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UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION 5

Statement of Basis

for

RACER Trust
Former GM Delco Plant 5

Kokomo, Indiana

EPA ID NO. 000 806 844

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FIGURES

TABLES

ATTACHMENTS

ACRONYMS

AOC	Area of Concern
AOC	Administrative Order on Consent
AOI	Area of Interest
AST	Above Ground Storage Tank
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Total Xylenes
BUSTR	Bureau of Underground Storage Tank Regulations
CAO	Corrective Action Objective
CCR	Coal Combustion Residuals
CMS	Corrective Measures Study
ESL	Ecological Screening Level
EPA	U.S. Environmental Protection Agency
GLI	Great Lakes Initiative
HHRA	Human Health Risk Assessment
HI	Hazard Index
IC	Institutional Control
IDEM	Indiana Department of Environmental Management
IDNL	Indiana Dunes National Lakeshore
IDNP	Indiana Dunes National Park
ISS	In-Situ Solidification/Stabilization
MCL	Maximum Contaminant Level (Drinking Water)
LNAPL	Light Non-aqueous Phase Liquid
PA/VSI	Preliminary Assessment/Visual Site Inspection
PCB	Polychlorinated biphenyl
PRG	Preliminary Remediation Goal
RCRA	Resource Conservation and Recovery Act
RSL	Regional Screening Level
RFI	RCRA Facility Investigation
SB	Statement of Basis
SPLP	Synthetic Precipitation Leaching Procedure
SVOCs	Semi-volatile Organic Compounds
SWMU	Solid Waste Management Unit
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
UST	Underground Storage Tank
VISLs	Vapor Intrusion Screening Levels
VOCs	Volatile Organic Compounds
WQS	Water Quality Standards

SECTION I: INTRODUCTION AND PURPOSE OF THE STATEMENT OF BASIS

The primary purpose of this Statement of Basis ("SB") document is to invite comments from the public on the approach being proposed by the U.S. Environmental Protection Agency (EPA) to remediate and manage in place contaminated soil and groundwater at the Former GM Delco Plant 5 facility ("Facility" or "Site") located in Kokomo, Indiana (see Figure 1). Soil and groundwater at the site have been contaminated by historical industrial processes. The primary contaminant at the Site is trichloroethene (TCE), an organic chemical known to be harmful to human health and the environment above certain concentrations. This proposed remedy is designed to protect people currently using the Site, future industrial or commercial workers at the site, and off-site receptors including residents and construction workers. The details of the proposed remedy are provided in this document.

EPA invites written, electronic and verbal comments from the public on the proposed remedy. Public comments will be used to inform EPA's final decision regarding the remedy selection for the Site. EPA will publish a Final Decision and Response to Comments (FD/RC) document conveying EPA's final decision on how the Site will be remediated, after the close of the comment period. Public comments will be reviewed and addressed in the FD/RC document. See pages 23-24 for instructions on how to provide comments to EPA on this SB.

This document summarizes information that can be found in greater detail in the Corrective Measures Proposal (RCRA Corrective Action Corrective Measures Proposal, RACER 2019) and other documents contained in the Administrative Record for this Facility (see Attachment A).

Corrective Action Order on Consent – 3008(h)
In 2011, EPA and the Revitalizing Auto Communities Environmental Response (RACER) Trust entered into an Administrative Order on Consent ("AOC" or "Order") requiring that RACER investigate and clean up contamination released at its property and establishing EPA oversight of the remedial process. The AOC 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).

Work ordered by EPA is designed and implemented to protect human health and the environment. The RCRA program oversees the cleanup of the Site under the Corrective Action program. The Corrective Action program is responsible for ensuring that facilities investigate and clean up releases of hazardous waste and hazardous constituents at their properties and any releases that have spread beyond the property boundaries, which may pose a risk to human health or the environment. The selected remedies, or clean-up actions, were chosen based upon the current and future anticipated use of the property.

Remedy Summary
After reviewing the results of samples and studies, past environmental practices, historical investigations and remedial activities, a suite of cleanup options were evaluated. Each option was evaluated for its ability to protect human health and the environment. After comparing options and weighing each against EPA standards, EPA is proposing the options presented below to address contamination, primarily trichloroethene (TCE). Each of the options summarized below are described in more detail in Section VI.

Proposed Remedies

In-Situ Solidification/ Stabilization (ISS)

The remedy proposed to address source area soil and groundwater contamination is in-situ stabilization/solidification (ISS)[1]. EPA is proposing the addition of zero-valent iron (ZVI) to the soil and ground water as an in-situ pretreatment (stabilization) followed by solidification of the material by mixing it with a pozzolanic reagent such as cement (see Attachment B for more information on this technology).

Groundwater Contingency Plan

After the implementation of the source area ISS remedy, a groundwater monitoring plan will be developed and implemented to identify the need to implement additional treatment of the ground water should groundwater concentrations of TCE or TCE degradation by-products increase during the ISS process.

Monitored Natural Attenuation

Monitored natural attenuation (MNA) is proposed as a follow up to the source control remedy, ISS. MNA is the use and monitoring of naturally occuring biological and chemical processes to reduce concentrations of contaminants. In this case, the MNA involves an extensive monitoring network and suite of parameters to be analyzed on a regular basis to track the progress of the remediation. It is being proposed based upon existing studies demonstrating the Site environment is conducive to the processes responsible for natural attenuation (see Attachment B for more information on this technology). A contingency plan to deal with the possibility of inadequate MNA progress in contaminant reduction will be developed as part of long-term stewardship for the Site.

Institutional Controls

The Facility will be deed restricted to non-residential, commercial/industrial uses. EPA is also requiring land use restrictions for the property to ensure the construction of or occupancy of an enclosed workspace or building is allowed only if a vapor mitigation system is installed, operated, and maintained within the structure (active or passive). Implementation of a groundwater use restriction for the property is also proposed, prohibiting the extraction of groundwater for any purpose, including, but not limited to human or animal consumption, gardening, industrial processes, or agriculture. EPA will require implementation of a Well Restriction Overlay District to ensure that no new groundwater wells will be installed in the designated area around the Facility; this action requires approval by the City and County Plan Commissions. An Institutional Control Implementation and Assurance Plan (ICIAP) will be prepared to document all controls.

Long Term Stewardship/Five Year Remedy Review

EPA will require RACER to establish a long-term stewardship (LTS) plan, including monitoring and reporting requirements, to remain in effect while contamination remains above unrestricted use levels. The frequency of data collection and reporting will be defined within the long-term stewardship plan. Institutional and engineered controls will be certified annually. Five-year remedy reviews, a component of long-term stewardship, will be the appropriate means to update the conceptual site model (CSM), as needed. The efficacy of Monitored Natural Attenuation will be monitored and assessed as part of LTS. If

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[1] Solidification/stabilization is within the top five most frequently selected in-situ methods for source remediation according to the 2017 Superfund Remedy Report, 15th Edition. As summarized on *clu-in.org,* EPA's 2010 Superfund Remedy Report indicates that 56 Superfund National Priorities List sites used ISS to treat sources between 1982-2008.

natural attenuation no longer appears to be occurring, is no longer taking place at a rate consistent with the cleanup timeline or is no longer consistent as a cleanup approach based on changes to groundwater use, the LTS plan will include a contingency plan that will address those situations. Clear short-, intermediate, and long-term remedial objectives will be established in the Corrective Measures Implementation Plan and incorporated into the LTS plan.

SECTION II: FACILITY BACKGROUND

Location and Setting

The Facility is a 10.5-acre property located in Kokomo, Indiana, the county seat of Howard County (see Figure 2). The property is vacant, grass-covered and has no structures on it. The Facility is bounded by Butler Street to the north, beyond which are residential and industrial properties; by an abandoned industrial property to the south (former Midwest Plating Corporation); a railroad to the west, beyond which are residential and commercial properties; and North Washington Street to the east, beyond which are residential properties.

The diverse range of properties surrounding the Facility is consistent with the current zoning districts. The Facility predominantly lies within a Heavy/Medium Industrial Development Area, which designates uses that manufacture or assemble products and that typically have moderate to significant traffic. Within the immediate vicinity of the Facility there are a variety of major transportation corridors, which include major roadways and an active railway.

Ownership History

The Facility was constructed in 1915 and used until 1926 by Apperson Brothers Automobile Company to assemble Haynes automobiles. In 1926 the Facility was owned by Wolfe Manufacturing Industries which manufactured radio cabinets. The Facility was purchased in the late 1930s by Reliance Manufacturing who used the Facility for manufacturing women's clothing and packing parachutes during World War II. In 1953, General Motors' (GM) Delco Division purchased the building and was using the Facility to assemble and test circuit boards when the plant closed in 1991. Prior to its closing, the operational buildings occupied approximately 144,000 square feet (sq ft) of floor space. Demolition of all site buildings, including the removal of the floor slabs, was completed in 1993. The property was donated to the Kokomo-Howard County Development Corporation (KHDC) in February of 1999. In December of 2003, the KHDC transferred the Facility back to GM.

As a result of GM's June 2009 bankruptcy, existing, non-continuing assets remain the property of "old" GM, which changed its name to Motors Liquidation Company (MLC) in its capacity as a debtor-in-possession in the bankruptcy case. On March 31, 2011, the RACER Trust became effective. On that date, all assets and cleanup funding that had been the responsibility of MLC were transferred to RACER Trust. RACER Trust is responsible for completing the Corrective Action activities at this Facility in accordance with the Cost Estimate and Settlement Agreement that are the basis for the Trust.

Geology and Hydrogeology

The generalized elevation of the Facility is approximately 826 feet above mean sea level (AMSL), with the land surface being relatively flat. The Facility is in the Upper Wabash Basin and lies within the Bluffton/Tipton Till Aquifer System physiographic unit. The topography resulted from Pleistocene time Wisconsinan glacial advances. The regional geology of the area around the Facility consists of approximately 80 feet of alluvial and glacial deposits overlying sedimentary carbonate bedrock (see Figure 3). The Pleistocene glacial drift is characterized by clay tills and stream deposits consisting largely of sand and gravel. The discontinuous sand and gravel deposits are interspersed within the clay tills.

According to the United States Department of Agriculture (USDA) Soil Survey of Howard County, the soil type at the Facility is classified as the Crosby Series and specifically the Crosby silt loam. The Crosby Series is described as poorly drained soils that formed in thin deposits of loess and in underlying glacial till. Runoff is very slow, with a 0 to 2 percent slope. Typically, this soil has a high-water capacity and a low permeability.

Seven distinct hydrostratigraphic units have been identified at the Facility. Three sand units separated by clay layers have been observed at the Facility and have been designated as the S1 Unit, the S2 Unit, and the S3 Unit, with the S1 Unit being the shallowest and the S3 Unit being the deepest. These water-bearing zones are each isolated by aquitards consisting of clay or till in the following sequence:

- Upper Confining Unit – consisting primarily of clay and till
- S1 Unit – sand and gravel glacial outwash
- Middle Confining Unit – hard clay-rich till
- S2 Unit - sand and gravel glacial outwash
- Lower Confining Unit - hard gray clayey silt
- S3 Unit - sand and gravel glacial outwash and highly weathered limestone
- B1 Unit - limestone bedrock.

The two uppermost units have been the primary zones of concern involving site investigations. The soil of the Upper Confining Unit is the area of contaminant impacts and is the source of groundwater contamination to the S1 Unit (see Figure 4). The S1 Unit is the horizon containing the Facility's contaminated groundwater plume, beneath the Upper Confining Unit. The location of the soil contamination that is causing groundwater contamination within the upper portion of the S1 Unit is described more in Section III. Due to the location of the soil contamination within this geologic setting and the S1 Unit contamination located in the upper portions of the aquifer, this proposed remedy relies on remediating that zone of contamination. This remedial approach is described more in Section VI.

Soil

The primary characteristics of the impacted units are summarized as follows:

Upper Confining Unit **–** The Upper Confining Unit is composed of topsoil, clay, and till. Underlying the topsoil is a plastic clay, which is composed of pliable silty, sandy clay and is generally encountered from the surface to approximately 15 feet below ground surface (bgs). Beneath the plastic clay lies a zone of till consisting of non-plastic and firm silt, sands, and trace pebbles. The till is encountered between approximately 15 to 25 feet bgs and ranges in thickness from 4 to 12 feet thick. The water table typically occurs near the base of this till unit, though the soil is of sufficiently low permeability that wetness is often difficult to observe in soil samples. This unit contains isolated lenses of saturated sand. Additionally, on the eastern portion of the Facility, temporary wells that were set within the Upper Confining Unit yielded water, albeit in limited amounts.

S1 Unit **–** The S1 Unit is the first encountered continuous water-bearing unit and is generally first observed between 15 to 25 feet bgs. The S1 Unit consists primarily of sand and gravel glacial outwash deposits. Outwash sediments form as meltwater from the glacier deposits sands and silts in braided-stream environments directly in front of the glacial extent. This depositional environment can create heterogeneous sedimentary deposits with complex transport flow fields that are likely multi-directional. Because braided-stream deposits tend to form long, narrow beds rather than laterally extensive, planar beds, the hydraulic conductivity is greatest in the direction parallel to the deposited beds. This anisotropy will tend to bias groundwater flow parallel to the long axis of the most highly permeable beds.

While in bulk, the S1 Unit consists mostly of very permeable sand and gravel, site data show that the S1 Unit is heterogeneous both laterally and vertically. In a number of borings, very highly permeable beds appear to occur at the base of the S1 Unit, while finer sand or silt beds are noted in the upper part of the unit. Neither of these observations, however, is found consistently across the Facility. Based on the dynamic nature of the depositional environment, no single trend (e.g., fining upward sequence) appears to be consistently applicable and this environment impacted the recommended remedy.

A key aspect of the S1 Unit is that it thins dramatically to the east and southeast. The S1 Unit ranges in thickness from 1 foot near the eastern and southeastern margins of the study area and 35 feet near the center of the Facility (e.g., primary source area).

Surface Water
There are no surface water bodies in the immediate vicinity of the Facility. The nearest major surface water body is Wildcat Creek, which is located approximately 1.5 miles south of the Facility and flows in a west-southwest direction. It is not impacted by any contamination at the Facility.

SECTION III: SUMMARY OF ENVIRONMENTAL INVESTIGATION

The purpose of a Corrective Action Remedial Facility Investigation ("RFI") is to determine whether hazardous waste or hazardous constituents were released into the environment at a Facility, 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 Site physical characteristics, sources of contaminants, their fate and transport, affected environmental media, and potentially exposed people. Each RFI varies depending on site-specific details.

During the investigation phases, environmental media such as soil and groundwater 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 to 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. This process can often take several years to complete. At the RACER site, the primary contaminant of concern is TCE due to its wide-spread presence and its concentration, but the site also contains other contaminants related to TCE. These TCE related contaminants include cis- and trans-1,2-dichloroethene (DCE) and vinyl chloride (VC). Table 1, below, presents a summary of the groundwater data that was collected at various locations during the investigation. Table 2 presents a summary of the soil data.

Site Investigation Summary
The RFI included the following areas of investigation:

- AOI 2: Fill Area
- AOI 3 and Upgradient Area
- AOI 5: Former Hazardous Waste Storage Area
- AOI 6: Former Waste Pile
- AOI 7: Former East Manufacturing Building

- Downgradient areas

These areas (see Figure 5) were included in the RFI to determine if hazardous constituents had been released to the environment. Over the course of the investigation, approximately 480 soil samples were collected, and 1,166 groundwater samples collected (see tables below). Additional investigation was conducted at the adjacent property during the RFI to determine any contributions from the Former Midwest Plating facility, a former Superfund site to the south. The RFI was conducted in four phases and the investigations are summarized below. Summary data tables can be found at the end of this section.

Upgradient Groundwater Evaluation

The Upgradient investigation activities consisted of installing four monitoring wells (MW-0501-P1, MW-0501-S2, and MW-0501-S3U) upgradient from the former Facility operations. Vinyl chloride (VC), a degradation product of TCE, was detected at one location during one sampling event. Subsequent sampling events and other locations in this area did not detect VC above screening criteria.

AOI 2

The scope of the RFI work completed at AOI 2 involved the sampling of an existing monitoring well (MW-0103-S1U) during Phases II and IV of the RFI to evaluate groundwater quality in AOI 2. TCE, cis-1,2-dichloroethene (DCE), and vinyl chloride were detected at concentrations above their respective drinking water criteria. Downgradient from AOI 2, TCE, cis-1,2-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than their respective drinking water criteria. The groundwater data collected during the RFI indicated that concentrations in groundwater are stable in this area.

AOI 3

The scope of investigation for this area included the installation of six groundwater monitoring wells and the advancement of over 100 soil borings. Lead, TCE, tetrachloroethene (PCE), cis-1,2-DCE, methylene chloride, and vinyl chloride were detected in soil at concentrations above the industrial Preliminary Remediation Goal (PRG), industrial volatilization to indoor air, and/or migration to groundwater criteria for soil within AOI 3 during the RFI. Soil concentrations exceeding these soil criteria are bounded by locations with lower concentrations within AOI 3 or by AOIs to the north and east of AOI 3. Cadmium, TCE, cis-1,2-DCE, and vinyl chloride were detected at concentrations above the drinking water criteria in AOI 3. Downgradient from AOI 3, cadmium, TCE, cis-1,2-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than the drinking water criteria. The RFI Report concluded that the data collected meet the objectives of the RFI and adequately characterize soil and groundwater at and around AOI 3. The groundwater data collected during the RFI indicated that constituent concentrations in groundwater are stable in this area.

AOI 5

The scope of the RFI at AOI 5 involved the advancement of 15 soil borings and the installation and sampling of 10 monitoring wells to characterize soil and water quality. TCE was detected in soil at concentrations above the Industrial PRG, industrial volatilization to indoor air, and/or migration to groundwater criteria for soil. Soil concentrations exceeding these soil criteria are bounded by locations with decreasing concentrations within AOI 5 or by AOIs to the east of AOI 5. TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride were detected at concentrations above their respective drinking water criteria in AOI 5. Downgradient from AOI 5, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than their respective drinking water criteria. Based on the vertical groundwater data obtained within AOI 5, groundwater concentrations are delineated vertically within AOI 5.

AOI 6

Investigation activities in this area involved the advancement of 18 soil borings and the installation and sampling of four monitoring wells. TCE and PCE were detected in soil at concentrations above the industrial PRG, industrial volatilization to indoor air, and/or migration to groundwater criteria for soil. Soil concentrations exceeding these soil criteria are bounded by locations within AOI 6. TCE, cis-1,2-DCE, and vinyl chloride were detected at concentrations above their respective drinking water criteria in AOI 6. Downgradient from AOI 6, TCE, cis-1,2-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than their respective groundwater screening criteria. The groundwater contamination was delineated in this area and appears to be stable.

AOI 7

The scope of the RFI at AOI 7 involved the advancement of 15 soil borings, the installation and sampling of five monitoring wells, and sampling of an existing monitoring well to characterize soil and water quality. TCE was detected in soil at concentrations above the Industrial PRG, industrial volatilization to indoor air, and/or migration to groundwater criteria for soil. Soil concentrations exceeding these soil criteria are bounded by locations within AOI 7. TCE, cis-1,2-DCE, and vinyl chloride were detected at concentrations above their respective drinking water criteria groundwater. Downgradient from AOI 7, TCE, cis-1,2-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than their respective drinking water criteria.

Off-Site East

The Off-Site East Investigation consisted of monitoring wells, soil borings, and soil gas vapor ports located downgradient and to the east of the former Facility. The scope of the RFI completed as part of the Off-Site East investigation included the advancement of nine soil borings, the installation and sampling of 22 monitoring wells, and the installation and sampling of 11 soil gas ports. No soil constituent concentrations exceeded soil screening criteria. TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride were detected at concentrations above their respective drinking water criteria for the Off-Site East area. TCE, cis-1,2-DCE, trans-1,2-DCE, and vinyl chloride are bounded by monitoring wells that do not exhibit concentrations higher than the drinking water criteria. Further, based on the vertical groundwater data, groundwater is bound vertically. Soil gas concentrations resulted in a Superfund referral, discussed in more detail later. Investigation downgradient and west of the Facility also took place but site-related impacts were not found. The scope of investigation in this area included 13 groundwater monitoring wells and one soil boring.

High-Resolution Site Investigation

High-resolution site characterization (HRSC) consists of strategies and techniques designed to collect data that is representative of actual environmental conditions. Contaminant distribution in the environment is usually highly variable. Concentrations can vary widely over small distances and small changes in the soil can significantly impact how contamination moves. HRSC is a set of tools implemented to collect data at the appropriate scale of the variability in the environment.[2]

A HRSC groundwater investigation was conducted to better understand the exact locations where groundwater is contaminated and where it is migrating off-site. A hydraulic profiling tool (HPT) was used

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[2] CLU-IN, https://clu-in.org/characterization/technologies/hrsc/index.cfm

to conduct vertical aquifer profiling (VAP) along the eastern and southern property boundaries at the facility. The primary purpose of the VAP investigation was to understand the relative mass flux at the eastern and southern property boundaries. The relative mass flux distinguishes the mass that moves in transport zones from the mass stored within the slow advection and storage zones within an aquifer, thereby identifying the primary areas along the property boundary where contaminate mass migration occurs.

The VAP investigation consisted of:

- Sixteen HPT borings to characterize aquifer hydraulic properties
- Nineteen groundwater sampling locations with water samples collected from up to eight separate intervals within the S1 Unit
- Installation of 12 temporary monitoring wells to characterize the groundwater in the Upper Confining Unit

The key finding of the investigation demonstrated that 90 percent of the mass flux of TCE, cis-1,2-DCE, and vinyl chloride occurs within approximately 20 percent, 50 percent, and 30 percent, respectively, of the cross-sectional area containing concentrations above the MCL. Figure 6 shows the results of the investigation. This information is important because it helped develop a targeted cleanup strategy that will provide the biggest return on investment. Understanding that the groundwater concentrations of concern occupy a relatively small area of mass transport indicates that an aggressive source area treatment, as proposed, in combination with the natural attenuation that has been documented will successfully foster groundwater restoration.

A HRSC soil investigation was also conducted at the known and suspected contaminant source areas in order to target those areas that would have the greatest potential for reducing the groundwater concentrations, if targeted. A total of 46 soil borings were installed (these borings were in addition to hundreds of soil borings collected throughout the course of the investigation). The purpose of these focused borings was to delineate the soil footprint that would be included in a proposed remedy targeting the source. A TCE soil footprint concentration of 100 mg/kg was determined through modeling to be the concentration at which groundwater restoration would be successful based upon remedial endpoints.

Soil borings were advanced using direct-push drilling through the upper silt and clay overburden units and into the upper portion of the S1 Unit. Soil samples were collected at 2-foot intervals for analysis of CVOCs (specifically, TCE, PCE, cis-1,2-DCE, vinyl chloride, 1,1,1-trichloroethane, 1,1-dichloroethane, 1,1-DCE, and trans-1,2-DCE), see Figure 7. A mobile laboratory was brought on-site that allowed for an adaptive field sampling approach to strategically target and delineate CVOC soil concentrations. Based on the mobile laboratory data analyzed on-site, some soil boring locations were extended deeper into the S1 Unit to further delineate the vertical extent of CVOC impacts. Soil samples with PID results greater than 100 parts per million (ppm) were also field screened for the presence of DNAPL using hydrophobic dye test kits.

The key findings included:

- TCE located in the northern (AOI 2) and southern source (AOI 5) areas is leaching from the silt and clay unit to groundwater in the S1 Unit. There does not appear to be a soil source in the eastern area of the site.
- The source area footprints were further refined and can be seen on Figure 8

- DNAPL was not observed in any of the samples

Natural Attenuation Investigation
The processes of natural attenuation (NA) rely on natural biological and chemical mechanisms to reduce or eliminate contamination in soil or groundwater. In order to incorporate monitored natural attenuation (MNA) into a cleanup remedy, an investigation is necessary to better understand the exact mechanisms and the viability of attenuation as a component of a remedy. EPA guidance adopts a tiered lines-of-evidence approach to documenting NA and includes assessing chemical data, geochemical parameters and microbial populations. This investigation included those three lines of evidence (see Figures 9 and 10).

The chemical data evaluation included:

- a statistical evaluation of concentration trends for key monitoring wells and CVOC pairs
- a linear regression trend analysis on wells where an extensive amount of data was present
- the Mann-Kendall trend test completed on wells where a smaller amount of data was present

Results demonstrated:

- the TCE plume at the Site is generally stable and not expanding, and is decreasing in the central zone and western lobe of the plume body
- TCE is degraded relatively rapidly as it is transported away from the western Site boundary source areas
- the presence of cis-1,2-DCE and vinyl chloride suggests that TCE degradation via natural reductive dechlorination occurs at the Site
- cis-1,2-DCE concentrations are stable immediately downgradient and side-gradient of the identified plume core areas
- Vinyl chloride concentrations exceeding the MCL are not widely found at the Site. Taken together with stable to decreasing TCE and cis-1,2-DCE concentration trends, this suggests: (1) TCE and cis-1,2-DCE are not fully biodegraded via reductive dechlorination to vinyl chloride, but are rather co-metabolized or (in the case of cis-1,2-DCE) oxidized, or (2) vinyl chloride produced via reductive dechlorination is rapidly metabolized. Vinyl chloride trend analysis results indicate that, where vinyl chloride is present, concentrations are generally stable to decreasing.

Geochemical parameters provide critical information and indirect evidence of biodegradation based on an evaluation of the suitability of environmental conditions to specific degradation processes. In order to evaluate the site conditions for the use of specific remedies, geochemical conditions at the site were evaluated.

The geochemical evaluation at the site included:

- sampling and analysis of dissolved oxygen, oxidation-reduction potential, nitrate, total organic carbon, sulfate, and methane
- ethane, ethene and chloride analysis to determine if degradation end products were present

Results demonstrated:

- conditions in the plume core and body are moderately to strongly reducing, which is necessary for the reductive dechlorination to occur and degrade the CVOCs

- the highest concentrations of ethane and ethene were in the plume core and the downgradient areas, which suggests complete reductive dechlorination of TCE is occuring

An evaluation of the microbial population in the environment provides a direct line of evidence for natural attenuation. Certain microbes with specific genes are known to degrade CVOCs. The presence of these microorganisms in combination with the right geochemical conditions provide evidence of on-going NA.

The microbial evaluation included:

- two targets were measured with Bio-Trap samplers, Dehalococcoides and Dehalobacter (both known to degrade CVOCs)
- three common reductase enzyme genes were measured: tceA, BVC and VCR
- three common genes known to catalyze oxidation reactions were measured: EtnC, EtnE and SMMO

Results demonstrated:

- both microbe targets, Dehalococcoides and Dehalobacter, were detected in the groundwater plume (see Figure 11)
- BVC was the primary reductase gene found in the plume at moderately high abundance
- SMMO was the primary oxidation gene found in the plume at a high abundance
- overall results demonstrate spatial variability in the genes measured but provide a clear line of evidence that reductive dechlorination is occurring

Summary Data Table 1: Groundwater Sampling Data

AOI	Constituent	Max Detected (ug/L)	MCL (ug/L)	Commercial/ Industrial Groundwater Vapor Intrusion Screening Criteria (ug/L)	Residential Groundwater Vapor Intrusion Screening Criteria (ug/L)
AOI 3	TCE	28800	5	2150	1540
AOI 5	TCE VC	18500 684	5 2	2150 1810	1540 540
AOI 7	TCE	5060	5	2150	1540
Off-Site, East	TCE	5440	5	2150	1540

Summary Data Table 2: Soil Sampling Data

AOI	Constituent	Max Detected (mg/kg)	Industrial Soil Screening Criteria* (mg/kg)	Industrial Soil Vapor Intrusion Criteria (mg/kg)
AOI 2	Arsenic	7.6	30	NA
AOI 3	Carbon tetrachloride cis-1,2-Dichloroethene Methylene chloride Tetrachloroethene Trichloroethene Vinyl chloride Arsenic Lead Thallium	2.7 140 29.2 5.15 4520 7.9 12.6 1150 3.5	29 230 320 39 1.9 17 30 800 1.2	2.8 120 220 22 65 1.7 NA NA NA
AOI 5	Trichloroethene Arsenic	150 9	1.9 30	65 NA
AOI 6	Tetrachloroethene Trichloroethene Arsenic Cadmium Chromium Lead Thallium	30 270 8.9 13 59.1 671 2.92	39 1.9 30 98 63 800 1.2	22 65 NA NA NA NA NA
AOI 7	cis-1,2-Dichloroethene Trichloroethene Arsenic	41 83 15	230 1.9 30	120 65 NA
Background	Arsenic Thallium	15.1 4.63	30 1.2	NA NA
Off-Site, West	Aresenic	9.03	30	NA
Upgradient	Arsenic Thallium	11 3.62	30 1.2	NA NA

*Regional Screening Level (RSL)

SECTION IV: SUMMARY OF RISK EVALUATION

Risk assessments are the evaluation of the information and data collected during the investigation to determine whether the contamination present poses a risk. This can be done in a human health risk assessment (HHRA) and/or an ecological risk assessment. This Facility is a vacant 10-acre lot without any significant ecological habitat on it or nearby, therefore, this site only required a human health risk assessment.

As part of the HHRA process, EPA has developed a cancer risk range that it deems acceptable to protect the public. This range is identified through the risk assessment process and used to make risk management decisions. Cancer risk is often expressed as the maximum number of new cases of cancer projected to occur in a population due to exposure to the cancer-causing substance over a 70-year lifetime. For example, a cancer risk of one in one million means that in a population of one million people, not more than one additional person would be expected to develop cancer as a result of the exposure to the substance causing that risk. EPA utilizes the acceptable exposure level, or "risk goal" defined within the National Contingency Plan (NCP) for site enforcement and cleanup decisions. The NCP defines the acceptable excess upper lifetime cancer risk as generally a range between $1x10^{-6}$ to $1x10^{-4}$ for determining remediation goals.

If the contaminants are noncancerous but could cause other health problems, then a hazard index quotient is used. To be an acceptable risk to the EPA, the hazard index (HI) quotient for all contaminants must be less than one. The hazard index is the ratio of the concentration of a contaminant to its human health screening value.

The risk assessment completed as part of this investigation evaluated the potential significance of exposures to affected environmental media under current and reasonably expected future land use. Potential exposures were evaluated for the following groups of people on-site: routine workers, maintenance workers, construction workers and trespassers. Potential off-site groups included: residents, routine workers and maintenance workers. Each receptor group was evaluated under a variety of potential exposures in accordance with EPA risk assessment guidance. Potential exposures are evaluated with conservative assumptions, meaning EPA characterizes risk based on the maximum exposure frequency for any given individual. We evaluate scenarios that are unlikely to occur in order to arrive at a conclusion that is fully protective.

Risk Assessment Summary

The RFI risk assessment concluded that none of the areas investigated during the RFI posed an unacceptable risk to human health under current land use and groundwater use[3]. In order for unacceptable risk to be present, contamination at certain levels must be accessible to receptors over a period of time. For future land and groundwater uses, the RFI risk assessment concluded that soil in the source area posed an unacceptable risk to human health for potential vapor intrusion (VI) from soil into future buildings at the Facility (VI on the Facility is not a complete exposure pathway under current land uses because there are no buildings present). Concentrations in the soil are at levels that present potential inhalation risk from vapor intrusion if a building was present and people occupied that structure.

The RFI risk assessment assumed that institutional controls will be implemented to prohibit new uses of groundwater at and near the Facility, which is a component of the proposed remedy. On-site and off-site groundwater is not a complete exposure pathway. The off-site groundwater exposure pathway will remain incomplete with the implementation of a drilling restriction filed with the city. The

[3] During the off-site investigation it was determined that vapor intrusion was a potential risk in the off-site area to the east. A multiple lines-of-evidence approach ruled out the RACER site as the source of contamination contributing to that potential vapor intrusion. The EPA RCRA Corrective Action program formally referred the off-site vapor intrusion area to the EPA Superfund program. Superfund has subsequently conducted its own investigation of that area.

implementation of the proposed soil remedy will allow the on-site and off-site groundwater restoration to occur. The conclusions of the RFI risk assessment are predicated on the application of a deed restriction to keep future land and groundwater use at the Facility consistent with the current uses, which are commercial/industrial and no use of groundwater.

Based on the risk assessments conducted to date, corrective measures are required to address the following potential exposures and risks to human health at the Facility:

- Institutional and/or engineered controls to eliminate exposure pathways for anticipated reuse scenarios at the Facility including the requirement that newly constructed structures will be required to have a preemptive mitigation system and/or a vapor barrier installed prior to building occupancy on site.
- Institutional controls to prevent use of groundwater on site and in the vicinity of the Facility for water supply purposes. The risk assessment assumed no future uses of contaminated groundwater would occur at or in the vicinity of the Facility.
- Implementation of a health and safety plan and soil management plan during subsurface excavations on site to control potential exposures and risks for workers (routine worker, construction worker, and redevelopment worker) contacting volatile constituents in the ambient air of a trench or excavation on site.

SECTION V: CORRECTIVE ACTION OBJECTIVES

The proposed final remedy and associated remedial goals are designed to protect human health and the environment by mitigating risk to current and potential future receptors. EPA's long-term goals for the remedy being proposed are the following:

- Protecting human health and the environment;
- Attain the applicable media (e.g., soil, water, etc) cleanup standards (cleanup levels);
- Control the sources of the releases to the extent practicable; and
- Manage all remediation waste in compliance with applicable standards.

Presented below are the cleanup objectives, or Corrective Action Objectives (CAOs), for the affected media and applicable cleanup criteria.

Environmental Media	Corrective Action Objectives	
	On-Site	Off-Site
Groundwater	Reduce contaminant concentrations to the MCL at the property boundary and, eventually, throughout the area of contamination.	Until the MCL is met at the property boundary, demonstrate off-site concentrations above the MCL remains within the boundary of the well restriction area (proposed institutional control discussed later). Demonstrate the plume is not expanding or migrating beyond its current footprint. Demonstrate that natural attenuation processes are occuring as necessary to reach the MCL. Ensure potential exposure pathways remain incomplete.
Soil	1. Eliminate future vapor intrusion risk. 2. Reduce the soil-to-groundwater migration through source control.	N/A: site-related impacts are not found in off-site soil

SECTION VI: PROPOSED FINAL REMEDY AND EVALUATION OF ALTERNATIVES

The process of developing a proposed final remedy often starts with a broad range of options that are evaluated and either retained for further consideration or eliminated based on disqualifying evidence. Technologies were eliminated if they did not protect human health and the environment by mitigating risk to receptors and address the source of contamination. A summary of all the technologies evaluated for the site are in the table below with the proposed remedies shaded. Detailed information about the proposed remedies follow. More information about all these remedial options can be found in the Corrective Measures Proposal Report (2019).

Alternative	Groundwater/Saturated Soil	Soil	Facility-Wide
1	Monitored Natural Attenuation (MNA)	Deed Restriction; Vapor Intrusion Mitigation	Environmental Restrictive Covenant; Groundwater Use
2	Source Zone Isolation Barrier	Source Zone Excavation and Disposal	Well Restriction Overlay District
3	Source Zone Excavation and Disposal with MNA	Calcium Oxide Treatment	Environmental Restrictive Covenant; Land Use
4	Calcium Oxide Treatment with MNA	In-Situ Solidification and Stabilization (ISS)	
5	In-Situ Solidification and Stabilization (ISS) of saturated soil with MNA		

6	Electrical Resistivity Heating with MNA		
7	Contingency Plan Groundwater Treatment		

The process of selecting a proposed remedy involves screening them against certain criteria and comparing them to each other. EPA has defined threshold and balancing criteria to compare remedial technologies at all sites in a consistent manner. All remedies must meet the threshold criteria and the balancing criteria can be used to further refine the best possible technology based on site-specific factors. The remedies presented above were all compared to these criteria and the proposed remedies presented in this document represent the best possible options.

EPA's 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 seven remedial Balancing Criteria are the following:

1) Long-term reliability and effectiveness (long-term effectiveness should consider reasonably anticipated future land uses)
2) Reduction of toxicity, mobility, and volume of waste
3) Short-term effectiveness
4) Implementability (technical feasibility and availability of services and materials)
5) Cost
6) Community acceptance of remedy
7) State/support agency acceptance

Proposed Final Remedy

The proposed remedy is described in more detail below. The table below presents the proposed threshold and balancing criteria as they pertain to the proposed remedies. Tables 1 and 2 (attached) provide in-depth criteria comparisons for all the remedies considered. These in-depth tables evaluate stabilization and solidification separately in order to evaluate their individual merits. The remedy selection process determined a combination of the two was most appropriate. Prior to implementing the final remedy, RACER will be required to submit to EPA a Corrective Measures Implementation Plan (CMI Plan).

In-Situ Solidification and Stabilization with MNA, Groundwater and Soil: The alternatives evaluated for addressing contaminated soil and groundwater are designed to meet the corrective action objectives discussed above. The immediate to short-term objective is to eliminate the source, which is the contaminated soil leaching into the groundwater. The short to intermediate-term objective is to demonstrate no migration of groundwater above the drinking water standards to potential groundwater users. The intermediate to long-term objective is to demonstrate the plume doesn't exceed the drinking water standards at the property line. The final remedial objective and long-term goal is drinking water standards throughout the area of contamination. These tiered objectives for restoring groundwater to its maximum beneficial use are consistent with EPA's groundwater policies[4]. The CMI Plan will include additional site-specific information regarding these tiered objectives, including, but not limited to detailed definitions of each objective; points of compliance for each objective; reasonable and supported timelines for achieving each objective.

The source of contamination to the groundwater are the soils directly above and in contact with the aquifer. Therefore, remediation of contaminated soils at depth is proposed to reduce the potential for migration of source soil impacts to the underlying aquifer. The proposed remedy intended to address the deep, saturated soil will also address the groundwater along with the demonstrated natural attenuation processes.

The proposed groundwater remedy includes Alternatives 5 and 7 from the above table. The proposed soil remedy includes Alternatives 1 and 4. The contaminated soil will be solidified in place by mixing in amendments designed to reduce the leachability of soil contaminants through a reduction of both hydraulic conductivity and increased chemical fixation (also referred to as in-situ solidification and stabilization, ISS). As described in Attachment B, solidification binds the waste in a solid block of material and traps it in place. The stabilization component of ISS causes chemical reactions that make contamination less likely to be leached into the environment.[5]

In-situ mixing of source zone soil (see Figure 12) with a sorbing reagent, such as zero valent iron (ZVI), was identified as a feasible alternative to reduce groundwater impacts migrating off site to below MCLs. The source soil would be homogenized in-situ with ZVI using excavator-mounted mixers. Once the contaminants contact the ZVI, a rapid chemical process occurs, which reduces the chlorinated compounds to non-hazardous byproducts. The treated soil would no longer leach groundwater impacts into the S1 Unit. The ZVI mixing process destroys the existing soil structure, which can greatly reduce the strength of the homogenized material. The material will be remixed with a binding reagent, such as Portland cement, to make it geotechnically competent. The homogenized mixture would cure into a low permeability monolith, which would further eliminate soil leaching contamination into the groundwater.

A groundwater remediation contingency plan will be incorporated into the CMI Plan. During remediation, the source zone would be disturbed, which may result in a temporary spike in groundwater concentrations. Contingency measures will be incorporated into the final remedial design to address the potential risk associated with a temporary increase in VOC concentrations in groundwater caused by the in-situ mixing or failure of MNA to achieve MCLs after a reasonable amount of time. The purpose of this contingency plan will be to assure the short-term efficacy of the remediation by preventing the expansion of the groundwater plume and provide an opportunity to change the GW remedy if MNA fails. Metrics designed to trigger the contingency plan will include, but may not be limited to, CVOC concentrations within an approved monitoring network.

Once the source of the groundwater contamination is under control, MNA will be utilized to reach the intermediate and long-term goals. The primary mechanism of attenuation of CVOCs involves tiny bugs, or microbes, that naturally live in the environment and use the chemicals for food. When microbes digest the chemicals, they remove them from the environment. Monitored natural attenuation is the

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[4] Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action, EPA 2004

[5] A Citizen's Guide to Solidification and Stabilization, EPA 2012

systematic evaluation of those processes at a contaminated site such that the exact mechanisms are understood, and the rate of attenuation is tracked. Assuming the long-term goal (i.e. on-site GW contaminant concentrations are below MCL) will require up to a 30-year monitoring period, the following monitoring schedule is proposed:

- groundwater samples collected from up to 15 monitoring wells at the boundary and near the plume core
- groundwater samples collected from at least 2 off-site wells representative of the plume core and fringe
- semi-annual sampling of CVOCs for 5 years, annual sampling for 15 years, and biannual sampling thereafter
- geochemical parameters and microbial population monitoring will occur as needed

Facility-Wide Institutional Controls

Institutional Control ("IC") remedies restrict land or resource use at a Site through legal instruments. ICs are distinct from engineered or construction remedies. ICs preclude or minimize exposures to contamination or protect the integrity of a remedy by limiting land or resource use through means such as rules, regulations, building permit requirements, well-drilling prohibitions and other types of ordinances. For an IC to become part of a remedy, there must be binding documentation such as land-use restrictions in an environmental covenant, local zoning restrictions, or rules restricting private wells. There will be institutional controls implemented at this site, including an environmental restrictive covenant (ERC) on groundwater, ERC on land use, and a well restriction overlay district.

Groundwater ERC: Groundwater on site contains contaminant concentrations exceeding the drinking water standards. If the use of contaminated groundwater for drinking water is prevented, the groundwater will not pose a risk to human health. An ERC restricting groundwater use could be placed on the property. This institutional control provides notification to potential future owners that the groundwater contamination is present, and that the installation of a water well is prohibited.

Land Use ERC: The risk assessment evaluated risk to potential receptors in a commercial or industrial setting. To reduce the likelihood of a change in land use, an ERC would be recorded, limiting future land use at the Facility to commercial/industrial. Additionally, to mitigate the potential risk associated with vapor intrusion, the implementation of an institutional control for the entire property would require newly constructed structures to have a preemptive mitigation system and/or a vapor barrier installed prior to building occupancy. As described in the risk assessment, an additional institutional control for the entire property would require a Health and Safety Plan and a Soil Management Plan be prepared prior to subsurface excavations on site to control potential exposures and risks for workers (routine worker, construction worker, and redevelopment worker) contacting volatile constituents in the ambient air of a trench or excavation on site.

Well Restriction Overlay District (WR-OL): Groundwater with contaminant concentrations exceeding the drinking water standards also extend off site, beneath multiple properties. A WR-OL District is a unique and conservative tool described in Article 4.10 and 4.11 of the City of Kokomo Zoning Ordinance, No. 6279 (July 27, 2010) for restricting groundwater use regionally. The WR-OL District is established and enforced by the City of Kokomo to protect the community from groundwater contaminated with chemicals. The WR-OL District restricts the drilling of water wells that may bring contaminated groundwater to the surface. As proposed for the purpose of this site, the WR-OL District will include an area much larger than the area of contamination. Establishing the boundary of the District well outside the contamination is a conservative approach (see Figure 13). WR-OL Districts have been established related to other contaminated sites in Kokomo and is an effective tool to protect the public.

Proposed Remedy Threshold and Balancing Criteria Summary Table

Threshold Criteria	Evaluation
1) Protect human health and the environment	EPA's proposed remedy for the Facility protects human health and the environment by eliminating, reducing, or controlling potential unacceptable risk from the continued leaching of contamination from the contaminated soil into groundwater. During implementation, security fencing will be in place and dust control measures will be employed. An ambient air monitoring plan will be developed and included in the implementation work plan.
2) Achieve media cleanup objectives	EPA's proposed remedy meets the media cleanup objectives based on assumptions regarding current and reasonably anticipated land and water resource use(s). The remedy proposed in this SB is based on the current and future anticipated land use at the Facility as commercial or industrial. The contaminant concentrations will meet MCLs in groundwater at the property boundary in the short term and across the site in the long term. Exposures to any remaining on-site soil contamination will be adequately controlled through land use restrictions.
3) Remediating the sources of releases	In all proposed remedies, EPA seeks to eliminate or reduce further releases of hazardous wastes and hazardous constituents that may pose a threat to human health and the environment. The Facility will meet this criterion by eliminating the source of groundwater contamination from the source area.

Balancing Criteria	Evaluation
4) Long-term effectiveness	The long-term effectiveness of the proposed remedy has been demonstrated. Eliminating the source of leachable material within the source area will allow uncontaminated groundwater to flow through the aquifer and facilitate the remediation of the off-site and on-site

	groundwater through the natural attenuation processes that have been documented.
5) Reduction of toxicity, mobility, or volume of the Hazardous Constituents	An immediate reduction of the volume of hazardous constituents in soil will be achieved by the initial stabilization step with zero valent iron, which destroys the contaminants. Long-term reduction of volume will occur through the reductive dechlorination during natural attenuation. The reduction of toxicity will be demonstrated during both phases as the chlorinated compounds are reduced to harmless by-products, such as ethane, ethene and carbon dioxide.
6) Short-term effectiveness	EPA's proposed remedy will be partially effective in the short-term. The in-situ stabilization step will exhibit the most immediate effectiveness. The additional short-term impacts of solidification will be more moderate since it is a remedy that relies on the immediate fixation of contamination to result in long-term benefits down gradient.
7) Implementability	EPA's proposed remedy is readily implementable. Once the proposed remedy is either selected or modified based on public comment, RACER will be able to immediately plan for the implementation of the work.
8) Cost	The proposed ISS remedial alternative will cost $2,879,000. An additional $919,000 will be included for the various institutional controls MNA. The total cost of the proposed remedy is $3,798,000. Other remedial alternatives would have achieved similar outcomes at twice the cost. For example, excavation with MNA would cost $6,376,000 and calcium oxide with MNA would cost $5,377,000. Similar remedial endpoints and timeframes will be achieved with the proposed remedy.
9) Community Acceptance	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.
10) State/Support agency acceptance	It is anticipated that the State and local stakeholders will find this remedy acceptable.

Long Term Care

RACER must ensure all controls and long-term remedies are maintained and operate as intended. RACER will submit a Long-Term Stewardship (LTS) Plan. Components of a LTS Plan include: an Institutional Control Implementation and Assurance Plan (ICIAP), five-year remedy review procedures, operation, maintenance and monitoring details. An annual certification that all controls, including institutional controls, are in place and remain effective should be required in this plan. 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.

The tiered remedial objectives (short, intermediate and long-term) discussed above will also be incorporated into the LTS Plan. This plan will serve as an opportunity to monitor the progress of timelines and points of compliance associated with each objective.

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. EPA may approve non-significant changes without public comment. EPA will inform the public about any significant or fundamental changes to the remedy.

SECTION VII. PUBLIC PARTICIPATION AND INFORMATION REPOSITORY

EPA requests feedback from the community on this proposal to remediate the RACER Trust Former GM Delco Plant 5 Site. The public comment period will last forty-five (45) calendar days from the date of the public notification in the local newspaper, from February 1, 2021 to March 17, 2021. We encourage community members to submit any comments regarding the proposed remedy in writing by March 17, 2021. Send comments to EPA in writing at the EPA address listed below or in the comment form provided on the website: https://www.epa.gov/hwcorrectiveactionsites/kokomo-indiana.

In an abundance of caution during the ongoing COVID-19 pandemic, EPA will not be hosting an in-person public meeting. If you would like EPA to host a virtual open house, please contact EPA at the address provided below.

Following the 45-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 written comments received by mail or electronically. EPA will make the Final Decision and Response to Comments document available to the public and will be posted on the above website.

The Facility Record contains all information considered when making this proposal. The Facility Record (documents about the Site) may be reviewed at the website listed above or at these locations (please call for hours):

Local Document Repository	EPA Region 5 Office
Kokomo-Howard County Public Library Main Branch 220 N. Union Street Kokomo, IN (765) 457-3242	EPA Records Center 77 W. Jackson Blvd. 7th Floor Chicago, IL (312) 886-4253

At the conclusion of the comment period, EPA will summarize public comments and prepare the Response to Comments and Final Decision document, which will become part of the EPA Facility Record. To send written comments or obtain further information, contact:

Michelle Kaysen (LR-16J)
77 W. Jackson Blvd
Chicago, IL 60604
(312) 886-4253
kaysen.michelle@epa.gov

Next Steps

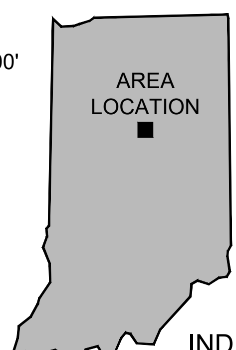
Following issuance of the Final Decision and Response to Comments document, RACER will prepare a Corrective Measures Implementation Work Plan. The Plan will identify any additional data collection needed to implement the corrective measures, along with the specifications for completing the selected corrective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

Figures

REFERENCE: BASE MAP USGS 7.5. MIN. TOPO. QUAD GALVESTON, IND. 2016, MIAMI, IND. 2016, KOKOMO EAST, IND. 2016, AND KOKOMO WEST, IND. 2016.

0 2000' 4000'

Approximate Scale: 1 in. = 2000 ft.

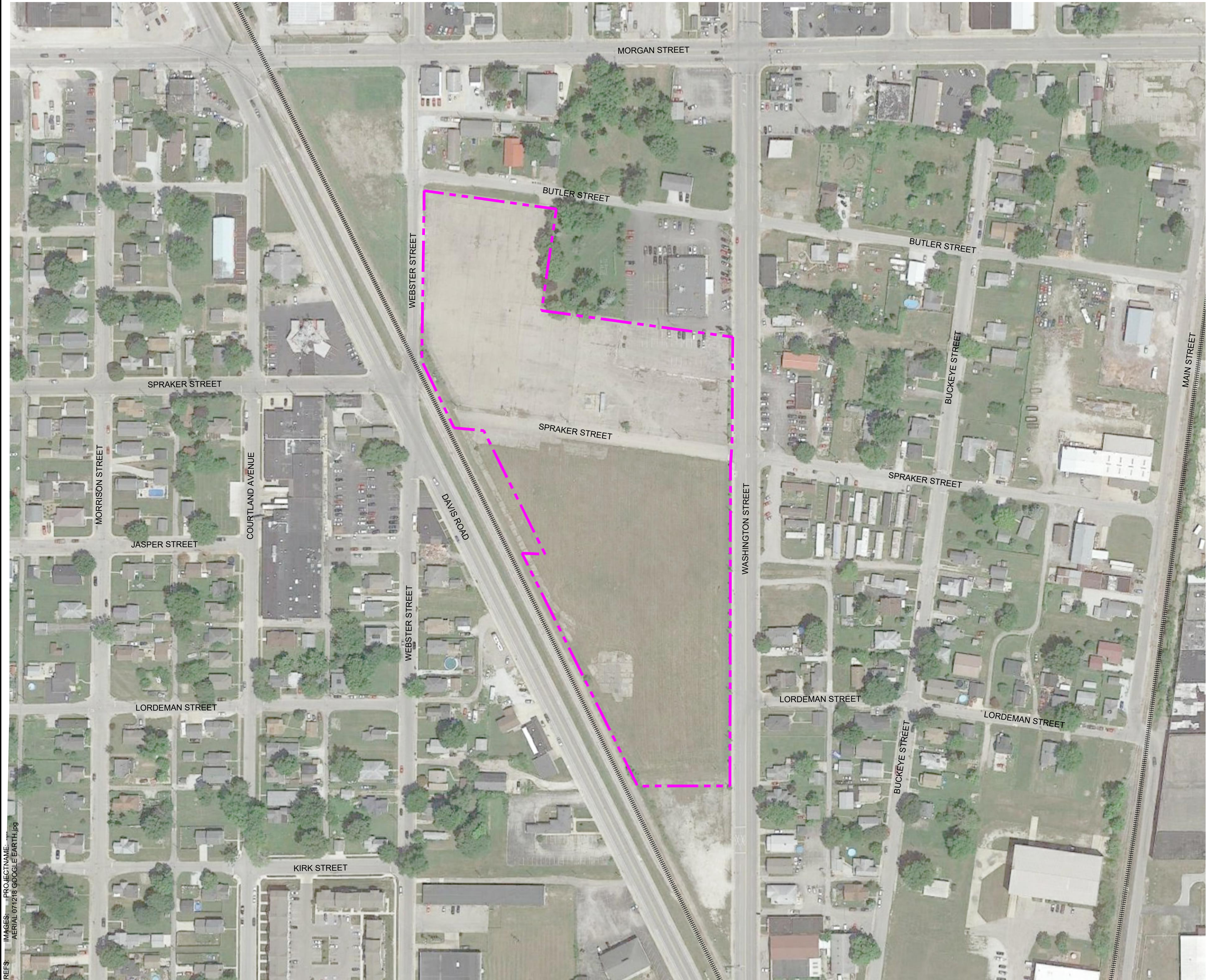


RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

SITE LOCATION

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1



N

0 100' 200'
GRAPHIC SCALE

LEGEND

PROPERTY LINE

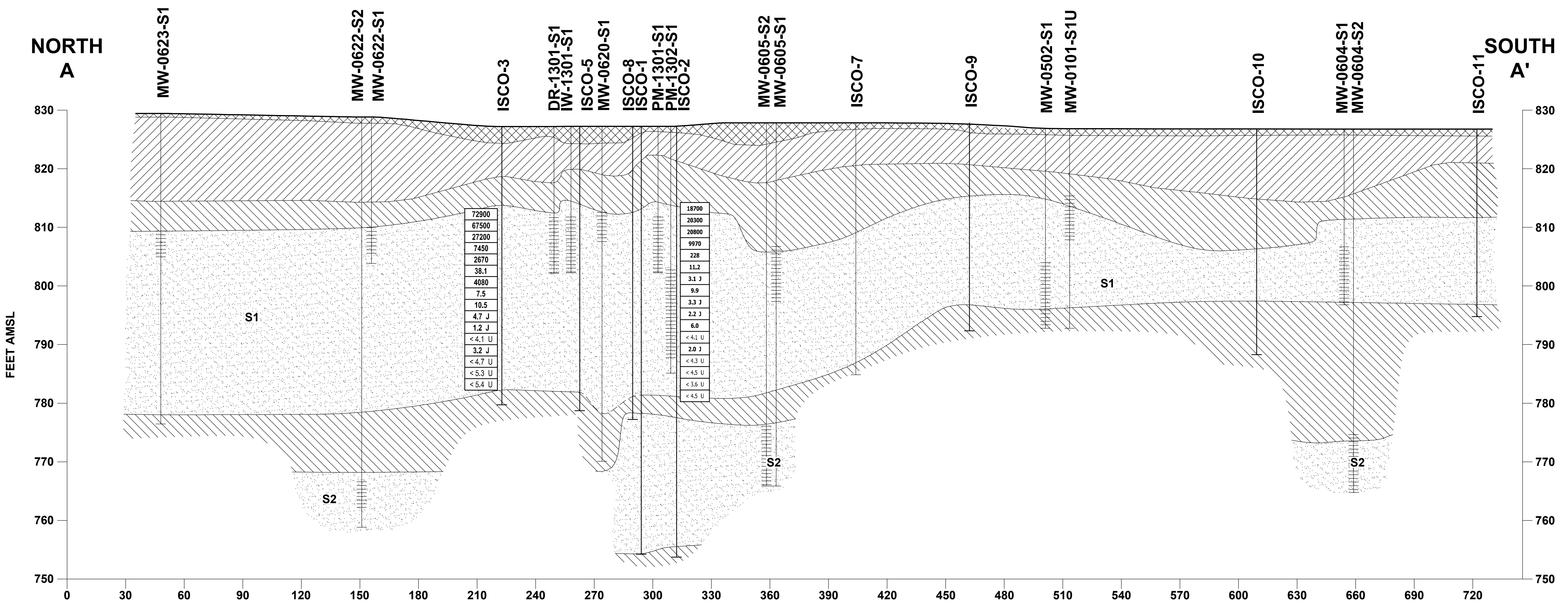
REFERENCE:
AERIAL DATED JULY 12, 2018 DOWNLOADED FROM GOOGLE EARTH.

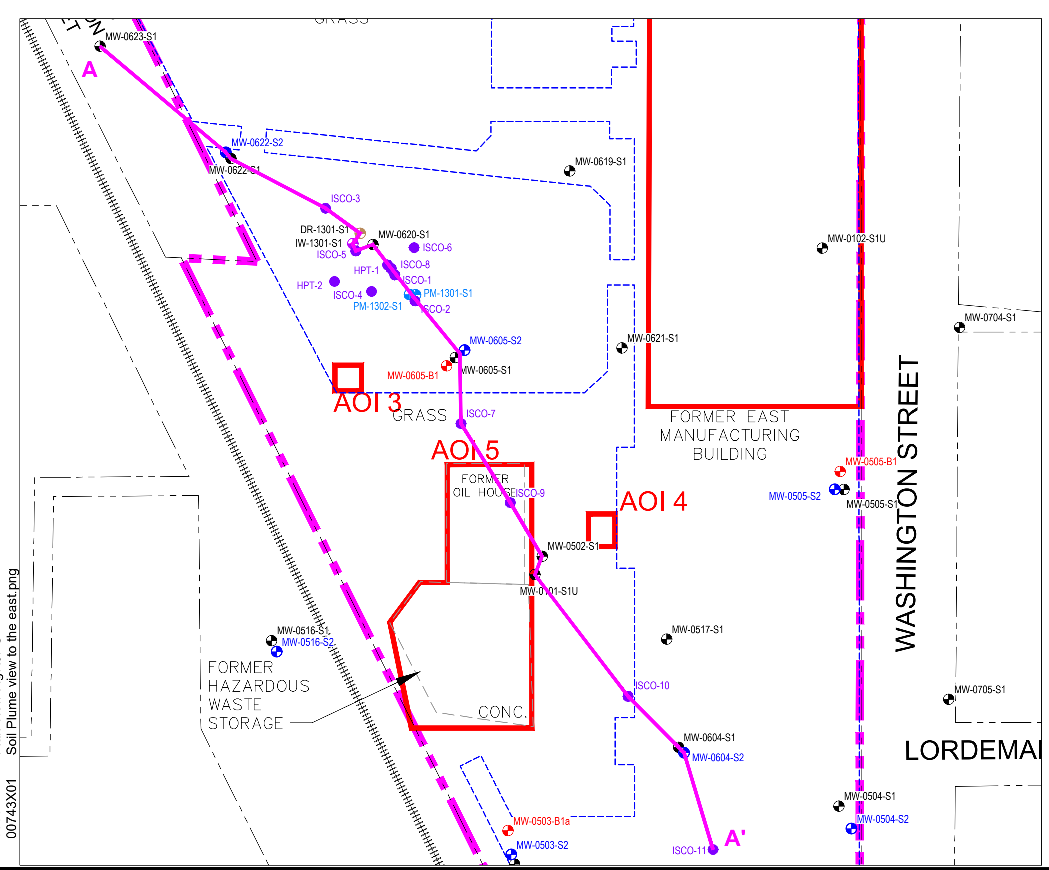
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

SITE AERIAL

ARCADIS Design & Consultancy for natural and built assets

FIGURE
2





N

0 60' 120'
HORIZONTAL SCALE

LEGEND
- MONITORING WELL SCREENED IN UNIT S1
- MONITORING WELL SCREENED IN UNIT S2
- MONITORING WELL SCREENED IN UNIT B1
- INJECTION WELL
- DOSE RESPONSE WELL
- PERFORMANCE MONITORING WELL
- BORING LOCATION
- AOI
- PROPERTY LINE
- FORMER BUILDING
- A — A' TRANSECT LOCATION

0 10' 20'
VERTICAL SCALE

0 30' 60'
HORIZONTAL SCALE

LEGEND:

- FILL/TOPSOIL/GRAVEL/ASPHALT
- PLASTIC CLAY
- SAND
- TILL
- MONITORING WELL SCREENED INTERVAL
- S1/S2 SATURATED UNIT ID

NOTES:

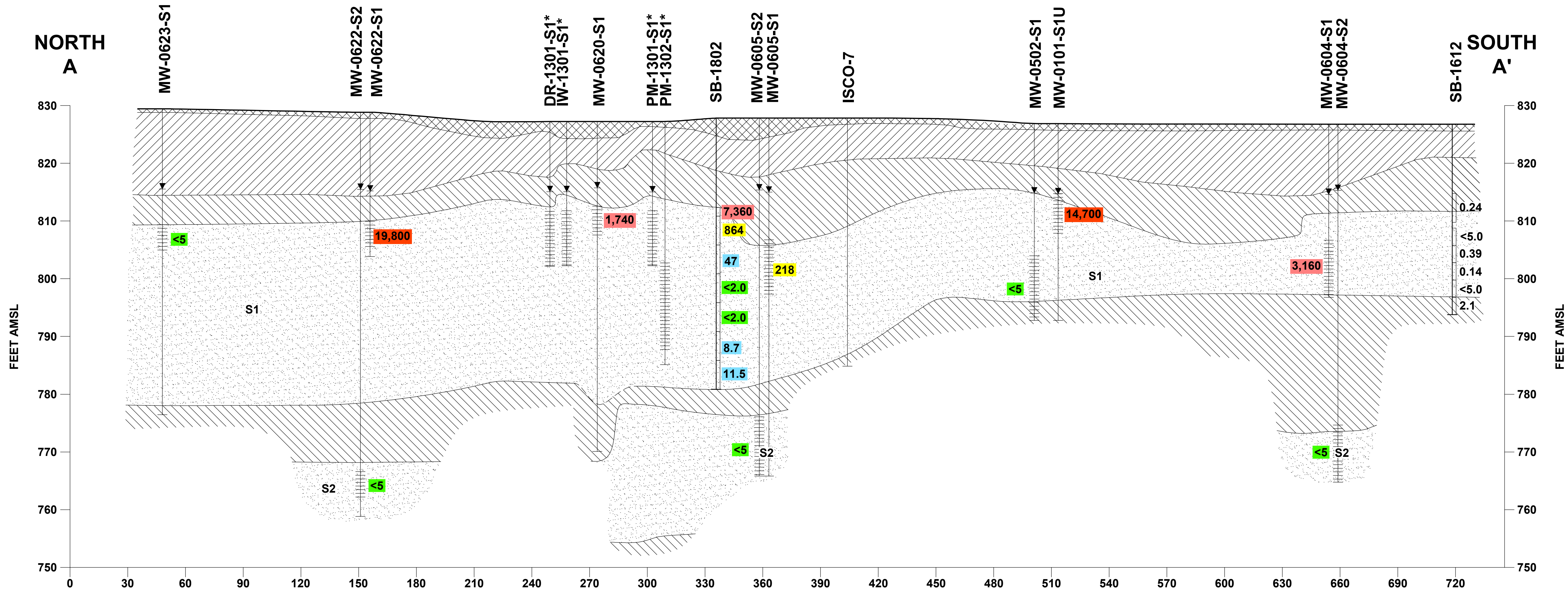
1. SURFACE ELEVATIONS OF ISCO WELLS AND SOIL BORINGS ARE ESTIMATED FROM KNOWN SURFACE ELEVATIONS.
2. ISCO-8 WAS BLANK DRILLED TO 33.5' BELOW GROUND SURFACE.
3. DATA BOXES ARE TRICHLOROETHENE (TCE) IN SOIL. UNITS ARE MICROGRAMS PER KILOGRAM (μg/kg).

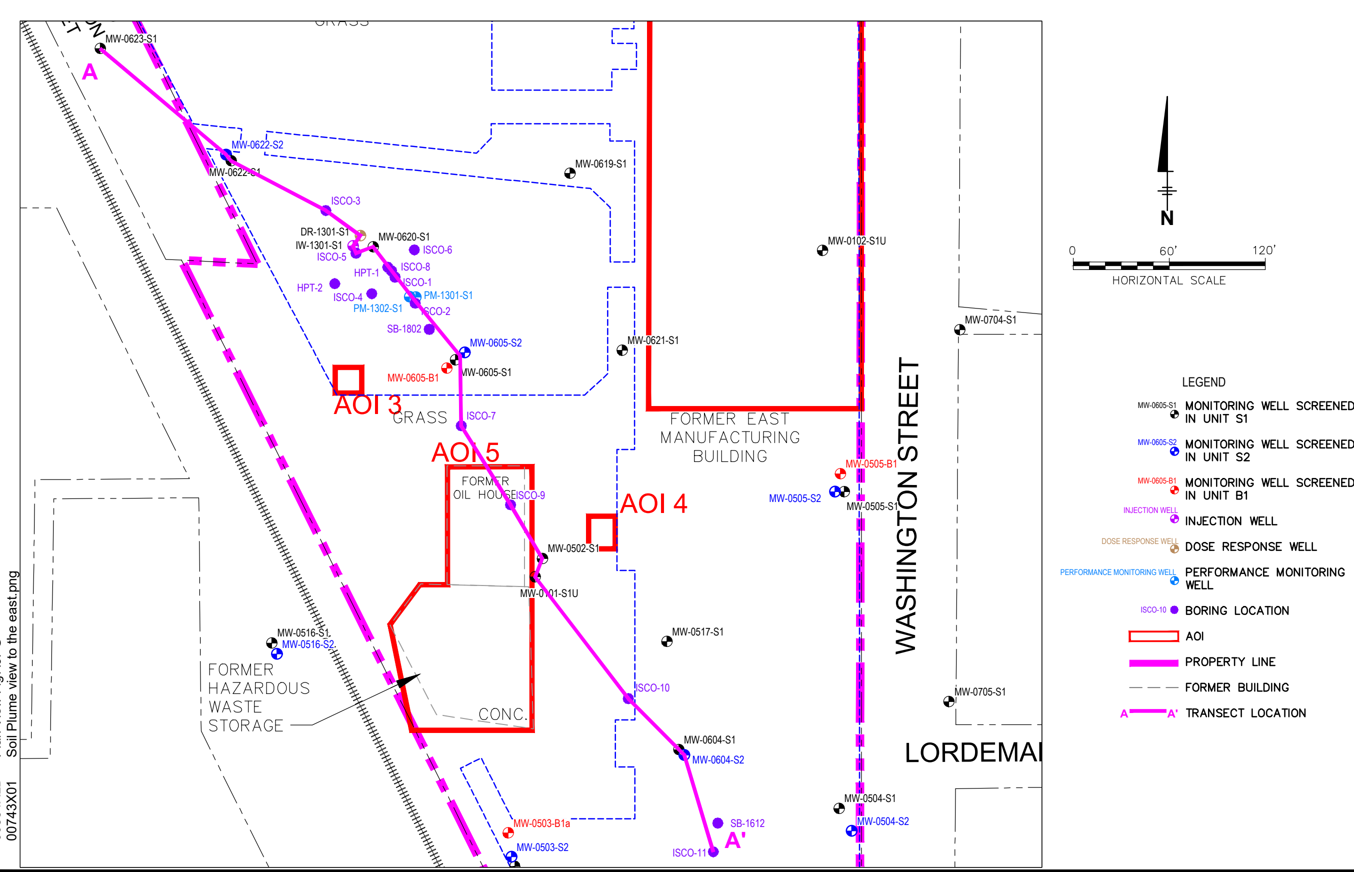
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

CROSS SECTION A-A'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3





0 10' 20' VERTICAL SCALE

0 30' 60' HORIZONTAL SCALE

LEGEND:

[pattern]	FILL/TOPSOIL/GRAVEL/ASPHALT
[pattern]	PLASTIC CLAY
[pattern]	SAND
[pattern]	TILL
[symbol]	MONITORING WELL SCREENED INTERVAL
S1/S2	SATURATED UNIT ID
▼	DEPTH TO WATER DATA (3/4/2020)
*	GROUNDWATER SAMPLES WERE NOT COLLECTED DURING THE SPRING 2020 SAMPLING EVENT
<5	TRICHLOROETHENE CONCENTRATION
[red]	TCE CONCENTRATION >10,000 µg/L
[pink]	TCE CONCENTRATION >1,000 µg/L
[yellow]	TCE CONCENTRATION >100 µg/L
[blue]	TCE CONCENTRATION >5 µg/L
[green]	TCE CONCENTRATION NOT DETECTED

NOTES:
1. TRICHLOROETHENE (TCE) CONCENTRATIONS PROVIDED IN MICROGRAMS PER LITER (µg/L).
2. TCE GROUNDWATER CONCENTRATION DATA WAS COLLECTED ON MARCH 27, 2020.
3. GROUNDWATER DATA FROM SB–1802 COLLECTED ON MARCH 21, 2018.

RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

CROSS SECTION A-A' WITH TCE GROUNDWATER CONCENTRATIONS

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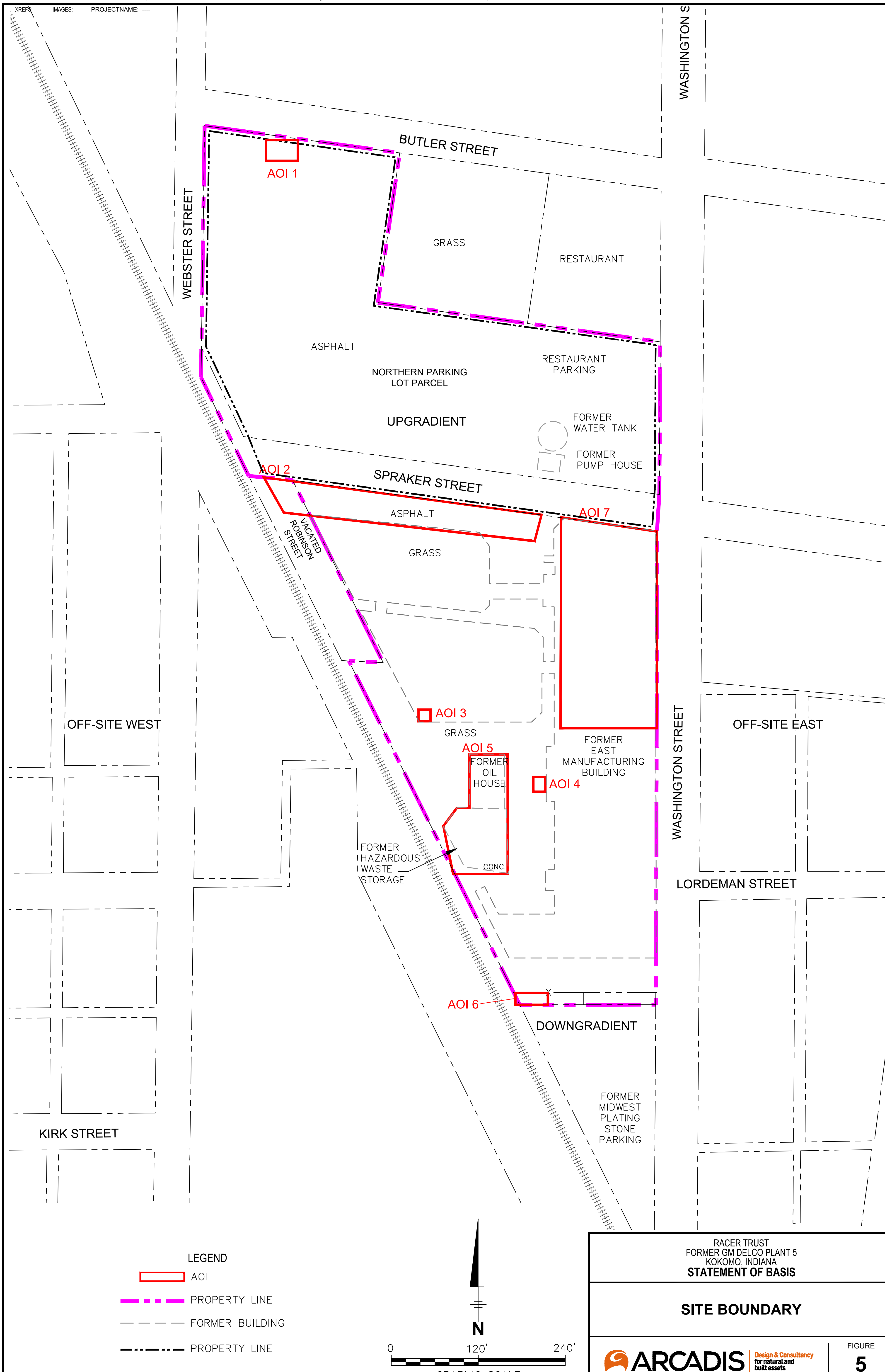
FIGURE
4

CITY:(COLUMBUS, OH) DIV/GROUP:(ENVCAD) DB:(R. SMITH) LD:(Opt) PIC:(Opt) PM:(W. STEPHENS) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF*
C:\Users\bsmith\BIM 360\Arcadis\ANA - RACER TRUST\Project Files\KOKOMO INDIANA\2020\30029075\01-DWG\SBASIS\SBASIS-AOI.dwg LAYOUT: 3 SAVED: 7/16/2020 3:04 PM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/21/2020 9:47 AM BY: SMITH, BOB

XREFS: IMAGES: PROJECTNAME: ----

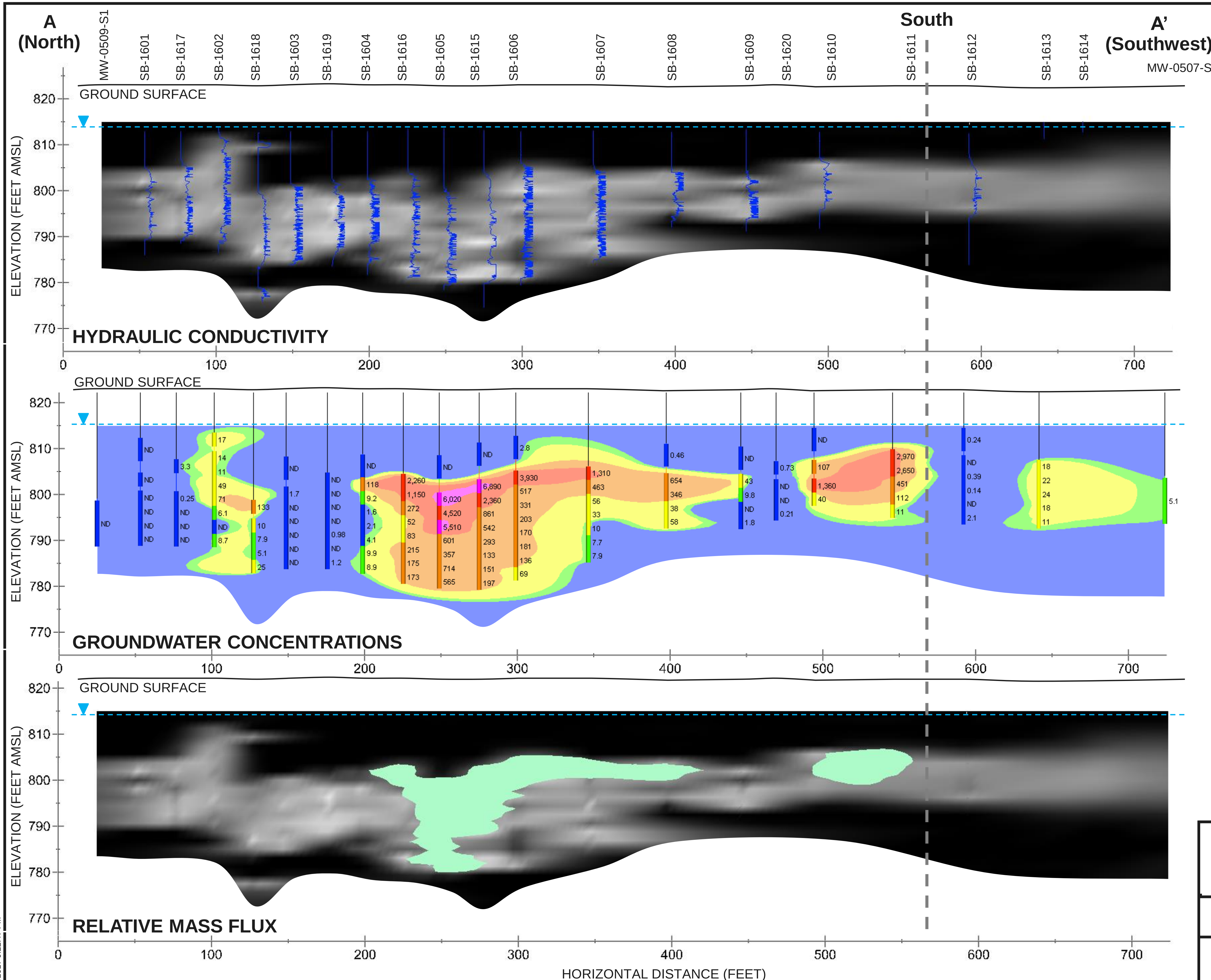


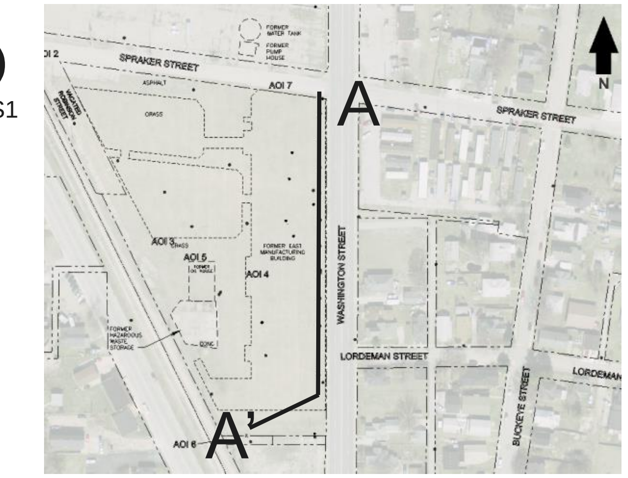
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

SITE BOUNDARY

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5





Piezometric surface from HPT

Estimated hydraulic conductivity (<0.1 – >150 ft/day)

HPT

- >150 ft/day
- 125 ft/day
- 100 ft/day
- 75 ft/day
- 50 ft/day
- 25 ft/day
- <0.1 ft/day

Trichloroethene

Groundwater Analytical (Tubes)

- 5,000-10,000 µg/L
- 1,000-5,000 µg/L
- 100-1,000 µg/L
- 10-100 µg/L
- 5-10 µg/L
- <MCL (5 µg/L)

Relative Flux (unitless)

~90% Flux occurs within ~20% of area >MCL

Notes:
1) HPT = Hydraulic Profiling Tool
2) TCE = Trichloroethene
3) MCL = Maximum Contaminant Level
4) ND = Not Detected
5) ft/day = feet per day
6) AMSL = above mean sea level
7) µg/L = micrograms per liter

RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA

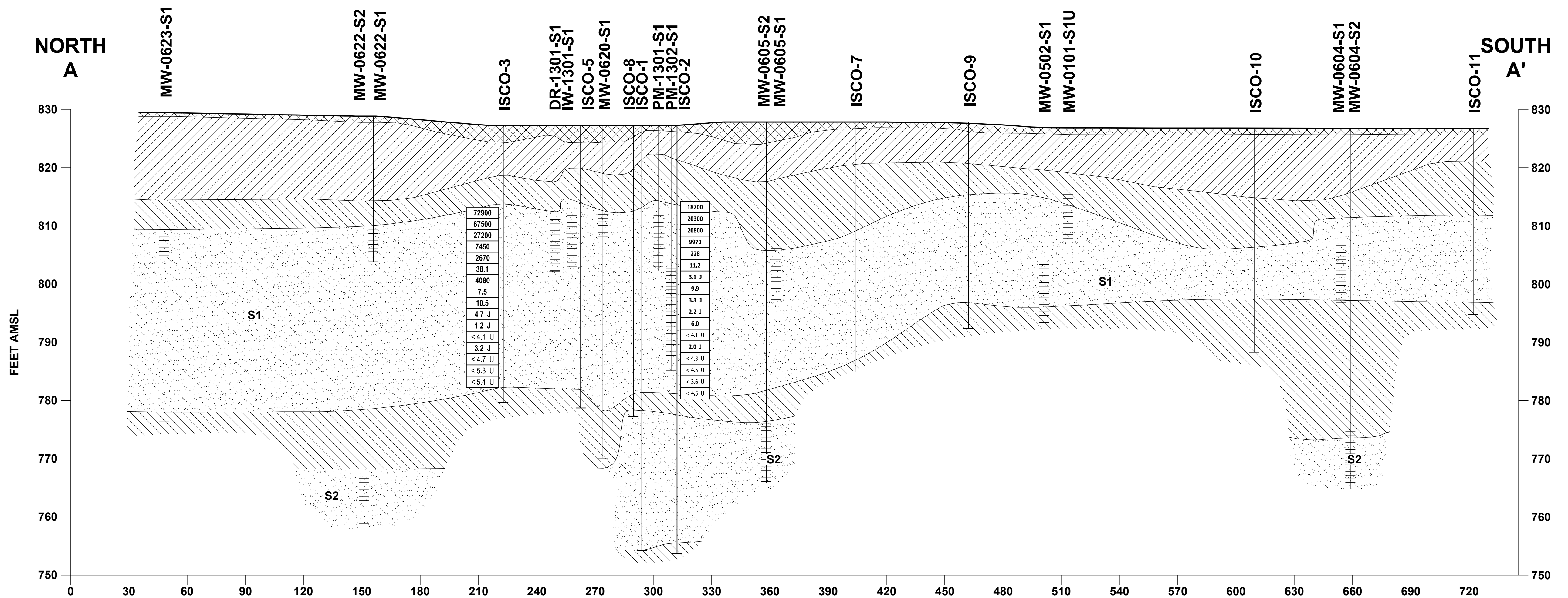
STATEMENT OF BASIS

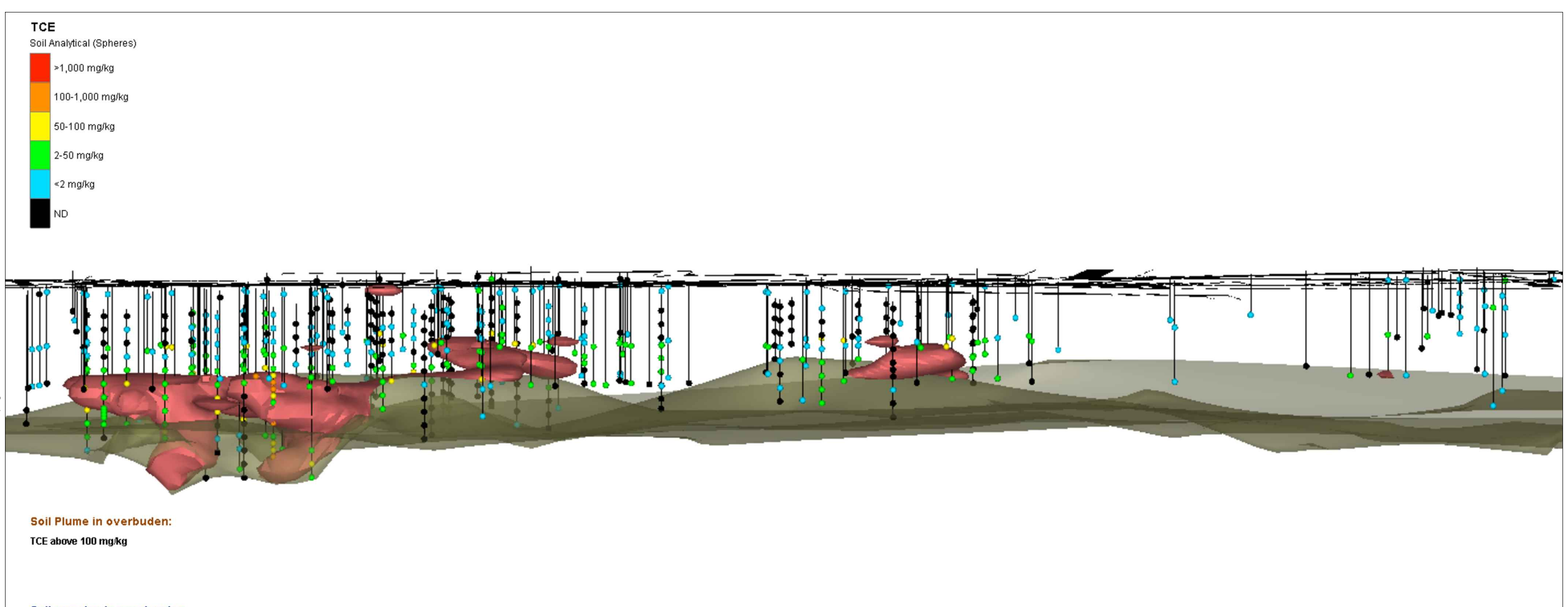
MASS FLUX CROSS SECTION
TCE FLUX ALONG TRANSECT A-A'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
6

D:\COMMON\RACER Trust\1288 - Kokomo\EVS\Output\Presentation
3/9/2017 9:22:47 PM





0 10' 20'
VERTICAL SCALE

0 30' 60'
HORIZONTAL SCALE

LEGEND:

- FILL/TOPSOIL/GRAVEL/ASPHALT
- PLASTIC CLAY
- SAND
- TILL
- MONITORING WELL SCREENED INTERVAL
- S1/S2 SATURATED UNIT ID

NOTES:

1. SURFACE ELEVATIONS OF ISCO WELLS AND SOIL BORINGS ARE ESTIMATED FROM KNOWN SURFACE ELEVATIONS.
2. ISCO–8 WAS BLANK DRILLED TO 33.5' BELOW GROUND SURFACE.
3. DATA BOXES ARE TRICHLOROETHENE (TCE) IN SOIL. UNITS ARE MICROGRAMS PER KILOGRAM (μg/kg).

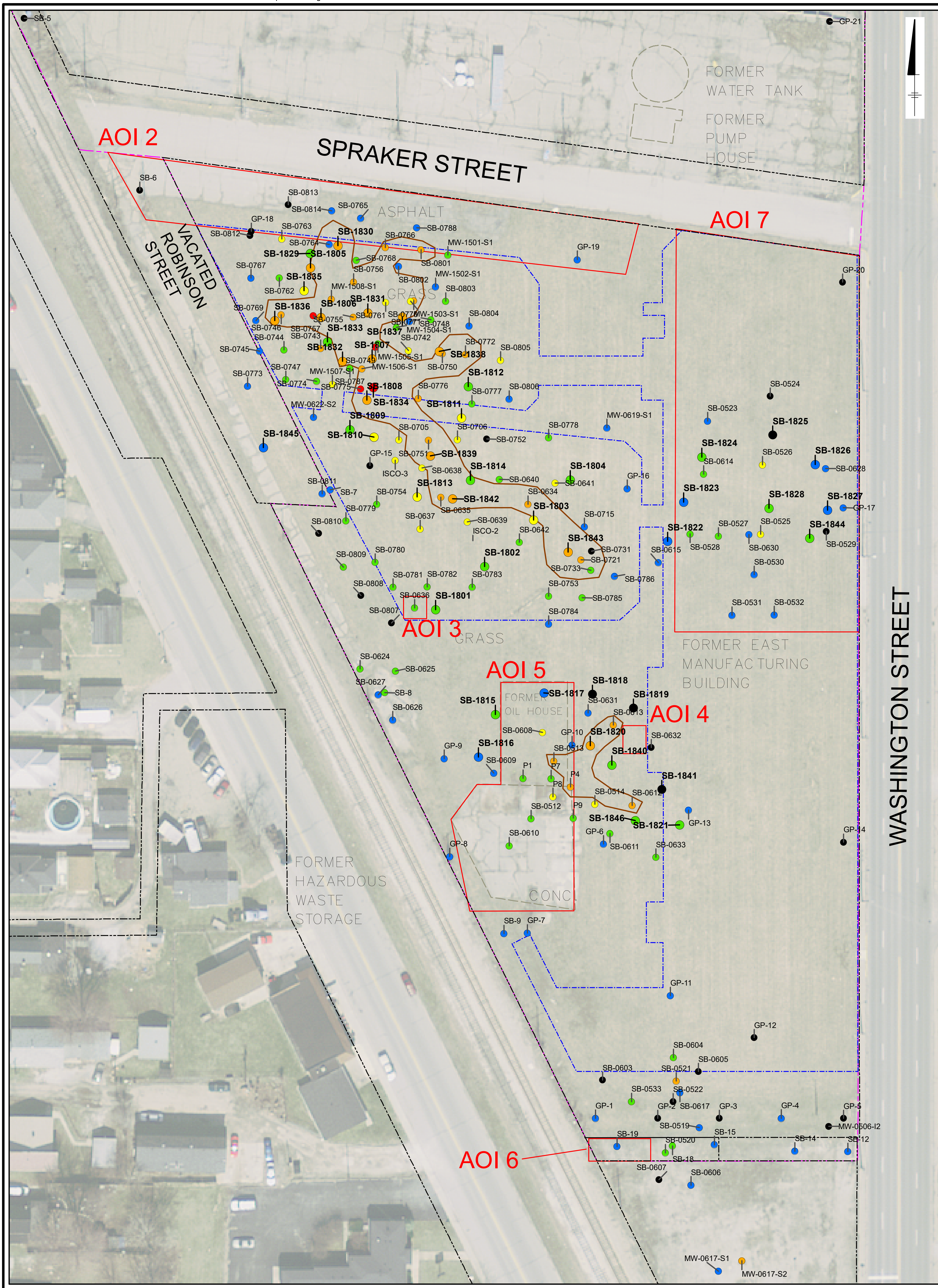
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

CROSS SECTION A-A'

ARCADIS Design & Consultancy for natural and built assets

FIGURE
7

CITY:Syracuse DIV/GROUP:Env-141 DB:A.Schilling, R. BASSETT LD:A.Schilling PIC:(Opt) PM:(Reqd) TM:(Opt) LYR:(Opt)ON=*;OFF=*REF* SAVED: 7/23/2020 10:51 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/23/2020 12:56 PM BY: SMITH, BOB
C:\Users\bsmith\BIM 360\Arcadis\ANA - RACER TRUST\Project Files\KOKOMO INDIANA\2020\30029075\01-DWG\SBASIS\SBASIS-CS A-A.dwg LAYOUT: 7
XREFS: 00884XLD 00743X01 IMAGES: Plan View Fig7.JPG Soil Plume view to the east.png PROJECTNAME: ----



LEGEND

Maximum TCE in Soil (mg/kg)

- ND
- < 2
- 2 - 50
- 50 - 100
- 100 - 1,000
- > 1,000

- Former building outline
- Property boundary
- Area of interest
- TCE overburden soil concentrations >100 mg/kg

Notes:
1) 2018 Pre-Design Investigation locations **Bold**
2)Outline indicates TCE overburden soil concentration locations greater >100 mg/kg

0 50 100 Feet

GRAPHIC SCALE

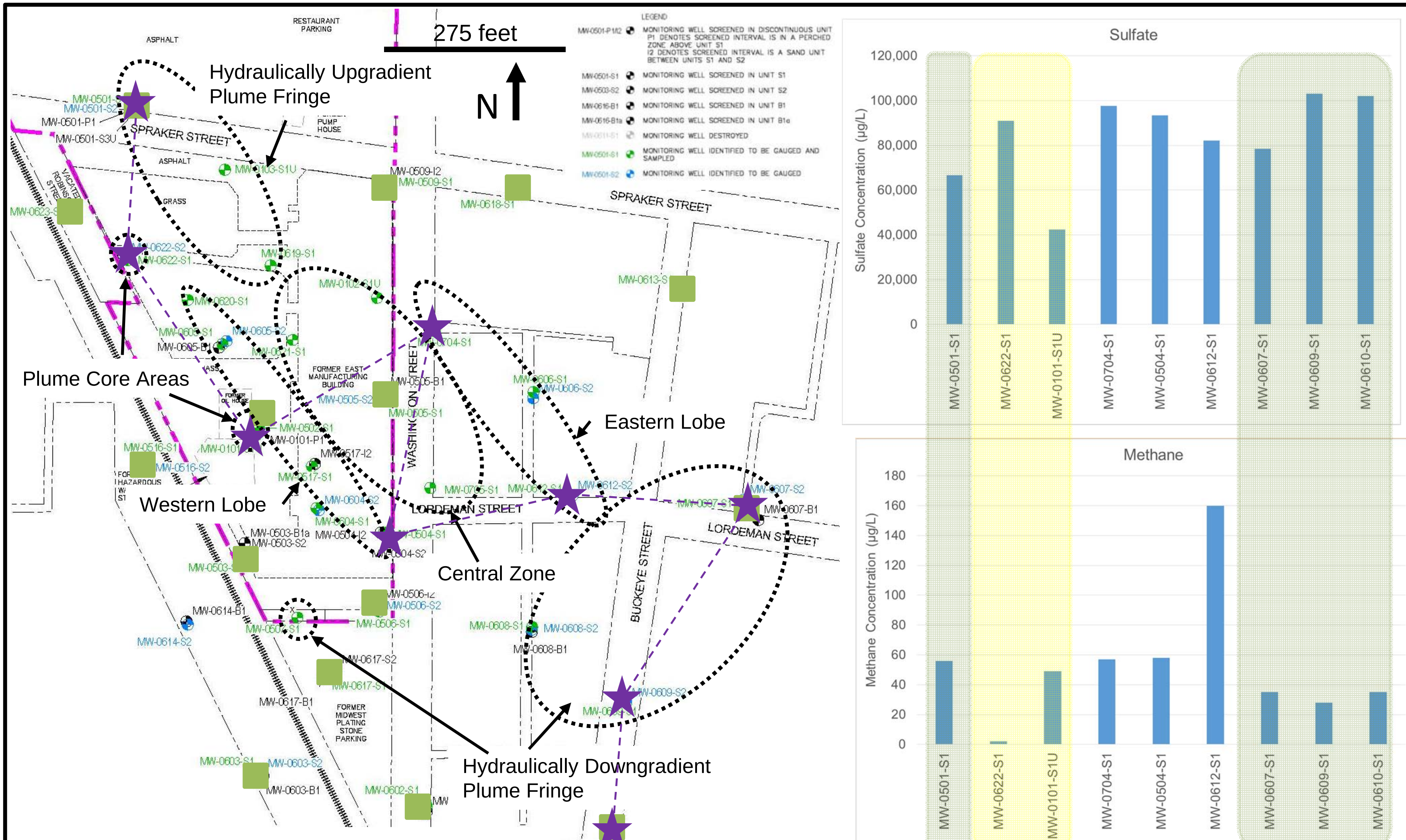
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA

STATEMENT OF BASIS

Soil Boring Locations and Historical TCE Analytical Results for the Overburden Unit

ARCADIS Design & Consultancy for natural and built assets

FIGURE
8



All CVOC currently delineated MCL or LRL.

Monitoring well sampled for geochemical indicator parameters

Plume fringe

Plume core

NOTES:

CVOC = CHLORINATED VOLATILE ORGANIC COMPOUNDS

MCL = MAXIMUM CONTAMINANT LEVEL

LRL = LABORATORY REPORTING LIMIT

µg/L = MICROGRAMS PER LITER

RACER TRUST

FORMER GM DELCO PLANT 5

KOKOMO, INDIANA

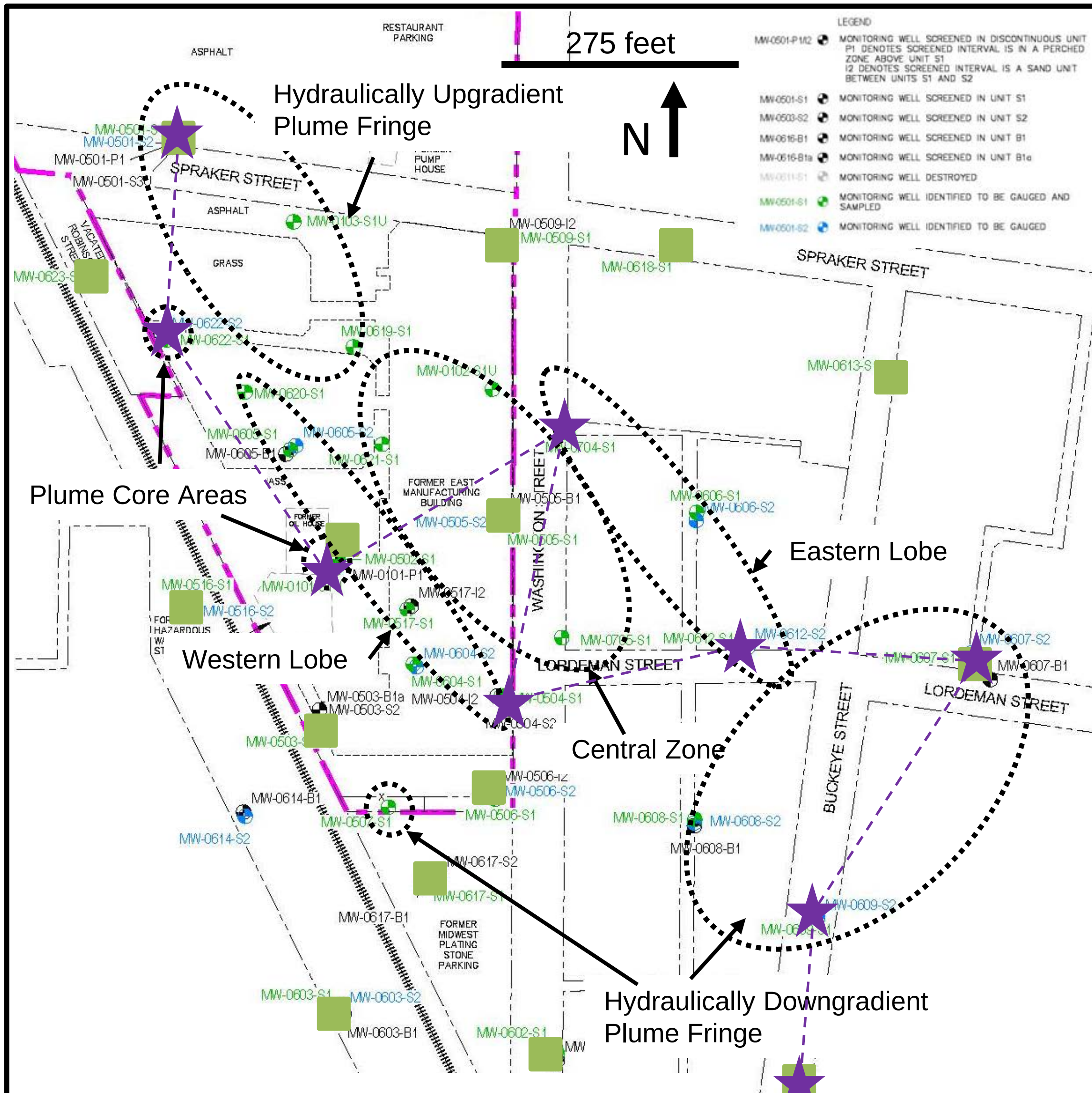
STATEMENT OF BASIS

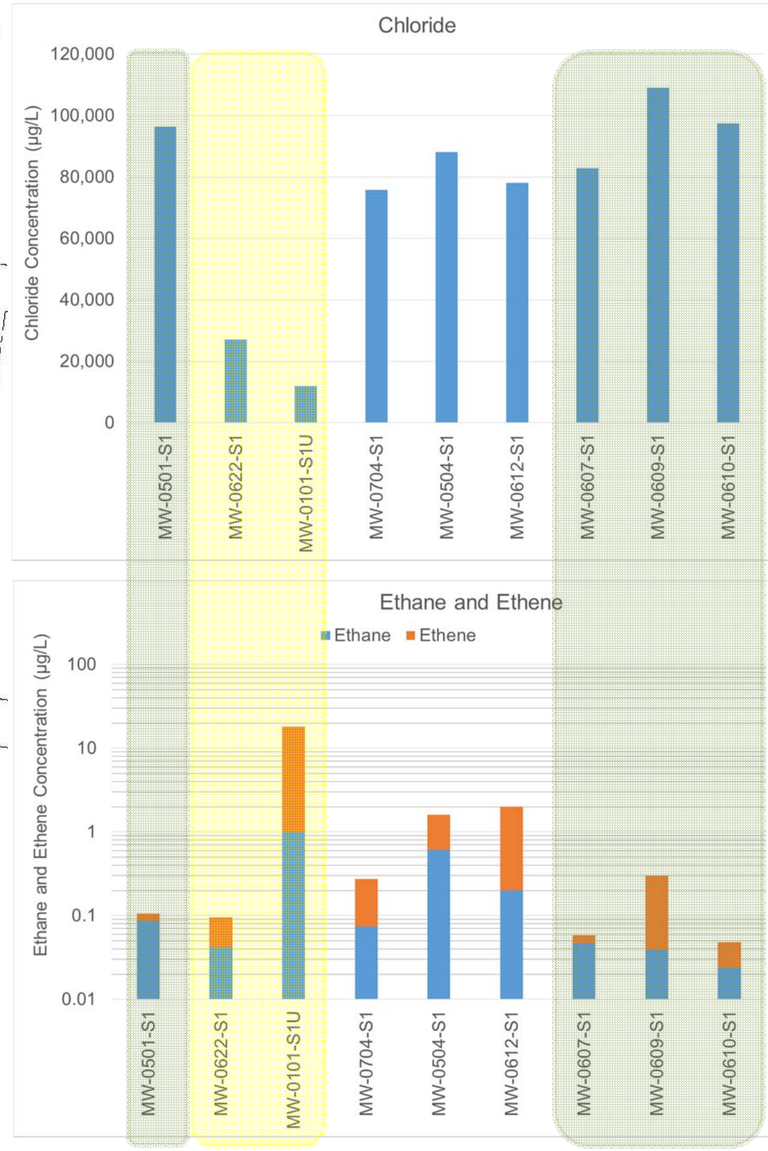
OXIDATION-REDUCTION INDICATOR PARAMETER CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE

9





All CVOC currently delineated MCL or LRL.

Monitoring well sampled for geochemical indicator parameters

Plume fringe

Plume core

NOTES:

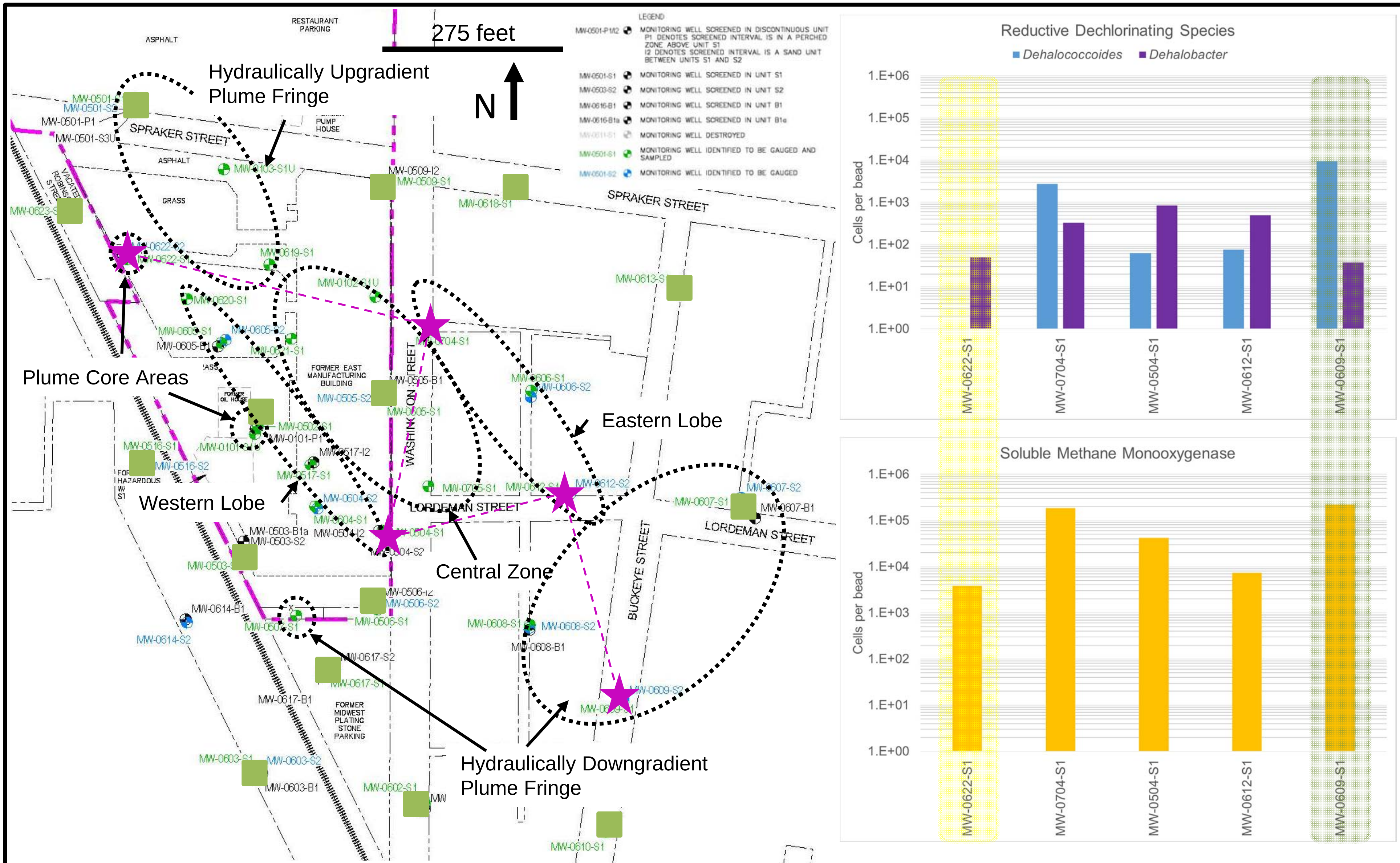
CVOC = CHLORINATED VOLATILE ORGANIC COMPOUNDS
MCL = MAXIMUM CONTAMINANT LEVEL
LRL = LABORATORY REPORTING LIMIT
µg/L = MICROGRAMS PER LITER

RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

DEGRADATION BY-PRODUCT CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 10



All CVOC currently delineated MCL or LRL.

Monitoring well where Bio-Trap® was deployed

Plume fringe

Plume core

NOTES:

CVOC = CHLORINATED VOLATILE ORGANIC COMPOUNDS

MCL = MAXIMUM CONTAMINANT LEVEL

LRL = LABORATORY REPORTING LIMIT

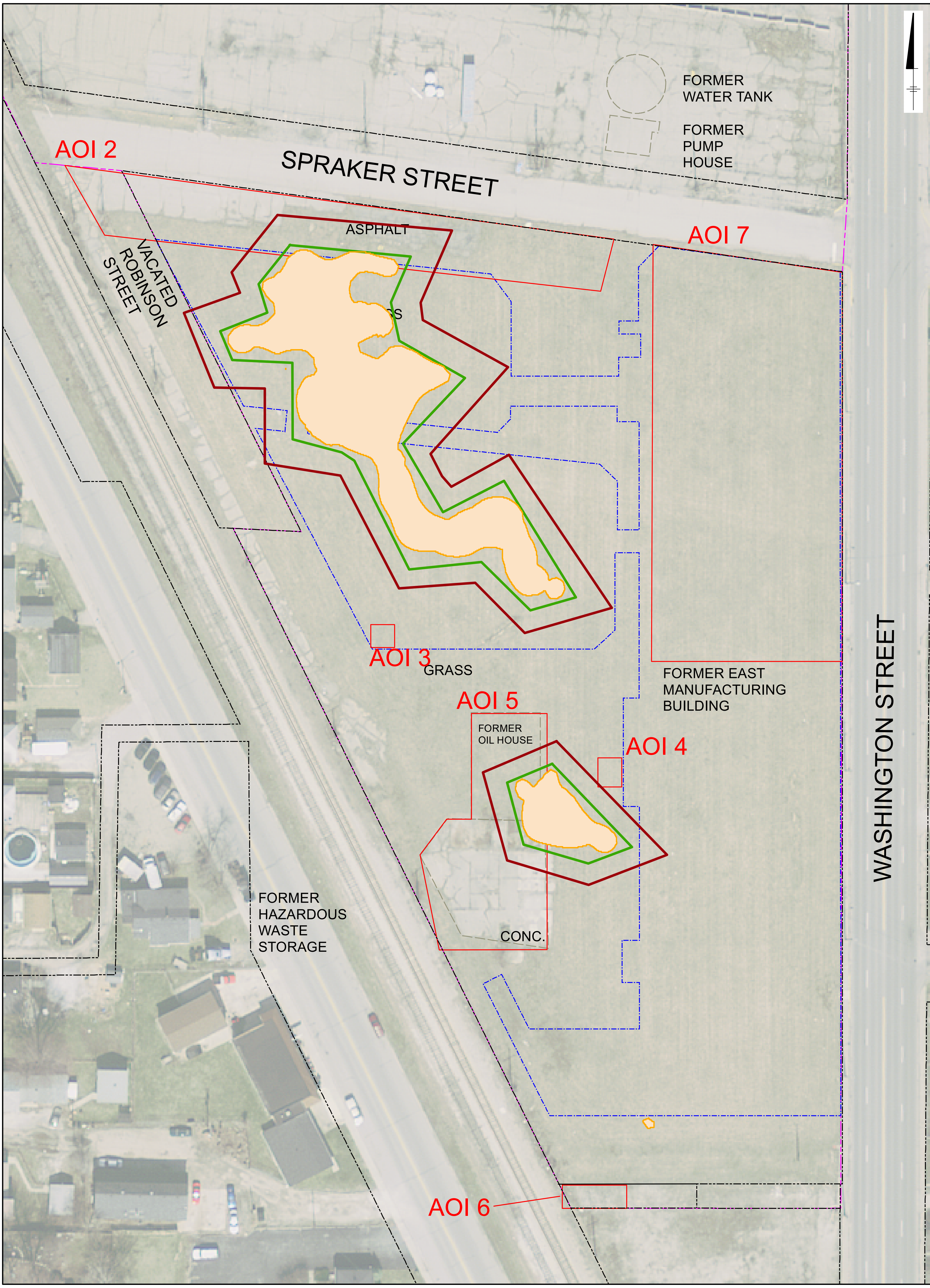
RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

BIODEGRADATION GENE TARGETS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 11

City: Div/Group: Created By: Last Saved By: ayanites
Project (Project #)
E:\APROJECT\RACER Trust\1288 - Kokomo\EVS\GIS\Documents\Kokomo Source Soil Area with Proposed Excavation Extent.mxd 11/30/2018 12:38:02 PM



LEGEND

- Proposed Excavation Boundary
- Proposed Slope Excavation Boundary
- Former Building Outline
- Area with >100 mg/kg Trichloroethene in soil

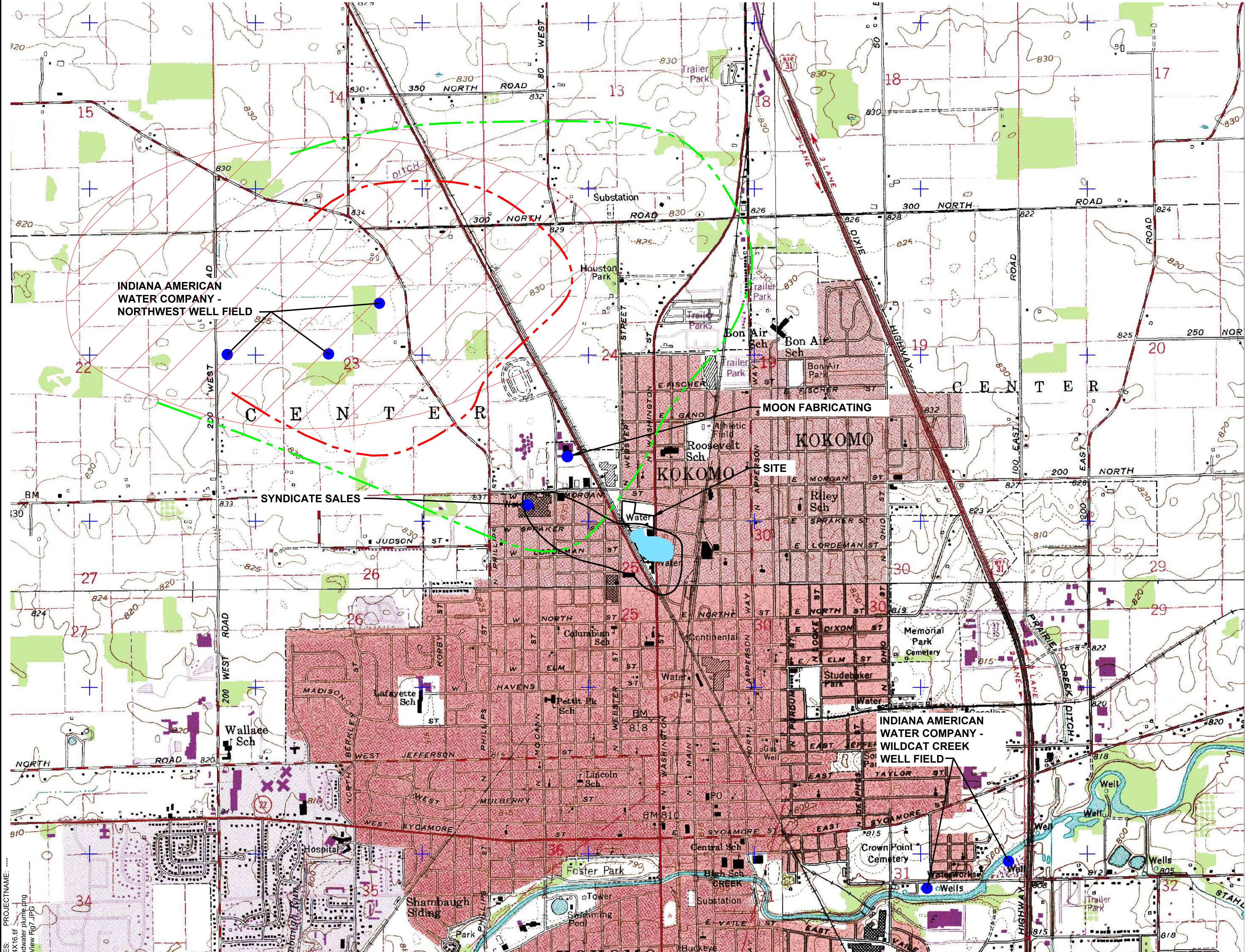
0 50 100 Feet
GRAPHIC SCALE

RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

PRE DESIGN INVESTIGATION SOURCE ZONES

ARCADIS Design & Consultancy for natural and built assets

FIGURE
12



LEGEND:

- MODEL SIMULATED APPROXIMATE EXTENT OF THE 5–YEAR TIME OF TRAVEL LINE
- MODEL SIMULATED APPROXIMATE EXTENT OF THE 10–YEAR TIME OF TRAVEL LINE
- PROPOSED WELL RESTRICTION OVERLAY DISTRICT EXTENT
- LOCATION OF KNOWN SIGNIFICANT WATER USERS
- APPROXIMATE EXTENT OF THE EXISTING WELLHEAD PROTECTION OVERLAY DISTRICT
- GROUNDWATER PLUME (MARCH 2020)

NOTE:

1. BOUNDARY OF THE WELL RESTRICTION OVERLAY DISTRICT MAY BE ADJUSTED WITH EPA APPROVAL PRIOR TO FINALIZING.

NOTE:

1. SOURCE: USGS 7.5 MINUTE TOPOGRAPHIC MAP.

0 1000' 2000'
GRAPHIC SCALE

RACER TRUST
FORMER GM DELCO PLANT 5
KOKOMO, INDIANA
STATEMENT OF BASIS

BOUNDARY OF PROPOSED WELL RESTRICTION - OVERLAY DISTRICT

ARCADIS Design & Consultancy for natural and built assets

FIGURE
13

CITY: SYRACUSE DIV/GROUP: 141 DB: GMS LD: GMS PM:(Reqd) LYR:ON=*;OFF=*REF
C:\Users\bsmith\BIM 360\Arcadis\ANA - RACER TRUST\Project Files\KOKOMO INDIANA\2020\30029075\01-DWG\SBASIS\SBASIS-OVERLAY DISTRICT.dwg LAYOUT: 13 SAVED: 7/21/2020 9:59 AM ACADVER: 23.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 7/21/2020
11:10 AM BY: SMITH, BOB
XREFS: 00884XLD IMAGES: 00884X16.tif groundwater plume.png Plan View Fig7.JPG PROJECTNAME: ----

Tables

Table 1
Evaluation of Facility-Wide Management Controls
Statement of Basis
Former GM Delco Plant 5
Kokomo, Indiana

ARCADIS Design & Consultancy for natural and built assets

Evaluation Criteria	Corrective Measures Alternatives: No Action	ERC - Groundwater Use (On Site)	Well Restriction Overlay District (On Site and Limited Off Site)	ERC - Land Use (On Site)	Monitoring - Groundwater Monitoring Program
Protect Human Health and the Environment	Not effective at protecting human health and the environment.	Effective at protecting human health and the environment by prohibiting potable and non-potable uses.	Effective at protecting human health and the environment by prohibiting potable and non-potable uses.	Effective at protecting human health and the environment by limiting land use to commercial and industrial.	Does not directly protect human health and the environment, but provides data that can be used to evaluate whether human health and the environment are protected.
Attain Media Cleanup Standards (Corrective Measures End Points) Set by the Implementing Agency	Will not meet corrective measures end points.	Will not reduce CVOC concentrations, but will attain corrective measures end points associated with limiting exposure.	Will not reduce CVOC concentrations, but will attain corrective measures end points associated with limiting exposure.	Will not reduce CVOC concentrations, but will attain corrective measures end points associated with limiting exposure.	Will not meet corrective measures end points.
Control the Sources of Releases	Does not control the sources of releases.	Does not control the sources of releases.	Controls the sources of the releases by eliminating potential induced migration associated with groundwater pumping.	Does not control the sources of releases.	Does not control the sources of releases.
Comply with Any Applicable Standards for Management of Waste	No waste would be generated from this corrective measure.	Does not produce waste requiring management.	Does not produce waste requiring management.	Does not produce waste requiring management.	Wastes derived from monitoring would be managed in accordance with applicable standards.
Long-Term Reliability and Effectiveness	Not reliable or effective in the long term.	Reliable and effective in the long term by prohibiting potable and non-potable uses of groundwater.	Reliable and effective in the long term by prohibiting potable and non-potable uses of groundwater.	Reliable and effective in the long term by limiting land use to commercial and industrial.	Criterion is not directly applicable, but monitoring data would be used to assess long-term reliability and effectiveness of other corrective measures.
Reduction in the Toxicity, Mobility, and Volume of Wastes	Does not reduce toxicity, mobility, or volume of CVOCs.	Does not reduce toxicity, mobility, or volume of CVOCs.	Does not reduce toxicity, mobility, or volume of CVOCs.	Does not reduce toxicity, mobility, or volume of CVOCs.	Does not reduce toxicity, mobility, or volume of CVOCs.
Short-Term Effectiveness	Does not create negative short term effects on human health and the environment during implementation	Does not create negative short term effects on human health and the environment during implementation	Does not create negative short term effects on human health and the environment during implementation	Does not create negative short term effects on human health and the environment during implementation	Does not create negative short term effects on human health and the environment during implementation
Implementability	No action is easily implemented.	A groundwater deed restriction is easily implemented in the short term.	A Well Restriction Overlay District may be easily implemented in the short term, depending on response from county.	A land use deed restriction is easily implemented in the short term.	Groundwater monitoring is easily implementable because the monitoring well network is already in place. Vapor monitoring points can be easily installed and maintained to facilitate sampling. Implementation completed in the short term.

Evaluation Criteria	Corrective Measures Alternatives				
	No Action	ERC - Groundwater Use (On Site)	Well Restriction Overlay District (On Site and Limited Off Site)	ERC - Land Use (On Site)	Monitoring - Groundwater Monitoring Program
Cost	Low costs for implementation.	Low costs for implementation.	Low costs for implementation.	Low costs for implementation.	Low to moderate costs to complete periodic monitoring, data evaluation, and reporting. Maintenance costs would be low for monitoring well repairs, as required.
Community Acceptance	Does not negatively impact the community.	Does not negatively impact the community.	A Well Restriction Overlay District limits property owners from installing wells on their property.	Does not negatively impact the community.	Does not negatively impact the community.
State Acceptance	Would not be acceptable to IDEM.	An ERC using IDEM's template would be acceptable to IDEM.	A Well Restriction Overlay District is in line with IDEM's environmental restrictive ordnance program.	An ERC using IDEM's template would be acceptable to IDEM.	Long term groundwater monitoring would be acceptable to IDEM in order to monitor plume area.
Conclusion	This technology was not included in the final corrective measures because more appropriate options are available.	**Included in proposed final corrective measures to prohibit potable and non-potable uses of groundwater.**	**Included in proposed final corrective measures to prohibit well installation.**	**Included in proposed final corrective measures.**	**Included in proposed final corrective measures.**

Note:
CVOC = chlorinated volatile organic compound

Table 2
Evaluation of Groundwater Corrective Measures Alternatives
Statement of Basis
Former GM Delco Plant 5
Kokomo, Indiana

ARCADIS Design & Consultancy for natural and built assets

Evaluation Criteria	Corrective Measures Alternative 1: Monitored Natural Attenuation	Alternative 2: Source Zone Isolation Barrier	Alternative 3: MNA with Source Zone Excavation and Disposal	Alternative 4: MNA with Calcium Oxide Treatment and Reuse of Soil	Alternative 5: MNA with In-situ Mixing of Sorbing Reagents	Alternative 6: MNA with In-situ Mixing of Binding Reagents	Alternative 7: MNA with Electrical Resistivity Heating
Protect Human Health and the Environment	Effective at protecting human health and the environment when used in conjunction with Facility-Wide Controls.	Effective at protecting human health and the environment by limiting migration to potential ingestion receptors during lifespan of barrier (50 years).	Effective at protecting human health and the environment when used in conjunction with Facility-Wide Controls by removing CVOC-impacted soil.	Effective at protecting human health and the environment when used in conjunction with Facility-Wide Controls by volatilizing CVOCs and binding contaminants to the treated soil matrix.	Effective at protecting human health and the environment when used in conjunction with Facility-Wide Controls by sorbing CVOCs to the stabilizing reagent.	Effective at protecting human health and the environment when used in conjunction with Facility-Wide Controls by binding CVOCs to the treated soil matrix and reducing source leachability to groundwater.	Effective protecting human health and the environment by removing CVOCs from the soil.
Attain Media Cleanup Standards Set by the Implementing Agency	Can reduce CVOC concentrations to meet remediation end points given a long enough timescale (>100 years).	May not meet remediation end points, as barrier would isolate impacted groundwater and limit natural attenuation for the duration of the barrier lifespan.	Can reduce CVOC concentrations by eliminating source zones, which leach to groundwater to meet corrective measures end points on shorter timescale than Alternative 1.	Can reduce CVOC concentrations by eliminating source zones, which leach to groundwater, to meet corrective measures end points on shorter timescale than Alternative 1.	Can reduce CVOC concentrations by eliminating source zones, which leach to groundwater, to meet corrective measures end points on shorter timescale than Alternative 1.	Can reduce CVOC concentrations by eliminating source zones, which leach to groundwater, to meet corrective measures end points on shorter timescale than Alternative 1.	Can reduce CVOC concentrations by eliminating source zones which leach to groundwater to meet corrective measures end points on shorter timescale than Alternative 1.
Control the Sources of Releases	Does not control the sources of releases.	Controls the sources of releases by limiting migration to potential ingestion receptors during lifespan of barrier.	Controls the sources of releases by removing CVOC-impacted soil source zones.	Controls the sources of releases by removing CVOCs from soil source zones.	Controls the sources of releases by treating sorbed-phase and dissolved-phase CVOCs.	Controls the sources of releases by treating sorbed-phase and dissolved-phase CVOCs.	Controls the sources of releases by removing CVOCs from the soil.
Comply with Any Applicable Standards for Management of Waste	No significant waste would be generated from this corrective measure.	Waste removed during wall installation would be managed in accordance with applicable standards.	Waste removed during excavation would be managed in accordance with applicable standards.	None to limited waste generated, as soil is placed back on site, and accumulated groundwater can be used to mix calcium oxide and soil.	None to limited waste generated, as reagent is mixed in situ and left in place.	None to limited waste generated, as reagent is mixed in situ and left in place.	Waste removed during system construction would be managed in accordance with applicable standards.
Long-Term Reliability and Effectiveness	Reliable and effective in the long term by natural attenuation of CVOCs.	Not reliable or effective in the long term after lifespan of barrier is exhausted and can no longer limit migration of CVOCs, slowing the speed of natural attenuation.	Reliable and effective in the long term by natural attenuation of CVOCs. Speed of natural attenuation increased as CVOC source material is removed from the Facility.	Reliable and effective in the long term by natural attenuation of CVOCs. Speed of natural attenuation increased as CVOCs within the source zones are removed from the Facility, and treatment residuals act as a binder to reduce CVOC mobility.	Reliable and effective in the long term by natural attenuation of CVOCs. Speed of natural attenuation increased as CVOCs within the source zones are sorbed to reagents.	Reliable and effective in the long term by natural attenuation of CVOCs. Speed of natural attenuation increased, as hydraulic conductivity of source zones are severely decreased, reducing leachability.	Reliable and effective in the long term by natural attenuation of CVOCs. Speed of natural attenuation increased as CVOCs within the source zones are removed from site.
Reduction in the Toxicity, Mobility, and Volume of Wastes	Mobility and toxicity are only reduced by natural attenuation mechanisms, and rates may be slower than other more aggressive remedial alternatives. Decreases the volume and toxicity of CVOCs over a long enough timescale. Does not reduce mobility of CVOCs.	Source zone would be contained for the lifespan of the barrier wall and cap. The mobility of the groundwater plume would be severely limited, but there would be very little reduction in toxicity.	Does not reduce mobility of CVOCs. Removal of NAPL impacts and replacement with clean import material would eliminate the source zone and any potential for material to leach to groundwater. Removes CVOCs from Facility and places it into a controlled and monitored landfill. Some CVOCs transferred from soil to air for subsequent dispersion and degradation.	Treatment dosing required to reduce soil concentrations to levels that groundwater concentrations will naturally attenuate to MCLs at Facility boundary has been confirmed by bench-scale testing. Decreases toxicity over long enough timescale. CVOCs are transferred from the soil to air for subsequent dispersion and degradation.	ZVI mixing has been used as a stabilizing treatment for sites with similar geology and constituents. ZVI mixing may not be an effective treatment in areas where large amounts of NAPL are present.	PC and BFS mixing has been used as a solidifying treatment for sites with similar geology and constituents. Solidification using cement within soil heavily impacted with NAPL may inhibit reduction in soil leachability to groundwater.	Decreases volume and toxicity of CVOCs over short term. Does not reduce contaminant mobility. CVOCs are transferred from the ground to air for subsequent dispersion and degradation.
Short-Term Effectiveness	Does not produce negative effects on human health or the environment during implementation	Installation of barrier wall will create dust and noise during installation. No transportation of hazardous materials are anticipated during implementation.	Excavation activities will create dust and noise during implementation. Hazardous materials will be transported off-site for disposal during implementation. Hazardous chemicals (oxidant) will be delivered to the site and used, if necessary, to reduce the groundwater concentrations downgradient during implementation.	Excavation and mixing activities will create dust and noise during implementation. No hazardous waste will be generated during implementation. Hazardous chemicals (oxidant) will be delivered to the site and used, if necessary, to reduce the groundwater concentrations downgradient during implementation.	Excavation and mixing activities will create dust and noise during implementation. No hazardous waste will be generated during implementation. Hazardous chemicals (oxidant) will be delivered to the site and used, if necessary, to reduce the groundwater concentrations downgradient during implementation.	Excavation and mixing activities will create dust and noise during implementation. No hazardous waste will be generated during implementation. Hazardous chemicals (oxidant) will be delivered to the site and used, if necessary, to reduce the groundwater concentrations downgradient during implementation.	Installation of electrodes and piping may produce dust and noise during implementation. An SVE system will be used to remove vapors from the subsurface; however, exhaust will be monitored and effectively treated, as needed.
Implementability	This alternative can be practically implemented.	Barrier wall assumed to need to extend to 5' into middle confining unit (assumed to be 50 feet bgs). One-pass trenching systems have been installed to the required depths. Below-grade cap consisting of HDPE liners are frequently used to isolate surface infiltration of landfills. Potential for need for relief of water pressure within source zone using extraction wells or small PRB groundwater treatment gates. This alternative can be practically implemented.	Option includes excavation of source material, treatment with bed ash, disposal, and backfilling with imported material. Materials excavated under slurry near the top of the S1 Unit to prevent soil heave. This alternative can be practically implemented	Proximity of confined S1 Unit to excavation/treatment depth will cause basal heave stability during removal of material near bottom of treatment. Treatability testing has been conducted showing that treatment of impacted soil with CaO can reduce concentrations to levels that will allow groundwater migrating off site to reach MCLs. This alternative can be practically implemented.	Stabilization mixing of ZVI using excavator-mounted mixers has been used in soil types and depths similar to those at the Facility to homogenize reagents with soil. This alternative can be practically implemented.	Solidification mixing of pozzolanic materials (e.g., PC or BFS) using excavator-mounted mixers has been used in soil types and depths similar to those at the Facility to homogenize reagents with soil. This alternative can be practically implemented.	The area that would be treated consists of open ground, and installation of equipment would be easily completed. The technology relies on use of a companion vapor extraction system to recover volatilized CVOCs. The shallow soil at the site consists of clay, which can limit the performance of vapor extraction.

Table 2
Evaluation of Groundwater Corrective Measures Alternatives
Statement of Basis
Former GM Delco Plant 5
Kokomo, Indiana

ARCADIS Design & Consultancy for natural and built assets

Evaluation Criteria	Corrective Measures						
	Alternative 1: Monitored Natural Attenuation	Alternative 2: Source Zone Isolation Barrier	Alternative 3: MNA with Source Zone Excavation and Disposal	Alternative 4: MNA with Calcium Oxide Treatment and Reuse of Soil	Alternative 5: MNA with In-situ Mixing of Sorbing Reagents	Alternative 6: MNA with In-situ Mixing of Binding Reagents	Alternative 7: MNA with Electrical Resistivity Heating
Cost	When combined with the Facility-wide controls, this alternative will not exceed the total property funding balance.	When combined with the Facility-wide controls, this alternative will not exceed the total property funding balance.	This alternative exceeds the total property funding balance.	When combined with the Facility-wide controls, this alternative will exceed the total property funding balance.	When combined with the Facility-wide controls, this alternative will not exceed the total property funding balance.	When combined with the Facility-wide controls, this alternative will not exceed the total property funding balance.	In combination with the Facility-wide controls, this alternative will exceed the total property funding balance.
Community Acceptance	Does not negatively impact the community.	Does not negatively impact the community.	Does not negatively impact the community.	Does not negatively impact the community.	Does not negatively impact the community.	Does not negatively impact the community.	Does not negatively impact the community.
State Acceptance	This alternative is a common remedy in Indiana as long as the COCs are fully degrading.	Although not vetted with the state, this alternative does not eliminate or stabilize the source mass; therefore, IDEM would likely not be accepting of this technology when other technologies can be more effective.	Although not vetted with the state, this alternative has been used to treat CVOCs and is generally accepted.	Although not vetted with the state, this alternative has been used to treat CVOCs and is generally accepted.	Although not vetted with the state, this alternative has been used to treat CVOCs and is generally accepted.	Although not vetted with the state, this alternative has been used to treat CVOCs and is generally accepted.	Although not vetted with the state, this alternative has been used to treat CVOCs and is generally accepted.
Conclusion	**This technology was selected as a final corrective measure for groundwater.**	This technology was not included in the final corrective measures because more appropriate and cost-effective options are available.	This technology was not included in the final corrective measures because more appropriate and cost-effective options are available.	This technology was not included in the final corrective measures because more appropriate and cost-effective options are available.	**This technology was selected as an alternative for the final corrective measure for groundwater.**	This technology was not included in the final corrective measures because more appropriate options are available.	This technology was not included in the final corrective measures since more appropriate and cost-effective options are available.

Notes:
BFS = blast furnace slag
bgs = below ground surface
CaO = calcium oxide
CVOC = chlorinated volatile organic compound
HDPE = high-density polyethylene
MCL = maximum contaminant level
MNA = monitored natural attenuation
NAPL = non-aqueous phase liquid
PC = Portland cement
ZVI = zero-valent iron

Attachment A

ATTACHMENT A

U.S. ENVIRONMENTAL PROTECTION AGENCY

PENDING ADMINISTRATIVE RECORD
FOR THE
DELCO ELECTRONICS PLANTS SITE
KOKOMO, HOWARD COUNTY, INDIANA

ORIGINAL
JANUARY, 2021
SEMS ID:

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
1	955928	10/7/05	Arcadis	General Motors Corp.	RCRA Corrective Action Description of Current Conditions Report (Redacted)	291
2	955929	12/15/05	Arcadis	General Motors Corp.	RCRA Facility Work Investigation Work Plan	1699
3	955930	1/19/06	Arcadis	General Motors Corp.	Data Report - RCRA Facility Investigation Phase I - Second Half 2005	100
4	955932	5/26/06	Arcadis	General Motors Corp.	Data Report - RCRA Facility Investigation (Redacted)	4903
5	956037	5/1/07	Arcadis	General Motors Corp.	Data Report - RCRA Facility Investigation (Redacted)	754
6	956036	6/1/08	Arcadis	RACER Trust	Supplemental Data Report	691
7	956015	5/21/10	Favero, D., Favero GeoSciences	Kaysen, M., U.S. EPA	RCRA Facility Investigation Report - Performance-Based RCRA Corrective Action (Redacted)	792
8	956023	9/29/11	Guerriero, M., U.S. EPA	RACER Trust	Administrative Order on Consent, Docket # RCRA-05-2011-0017	12
9	956025	12/6/11	Hare, R., RACER Trust	Kaysen, M., U.S. EPA	Corrective Measures Proposal	319
10	956016	3/23/12	Hare, R., RACER Trust	Kaysen, M., U.S. EPA	Supplemental Memo - Corrective Measures Proposal	23

NO.	SEMS ID	DATE	AUTHOR	RECIPIENT	TITLE/DESCRIPTION	PAGES
11	956020	6/11/14	Griles, M., Arcadis	RACER Trust	Risk Assessment Addendum to CMP Amendment	92
12	956017	7/14/14	Griles, M., Arcadis	Kaysen, M., U.S. EPA	ISCO Investigation Work Plan	22
13	956021	1/19/15	Heintz, M. and Cohen, E., Arcadis	Kaysen, M., U.S. EPA	Natural Attenuation Evaluation Memorandum	139
14	956029	5/6/15	Arcadis	RACER Trust	ISCO Pilot Injection Summary Report	273
15	956031	10/19/15	Arcadis	RACER Trust	RCRA Corrective Action Vapor Intrusion Conceptual Site Model (Redacted)	612
16	956035	5/9/17	Arcadis	RACER Trust	Vertical Aquifer Profiling Investigation Report	588
17	956028	5/16/17	Arcadis	RACER Trust	Parking Lot Summary of Investigation	3039
18	956018	7/8/17	Arcadis	RACER Trust	Environmental Restrictive Covenant	13
19	956019	8/11/17	Cisneros, J., U.S. EPA	Hare, R., RACER Trust	Letter re: Delco Northern Parking Lot	19
20	956033	7/13/18	Arcadis	Hare, R., RACER Trust	Semi-Annual Progress and Data Report - First Half 2018	652
21	956032	1/14/19	Arcadis	Hare, R., RACER Trust	Semi-Annual Progress and Data Report - Second Half 2018	186
22	956024	7/15/19	Arcadis	Hare, R., RACER Trust	Semi-Annual Progress and Data Report - First Half 2019	202
23	956027	9/5/19	Arcadis	Hare, R., RACER Trust	RCRA Corrective Action Measures Proposal (Redacted)	534
24	956034	1/15/20	Arcadis	Hare, R., RACER Trust	Semi-Annual Progress and Data Report - Second Half 2019	182
25	962077	1/13/21	U.S. EPA	RACER Trust	Area C Statement of Basis (Final)	51
26	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	_ _ _ _ _	Final Decision and Response to Comments (Pending)	_ _ _ _ _

Attachment B

A Citizen's Guide to Solidification and Stabilization

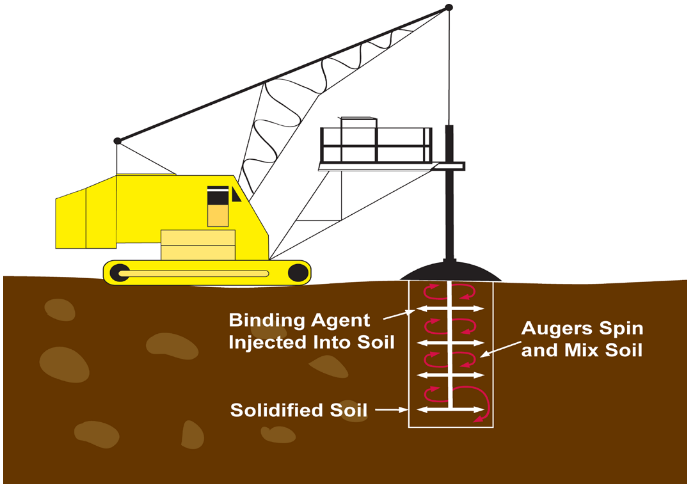
What Are Solidification And Stabilization?

Solidification and stabilization refer to a group of cleanup methods that prevent or slow the release of harmful chemicals from wastes, such as contaminated soil, sediment, and sludge. These methods usually do not destroy the contaminants. Instead, they keep them from "leaching" above safe levels into the surrounding environment. Leaching occurs when water from rain or other sources dissolves contaminants and carries them downward into groundwater or over land into lakes and streams.

Solidification binds the waste in a solid block of material and traps it in place. This block is also less permeable to water than the waste. Stabilization causes a chemical reaction that makes contaminants less likely to be leached into the environment. They are often used together to prevent people and wildlife from being exposed to contaminants, particularly metals and radioactive contaminants. However, certain types of organic contaminants, such as PCBs and pesticides, can also be solidified.

How Does It Work?

Solidification involves mixing a waste with a binding agent, which is a substance that makes loose materials stick together. Common binding agents include cement, asphalt, fly ash, and clay. Water must be added to most mixtures for binding to occur; then the mixture is allowed to dry and harden to form a solid block.



Binding agents can be injected into soil and mixed using augers.

Similar to solidification, stabilization also involves mixing wastes with binding agents. However, the binding agents also cause a chemical reaction with contaminants to make them less likely to be released into the environment. For example, when soil contaminated with metals is mixed with water and lime — a white powder produced from limestone — a reaction changes the metals into a form that will not dissolve in water.

Additives can be mixed into the waste while still in the ground (often referred to as "in situ"). This usually involves drilling holes using cranes with large mixers or augers, which both inject the additives underground and mix them with the waste. The number of holes needed depends on the size of the augers and the contaminated area. Dozens of holes may need to be drilled. When the waste is shallow enough, the contaminated soil or waste is excavated and additives are mixed with it above ground (often referred to as "ex situ"). The waste is either mixed using backhoes and front end loaders or placed in machines called "pug mills." Pug mills can grind and mix materials at the same time.

Solidified or stabilized waste mixed above ground is either used to fill in the excavation or transported to a landfill for disposal. Waste mixed in situ is usually covered with a "cap" to prevent water from contacting treated waste (See *A Citizen's Guide to Capping* [EPA 542-12-004].)

How Long Will It Take?

Solidification and stabilization may take weeks or months to complete. The actual time it takes will depend on several factors. For example, they may take longer where:

- The contaminated area is large or deep.
- The soil is dense or rocky, making it harder to mix with the binding agent.
- Mixing occurs above ground, which requires excavation.
- Extreme cold or rainfall delays treatment.

Are Solidification And Stabilization Safe?

The additives used in solidification and stabilization often are materials used in construction and other activities. When properly handled, these materials do not pose a threat to workers or the community. Water or foam can be sprayed on the ground to make sure that dust and contaminants are not released to the air during mixing. If necessary, the waste can be mixed inside tanks, or the mixing area can be covered to minimize dust and vapors. The final solidified or stabilized product is tested to ensure that contaminants do not leach. The strength and durability of the solidified materials are also tested.

Large augers inject and mix binding agent with contaminated soil.

How Might It Affect Me?

Nearby residents or businesses may notice increased truck traffic as equipment and additives are brought to the site or as treated waste is transported to a landfill. They also may hear earth-moving equipment as waste is excavated or mixed. When cleanup is complete, the land often can be redeveloped.

Why Use Solidification Or Stabilization?

Solidification and stabilization provide a relatively quick and lower-cost way to prevent exposure to contaminants, particularly metals and radioactive contaminants. Solidification and stabilization have been selected or are being used in cleanups at over 250 Superfund sites across the country.

Contaminated soil mixed with cement in a pug mill is spread on the ground as pavement.

Example

Solidification and stabilization were used to clean up contaminated sludge and soil at the South 8th Street Landfill Superfund site in Arkansas. From the 1960s to 1970s, municipal and industrial wastes were disposed at the site, including a 2.5-acre pit of waste-oil sludge. In the 1980s, that area was found to be contaminated with oily wastes, PCBs, pesticides, and lead.

In 1999, cranes with augers were used to inject and mix limestone, fly ash, and Portland cement with 40,000 cubic yards of sludge and soil in the pit. These additives helped solidify the mixture as well as stabilize the lead and other metals. The hardened material was left in place and covered with a soil cap. Evaluations in 2004 and 2009 indicated that the cleanup approach is still protecting human health and the environment. The site has been deleted from the National Priorities List, the list of the nations most serious hazardous waste sites.

For More Information

For more information about this and other technologies in the Citizen's Guide Series, visit:

www.cluin.org/remediation
www.cluin.org/products/citguide

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United States
Environmental Protection
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Office of Solid Waste and
Emergency Response
(5102G)

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www.epa.gov/superfund/sites
www.cluin.org

A Citizen's Guide to Monitored Natural Attenuation

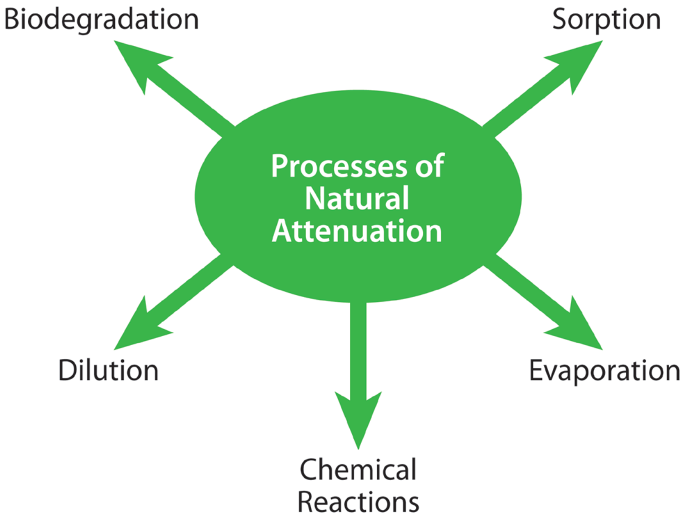
What Is Monitored Natural Attenuation?

Natural attenuation relies on natural processes to decrease or "attenuate" concentrations of contaminants in soil and groundwater. Scientists monitor these conditions to make sure natural attenuation is working. Monitoring typically involves collecting soil and groundwater samples to analyze them for the presence of contaminants and other site characteristics. The entire process is called "monitored natural attenuation" or "MNA." Natural attenuation occurs at most contaminated sites. However, the right conditions must exist underground to clean sites properly and quickly enough. Regular monitoring must be conducted to ensure that MNA continues to work.

How Does It Work?

When the environment is contaminated with harmful chemicals, nature may work in five ways to clean it up:

- *Biodegradation* occurs when very small organisms, known as "microbes," eat contaminants and change them into small amounts of water and gases during digestion. Microbes live in soil and groundwater and some microbes use contaminants for food and energy. (*A Citizen's Guide to Bioremediation* [EPA 542-F-12-003] describes how microbes work.)



- *Sorption* causes contaminants to stick to soil particles. Sorption does not destroy the contaminants, but it keeps them from moving deeper underground or from leaving the site with groundwater flow.

- *Dilution* decreases the concentrations of contaminants as they move through and mix with clean groundwater.

- *Evaporation* causes some contaminants, like gasoline and industrial solvents, to change from liquids to gases within the soil. If these gases escape to the air at the ground surface, air will dilute them and sunlight may destroy them.

- *Chemical reactions* with natural substances underground may convert contaminants into less harmful forms. For example, in low-oxygen environments underground, the highly toxic "chromium 6" can be converted to a much less toxic and mobile form called "chromium 3" when it reacts with naturally occurring iron and water.

MNA works best where the source of contamination has been removed. For instance, any waste buried underground must be dug up and disposed of properly, or removed using other available cleanup methods. When the source is no longer present, natural processes may be able to remove the remaining, smaller amount of contaminants in the soil or groundwater. The site is monitored regularly to make sure that contaminants attenuate fast enough to meet site cleanup objectives and that contaminants are not spreading.

How Long Will It Take?

MNA may take several years to decades to clean up a site. The actual cleanup time will depend on several factors. For example, cleanup will take longer when:

- Contaminant concentrations are higher.

- The contaminated area is large.

- Site conditions (such as temperature, groundwater flow, soil type) provide a less favorable environment for biodegradation, sorption or dilution.

These factors vary from site to site.

Is It Safe?

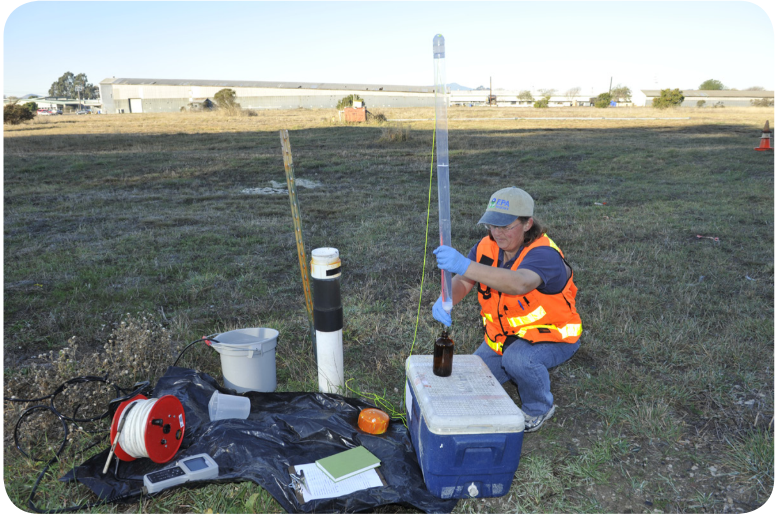
MNA does not pose a threat to the community or to site workers. MNA does not involve excavating soil or pumping groundwater to the surface for above ground treatment, so the potential to contact contaminants is limited. Long-term, regular monitoring is conducted to make sure contamination does not leave the site and that it is being attenuated at a rate that's consistent with cleanup goals for the site. This ensures that people and the environment are protected during the cleanup process.

How Might It Affect Me?

Generally, MNA does not cause much disruption to the surrounding community since no heavy machinery or other equipment is required during the MNA process. Residents and businesses near the site may initially see and hear drilling rigs when wells to monitor groundwater quality are installed. Once installed, workers will need to visit the site to collect samples of groundwater, soil or sediment to ensure MNA is working properly and is protective of human health and the environment. At those times, residents may hear the pumps and generators often used to collect groundwater samples from the wells.

Why Use Monitored Natural Attenuation?

MNA is selected when any contaminant source has been removed and only low concentrations of contaminants remain in soil or groundwater. The anticipated cleanup time for MNA must be reasonable compared to that of other more active cleanup methods. MNA requires less equipment and labor than most methods, which decreases cleanup costs. However, the cost of many years of monitoring can be high. MNA has been selected or is being used at over 100 Superfund sites across the country.



Monitoring natural attenuation at the site by collecting a groundwater sample.

Example

MNA is being used to complete groundwater cleanup at a former landfill on the Kings Bay Naval Submarine Base, Georgia. From 1993 to 2001, other cleanup methods were used to contain and treat the source of solvents in the groundwater. The goal was to reduce solvent concentrations to a level at which MNA would ensure safe concentrations at the property boundary, and unsafe levels of solvents would no longer flow beneath nearby housing. MNA was considered an efficient final treatment because of the right conditions for bioremediation to occur.

Monitoring for natural attenuation has been occurring monthly since 1998. Groundwater is being sampled for solvents and other conditions that indicate MNA is working. The long-term objective is to reduce contaminant concentrations across the site to below Maximum Contaminant Levels (MCLs). Concentrations have decreased at most wells, but the groundwater in the former source area is still expected to take decades to reach MCLs.

For More Information

For more information about this and other technologies in the Citizen's Guide Series, visit:

www.cluin.org/remediation
www.cluin.org/products/citguide
www.cluin.org/products/MNA

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