any significant changes as issues arose.

The release to the NRB resulted in the migration of VOCs and SVOCs from the bottom of the basin through the underlying Middle Outwash vadose zone and into ground water of the Middle Outwash since the NRB was located directly over the Middle Outwash aquifer. Veolia implemented IMs at the NRB to treat residual contaminants in the vadose zone and ground water beneath the basin and prevent contaminants in Middle Outwash ground water from migrating off site as detailed in a Permanganate Infiltration and Ground Water Recirculation Workplan (Cox-Colvin, 2009a). Ohio EPA approved this workplan through a June 8, 2009 letter, and the IMs were implemented in May through July 2009. Four recovery wells were installed to address the migration of contaminants in ground water, and sodium permanganate was used treat the vadose zone and ground water beneath the NRB.

The former Operations AOI (WMUs 1, 2, and 4), the former Decant Building (WMU 3), the former Laboratory Building, and all above-ground equipment and structures associated with these areas were demolished and removed, leaving only the concrete and asphalt surfaces. Soil and ground water sampling was conducted following the incident to evaluate the need, potential design, and implement additional IMs for the Decant Building and the former Operations AOI.

Soil sampling at the Decant Building was conducted from August 13 to September 3, 2009. The purpose of the sampling at the Decant Building was to determine if a release had occurred from the former Decant Building to underlying soil, and, if so, to determine both the nature and horizontal and vertical extent of the release.

Soil samples were collected from the Operation AOI on a systematic sampling approach from depths that were expected to be uncontaminated or below screening levels using a 20 ft. grid interval and a column and row designation. The grid-based soil sampling was conducted within the Operations AOI from July 24 through September 4, 2009. Additional soil sampling was performed on September 28 and 29, 2009.

Two ground water sampling events occurred following the incident. Upper/Middle Till and Upper Outwash wells were sampled on May 14 and 15, 2009, and a comprehensive site-wide sampling event of all site monitor wells was conducted from June 30 through July 2, 2009.

The soil and ground water sampling conducted at the former Operations AOI and the Decant Building indicated that VOCs and SVOCs in the soil and perched ground water were a potential unacceptable risk to a site worker and a continuing source of ground water contamination to the regional Middle Outwash aquifer. To limit the subsurface migration of contaminants and facilitate timely reconstruction, a December 10, 2009 IM Workplan presented an evaluation of various remedial alternatives and a design for a preferred remedial alternative (Cox-Colvin, 2009b).

The selected IMs were implemented for former Operations AOI and Decant Area between May 2009 and June 2010. The IM activities included: RCRA Closure activities, excavation and offsite disposal of 72,661 tons of soil followed by backfill and compaction, pumping and offsite disposal of 1,135,730 gallons of storm water and ground water, and well abandonment activities. A June 8, 2011 IMs Completion Report details the IMs for the NRB, former Operations AOI, and former Decant Area. Ohio EPA approved the IMs Completion Report on July 27, 2011. As discussed further in Section 5.0, these IMs were intended to serve, in part, as a final remedy for the site.

Shortly following completion of the IMs, Ohio EPA requested verification sampling of the Lower Outwash monitor wells in an August 17, 2010 letter. A verification scope of work was provided to Ohio EPA on August 30, 2010, and verification sampling was conducted on September 22, 2010. The verification sampling results submitted to Ohio EPA on November 19, 2010 indicated that the Lower Outwash had not been impacted by the 2009 incident (Cox-Colvin, 2010).

Following completion and Ohio EPA approval of the IMs, Ohio EPA granted Veolia positive determinations for the Environmental Indicators Current Human Exposures Under Control (CA725) and Migration of Contaminated Groundwater Under Control (CA750) on September 27, 2011 and September 28, 2012, respectively.

4.0 RCRA FACILITY INVESTIGATION SUMMARY

The CA process is defined in Ohio EPA's Corrective Action Plan. The general steps in the CA process are as follows:

- *FACILITY ASSESSMENT* - Updated or conducted by Ohio EPA. It answers the questions: Is there a current release and/or imminent threat?

- *INTERIM MEASURE(S)* - Undertaken by the facility, it addresses in the near term a release or potential release and/or an imminent threat or potential imminent threat.

- *RCRA FACILITY INVESTIGATION* - Undertaken by the facility. It answers the questions: How significant is the release or potential release and/or imminent threat or potential imminent threat?

- *CORRECTIVE MEASURE(S) STUDY (CMS) AND DECISION* - Shared responsibility by both the facility and Ohio EPA. It determines how to best address the release or potential release and/or imminent threat or potential imminent threat.

- *CORRECTIVE MEASURE(S) IMPLEMENTATION (CMI)* - Performed by the facility, it designs the solution and addresses the release or potential release and/or imminent threat or potential imminent threat.

RCRA CA is a requirement of the Veolia's permit and Section E.5 of the Permit requires that an RFI be conducted to determine the nature and extent of the releases of hazardous waste and hazardous constituents from the WMUs. An RFI was submitted on June 29, 2007 to Ohio EPA. Ohio EPA provided comments on the RFI and additional investigations to address the comments were being conducted when an explosion and fire occurred at the facility on May 4, 2009. IMs were implements to address the VOCs that were released as a result of the incident. The IMs were implemented as part of the RCRA CA Program and included the excavation and offsite disposal of more than 70,000 tons of impacted soil.

Following IM activity completion, additional data was collected to evaluate issues remaining at the site from the incident and address the significant changes to site conditions as a result of the incident. On July 10, 2018, a revised RFI Report was submitted and comments were exchanged. The comments were addressed and the RFI Report was finalized on May 22, 2019. The findings of the May 22, 2019 RFI Report are summarized below:

- The horizontal and vertical extent of residual constituents is extremely limited beyond excavation areas and has been adequately defined using screening criteria.
- The human health risk assessment (HHRA) concluded that there is no unacceptable risk to site workers through direct contact exposure to contaminated soil.
- The residual saturation within the Upper Outwash and Upper/Middle Till do not represent an enough yield of ground water to be classifies as a drinking water source.
- The Lower Outwash is free of contamination and is separated from the Middle Outwash by a continuous clay confining unit.

- Based on the HHRA and the facility's use of municipally supplied water, there is no unacceptable risk to site workers or downgradient residents through the potable use of ground water.
- Current site workers are not considered potential receptors via the vapor intrusion pathway because the facility recovers and manages solvents as part of its permitted process and is regulated by Occupational Safety and Health Administration (OSHA). An Environmental Covenant would require a reevaluation of the vapor intrusion pathway if the property use changes to ensure protection of future workers.
- No further ecological assessment is recommended for the site based on the general lack of functioning habitat over the majority of the site, lack of significant ecological resources or communities at or in the vicinity of the site, and the quantitative comparisons of the site analytical data to ecological benchmarks.
- The IMs were intended to serve, in part, as a final remedy.
- The site would require an Environmental Covenant and a Ground Water Monitoring Program and Plan.

In typical RCRA CAs, an RFI concludes by identifying the need for corrective measures, which leads to a CMS. However, no other activities will be required as part of the final remedy and a CMS and CMI Workplan will not be necessary.

On July 24, 2020, a letter was provided to the Ohio EPA to discuss the risk evaluation for construction workers (Cox-Colvin, 2020). The letter concluded that there is no unacceptable risk to construction workers through direct contact exposure to contaminated soil.

Ohio EPA has reviewed the RFI and has determined that the remedial activities have fulfilled the requirements of CAs at the facility. More detailed results of the RFI are summarized in the following sections.

4.1 Human Health Evaluation

Risks associated with exposure to Constituents of Concern (COCs) were evaluated for exposure pathways determined to be complete. The following complete exposure pathways were identified:

- Site worker direct contact exposure to contaminated soil;
- Offsite residential exposure to ground water through potable use and vapor intrusion pathways; and
- Site worker exposure to VOC-contaminated soil and ground water through a vapor intrusion pathway.

COCs at the site do not currently present unacceptable risk for complete exposure pathways. This evaluation was completed by comparing data to existing comparison standards for each pathway as noted below. For each COC, the maximum value in each media for each discrete area, were compared to the following:

Soil Standards

- U.S. EPA Regional Screening Levels (RSL) (November 2018) for residential and industrial direct contact scenarios based on a target risk (TR) of 1E-06 and a target hazard quotient (THQ) of 0.1 were used a screening levels.
- U.S. EPA RSLs (November 2018) for residential and industrial direct contact scenarios based on a TR of 1E-05 and a THQ of 1.0 were used as action levels.
- U.S. EPA RSL Calculator for construction worker direct contact scenarios based on TR of 1E-06 and THQ of 0.1 and TR of 1E-05 and THQ of 1.0.
- Remediation Goals from the IM Workplan (Cox-Colvin 2009, Table 6-1).
- Leach-based soil standards based on 2009 RSLs as discussed in Section 4.2.1 of RFI Report (Cox-Colvin, 2019).
- Action Levels in OAC 1301:7-9-13 (Petroleum UST Corrective Action) were used for petroleum detected in soil.
- Background Limits for metals.

Sediment Standards

The sediment direct contact pathway at the site is not considered to be complete, therefore sediment standards are not applicable.

Surface Water Standards

The surface water pathway at the site is not considered to be complete, therefore surface water standards are not applicable.

Ground water Standards

- U.S. EPA MCLs for drinking water.
- U.S. EPA RSLs (November 2018) for tap water based on a TR of 1E-06 and a THQ of 0.1 were used as screening levels.
- U.S. EPA RSLs (November 2018) for tap water based on a TR of 1E-05 and a THQ of 1.0 were used as action levels.

Indoor Air Standards

- U.S. EPA Vapor Intrusion Screening Levels Calculator (May 2019) using a ground water temperature of 13°C for residential scenario at TR=1E-06 and THQ=0.1.
- U.S. EPA Vapor Intrusion Screening Levels Calculator (May 2019) using a ground water temperature of 13°C for residential scenario at TR=1E-05 and THQ=1.0.

4.1.1 Soil Direct Contact Pathway for Site Worker

Of the 57 COCs detected in soil samples, only three were associated with an exceedance of the residential RSL based on TR=1E-06 and THQ=0.1: N,N-dimethylacetamide, TCE and vinyl chloride (see Table 2 below). N,N-dimethylacetamide was detected in two samples over the residential screening level, but both sample concentrations fell below the industrial screening level, residential and industrial action levels, and IM remediation goals. A similar pattern was observed for TCE. Vinyl chloride was detected in six soil samples over the residential screening level, but all sample concentrations fell below the industrial screening level, residential and industrial action levels, and IM remediation goals. Because there were no exceedances of industrial screening levels, a multiple chemical adjustment was not performed. Soil sample locations that were found to exceed residential RSLs are shown in Figure 8.

TABLE 2 SOIL DIRECT CONTACT SAMPLE EXCEEDANCES

COC	Sample Concentration (µg/kg)	Sample Location	RSL Screening Level (TR=1E-06, THQ=0.1) (µg/kg)		RSL Action Level (TR=1E-05, THQ=1.0) (µg/kg)		IM Remediation Goal (µg/kg)
			Residential	Industrial	Residential	Industrial	
N,N-dimethylacetamide	480	CS-F2-729 at 17.5 ft. bgs	260	1,500	2,600	15,000	92,000
N,N-dimethylacetamide	510	CS-G5-725 at 26.5 ft. bgs	260	1,500	2,600	15,000	92,000
TCE	490	AOI10-3.15 at 21.4 ft. bgs	410	1,900	4,100	19,000	563
TCE	440	CS-H1-744 at 9.1 ft. bgs	410	1,900	4,100	19,000	563
Vinyl Chloride	1,400	F7-731 at 16. 4 ft. bgs	59	1,700	590	17,000	128
Vinyl Chloride	1,400	E7-729 at 16.1 ft. bgs	59	1,700	590	17,000	128
Vinyl Chloride	1,200	E7-731 at 14.1 ft. bgs	59	1,700	590	17,000	128
Vinyl Chloride	320	CS-E7-733 at 12.1 ft. bgs	59	1,700	590	17,000	128
Vinyl Chloride	190	CS-F7-733 at 14.4 ft. bgs	59	1,700	590	17,000	128

Vinyl Chloride	170	EXWALL-14 at 12.5 ft. bgs	59	1,700	590	17,000	128

The maximum concentration of total petroleum hydrocarbon (TPH) found in soil samples did not exceed the action levels in OAC 1301:7-9013.

The maximum concentrations of metals post-IM did not exceed the background limits for metals.

Based on the detected COCs and the facility's commercial/industrial land use, there is no unacceptable risk to the site workers through direct contact exposure to contaminated soil.

4.1.2 Soil Direct Contact Pathway for Construction Worker

As stated in Section 4.1.1. only three COCs (N,N-dimethylacetamide, vinyl chloride and TCE) exceeded residential RSLs, but the concentrations were below industrial RSLs and therefore no unacceptable risk to the site worker. However, additional evaluation was needed to determine if there was any risk to construction workers as construction worker exposure can be more intensive than typical industrial or outdoor exposures, so industrial RSLs may not always be protective of the construction worker.

Ten feet is the maximum anticipated depth of disturbance during typical construction activities. The detections of N,N-dimethylacetamide and vinyl chloride that were found to exceed residential RSLs were found at depths deeper than 10 ft bgs (see Table 2) and more than 10 ft of clean backfill has been placed above the locations with N,N-dimethylacetamide and vinyl chloride exceedances. Given that the exceedances occurred below the anticipated depth that a construction worker would encounter, it was determined that N,N-dimethylacetamide and vinyl chloride do not present a potential risk to a construction worker.

TCE was detected in soil exceeding the residential RSL in two samples. One sample was found to have a TCE concentration of 490 micrograms per kilogram (µg/kg) at 21.4 ft bgs which was below the anticipated depth that a construction worker would encounter. The second sample had a TCE concentration of 440 µg/kg at 9.1 ft bgs. Clean backfill has been placed above these two locations, but as an additional line of evidence the U.S. EPA RSL calculator was used to determine a construction worker RSL for soil direct contact to TCE. Based on the Ohio risk goal TR of 1E-05 and THQ of 1.0 the construction worker RSL would be 4,220 µg/kg. Both TCE exceedances fall below the construction worker RSL and it was determined that TCE does not present a potential risk to a construction worker.

4.1.3 Potable Use Ground Water and Soil to Ground Water Leaching Pathways

The only ground water zone for which the potable use exposure pathway is complete is the Middle Outwash. Only six individual organics were detected in one or more of the Middle Outwash ground water monitoring wells: 1,1,1-Trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), chloroform, tetrahydrofuran (THF), TCE, and cis-1,2-DCE. Ten soil COCs were found to have concentrations that could potentially result in an exceedance of potable use standards in underlying ground water: 1,1-DCA, 1,4-dioxane, 2-butanone, acetic acid, cis-1,2-DCE, N,N-dimethylacetamide, naphthalene, tetrachloroethene (PCE), TCE and vinyl chloride. By combining those COCs that could potentially leach to the Middle Outwash ground water with those COCs identified in the Middle Outwash ground water samples, a total of 13 COCs are identified. Only two COCs exceeded potable use screening levels: TCE and 1,4-dioxane.

On-site TCE concentrations in Middle Outwash are as high as 8 micrograms per liter (µg/L), exceeding the MCL of 5 µg/L. Off-site (fenceline) concentrations of TCE are at or below 4 µg/L, and do not exceed the MCL. Because there is no on-site potable ground water use (Section 3.2 of Cox-Colvin, 2019), TCE concentrations do not presently pose unacceptable risk to receptors.

1,4-Dioxane concentrations are non-detect (<0.86 µg/L) in Middle Outwash (Section 4.3.4 of Cox-Colvin, 2019). However, the method detection limit (MDL) is greater than the potable use screening level (TR=1E-06, THQ=0.1) of 0.46 µg/L. Because 1,4-dioxane concentrations potentially exceed the potable use screening level, a comparison was made to the Ohio EPA action level of 4.6 µg/L (TR=1E-05, THQ=1.0). The MDL is less than this action level. 1,4-Dioxane is the only COC that does not have an MCL and is potentially present at the site above the point of departure for risk evaluation (TR=1E-06, THQ=0.1) and is, therefore, the only COC for which a multiple chemical adjustment is appropriate. Although this is not necessary for evaluation of the potable use pathway since there is a single chemical, performing a multiple chemical adjustment allows cumulation of risk across exposure pathways (Section 5.4 of Cox-Colvin, 2019). If it is conservatively presumed that 1,4-dioxane is present in ground water at a concentration just below the MDL of 0.86 µg/L, the carcinogenic risk is 2E-06, below the Ohio EPA risk goal of 1E-05. This carcinogenic risk was calculated by dividing 0.86 µg/L (representative concentration) by the carcinogenic action level of 4.6 µg/L (TR=1E-05, THQ=1), and then multiplying by the risk goal of 1E-05.

Based upon detected constituent concentrations, including those nearest the property boundary, and the facility's use of municipally-supplied water, there is no unacceptable risk to site workers or downgradient residents through the potable use of ground water pathway. Due to the presence of a continuous confining unit separating the Middle Outwash from the Lower Outwash, the deeper Lower Outwash is free of contamination.

4.1.4 Vapor Intrusion to Indoor Air Pathway

Veolia site workers are not considered potential receptors via the vapor intrusion pathway because the facility recovers and manages solvents as part of its permitted processes and exposure of site workers to VOCs in the work environment is regulated under OSHA. No corrective measures for this pathway are required for the current vapor intrusion pathway. It is not anticipated that the property use will change at Veolia, but as a protective measure, an Environmental Covenant for the property would include a requirement to reevaluate the onsite vapor intrusion pathway if the property use changes in the future.

The vapor intrusion pathway for off-site receptors was evaluated using recent ground water analytical data. The maximum detected concentration of the 13-ground water VOC COCs was used in the evaluation. Only one COC (TCE) exceeded the target Vapor Intrusion Screening Level (VISL) concentration in ground water 0.897 μg/L based on TR=1E-06 and THQ=0.1. Concentrations of TCE nearest the property boundary were as high as 3.7 μg/L. Although this value exceeds the VISL target ground water concentration, it is below both potable use standards (5 μg/L) and a residential, vapor intrusion-based target ground water concentration of 9 μg/L when calculated with TR=1E-05 and a THQ of 1.

The U.S. EPA VISL calculator was used to calculate incremental risk from TCE for offsite receptors. Carcinogenic risk for off-site (residential) receptors is 2E-06, and noncarcinogenic risk is 0.4. These values are also below Ohio EPA risk goals of 1E-05 and 1.0, respectively. In addition to being below risk goals, ground water with the highest concentrations of TCE is not located beneath occupied structures.

There is no unacceptable risk to downgradient residents through the vapor intrusion.

4.2 Screening Ecological Risk Assessment

Located in the northeast corner of the Veolia facility is an unnamed tributary to Opossum Creek. This intermittent creek flows across the northeast corner of the facility. A 1996 permit noted that Veolia discharged storm water from the non-process areas of the plant to the unnamed tributary to Opossum Creek at six locations. As such, it was possible, but unlikely, that a release from the Operations AOI may have occurred. In 1987, a surface water sample was collected from the unnamed tributary and a visual inspection was conducted of the creek area. There was no evidence of surface water contamination.

Three borings were installed between the Operations AOI and the unnamed tributary to determine shallow ground water was present adjacent to the stream which may be discharging to the unnamed tributary. Several VOCs were detected in the ground water above screening levels and it was conservatively concluded that a release of hazardous constituents to the unnamed tributary had occurred (Section 4.2 of Cox-Colvin, 2007).

To further evaluate if a release to the creek occurred, additional surface water and sediment samples were collected from the unnamed tributary in 1999. Two VOCs (1,1-DCA and toluene) were detected in downstream surface water samples but were below screening levels.

While toluene was detected in sediment samples, the results were below screening levels, and it is thought that the toluene was a laboratory artifact.

Given the surface water and sediment results, it was determined that a hazardous release to the unnamed tributary had not occurred. As such, the sediment direct contact pathway and surface water pathway at the site were not considered to be complete.

However, when the incident occurred in 2009, it is possible that a limited release occurred to the unnamed tributary. Emergency response actions took place immediately after the incident occurred to protect surface water. In addition, the incident was a one-time event and the event would not have resulted in any long-term release of contamination. Furthermore, IMs and redevelopment of the facility occurred with surface water protection in consideration.

A Screening Ecological Risk Assessment (SERA) was conducted and no further action was concluded in 2007. Surface water and sediment samples were collected from the unnamed tributary and results were compared to published ecological benchmarks. The SERA concluded that the site did not provide much functional wildlife habitat and that no threatened or endangered species of plants or animals were present. The 2009 incident is not expected to have altered the conclusions made in the 2007 SERA or changed the determination that the surface water and sediment pathways were considered incomplete.

5.0 SUMMARY OF PROPOSED REMEDY

The RFI Report (Cox-Colvin, 2019) concluded by referring to the data presented in the document as confirmation that no further CA measures should be required at the Veolia facility and that a CMS would not be necessary. The IMs were intended to serve, in part, as a final remedy for the site. An Environmental Covenant and a ground water monitoring plan will be considered as the other components of the final remedy. The Environmental Covenant would restrict land use to commercial/industrial use, prohibit potable use of ground water, and require reevaluation of the vapor intrusion pathway in the event operations on the property change in the future. Ohio EPA has reviewed the findings of the RFI Report (Cox-Colvin, 2019) and concurs that no additional investigations or CA measures are needed outside of obtaining an Environmental Covenant and updating the Ground Water Monitoring Plan.

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FIGURES

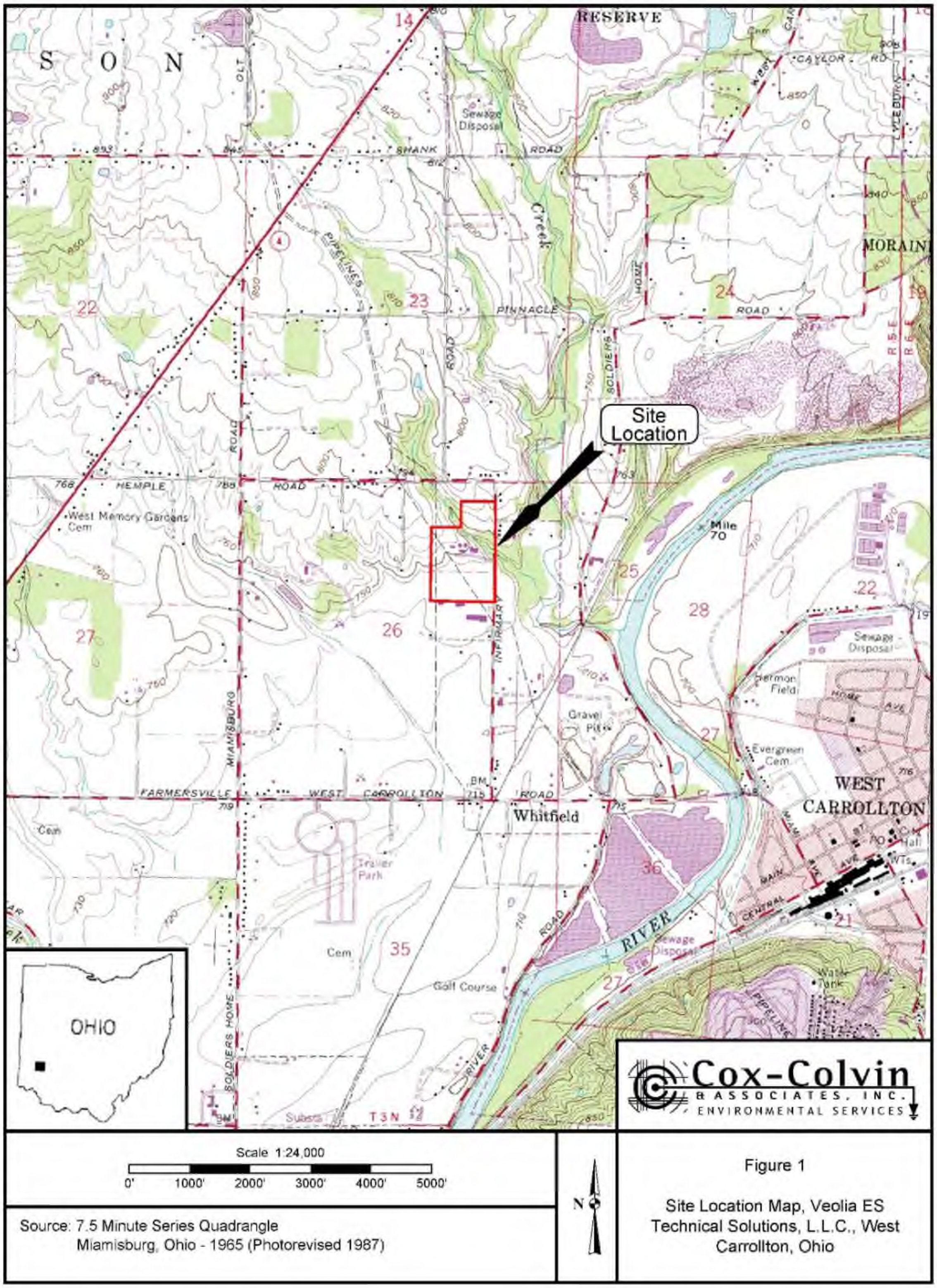

FIGURE 1 SITE LOCATION MAP

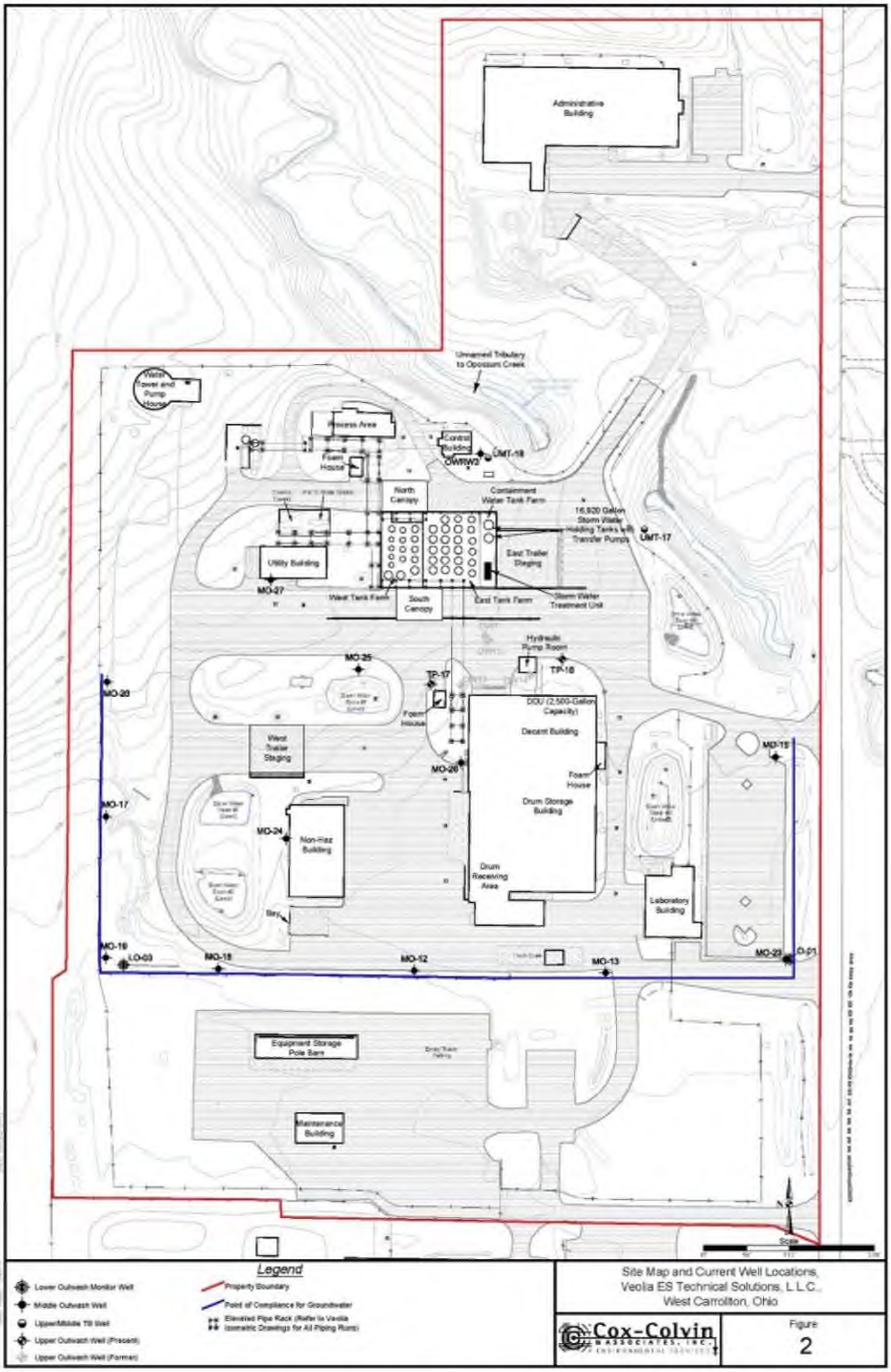

FIGURE 2 SITE MAP AND CURRENT WELL LOCATIONS

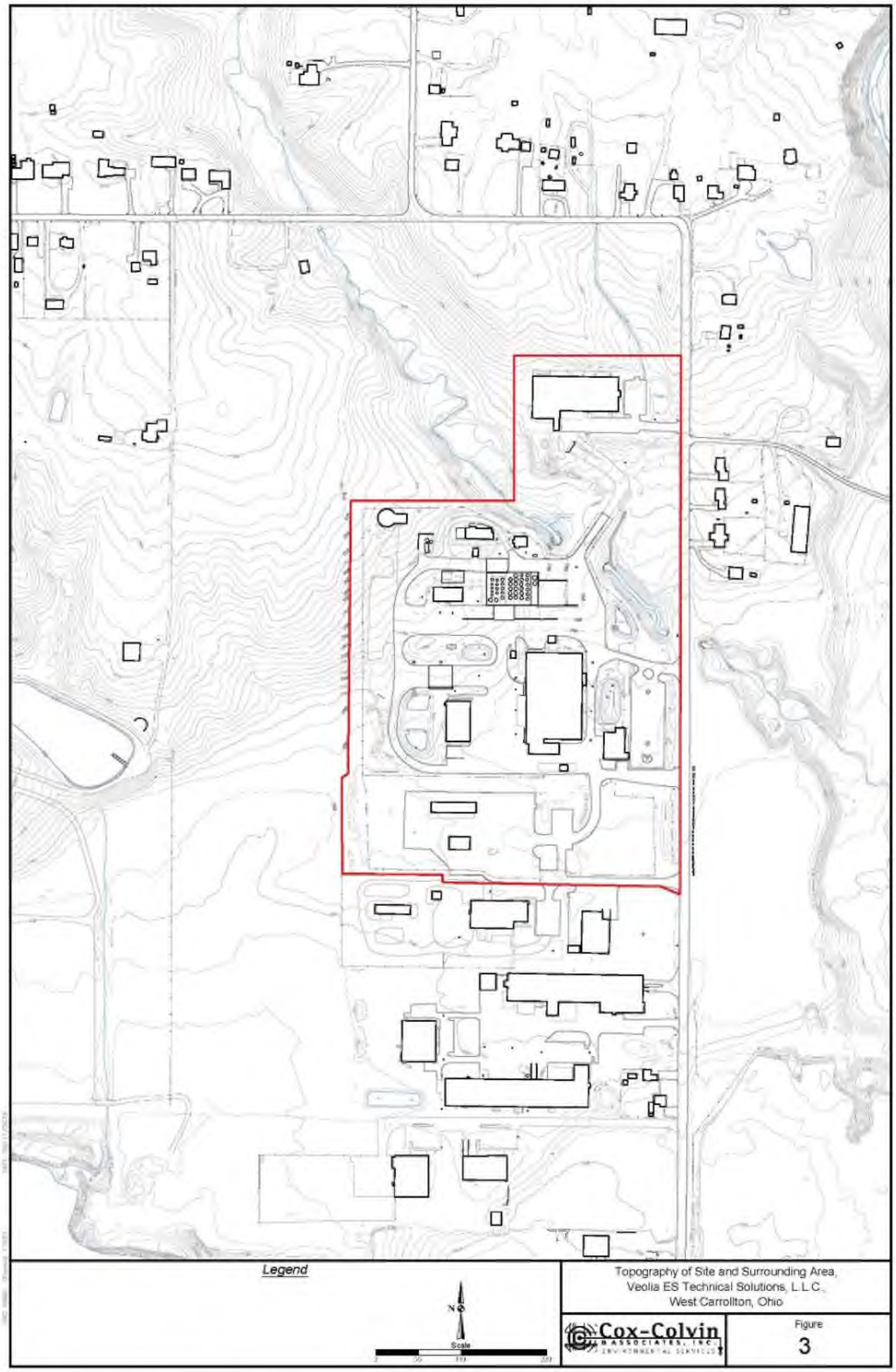

FIGURE 3 TOPOGRAPHY OF SITE AND SURROUNDING AREA

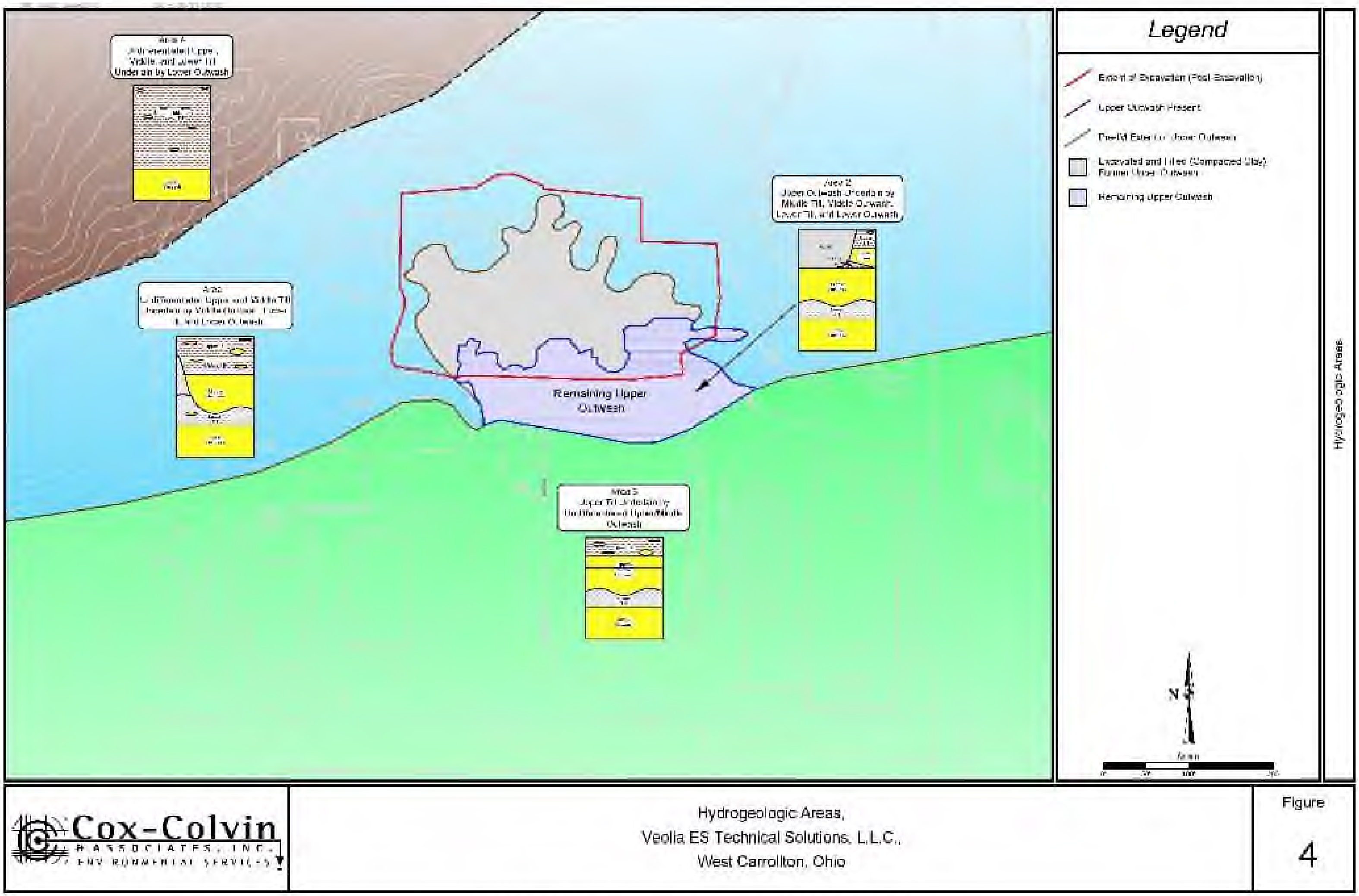

FIGURE 4 HYDROGEOLOGIC AREAS

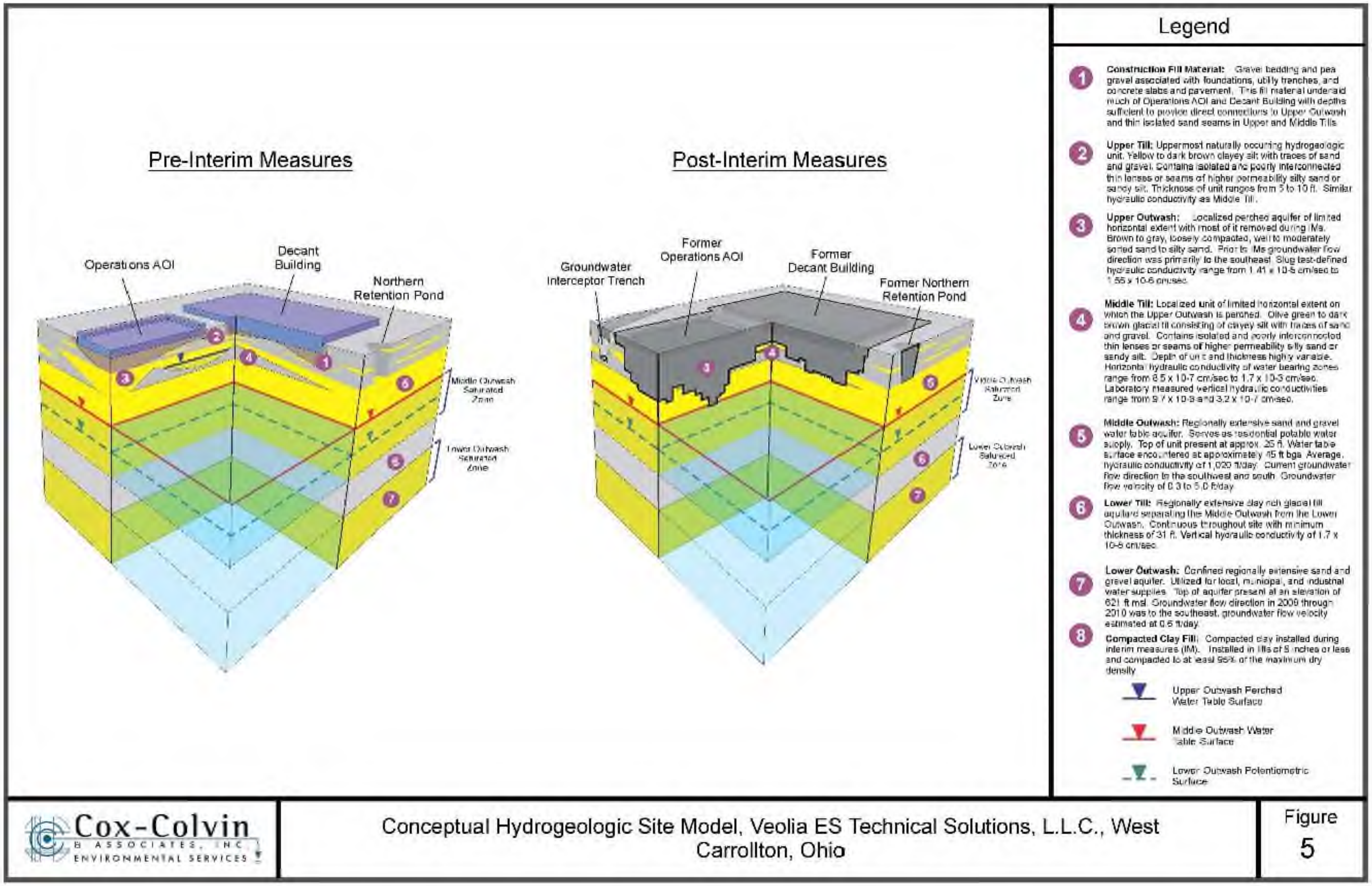

FIGURE 5 CONCEPTUAL HYDROGEOLOGIC SITE MODEL

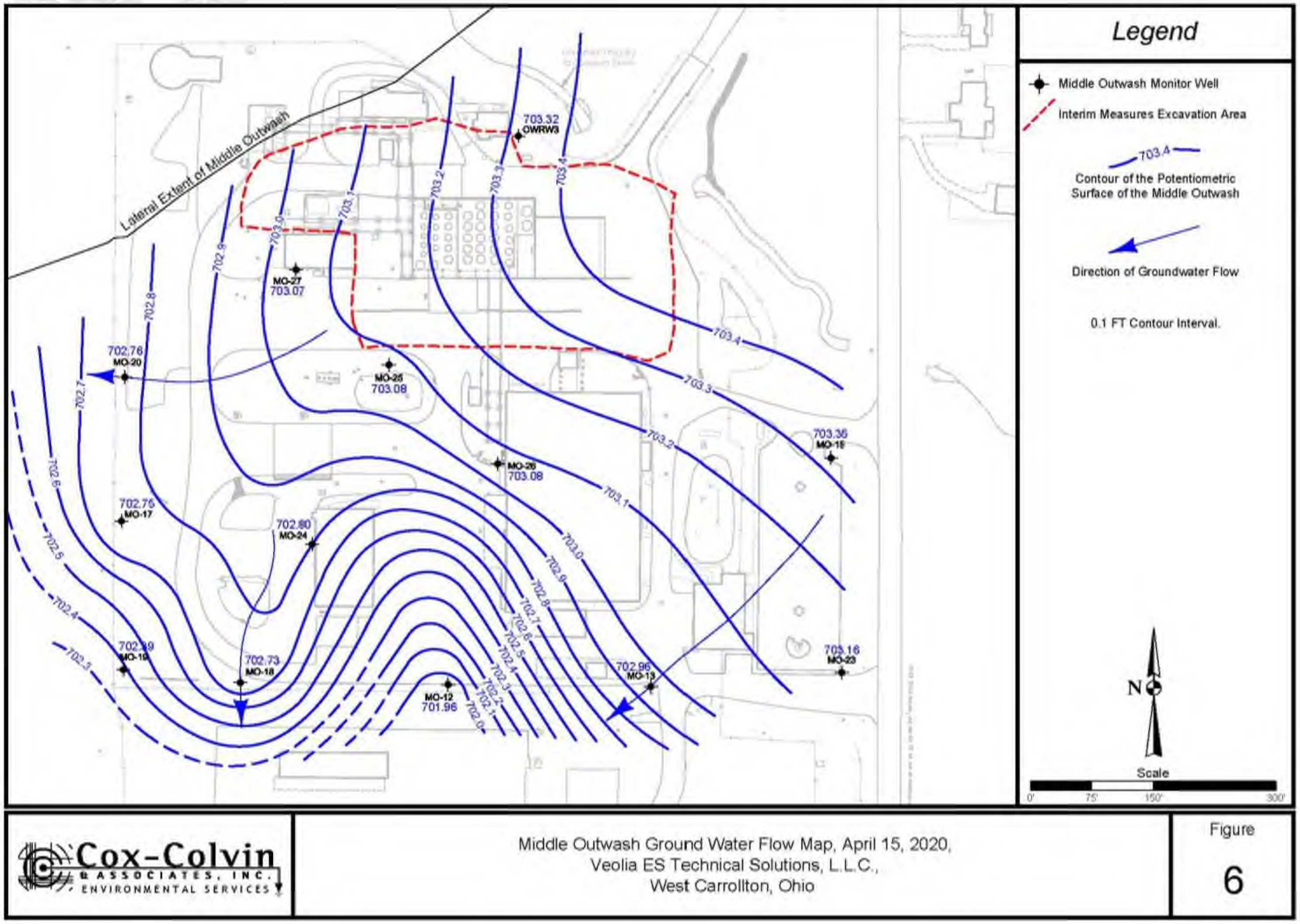

FIGURE 6 MIDDLE OUTWASH GROUND WATER FLOW MAP

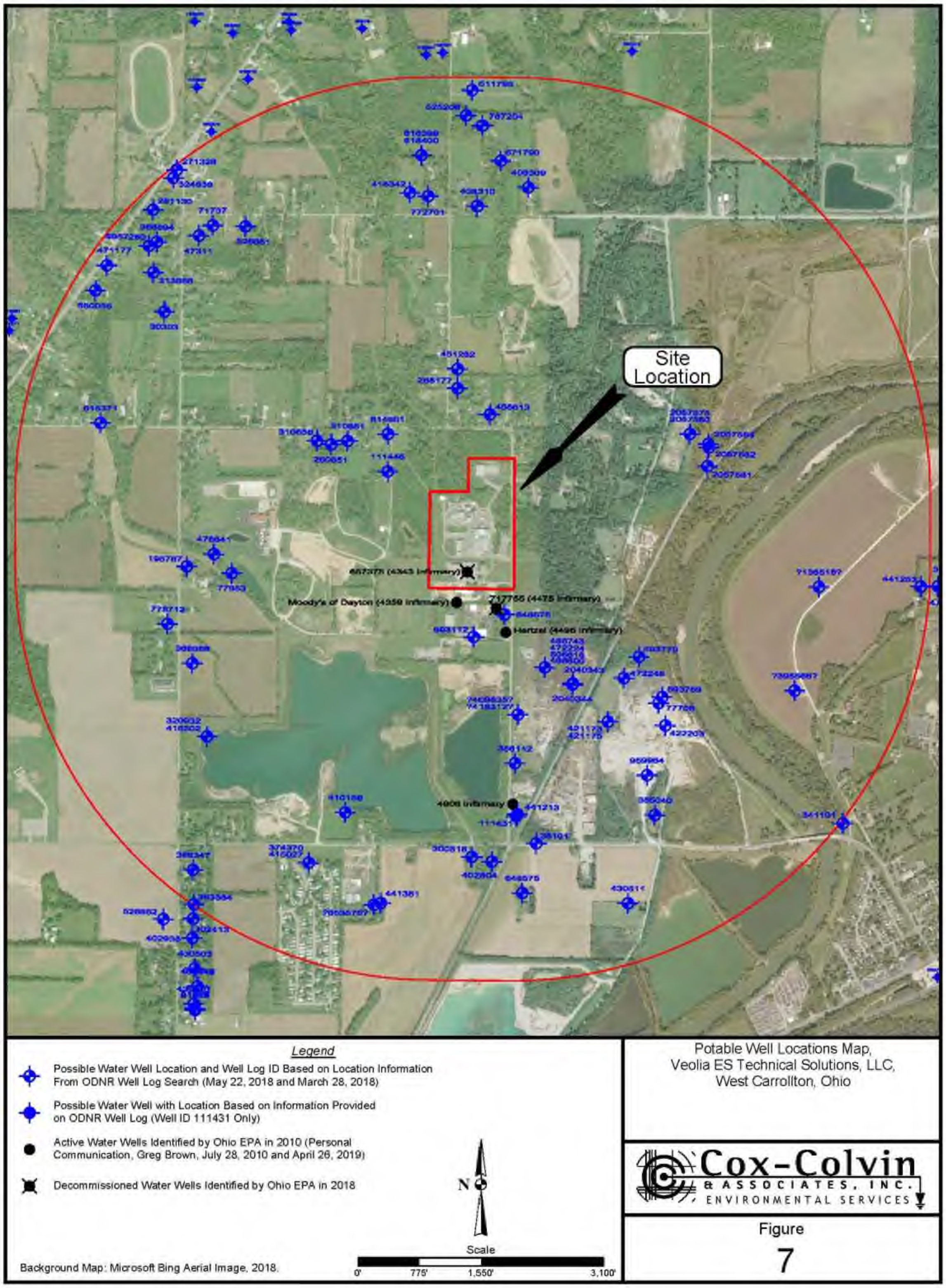

FIGURE 7 POTABLE WELL LOCATIONS MAP

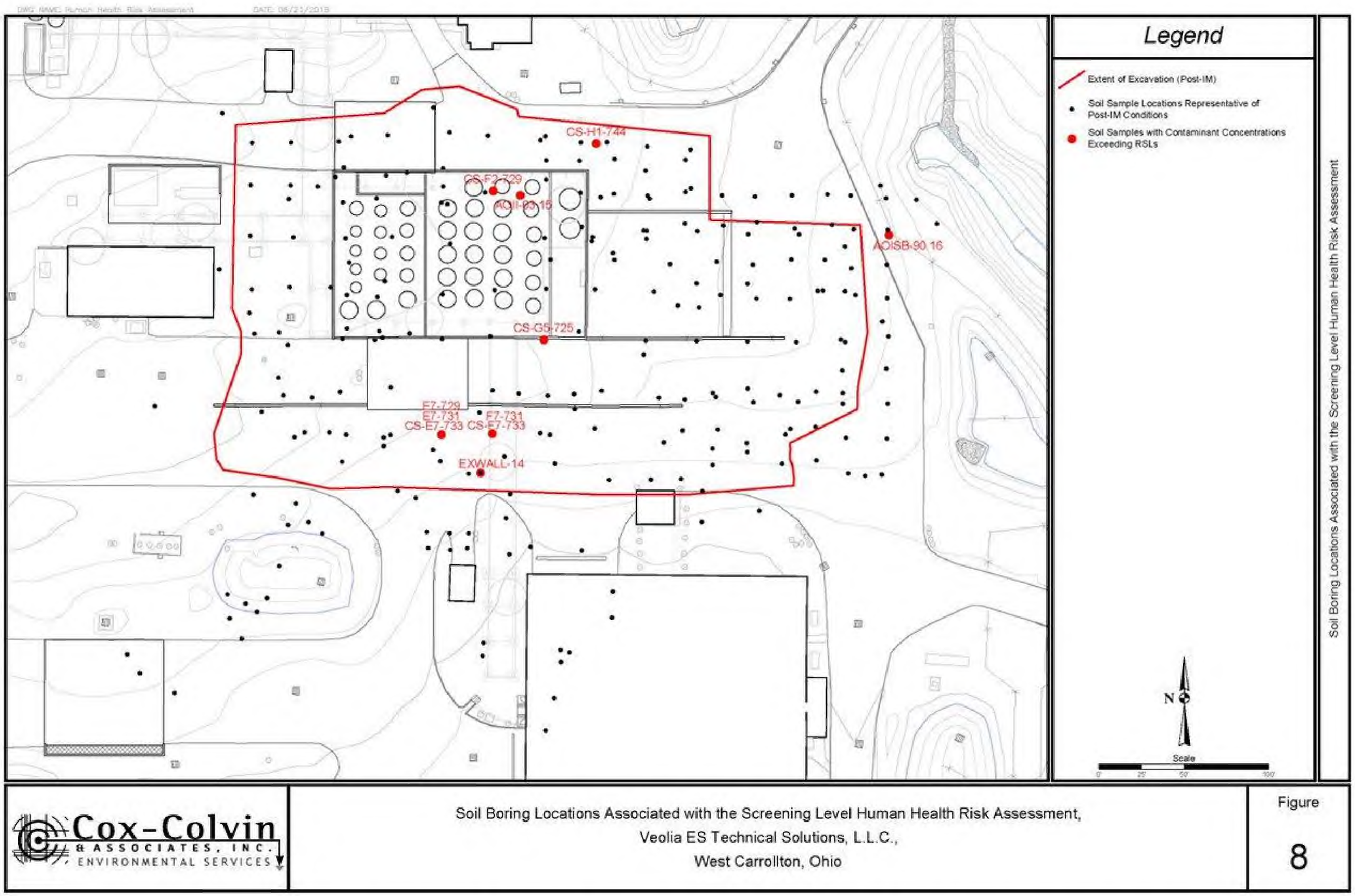

FIGURE 8 SOIL BORING LOCATIONS ASSOCIATED WITH THE HUMAN HEALTH RISK ASSESSMENT EXCEEDANCES