968892

SECOND FIVE-YEAR REVIEW REPORT FOR COPLEY SQUARE PLAZA SUPERFUND SITE SUMMIT COUNTY, OHIO

Prepared by

U.S. Environmental Protection Agency
Region 5
Chicago, Illinois

9/9/2021

X

Douglas Ballotti, Director
Superfund & Emergency Management Division
Signed by: DOUGLAS BALLOTTI

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS

µg/L	Micrograms per Liter ("parts per billion")
ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cis-1,2-DCE	*cis*-1,2-Dichloroethene
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FYR	Five-Year Review
ICs	Institutional Controls
ICIAP	Institutional Control Implementation and Assurance Plan
ISCR	In-situ Chemical Reduction
LTRA	Long-Term Response Action
MCL	Maximum Contaminant Level
mg/kg	Milligrams per Kilogram ("parts per million")
MW	Monitoring Well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
Ohio EPA	Ohio Environmental Protection Agency
OU	Operable Unit
PCE	Tetrachloroethylene or Tetrachloroethene
RA	Remedial Action
RAO	Remedial Action Objectives
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
SDWA	Safe Drinking Water Act
Site	Copley Square Plaza Superfund Site
SSD	Sub-slab Depressurization System
TBC	To be considered
TCE	Trichloroethene
UU/UE	Unlimited Use and Unrestricted Exposure
VC	Vinyl Chloride
VI	Vapor Intrusion
VOC	Volatile Organic Compound
ZVI	Zero-valent Iron

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The United States Environmental Protection Agency (EPA) is preparing this FYR report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)(40 CFR Section 300.430(f)(4)(ii)), and considering EPA policy.

This is the second FYR for the Copley Square Plaza Superfund Site (the Site). The triggering action for this **statutory** review is the completion date of the previous FYR. This FYR report has been prepared due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of two Operable Units (OUs). OU1 addresses contamination of subsurface soil, shallow groundwater, and indoor air. OU2 is comprised of the intermediate and deep groundwater aquifers. This FYR report addresses the remedy implemented for OU1. The remedy for OU2 is not addressed in this FYR report because implementation of the remedial action as prescribed in the 2015 OU2 Record of Decision (ROD) has not yet begun.

The Site FYR was led by Margaret Gielniewski, Remedial Project Manager, EPA. Participants included Nicholas Roope, State Project Manager, and Mark Caetta, State Geologist, with the Ohio Environmental Protection Agency (Ohio EPA). This FYR began on July 16, 2020 when EPA sent a notification letter to Ohio EPA announcing the FYR start.

Site Background

The Site is located approximately 35 miles south of Cleveland and five miles west of Akron, in northeastern Ohio (see Figure 1 in Appendix B). Prior to the 1960s, the land that the Site occupies was an undeveloped cattle farm. Once development began, the Site was and still is currently used for mixed residential, commercial, and retail properties, which include the commercial buildings at 2777 and 2799 Copley Road. Associated groundwater contaminant plumes exist beneath the commercial and residential properties as part of the Site. In 2021, new residential structures are being built just north of the existing residential Meadow Run subdivision; however, these structures are outside of the Site boundary. It is anticipated that the current Site land uses will remain the same into the foreseeable future.

The 2777 Copley Road building housed dry-cleaning businesses under various names from the 1960s until August 1994 (see Figure 3 in Appendix B). In 1990, Ohio EPA responded to a water odor complaint by sampling two nearby private wells and found volatile organic compounds (VOCs) in the well water at concentrations above the federal Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs).

In 1994, Ohio EPA sampled 55 area residential wells and nine were found to contain Site-related VOCs above MCLs, with concentrations of tetrachloroethylene (PCE) at 342 micrograms per liter (µg/L) and vinyl chloride (VC) at 14 µg/L, exceeding their 5 µg/L and 2 µg/L SWDA MCLs, respectively. Except for one homeowner that declined to connect their residence to the public water supply, drinking water in the area is currently supplied by the Akron municipal water supply.

The Site was proposed to the National Priorities List (NPL) in 2004 and finalized on the NPL in April 2005. For additional background information on the Site, see Table 1 in Appendix B, which is a chronology of Site events.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Copley Square Plaza		
EPA ID: OH0000563122		
Region: 5	**State:** OH	**City/County:** Copley, Summit County
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Margaret Gielniewski		
Author affiliation: EPA Region 5		
Review period: 7/16/2020 - 8/10/2021		
Date of site inspection: 10/14/2020		
Type of review: Statutory		
Review number: 2		
Triggering action date: 8/10/2016		
Due date *(five years after triggering action date)*: 8/10/2021		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

The primary contaminants of concern (COCs) found at the Site and shown in Table 1 (next page) are associated with past improper waste storage and disposal at the dry-cleaning operations at the Site.

The quantitative assessment of exposure and risk for a site is based on the Site-related COCs. COCs are a subset of all the chemicals positively identified at a site and are associated with its history and past use.

Table 1: Contaminants of Concern

SOIL	GROUNDWATER	INDOOR AIR
Trichloroethene (TCE)	TCE	TCE
PCE	PCE	PCE
	cis-1,2-Dichloroethene (cis-1,2-DCE)	cis-1,2-DCE
	Trans-1,2-Dichloroethene (trans-1,2-DCE)	trans-1,2-DCE
	VC	VC
	Carbon Tetrachloride	1,2-Dichloroethane (1,2-DCE)
	Chloroethane	1,1,2- TCA
	Chloroform	
	1,1,2- Trichloroethane (1,1,2- TCA)	

Elevated levels of other VOCs were discovered, including the breakdown or daughter products of PCE and TCE. Through sampling, EPA determined that nine residential wells had dry-cleaning contaminants at levels above MCLs, and 17 other residential wells were contaminated, but at levels below MCLs. At the time, the 26 impacted residences only had access to private wells for a drinking water source, so unless action was taken, people would continue to be exposed to human health threats from PCE, TCE and their daughter products through the ingestion of groundwater pathway.

The exposure assumptions used to develop the Human Health Risk Assessment and the exposure pathways of concern at the Site include exposure to contaminated groundwater for current and future residents through the ingestion, dermal contact, and inhalation resulting from potential vapor intrusion (VI) pathways (WESTON, 2008).

EPA also completed a screening level ecological risk assessment (WESTON, 2008). EPA determined that the potential for adverse impacts due to exposure to Site contaminants by terrestrial and aquatic wildlife species was limited, and no cleanup was needed to mitigate any potential ecological risks.

Response Actions

In summer 1994, Ohio EPA requested that EPA initiate an emergency removal action to address all immediate human health threats that the Site-related contaminants might pose to local residents. EPA's August 22, 1994 removal action resulted in five main actions, which included: 1) temporarily supplying bottled water for cooking and drinking purposes to nine residences with documented VOC contamination in their private wells; 2) design, installation, and evaluation of eight[1] point-of-entry household water treatment systems designed to remove the contaminants from the well water supplied to affected homes where Site contaminants exceeded MCLs; 3) closure of eight wastewater tanks, including removal and disposal of over 9,200 gallons of contaminated liquids at the dry cleaning building on 2777 Copley Road; 4) installation of a shallow groundwater recovery trench and sump

[1] Nine residential wells were found to have contamination above MCLs. The occupants of one residence connected to public water in lieu of having a whole-house filtration system installed through the EPA Removal Action.

system outside the dry-cleaning building, which EPA operated until the late 1990s; and 5) conducting an extent of groundwater contamination study at the Site for further evaluation.

In the early 2000s, the owners of one of the eight homes with whole-house water filtration systems connected to municipal water on their own to avoid continuous quarterly filter changeouts being performed by Ohio EPA. The owners of this home also removed the filtration system since the public water supply required no filtration. Ohio EPA maintained the seven remaining point-of-entry household water treatment systems until 2012, when EPA connected six of the seven[2] residences to the Akron municipal water supply as part of implementing the OU1 remedial action (RA), which is described in "Connection of Residences with Impacted Wells to an Alternative Water Supply" under the Status of Implementation Section of this FYR report.

In October 2009, EPA issued a ROD (EPA. 2009) for OU1 that called for the following selected remedy components to be implemented at the Site:

- Develop and implement institutional controls (ICs) in the form of a local ordinance to prohibit the installation of new wells in the shallow groundwater in order to prevent the consumption or accidental exposure to contaminated groundwater. The need for additional ICs for indoor air, soil and land use will be explored during the remedial design (RD) phase and documented in an IC Implementation and Assurance Plan (ICIAP).
- Conduct a VI assessment and sampling during the RD phase, and install VI mitigation systems [i.e. - sub-slab depressurization (SSD) systems] as needed at buildings where sub-slab and indoor air sampling demonstrates Site contaminants in groundwater through VI are providing an unacceptable indoor risk to occupants.
- Connect residences with impacted private wells to the Akron municipal water supply; and
- Perform *in-situ* chemical reduction (ISCR)[3], to reduce site-related contaminants in the soil and shallow groundwater. This component of the remedy also includes groundwater monitoring and an assessment to determine whether multiple rounds of ISCR injections are necessary to treat the contaminants.

The Remedial Action Objectives (RAOs) for the selected remedy in the 2009 OU1 ROD are:

- Subsurface Soil: prevent ingestion of, dermal contact with, and inhalation of vapors released from Site subsurface soils containing COCs exceeding risk-based values for future child and adult residents, including PCE and TCE. The clean-up criteria for PCE and TCE in subsurface soils are 0.48 milligrams per kilogram (mg/kg) and 0.053 mg/kg, respectively.

- Shallow Groundwater: prevent ingestion of, direct contact with, and inhalation of vapors released from groundwater containing COCs exceeding MCLs and target indoor air and sub-slab vapor concentrations for contaminants including: PCE, TCE, 1,1,2-TCA, Carbon Tetrachloride, chloroethane, chloroform, *cis*-1,2-DCE, *trans*-1,2-DCE; VC; and 1,2-DCE. The intent of the

[2] The residents of one home declined public water connection. Their whole-house filtration system was removed following EPA's remedial action.

[3] ISCR is a type of environmental remediation technique used for soil and/or groundwater remediation to reduce the concentrations of targeted environmental contaminants to acceptable levels. At this Site, it involves using equipment to push chemicals and microorganisms into the shallow groundwater to bond with and digest (microorganisms) the dry-cleaning chemicals until PCE, TCE and their daughter products are reduced to the harmless chemical, ethene.

RAO is restoration of the shallow groundwater to beneficial use as a drinking water source for area residents within a reasonable time frame.

- Indoor Air: reduce or eliminate inhalation of air containing COCs from the Site through the groundwater VI pathway to a human health cumulative excess lifetime carcinogenic risk goal of $1x10^{-6}$ and a cumulative non-cancer hazard goal equal to a hazard index of 1.

Status of Implementation

This section details the status of implementation of the 2009 OU1 ROD remedy. See Appendix B, Figures 12 showing an SSD system installation and Figure 13 identifying the water main installation map and properties with SSD systems at the Site.

Vapor Intrusion[4] Assessment and Mitigation Implementation

EPA completed RD activities for the VI SSD mitigation systems from June 2010 through December 2011. These activities included collecting soil gas samples near residential structures and collecting indoor air and sub-slab vapor samples from 17 residences. The basis of design was derived from the feasibility study (FS) report, groundwater modeling, and results from the above-mentioned field sampling. Due to the presence of at least one Site-related COC in the indoor air and/or sub-slab samples, EPA installed SSDs, also referred to as VI mitigation systems, in eight residences to mitigate the potential exposure pathway. Even though the indoor air and sub-slab samples were not above risk-based levels at the time of sampling, EPA anticipated that the ISCR groundwater remedy would impact sub-slab and indoor air quality. ISCR is known to increase TCE breakdown products in groundwater plumes prior to neutralizing them completely.

The design of the SSD systems, which operate in the same way as radon mitigation systems, was approved by EPA in December 2011; construction of SSD systems began, and was completed by, August 2012.

In 2013, EPA conducted two semi-annual air sampling events to ensure that the SSD systems were operational and functional. Also in 2014, EPA conducted two semi-annual air sampling events, including taking soil gas samples this time, to see if the ISCR application to groundwater impacted the VI pathway by creating more volatile (ready to turn into a gas more easily) daughter products, and whether additional residences needed to have SSD systems installed. Based on the results, no additional SSD systems were needed.

Connection of Residences with Impacted Wells to an Alternative Water Supply

The offer made to residents to connect their residence to the alternative water supply was based on 2011 residential well sampling and 2009-2011 monitoring well sampling results. Residents located within 300

[4] Vapor intrusion is the general term given to migration of hazardous vapors from any subsurface vapor source, such as contaminated soil or groundwater, through the soil and into an overlying building or structure. These vapors can enter buildings through cracks in "basements and foundations, as well as through conduits and other openings in the building envelope. Vapors can also enter structures that are not intended for human occupancy (e.g., sewers, drain lines, access vaults, storage sheds, pump houses) through cracks and other openings." – Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air, U.S. EPA - June 2015

feet of the established groundwater contaminant plumes' boundaries were included in the sampling event and EPA determined that 26 properties needed to be connected to Akron's public water supply, regardless of whether there were contaminants present in their wells at the time of sampling. This decision was made in anticipation of implementing the ISCR groundwater remedy, which is known to increase TCE breakdown products in the groundwater plumes prior to neutralizing them completely.

The design plans for the public water main installation were approved by EPA in December 2011 and construction began in July 2012 (See Figure 13 in Appendix B for a map depicting the location of the water main installation). Of the 26 properties, EPA connected 23 properties during the RA. The residents of two properties, one on South Plainview Drive and one on Appletree Lane, had already connected to the public water supply on their own. The residents of another property declined connection to public water altogether and continue to decline connection at this time. All of the Meadow Run condominiums were built with connection to Akron municipal water (no private wells).

Implementation of OU1 ISCR and Groundwater Treatment Remedy Components

In 2011, to aid in the design of the ISCR remedy, EPA completed a pilot study by injecting a variety of mixtures of zero-valent iron (ZVI), organic carbon, and nutrients into a portion of the shallow groundwater contaminant plume to determine the most effective ratio to treat the shallow groundwater at the Site. See Figure 2 in Appendix B for the Extent of Groundwater Contamination Pre-Remediation. In September 2012, EPA approved the RD for ISCR, which called for the EHC® brand of reagent or an equivalent product consisting of ZVI and nutrients in a controlled-released organic carbon substrate. The injected nutrients would feed the microorganisms already present in the Site area soil and groundwater and encourage them to metabolize the VOC contaminants.

The ISCR injection into shallow groundwater portion of the RA occurred from May through September 2013 and utilized both EHC® and Ferox-Plus®, another brand of reagent. The contractor performed bioaugmentation of the ISCR remedy by injecting microorganisms and feedstock (vegetable oil) for the microorganisms into the shallow groundwater aquifer in designated locations. After assessing the cleanup progress following the injection of ISCR materials, it was determined that a second round of ISCR was needed to clean up the shallow groundwater.

After the first round of ISCR, EPA began a ten-year groundwater monitoring program, referred to as the Long-term Response Action (LTRA). This is a ten-year period whereupon EPA will take periodic groundwater samples to monitor groundwater quality to ensure there is no off-site migration and to ensure the efficacy of the ISCR remedy component. The LTRA will end on September 12, 2023, whereupon Ohio EPA will take over all groundwater monitoring activities at the Site and future responsibility for remedy implementation components, such as additional ISCR injections, if needed.

The second round of ISCR began in April 2016 and was completed in July 2016. During this round, EPA focused on shallow groundwater areas where PCE and TCE were still present, predominantly in areas nearest the former dry-cleaning building.

RA construction activities are described in more detail in the *Remedial Action Report, Groundwater & Soil Remediation, Copley Square Plaza Site OU1, Summit County, Ohio (SulTRAC 2013b),* available in the record repositories at the Akron-Fairlawn Public Library and at the EPA Records Center.

Institutional Controls

ICs are required by the 2009 ROD to restrict groundwater use, maintain the integrity of the remedy, and assure the long-term protectiveness for areas that do not allow for UU/UE. ICs have not yet been implemented, but planned ICs for the Site are described in Table 2 below. There is currently only one known use of contaminated groundwater, which is inconsistent with the objectives to be achieved by the ICs. This is at the one residence where connection to Akron municipal water supply was, and still is, actively refused. The current residents are the original owners and have stated that they understand the risks of being exposed to the contaminants found in their drinking water. EPA may elect to pursue a deed notice providing public notification of contaminated groundwater present on this property. If property ownership changes, EPA will offer the new residents an opportunity to connect to the municipal water supply.

Based on yearly inspections, including this FYR inspection, EPA is not aware of other uses of the Site or media that are inconsistent with the stated objectives that will be required in the ICs. Summit County officials confirmed that no new water wells have been installed in the area. However, ICs are necessary to ensure the long-term protectiveness of the remedy. Also, procedures must be established in writing to ensure the ICs are implemented and monitored for effectiveness; and that compliance with ICs will be achieved and maintained. IC follow-up activities that are still needed include the following:

- Development of an ICIAP[5] to ensure that ICs and long-term stewardship (LTS) procedures are in place and effective at the Site.

- LTS plans and procedures that are developed will be reviewed by EPA to ensure that the LTS procedures are clear. Long-term protectiveness requires continued compliance with groundwater and any other use restrictions to ensure that the remedy continues to function as intended. LTS will ensure that the ICs are maintained, monitored, and enforced. Results of IC reviews conducted by the State, or local authority, should be provided to EPA annually with a certification that the ICs remain in-place and are effective.

Table 2: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Media: Groundwater Engineered Controls: Groundwater monitoring program to track attenuation of contaminants.	Yes	Yes	Real Estate located within and 300 feet from the shallow, intermediate, and deep groundwater	Prohibit installation of groundwater wells and restrict residential, commercial, and industrial	Summit County Health Department Well Drilling and Water Supply Systems Ordinance; planned for June 2024

[5] An ICIAP is a document designed to systematically: (a) establish and document the activities associated with implementing and ensuring the long-term stewardship of ICs: and (b) specify the persons and/or organizations that will be responsible for conducting these activities. Specifically, an ICIAP focuses on identifying the details of how ICs that are selected in decision documents should be implemented, maintained, enforced, modified, and terminated (if applicable) at a specific site.

Areas that DO NOT Support UU/UE Based on Current Site Conditions: All areas within and 300 feet from the shallow, intermediate, and deep groundwater contaminant plumes. See Figure 2 in Appendix B.			contaminant plumes. See Figure 2 in Appendix B.	groundwater use.	
Media: Indoor Air Informational Device: SSD system and VI monitoring program to track attenuation of contaminants in sub-slab and indoor air samples. Areas that DO NOT Support UU/UE Based on Current Site Conditions: Residential structures with SSD systems installed.	Yes/To be assessed	Yes/To be assessed	Residential structures with SSD systems installed.	Notify the residents of the purpose of SSD system and the importance of maintaining and using the SSD system installed in their residence.	Sub-slab Depressurization Systems Operation and Maintenance Ordinance; planned for June 2024
Media: Soil/Land Use Engineered Controls: Soil monitoring program to track attenuation of contaminants in soil. Areas that DO NOT Support UU/UE Based on Current Site Conditions: During the RD, it was determined that all the contaminants from the dry-cleaning facilities migrated from soil into groundwater; therefore, no soil contamination	No	Yes/To be assessed	Real Estate located within and 300 feet from the shallow, intermediate, and deep groundwater contaminant plumes. See Figure 2 in Appendix B	During the RD, it was determined that all the contaminants from the dry-cleaning facilities migrated from soil into groundwater; therefore, no soil contamination exists at the Site and no IC is needed.	N/A

exists at the Site and no soil IC is needed.					

Systems Operations/Operation & Maintenance

In 2013, EPA finalized an Operation and Maintenance (O&M) Plan for the Site, which also details the groundwater monitoring requirements (SulTRAC. 2013). Under the O&M Plan, groundwater is required to be monitored quarterly (in January, April, July, and October) for all the COCs associated with the Site and for certain metals that serve as sampling parameters for ISCR functionality. Figure 14 in Appendix B depicts the groundwater monitoring well network that is being sampled.

EPA is committed to O&M of the groundwater remedial components until September 2023, at which point the ten-year LTRA period will be complete. After September 2023, Ohio EPA will conduct all O&M activities, including groundwater monitoring and periodic soil gas sampling to make sure there is no additional potential for VI in area residences.

EPA's O&M activities for this FYR period included quarterly groundwater monitoring and periodic VI monitoring (soil gas, indoor air, sub-slab, and SSD system functionality; see Appendix B, Table 1 for sampling frequency). EPA has conducted quarterly groundwater monitoring activities since 2011, except for the quarters immediately following an ISCR application (due to the likelihood of drawing up ISCR slurry in the water samples) in 2013 and 2016. Most recently, EPA was unable to conduct quarterly sampling events at the Site after October 2020 until July 2021 due to the loss of its environmental support contracting. However, EPA awarded a new environmental support contract for OU1 Site work in February 2021 and is now laying the groundwork towards resumption of O&M activities.

EPA conducts periodic soil gas sampling to ensure that the ISCR remedy is not adversely impacting contaminant concentrations in soil gas, which can lead to current and future VI issues. During this FYR period, EPA conducted semi-annual VI monitoring in February/March and August 2016. Following the 2016 ISCR application, EPA again conducted another round of VI sampling in April/May 2019.

In October 2021, EPA will begin groundwater remedy optimization activities to evaluate frequency and location of groundwater sampling in preparation of LTRA completion. Groundwater monitoring will continue until the OU1 ROD groundwater cleanup goals are achieved for all COCs.

III. PROGRESS SINCE THE LAST REVIEW

This section includes the protectiveness determinations and statements from the last FYR as well as the recommendations from the last FYR and the current status of those recommendations.

Table 3: Protectiveness Determinations/Statements from the 2016 FYR[6]

OU #	2016 Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy at OU 1 currently protects human health and the environment because the remedy is functioning as intended by the decision document and no one is being exposed to site-related contaminants. However, in order for the OU 1 remedy to be protective in the long-term, the following actions need to be taken: develop an ICIAP; develop and implement ICs to prevent use of the shallow aquifer for drinking; and develop a LIS Plan.

Table 4: Status of Recommendations from the 2016 FYR[7]

OU #	Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
1	ICs are needed.	EPA should develop an ICIAP to determine necessary mechanisms that may include: informational ICs attached to property deeds of vacant parcels behind the former dry cleaning building; ICs to prevent installation of drinking water wells in all three aquifers without review and approval of county health department officials; informational ICs	Addressed in Next FYR	EPA will develop an ICIAP. In 2019, EPA began communication with Summit County and Ohio EPA to discuss the establishment of ICs in the form of a County groundwater-use ordinance. EPA will continue to coordinate with Summit County and Ohio EPA for that ordinance. EPA will also work with the owners of the residence who declined	N/A

[6] Although in the previous FYR a protectiveness determination of "protectiveness deferred" for OU2 was included, a determination should not have been made because the remedial actions for OU2 had not yet started, and therefore OU2 was not subject to being evaluated in a FYR. OU2 will be evaluated in FYRs once the remedial actions for that OU have started. The issues and recommendations from the previous FYR are tied to and being addressed under OU1.

[7] Although in the previous FYR, issues and recommendations were made that were also tied to OU2, the remedial actions for OU2 had not yet started, and therefore OU2 was not subject to being evaluated in a FYR yet. OU2 will be evaluated in FYRs once the remedial actions for that OU have started. The issues and recommendations from the previous FYR are tied to and are being addressed under OU1.

		on property deeds to notify vacant land owners that they must perform a VI investigation or install VI mitigation measures if they construct new buildings; and identify, develop and implement needed ICs.		public water connection to place a deed notice regarding their drinking water well contamination. New issues and recommendations are included in this FYR addressing development of an ICIAP and implementation of ICs.	
1	LTS procedures are needed to ensure that effective ICs are monitored, maintained, and enforced.	Develop and implement a LTS Plan or amend the existing site O&M Plan to include procedures for monitoring and tracking compliance with existing ICs, communicating with EPA, and providing an annual certification to EPA that the ICs remain in place and are effective.	Addressed in Next FYR	EPA plans to coordinate with Summit County and Ohio EPA to monitor, maintain, and enforce the ICs. A new issue and recommendation have been included in this FYR addressing LTS of ICs.	N/A
1	One property declined municipal water connection and it is uncertain if the residents are maintaining the whole-house	Collect quarterly samples from the residential well and tap water at the property that declined municipal water connection to ensure that the residents occupying the property have safe drinking water. Send a notification letter on an annual	Addressed in Next FYR	EPA determined the residents no longer have a water filtration system in their home. EPA collected quarterly residential well and tap water samples until 2020 (stopped due to COVID-19 restrictions	N/A

	filtration system and whether they have site contaminant above MCL in their drinking water.	basis to remind the occupants to maintain the water filtration system.		and contracting mechanism transition and new contract startup). EPA provided the residents the sample results and continues to offer connection to the Akron Municipal water supply because VC is found at levels above MCLs. A new issue and recommendation have been included in this FYR to continue to monitor the resident's water.	

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting in the *Akron Beacon Journal* on 8/7/2020, stating that EPA was beginning a five-year review and inviting the public to submit any comments to EPA (see Appendix C for a copy of the public notice). No comments were received in response to the public notice. The results of the review and the report will be made available at the Site information repository located at the Fairlawn-Bath Public Library, 3101 Smith Road, Akron, Ohio 44333.

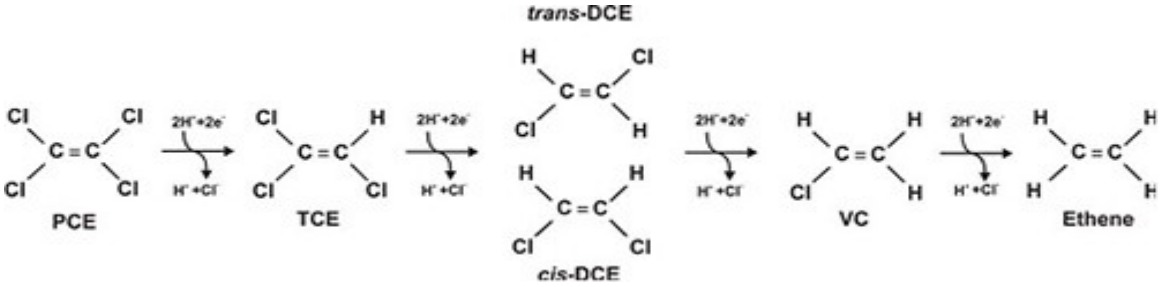
Community interviews were not conducted due to lack of interest in the Site from the public. Impacted residents, those with VI mitigation systems in their homes and those who declined the connection to public water, were provided with sample results for their respective properties, at the intervals at which data were collected.

Data Review

Groundwater

ISCR is a process that promotes reductive dechlorination of the VOC contaminants found in groundwater, which reduces the highly-chlorinated PCE and TCE down to 1,2-DCE, then to VC, and

finally to ethene gas. Ethene poses no risk from the ingestion, inhalation, or dermal contact pathways, and is the end-goal of ISCR.



In April 2013, EPA completed a baseline groundwater sampling event to establish baseline conditions, or concentration of contaminants found in the groundwater, prior to the application of ISCR. The April 2013 data set was selected to represent the "before treatment" mass of VOCs dissolved in the groundwater.

This data review focuses on data collected following the 2016 FYR, including data collected after the second ISCR treatment in 2016, through data collected in July 2020. Data collected in October 2020 is currently being analyzed and a report is due after this FYR report is planned to be completed. As previously mentioned, no data was collected after October 2020 through the present, but quarterly groundwater sampling is planned to resume with the October 2021 or January 2022 sampling events and EPA will review the new data for the next FYR report.

Reduction of VOCs in Shallow Groundwater: Baseline through July 2020

The most recently analyzed groundwater data set is from July 2020, nearly seven years from the first ISCR injection sequence. The data show that since the remedy was first applied, the estimated mass of PCE and TCE in the shallow groundwater zone was reduced by 100 percent from an estimated 56 kilograms (kg) to an estimated 0.01 kg. (See Table 6 below and Figures 4-11 in Appendix B for a visual representation of mass of VOCs in the groundwater plumes.) However, the estimated mass of PCE and TCE daughter products has increased. 1,2-DCE makes up 76 percent of the shallow groundwater plume with an estimated mass of 4.82 kg, VC makes up 23 percent of the shallow groundwater aquifer, with an estimated mass of 1.45 kg, while ethane and PCE make up the remaining 1 percent (see Table 6).

When ISCR is applied and PCE and TCE degrade, the injected reducing compounds bond with the chlorine atoms of the PCE and TCE and reduce them down to the daughter products 1,2-DCE, VC, and ethene. The end goal of ISCR is to break down PCE and TCE into ethene gas, which will have a larger estimated mass than the original estimated mass of the PCE and TCE because the reducing compounds contribute to the overall mass of materials.

Based on a review of Site data, EPA is seeing a rebound of certain contaminant concentrations, which would occur if the injected reducing compounds do not reach all of the contamination or if the injectate is used up before all of the contamination is fully treated. This occurrence is common with ISCR applications, for EPA saw the rebound in concentrations after the first application of ISCR and we therefore proceeded with a second injection at the Site. Although there has been a rebound of contaminant concentrations, with a net increase in the estimated mass in PCE and TCE daughter products in the aquifer, there is still a net reduction of overall contaminant mass for Site COCs from baseline to present. There is a 195 µg/L net increase of COC average concentrations in the shallow

groundwater from 587 µg/L to 782 µg/L, but a net decrease from the baseline average concentration of 3,859 µg/L. (Please see Table 5 on page 16 for more information.)

Specifically, the trends for the COCs in the shallow groundwater aquifer from the 2016 FYR to this FYR are as follows:

- PCE mass reduced from 0.12 kg to 0.01 kg
- TCE mass reduced from 0.003 kg to 0.00 kg
- DCE mass increased from 2.89 kg to 4.82 kg
- VC mass reduced from 2.62 kg to 1.45 kg
- Estimated mass of ethene generated from 2016 to 2020 is 0.18 kg (there was no estimated ethene mass calculated for the previous FYR report)

EPA is still in the RD process for OU2, which would address contamination in the intermediate and deep groundwater zones. It is anticipated that application of ISCR in the deeper zones will reduce the mass of VOCs currently found therein and help with reducing the mass of daughter products in the shallow groundwater zone as well.

Emergent Contaminants

In 2018, 1,4-Dioxane was designated an EPA emergent contaminant and EPA recommended sampling sites with VOC plumes containing PCE and TCE for 1,4-Dioxane. In October 2019, EPA sampled 50 percent of the Site monitoring wells and the residential well and tap of the residence not connected to the municipal water supply for 1,4-Dioxane. 1,4-Dioxane was found in four out of 30 samples, specifically in MWs 14S, 28S, 29S, and 30S, above the reporting limit and below the EPA remedial screening level (RSL) of 0.46 µg/L. The highest concentration recorded was 0.342 µg/L in MW-29S (See Table 7 on pages 16-17). EPA will assess the need for further 1,4-Dioxane sampling prior to the end of the LTRA period in 2023. Additional emergent contaminants will be assessed if or when indicated to do so.

SSD Systems and VI

Per the January 2019 Operation, Maintenance, and Monitoring Plan for the SSD systems (SulTRAC. 2019), ambient air and indoor air are to be monitored at the properties with the SSD systems before and after installation. EPA conducted two pre-SSD installation monitoring events, and ten post-SSD installation monitoring events from 2012 through 2019. Soil gas, sub-slab, indoor air, and ambient air samples were collected in Summa® canisters over a 24-hour period. EPA analyzed for target VOCs to confirm concentrations remain below action levels specified in the 2009 ROD.

In 2016, EPA conducted two semi-annual sampling events, which included sampling the SSD systems, and collecting soil gas, indoor air, and ambient air samples. The results found some of the same VOCs found in the groundwater to also be present in soil gas, sub-slab, and indoor air samples below action levels specified in the ROD and showed that the SSD systems were functioning as intended. Also, these samples showed five of the eight residences had 1,2-Dichloroethane (1,2-DCA) in their indoor air. 1,2-DCA is a chemical that is not found in the groundwater; therefore, there is a source or there are sources within the homes that are off-gassing 1,2-DCA into the indoor air. EPA did not act for 1,2-DCA because it is not considered one of the Site-related COCs.

Following the 2016 FYR, EPA removed the SSD system from one residence because the system was drawing up groundwater and not soil gas and was not functioning. Indoor air samples collected at this residence did not show elevated concentrations of VOCs. Additional attempts at sampling the property were declined after the SSD system was removed.

In 2019, EPA performed soil gas, sub-slab, indoor air, and ambient air sampling across the Site. During this sampling event, EPA also sampled the building adjacent to the former dry-cleaning operation, newly occupied as a car parts warehouse, with continuous occupancy by workers and occasional occupancy by customers. The results of the sampling at the car parts warehouse did not yield results consistent with VI, meaning elevated concentrations of VOCs were not found in sub-slab samples collected. Additionally, EPA sampled the residences with SSD systems, and found that the systems were still functioning as intended. COCs were found in sub-slab samples and indoor air samples, but at levels below the action levels specified in the 2009 ROD. Based on these results, it is recommended that VI sampling cease. EPA will review the recommendation to stop VI sampling prior to issuing a final optimization plan planned for spring 2023.

Site Inspection

The Site inspection was conducted on 10/14/2020. The purpose of the inspection was to assess the protectiveness of the remedy. EPA's contractor conducted the inspection on behalf of EPA and Ohio EPA due to COVID-19 work travel restrictions. The contractor reviewed each groundwater monitoring well to ensure that all caps and gaskets were in good condition, and that each well cover was bolted with bolts in good condition, all to minimize tampering with the wells. All wells, well caps and gaskets, and well covers were in good condition, with no issues identified. The contractor maintains the monitoring well network and addresses wear and tear issues on well components in real time.

During the Site inspection (see Appendix D), EPA's contractor also looked for uses of the Site that would be inconsistent with the IC objectives stated in the 2009 ROD. No private groundwater wells were installed within the COC contaminant plume, no groundwater is being used inconsistent with the IC objectives other than at the one property that declined public water connection.

Table 5: VOC Plume Comparison—2013 Baseline Through April 2020* vs 2013 Baseline Through October 2016

VOC	Plume Area (acres)		Average Concentration (µg/L)		Mass (kg)		Percent Change
	April 2013	April 2020	April 2013	April 2020	April 2013	April 2020	
Shallow Zone Plume							
PCE	8.4	0.4	3,375	8	52.6	0.01	-100.0
TCE	7.0	0.0	228	2.3	2.96	0.00	-100.0
DCE	7.4	4.2	193	616	2.66	4.82	44.8
VC	3.4	6.3	13	124	0.08	1.45	94.4
Ethene	0.7	3.0	3.8	32	0.005	0.18	97.0
Combined	***8.4***	***6.3***	***3,813***	***782***	***58.3***	***6.5***	***-88.9***
Intermediate Zone Plume							
PCE	1.1	3.1	11	111	0.18	1.10	83.4
TCE	0.1	2.4	2.7	37	0.001	0.29	99.6
DCE	0.4	17.0	7.6	55	0.07	2.97	97.8
VC	--	18.6	<2.5	10	0.00	0.61	100.0
Ethene	--	2.5	<0.3	8.2	0.00	0.07	100.0
Combined	***1.5***	***18.9***	***21***	***222***	***0.2***	***5.0***	***95.1***
Deep Zone Plume							
PCE	9.3	1.34	53	33.3	1.92	0.18	-90.8
TCE	7.8	1.0	22	14.8	0.67	0.06	-91.2
DCE	14.0	**13.8**	52	172	2.88	9.39	69.4
VC	1.0	**14.2**	2.8	28.2	0.01	1.58	99.3
Ethene	0.2	1.1	0.4	6.8	0.01	0.03	75.6
Combined	***23***	***14.4***	***129.7***	***255***	***5.5***	***11.2***	***51.2***
Overall Mass Change:					**64.1**	**22.7**	***-64.5***

VOC	Plume Area (acres)		Average Concentration (µg/L)		Mass (kg)		Percent Change
	April 2013	October 2016	April 2013	October 2016	April 2013	October 2016	
Shallow Groundwater Zone Plume							
PCE	8.4	0.8	3,375	7.0	52.63	0.12	-100
TCE	7.0	0.2	228	6.0	2.96	0.003	-99.9
DCE	7.4	4.6	193	343	2.66	2.89	8.1
VC	4.1	6.1	62	231	0.47	2.62	81.8
Combined	***8.0***	***6.0***	***3,859***	***587***	***58.7***	***5.5***	***-90.6***
Intermediate Groundwater Zone Plume							
PCE	5.1	3.1	11	54	0.18	0.54	66.1
TCE	0.7	2.5	0.07	38	0.00	0.31	100
DCE	2.7	18.9	7.6	39	0.07	2.35	97.2
VC	0.00	18.8	ND	9	0.00	0.55	100
Combined	***5.0***	***19***	***19***	***140***	***0.2***	***3.7***	***93.4***
Deep Groundwater Zone Plume							
PCE	9.3	0.02	53	6.0	1.92	0.001	-100
TCE	7.8	0.00	22	1.7	0.67	0.00	-100
DCE	23.1	20.8	54	41	4.91	3.39	-30.9
VC	0.3	14	6	7.0	0.01	0.39	98.1
Combined	***23***	***21***	***134***	***56***	***7.5***	***3.8***	***-49.6***
Overall Mass Change:					**66.5**	**13.1**	***-80.4***

KEY

PCE—tetrachloroethylene
TCE—trichloroethylene
DCE—1,2-Dichloroethene
VC—vinyl chloride
µg/L—contaminant concentration in micrograms per liter
kg—weight in kilograms
*Data following October 2016 includes area, concentration, and mass for ethene; whereas previous data did not include ethene. That accounts for the variance in the April 2013 data values from the first table to the second.

Table 6 Part I: October 2019 1,4-Dioxane Sample Results

Location	MW-2D	MW-3S	MW-3I	MW-3D	MW-4S
Sample Type (Grab/Composite)	GRAB	GRAB	GRAB	GRAB	GRAB
Sample Date	10/28/2019	10/29/2019	10/29/2019	10/29/2019	10/29/2019
Sample Time	928	1218	1000	1427	1135
LABORATORY PARAMETERS (ug/L):					
1,4-Dioxane	0.203 U	0.203 U	0.203 U	0.203 U	0.202 U

Location	MW-7D	MW-8S	MW-14S	MW-14I	MW-14D
Sample Type (Grab/Composite)	GRAB	GRAB	GRAB	GRAB	GRAB
Sample Date	10/24/2019	10/25/2009	10/29/2019	10/29/2019	10/29/2019
Sample Time	1105	1115	1548	1358	1008
LABORATORY PARAMETERS (ug/L):					
1,4-Dioxane	0.202 U	0.203 U	0.228	0.210 U	0.203 U

Location	MW-31S	MW-32I	MW-32D	MW-33I	MW-33D
Sample Type (Grab/Composite)	GRAB	GRAB	GRAB	GRAB	GRAB
Sample Date	10/28/2019	10/28/2019	10/28/2019	10/25/2019	10/25/2019
Sample Time	1340	1017	919	1439	1324
LABORATORY PARAMETERS (ug/L):					
1,4-Dioxane	0.202 U	0.202 U	0.202 U	0.214 U	0.203 U

Notes:
µg/L = micrograms per liter.
U = Not detected.
Analyte detected above the reporting limit and below the EPA Regional Screening Level for Tap Water - 0.46 ug/L. EPA November 2019.
Samples analyzed by TechLaw by SPE Low Level EPA Method 522.

Table 6 Part II: October 2019 1,4-Dioxane Sample Results

MW-4I	MW-4D	MW-5S	MW-5I	MW-5D
GRAB	GRAB	GRAB	GRAB	GRAB
10/29/2019	10/29/2019	10/30/2019	10/28/2019	10/28/2019
935	1526	945	1409	1304
0.203 U	0.203 U	0.203 U	0.203 U	0.205 U

MW-15D	MW-17D	MW-28S	MW-29S	MW-30S
GRAB	GRAB	GRAB	GRAB	GRAB
10/28/2019	10/22/2019	10/28/2019	10/28/2019	10/28/2019
1133	1513	1538	935	1045
0.203 U	.208 U	0.216	0.221	0.342

MW-34I	MW-34D	MW-35D	2730 Copley Road - IN (sink faucet)	2730 Copley Road - OUT (outdoor spigot)
GRAB	GRAB	GRAB	GRAB	GRAB
10/23/2019	10/23/2019	10/24/2019	10/30/2019	10/30/2019
1525	1405	952	925	938
0.202 U	0.200 U	0.202 U	0.205 U	0.212 U

Notes:
µg/L = micrograms per liter.
U = Not detected.
Analyte detected above the reporting limit and below the EPA Regional Screening Level for Tap Water - 0.46 ug/L. EPA November 2019. Samples analyzed by Tech Law by SPE Low Level EPA Method 522

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes. This review and the EPA contractor's October 14, 2020 Site inspection confirm that the OU1 remedy is functioning as intended by the 2009 ROD and that there have been no changes since the last FYR that would negatively affect the protectiveness of the OU1 remedy. Three of the four remedy components listed in the 2009 ROD were addressed through the 2012 installation of SSD systems to prevent VI into residential buildings, the 2013 connection of 23 homes to municipal water to prevent ingestion of contaminated groundwater, and the 2013 and 2016 ISCR applications to treat groundwater contaminants.

Current sampling results from this FYR period confirm that:

- The SSD systems are functioning as intended since Site-related contaminants were not found in the indoor air samples of the residential properties. Site-related contaminants were found in indoor air in the 2799 Copley Road commercial building; however, they were at levels below EPA's cleanup standards.
- EPA connected 23 residences to municipal water and abandoned 23 private wells to prevent use of contaminated groundwater. EPA regularly samples the water at the one residence that declined municipal water connection at the same frequency as the monitoring well network and provides sample results to the owners/occupants for their awareness. EPA continues to offer connection to municipal water at this residence because VC above MCLs is found in their drinking water. EPA also plans to pursue a deed notice for this property.
- The shallow groundwater contaminant plume footprint is shrinking due to the application of ISCR. The estimated mass of PCE and TCE in the shallow groundwater (OU1) is 100 percent reduced and only daughter products remain, although at an increased estimated mass. The cleanup progress is tracked through scheduled quarterly groundwater monitoring.

The one remedial component from the 2009 ROD not completed to date is the establishment of ICs in the form of a local ordinance to prohibit the installation of new wells in the shallow groundwater and ICs for indoor air, soils and land use that may be needed. ICs are still needed to prevent the installation of new wells in the shallow groundwater zone, and it is planned to develop and implement a local ordinance to prohibit the installation of new wells in the shallow groundwater by June 30, 2022. In the meantime, no new wells have been installed since before the 2009 ROD was issued. In addition, an ICIAP and LTS procedures need to be developed for ICs at the Site, which are expected to be completed by June 30, 2022.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

No. All the exposure assumptions, toxicity data, cleanup levels, and RAOs established during the 2009 ROD are still valid, except for the emergent contaminant 1,4-Dioxane.

The exposure pathway assumptions used for 2009 COCs at the Site can also be applied to 1,4-Dioxane including ingestion, dermal contact, and inhalation. The risks from the exposure pathways have been mitigated by the implementation of the OU1 ROD remedy components, particularly the provision of the alternative water supply.

There have been no changes in toxicity, other contaminant characteristics, or standardized risk assessment methodologies that could affect the protectiveness of the shallow groundwater remedy. There have been no changes in VOC cleanup standards, to-be-considered cleanup criteria, or cleanup goals that would affect or call into question the protectiveness of the remedy.

There have been no changes in the physical conditions of the Site so far that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered: ARARs were the basis for the groundwater cleanup goals. ARARs identified in the ROD that still must be met and that have been evaluated include the MCLs established under the SDWA. There have been no changes in these ARARs and no new standards affecting the protectiveness of the remedy since the 2016 FYR. Except for the owners of the one residence who declined connection to municipal water, the groundwater is not currently being used for potable purposes.

Changes in Exposure Pathways: The exposure assumptions used to develop the Human Health Risk Assessment included exposure to contaminated groundwater for future residents through ingestion, dermal contact and dermal contact pathways, and inhalation. In 2021, new residential structures are being built just north of the existing Meadow Run subdivision. Note, these new structures have public water connection, and are not using well-water. These homes are outside of the Site boundary. EPA's northern-most bounding monitoring wells (MW-26 I and D), wells that have always been free of Site-related COCs, were abandoned in 2019 in preparation for the development. EPA's new bounding wells (MW-32 I and D) are located within the original Meadow Run subdivision and remain free of site-related COCs. This is because groundwater flow is south, southeast from the dry-cleaning facility, and these new properties are northeast of the dry-cleaning facility.

Soil gas samples collected near MW-26 are free from site-related COCs; there is no known or anticipated VI risk. There is no new information at this time that would support a change to the exposure assumptions.

1,4-Dioxane is an emergent contaminant and is being assessed. No MCL or Ohio EPA groundwater cleanup standard has yet been established for this contaminant. 1,4-Dioxane levels at the Site are below current risk-based levels, and EPA plans to continue monitoring for 1,4 Dioxane at the Site.

Changes in Toxicity and Other Contaminant Characteristics: Since the selection of the remedy, there have been no changes in the toxicity factors for the COCs that were used in the baseline risk assessment.

Changes in Risk Assessment Methods: There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs: The remedy is progressing as expected.

However, shallow groundwater data still shows PCE and TCE daughter products at concentrations in some locations that exceed the cleanup goal of achieving MCLs. EPA anticipates that the daughter products in shallow groundwater will attenuate within a reasonable timeframe (20 years).

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No. No other information has come to light that could affect the protectiveness of the remedy. There have been no climatological or natural disaster events since 2016 that may have adversely affected remedy components or effectiveness.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None.

Issues and Recommendations Identified in the Five-Year Review:

OU(s): 1	**Issue Category: Institutional Controls**			
	Issue: An ICIAP is needed to help ensure that effective ICs are implemented, monitored, and maintained.			
	Recommendation: Develop an ICIAP and LTS procedures identifying the details of how ICs that are needed at the Site should and will be implemented, maintained, enforced, modified, and terminated (if applicable) at the Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	6/30/2022

OU(s): 1	**Issue Category: Institutional Controls**			
	Issue: ICs have not been implemented.			
	Recommendation: Develop and implement a local ordinance to prohibit the installation of new wells in the shallow groundwater. Reassess the need for ICs for indoor air, soils, and land use. If needed, establish ICs for those media.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	Other	EPA/State	6/30/2022

OU(s): 1	Issue Category: Monitoring			
	Issue: Residents in one property are using contaminated well water (VC above MCLs) and repeatedly decline connection to the Akron municipal water supply.			
	Recommendation: Continue sampling residential well and tap water and continue to offer connection to municipal water if contaminant levels are above MCLs. EPA will also pursue a deed notice for the property.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	10/31/2022

OU(s): 1	Issue Category: Monitoring			
	Issue: 1,4-Dioxane has been detected in groundwater but was not initially included in groundwater monitoring activities.			
	Recommendation: Perform semi-annual sampling of 50 percent of the monitoring wells and at the private residence without municipal water for 1,4-Dioxane.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA/State	EPA	10/31/2022

OTHER FINDINGS

In addition, the following are recommendations that were identified during the FYR and may improve performance of the remedy, reduce costs, improve management of O&M, accelerate site close out, conserve energy, promote sustainability, etc., but do not affect current or future protectiveness:

- Conduct remedy optimization tasks prior to completion of the 10-year LTRA period, which includes evaluation of frequency and location of groundwater sampling and VI sampling.
- Coordinate with Ohio EPA on performance of monitoring tasks before the LTRA ends and the State-lead O&M begins to ensure a smooth hand-off.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)	
Operable Unit:	*Protectiveness Determination:*
1	Short-term Protective

Protectiveness Statement: The remedy at OU1 currently protects human health and the environment because the remedy is functioning as intended by the decision document and no one is involuntarily being exposed to Site-related contaminants.
However, in order for the OU1 remedy to be protective in the long-term, the following actions need to be taken to ensure protectiveness:

- develop an ICIAP and implement LTS procedures for monitoring and tracking compliance with existing ICs and providing an annual certification that the ICs remain in place and are effective;
- develop and implement a local ordinance to prohibit the installation of new wells in the shallow groundwater;
- assess the need for additional ICs for indoor air, soil, and land use;
- continue sampling residential well and tap water, continue to offer connection to municipal water if contaminant levels are above MCLs, and pursue deed notice with the property owners; and
- perform semi-annual sampling of 50 percent of the monitoring wells and at the private residence without municipal water for 1,4-Dioxane.

VIII. NEXT REVIEW

The next FYR report for the Copley Square Plaza Superfund Site is required five years from the completion date of this review.

APPENDIX A – REFERENCE LIST

EPA. 2002. "OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)." Washington, DC. EPA 530-D-02-004.

WESTON. 2006. "Historical Data Evaluation Report, Revision 1." Copley Square Plaza Site. Vernon Hills, IL.

WESTON. 2008. "Remedial Investigation Report (with appendices including the Baseline Ecological Risk Assessment and the Baseline Human Health Risk Assessment), Copley Square Plaza Site, Copley, Summit County, Ohio." Vernon Hills, IL.

EPA. 2009. "Record of Decision, Copley Square Plaza Site, Operable Unit 1, Copley, Ohio." Chicago, IL.

SulTRAC. 2011. "Remedial Design Report for Vapor Intrusion, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2011. "Data Evaluation Report, Baseline Groundwater Sampling Event June 2011, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2011. "Remedial Design Report for Water Main Extension, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2013. "Remedial Design Report for In-situ Chemical Reduction, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2013. "Field Sampling Plan: Remedial Action for Groundwater In-Situ Treatment at Copley Square Plaza Site, Operable Unit 1, Summit County, Ohio." Chicago, IL. January 17.

SulTRAC. 2014. "Semi-Annual Air Monitoring Report Results, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

EPA 2015. "EPA – Record of Decision (Signed) Copley Square Plaza Operable Unit 2, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2015. "Semi-Annual Air Monitoring Report Results, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

EPA 2016. "First Five Year Review Report, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2016. "Semi-Annual Air Monitoring Report Results, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2017. "Data Validation Report for Geochemical Parameters - Jan 2017 Groundwater Sampling Event (OU1 & 2), Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2017. “2016 Annual Air Monitoring Report, Copley Square Plaza Site – Operable Unit 1, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2018. “Full CLP Data Table - April 2018 Groundwater Data (OU1 & 2), Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2018. “COCs MNA Data Table - April 2018 Groundwater Data (OU1 & 2), Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2018. “Groundwater Analytical Results - Monitoring Wells - Quarterly Sampling Event – April 2018, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2018. “Estimation of Chlorinated Volatile Organic Compounds Mass Removal from Groundwater – Feb 2018 (OU1 & 2), Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Groundwater Analytical Results - Monitoring Wells - Quarterly Sampling Event – October 2018, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Groundwater Analytical Results - Monitoring Wells - Quarterly Sampling Event – April 2019, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Operation, Maintenance, And Monitoring Plan for Sub-Slab Depressurization Systems Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Groundwater Analytical Results For 1,4-Dioxane At Select Monitoring Wells for Operable Unit 1 And Operable Unit 2, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, Ll.

SulTRAC. 2019. “Data Validation Report for Geochemical Parameters - July 2019 Groundwater Sampling Event, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Groundwater Analytical Results - Monitoring Wells - Quarterly Sampling Event – October 2019, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Groundwater Analytical Results for Contaminants of Concern and Monitored Natural Attenuation Parameters - Quarterly Sampling Event - October 2019, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “Summary of Sub-Slab and Soil Gas Sample Results of April 2019, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2019. “OU#1 And OU#2 - Estimation of Chlorinated Volatile Organic Compounds Mass Removal from Groundwater July 2019 Technical Memorandum, Copley Square Plaza Site, Copley, Summit County, Ohio.” Chicago, IL.

SulTRAC. 2020. Groundwater Analytical Results Monitoring Wells Quarterly Sampling Event for Operable Unit 1 And Operable Unit 2– January 2020 Groundwater Sampling Event, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2020. "Groundwater Analytical Results for Contaminants of Concern and Monitored Natural Attenuation Parameters Quarterly Sampling Event for Operable Unit 1 and Operable Unit 2– January 2020 Groundwater Sampling Event, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2020. "Groundwater Analytical Results – Monitoring Wells – Quarterly Sampling Event – April 2020, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2020. "Groundwater Analytical Results for Contaminants of Concern and Monitored Natural Attenuation Parameters – Quarterly Sampling Event – April 2020, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2020. "Groundwater Analytical Results for Contaminants of Concern and Monitored Natural Attenuation Parameters – Quarterly Sampling Event – July 2020, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

SulTRAC. 2020. "Data Validation Report for Geochemical Parameters – July 2020 Groundwater Sampling Event, Copley Square Plaza Site, Copley, Summit County, Ohio." Chicago, IL.

APPENDIX B—TABLES and FIGURES

Table 1: Chronology of Site Events

Date	Event
1960s-1994	Dry-cleaning businesses operated in the 2777 Copley Road building.
April 1990	Ohio EPA responded to a water odor complaint and sampled two private wells, found VOCs above MCLs, and directed owners to abandon the wells and to use public water.
April 1991, November 1992, August 1993	Ohio EPA sampled nearby private wells, found no contamination.
January 1994	Ohio EPA began a Site Investigation (SI) and discovered eight concrete pits containing wastewater beneath the floor of the 2777 Copley Road building.
Mid-1994	Ohio EPA sampled 55 nearby residential wells and found nine wells with site-related VOCs above MCLs.
Late-1994 through June 1997	EPA conducts emergency removal action, including installing eight point-of-entry water treatment systems (one residence eventually connected to the public water supply), draining the concrete pits at the former dry-cleaning facility, and installing a groundwater interception trench.
April 1995	Ohio EPA began maintaining the groundwater interception trench and residential point-of-entry water treatment systems.
May 1995	One of the nine residences with contaminated well water connected to Akron municipal water on their own.
2000s	One of the eight residence with the filtration system eventually connected to municipal water on their own because they did not want to keep having quarterly filter change-outs.
2002	Ohio EPA conducted a SI at the CSP site.
2003	Ohio EPA conducted an Expanded SI (ESI) to provide EPA with additional data.
2004	EPA proposed the site for the National Priorities List (NPL).
April 2005	EPA placed the CSP site on the NPL.
February 2006 through October 2006	EPA conducted a RI at the CSP site.
2009	EPA divided the site into two OUs.
June 2009	EPA completed the FS.
October 2009	EPA issued a ROD for OU1.
December 2009 through February 2011	EPA completed the remedial design for OU1 remedy, started the OU2 RI.
July 2011	EPA began remedial action (RA) and installed eight VI mitigation systems at impacted residences.
July 2011 through November 2012	EPA connected 23 residences to the Akron municipal water supply.

February-March and August 2013	EPA conducted two semi-annual air sampling events inside the residential structures where VI mitigation systems were installed and issued a 2013 Air Monitoring Report in 2014.
June through November 2013	EPA conducts first round of ISCR in OU1.
February and September-October 2014	EPA conducted two semi-annual air sampling events inside the residential structures where VI mitigation systems were installed and issued a 2014 Air Monitoring Report in 2015.
June 2015	EPA completed the FS for OU2.
October 22, 2015	EPA issued a ROD for OU2.
February-March and August 2016	EPA conducted two semi-annual air sampling events inside the residential structures where VI mitigation systems were installed and issued a 2016 Air Monitoring Report in 2017. EPA also conducted air sampling at the commercial building at 2777 Copley Road, where the dry-cleaning underground storage tanks are still located (although cleaned and filled with concrete).
April 2016 through July 2016	EPA conducted a second round of ISCR in OU1.
April-May 2019	EPA collected sub-slab vapor and soil gas samples and issued an Air Monitoring Report.
October 2019	EPA sampled select wells for 1,4-Dioxane, an emergent chemical of concern. EPA performed soil gas sampling and analysis.
2011- present	EPA is conducting quarterly groundwater water monitoring, including data collection, sample analysis, and generation of water quality reports to track COC degradation within all three aquifers.

Table 2: Action Levels for Contaminants of Concern in Groundwater and Indoor Air

COC	Groundwater Action Levels (µg/L)	Indoor Air Action Level (µg/m3)
Tetrachloroethene (PCE)	5	0.41
Trichloroethene (TCE)	5	1.2
cis-1,2-Dichloroethene (DCE)	70	35
trans-1,2-DCE		63
Vinyl Chloride (VC)	2	0.16
1,2-Dichloroethane (DCA)		0.094
1,1,2-Trichloroethane (TCA)		0.15

FIGURE 1: Site Location Map

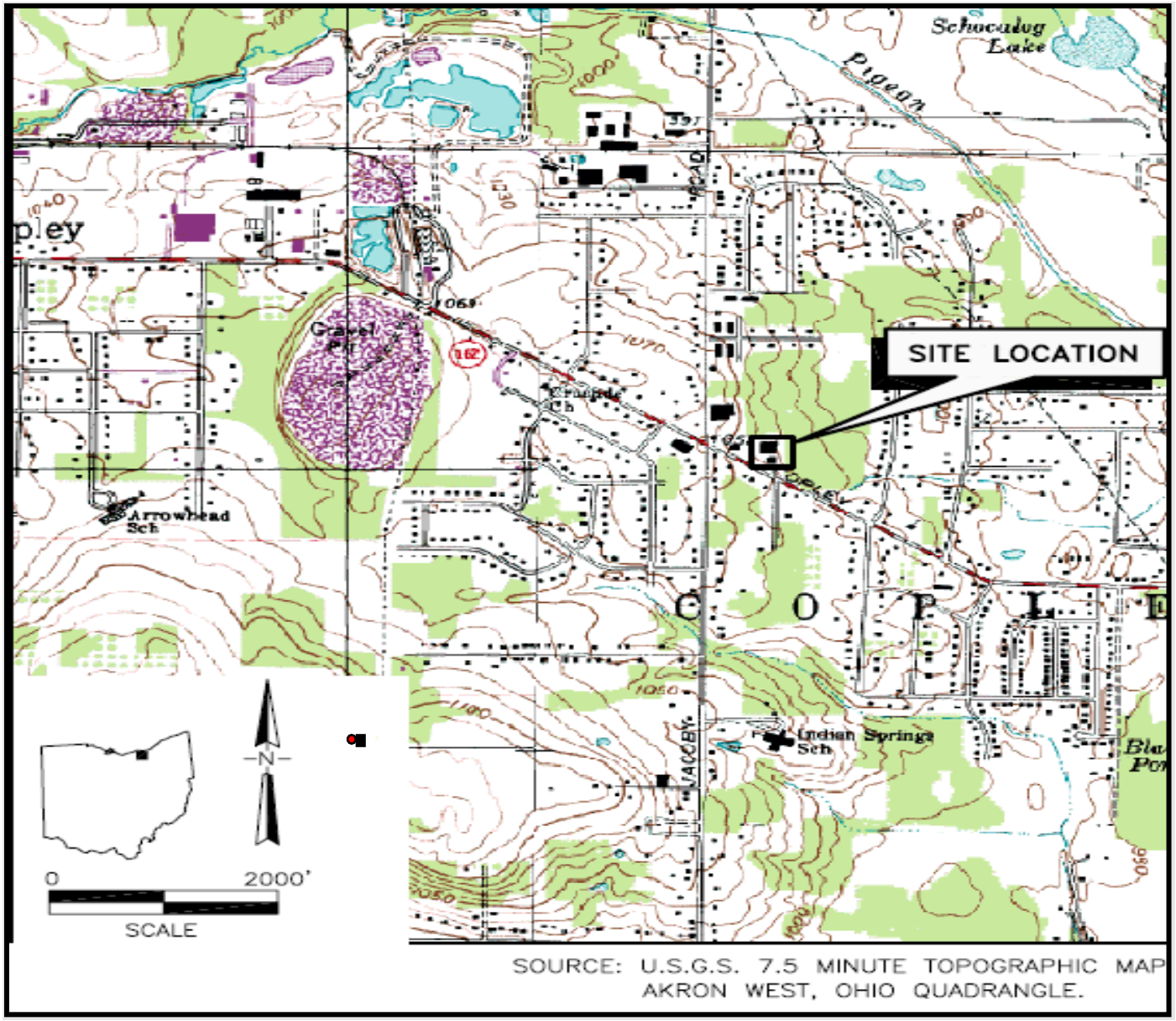


FIGURE 2: Extent of Groundwater Plumes Pre-Remediation

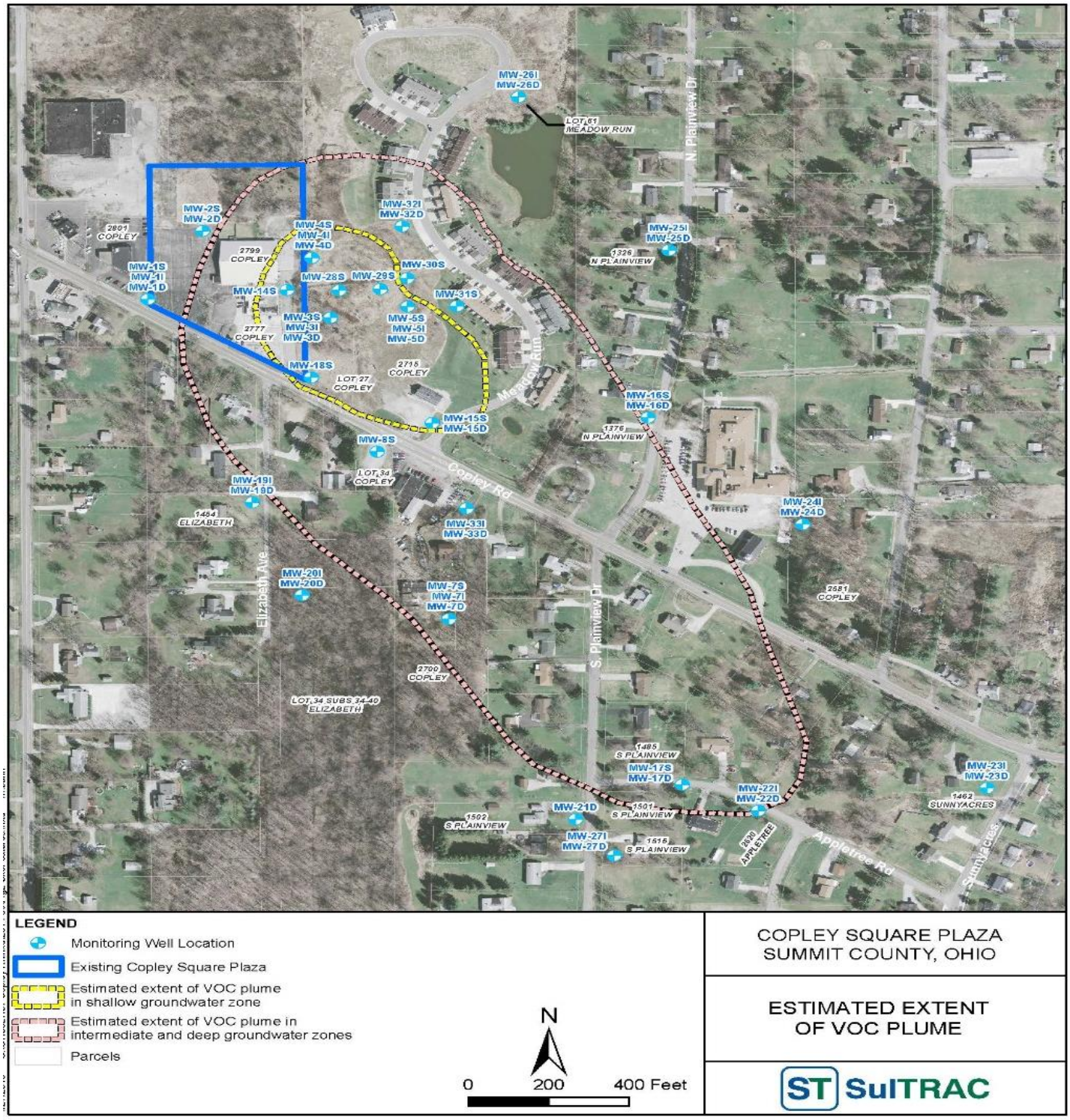


FIGURE 3: Dry Cleaning Building within the Copley Square Plaza

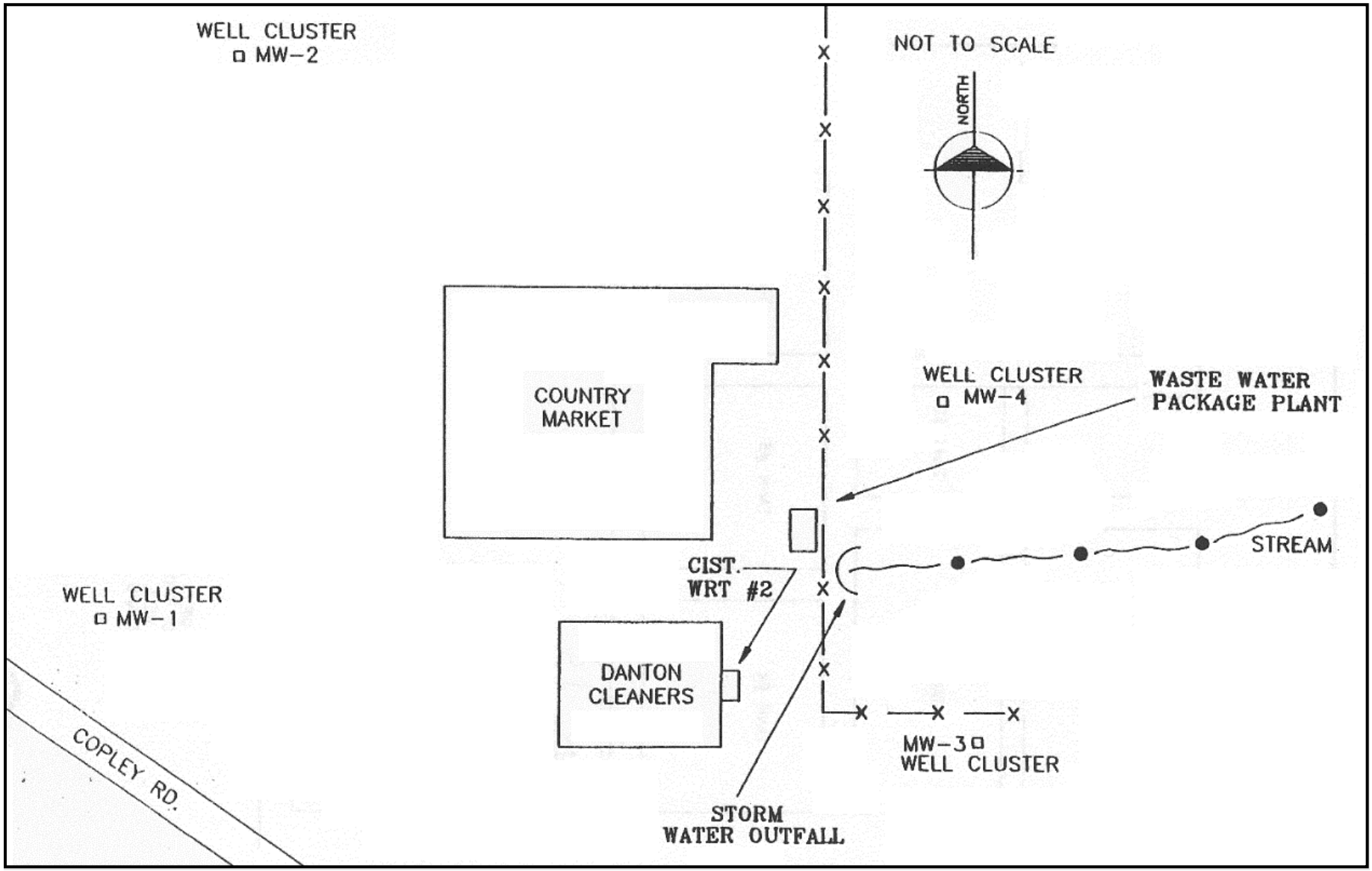


FIGURE 4: April 2020 3-D PCE Groundwater Plume Model Across Three Aquifers

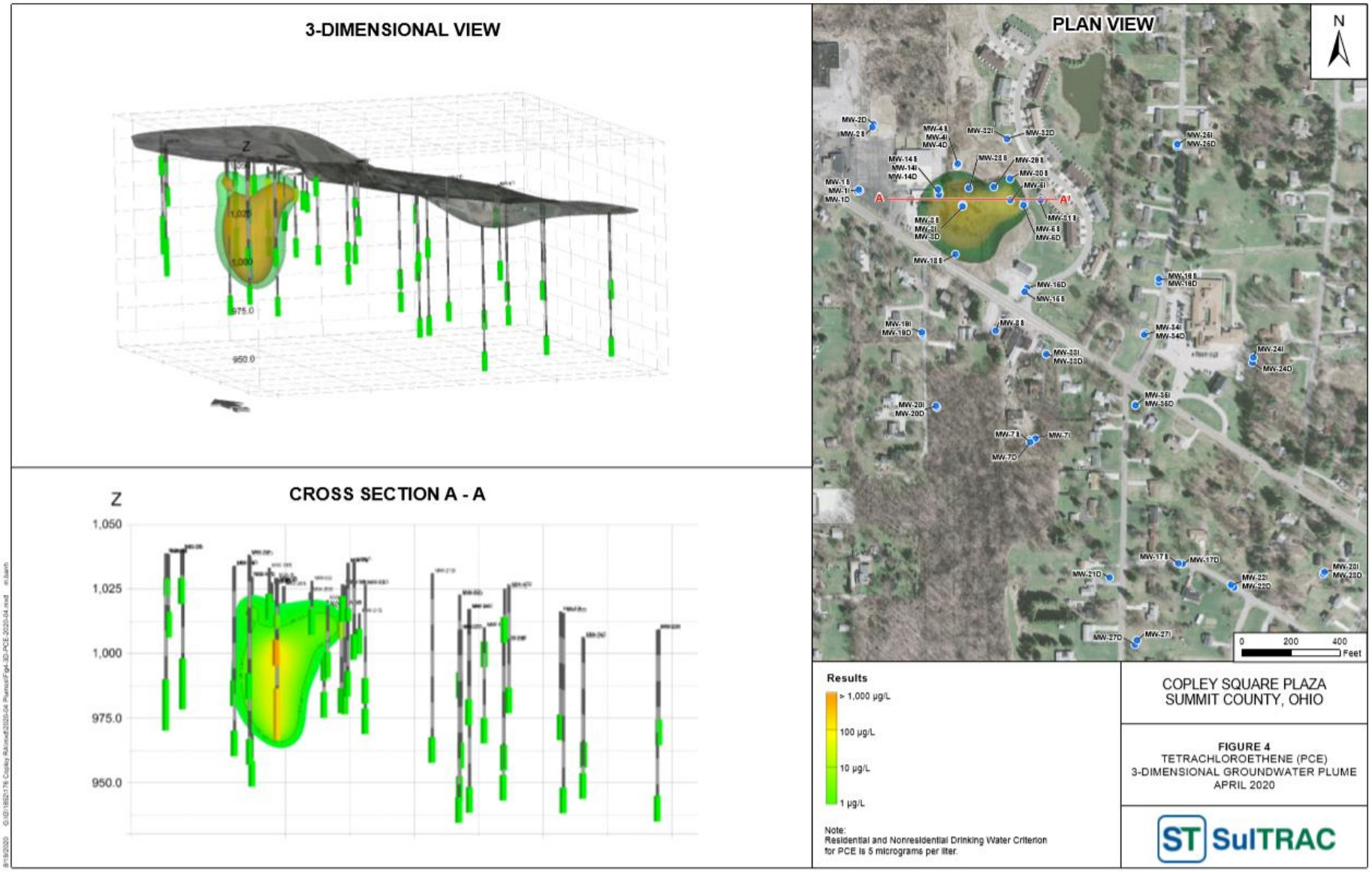


FIGURE 5: April 2020 3-D Cis-1,2, DCE Groundwater Plume Model Across Three Aquifers

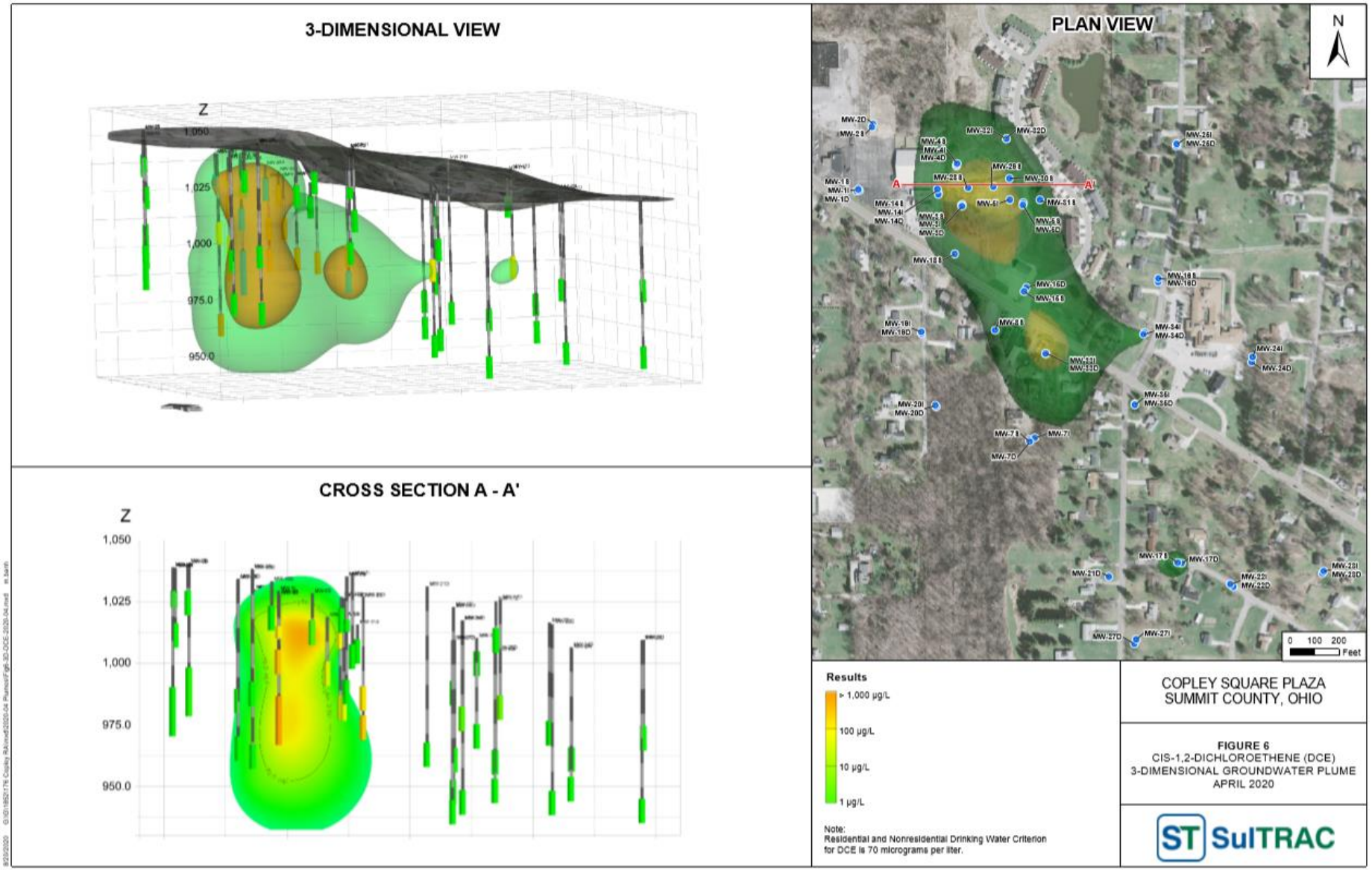


FIGURE 6: April 2020 VC Plume, Shallow Zone – Post-Treatment

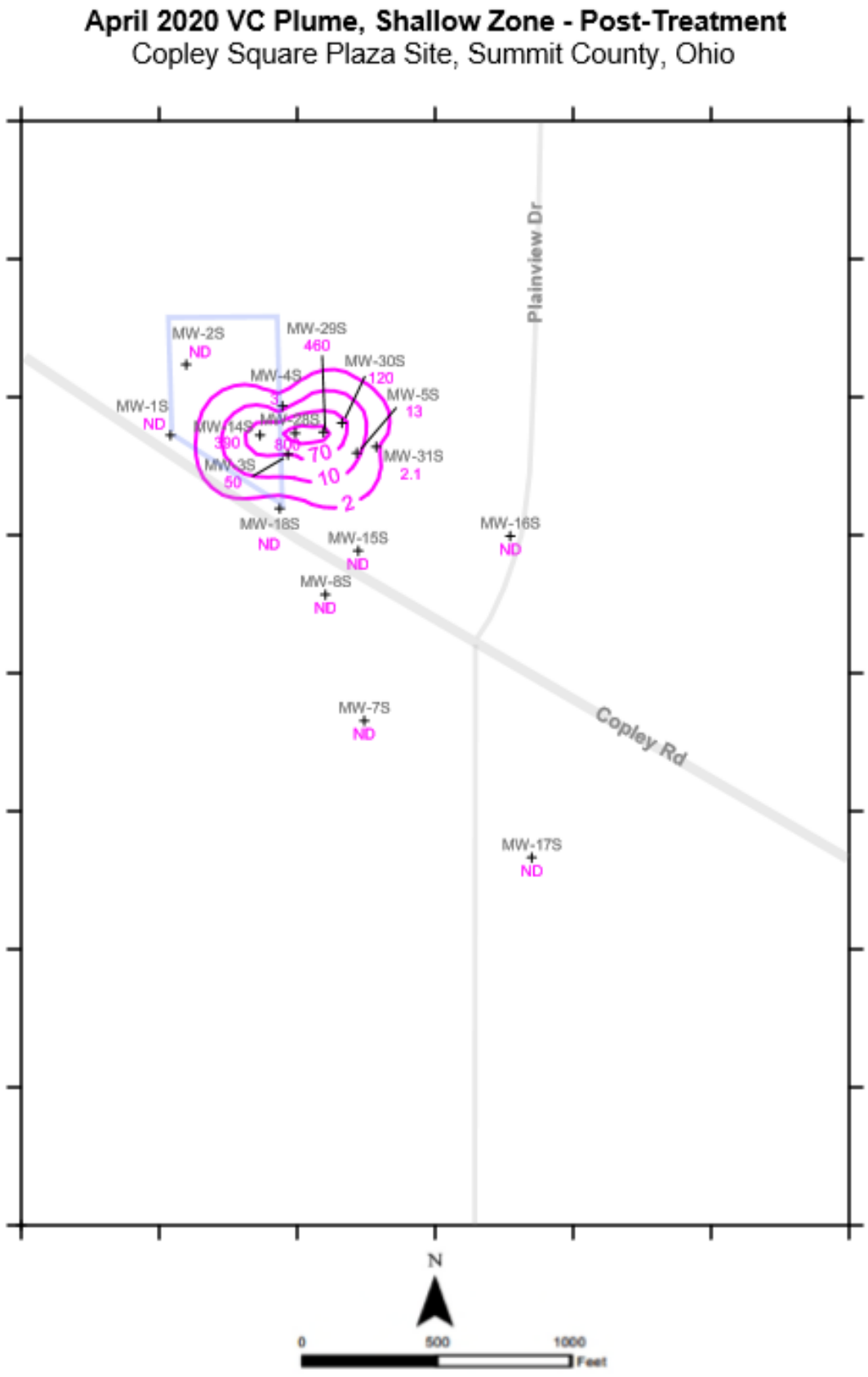


FIGURE 7: April 2020 VC Plume, Intermediate Zone – Post-Treatment

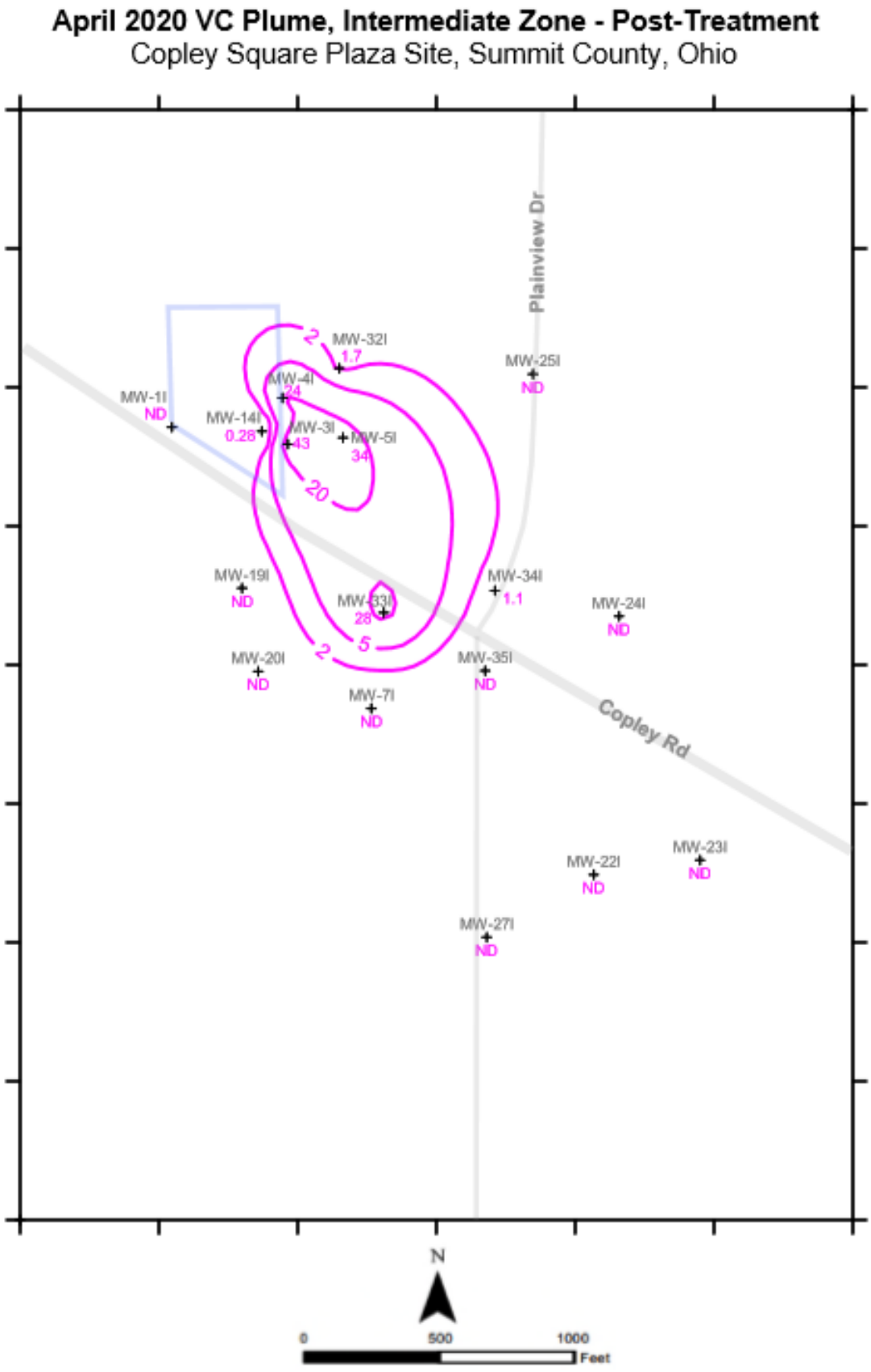


FIGURE 8: April 2020 VC Plume, Deep Zone – Post-Treatment

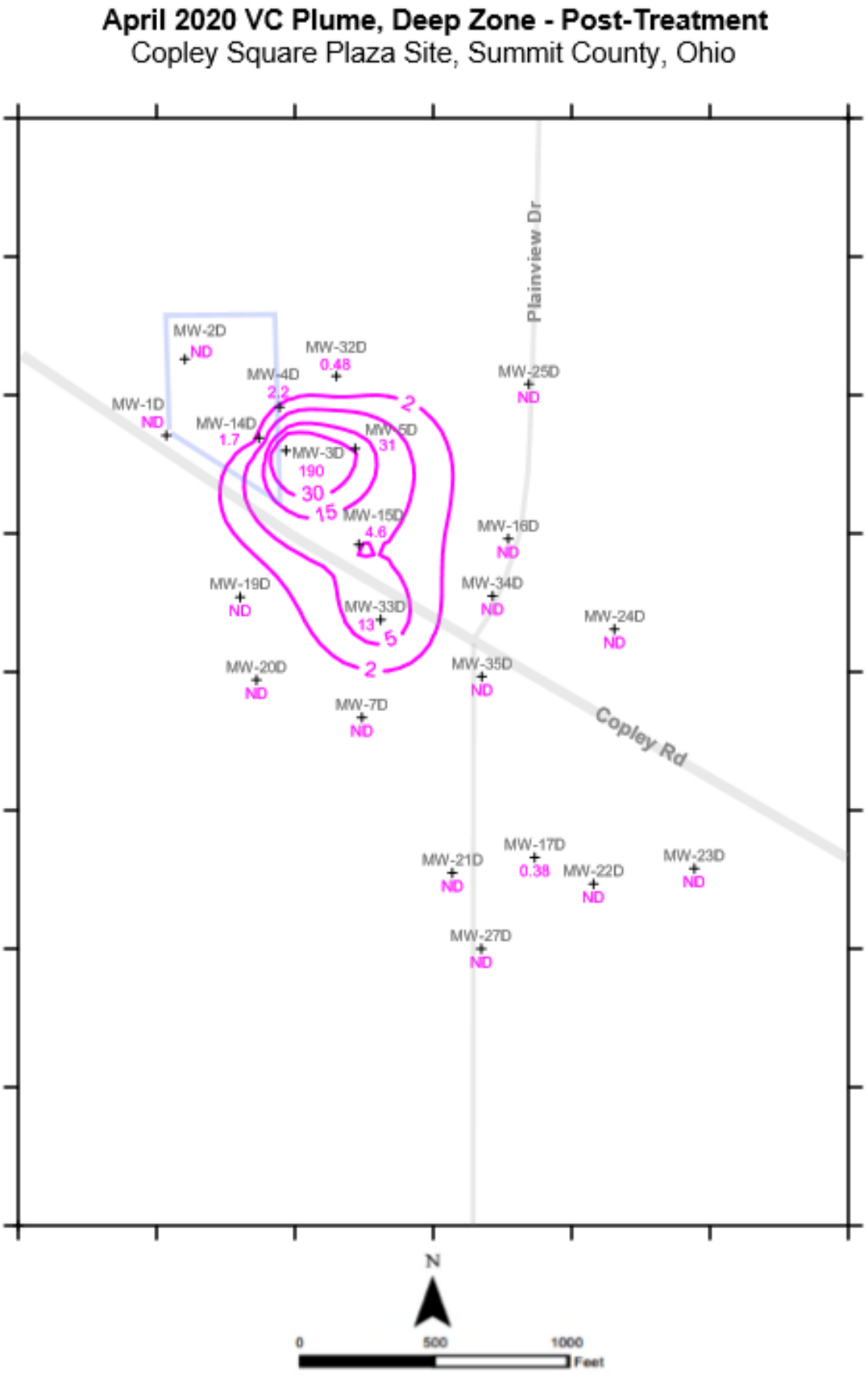


FIGURE 9: April 2020 Ethene Plume, Shallow Zone – Post-Treatment

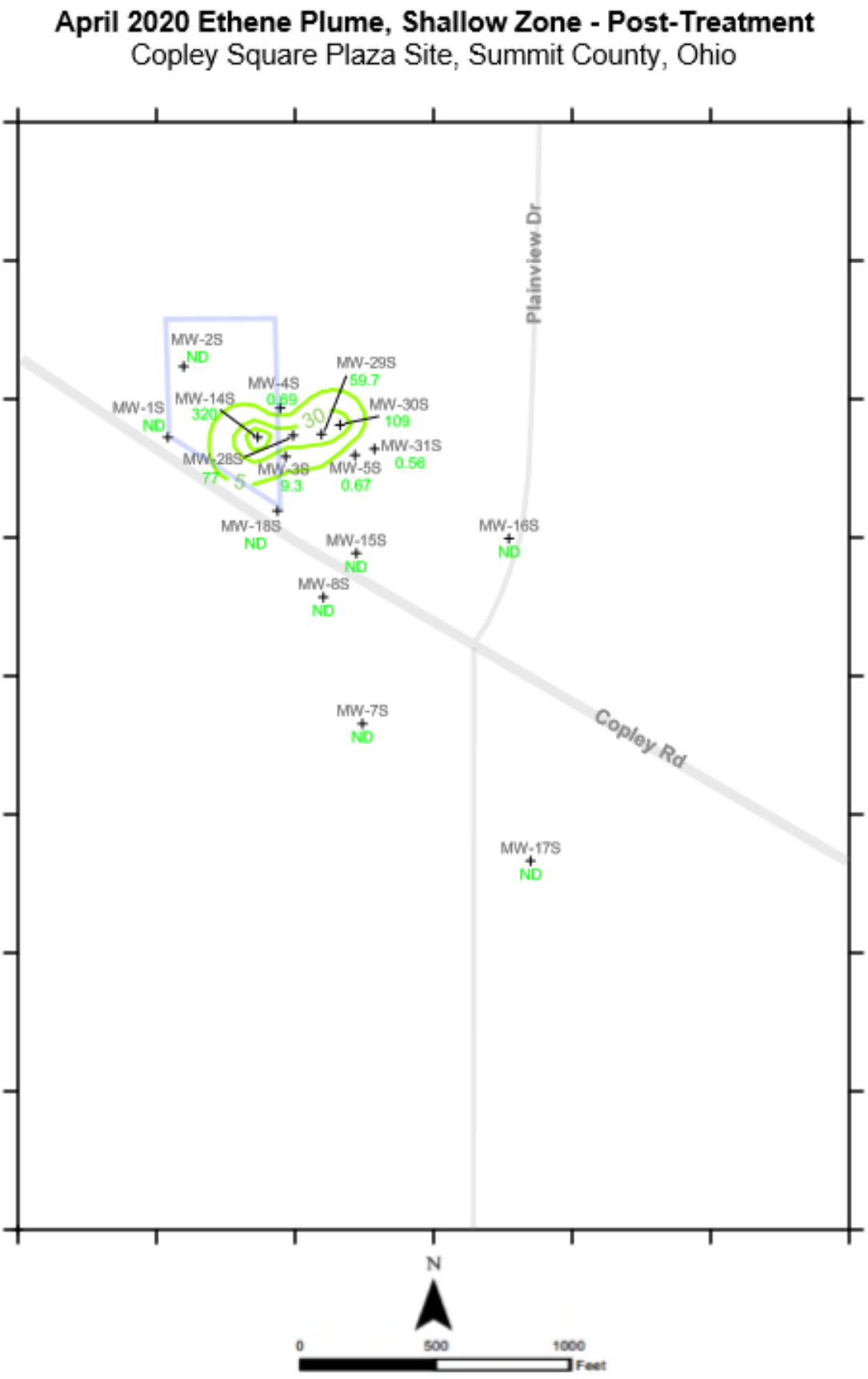


FIGURE 10: April 2020 Ethene Plume, Intermediate Zone – Post-Treatment

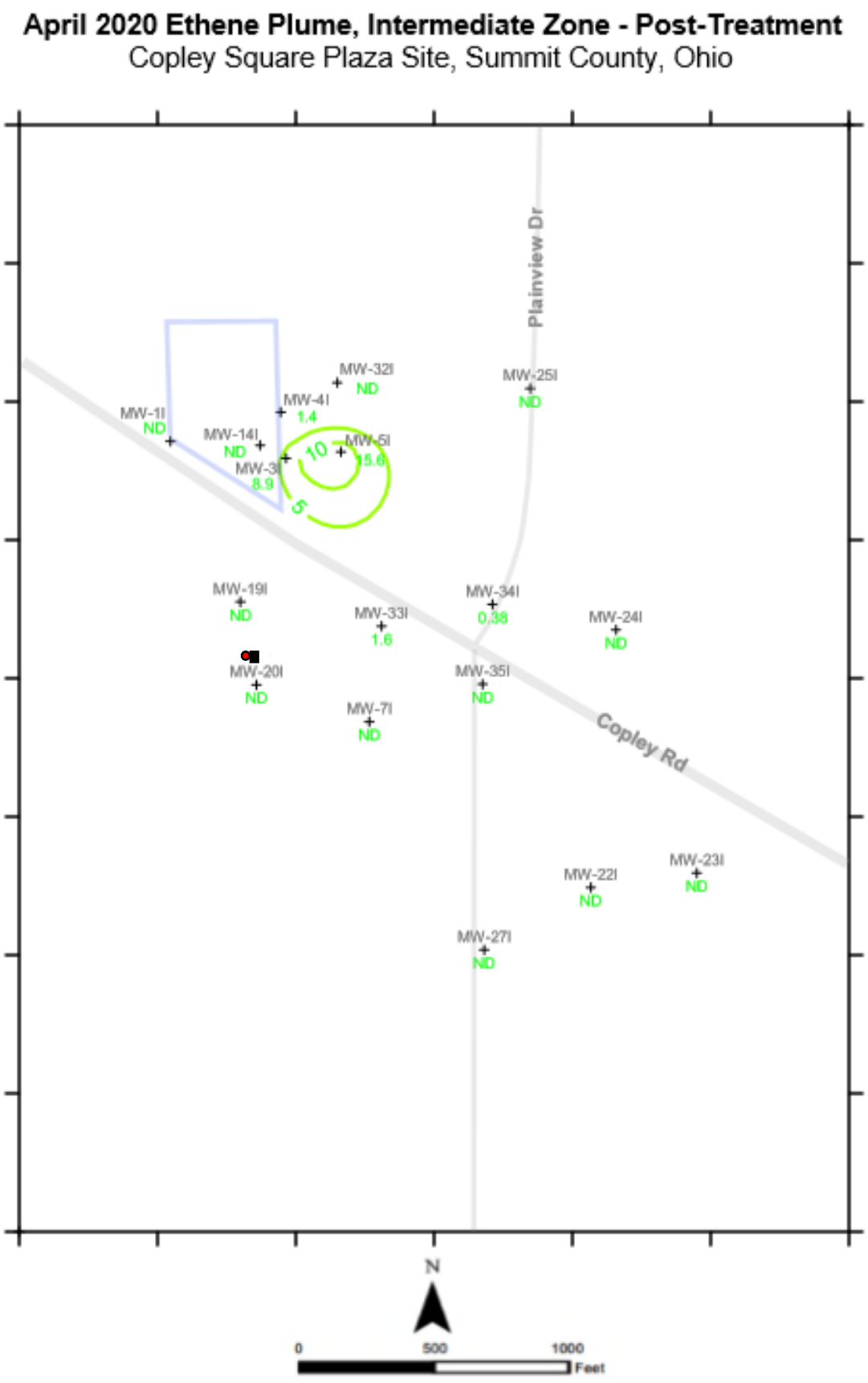


FIGURE 11: April 2020 Ethene Plume, Deep Zone – Post-Treatment

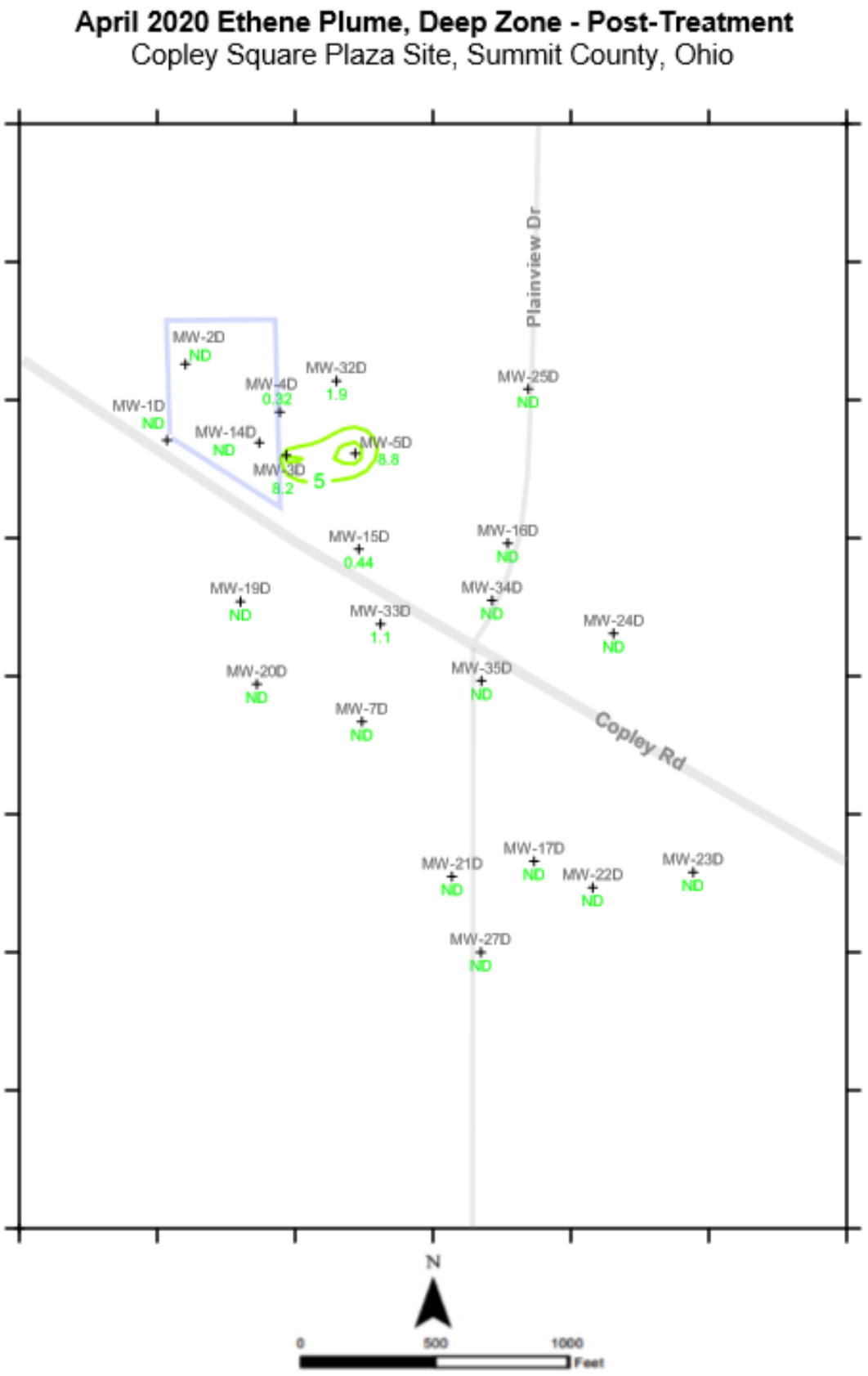


FIGURE 12: SSD System Installation—Exterior and Exterior Components

FIGURE 13: Water Main Installation Map

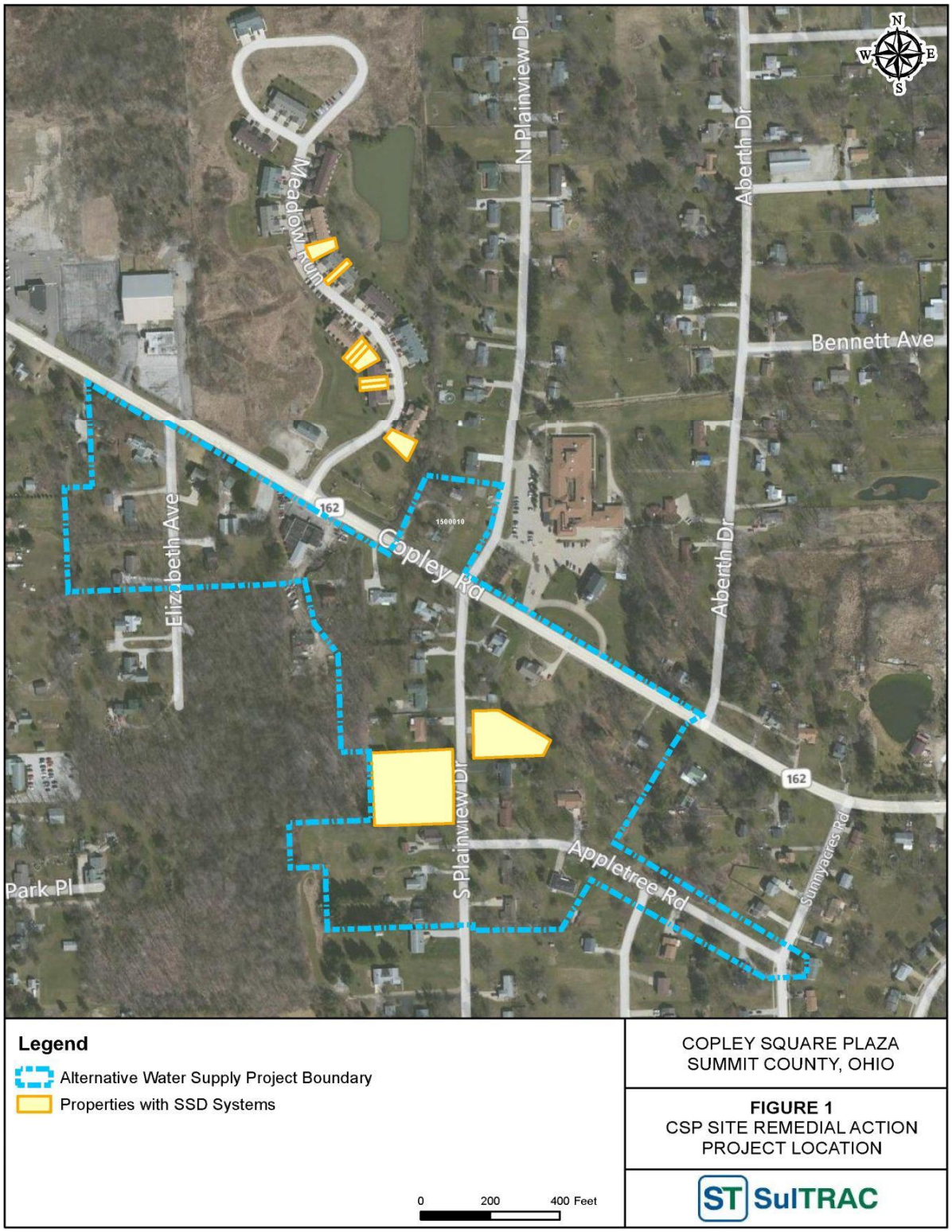
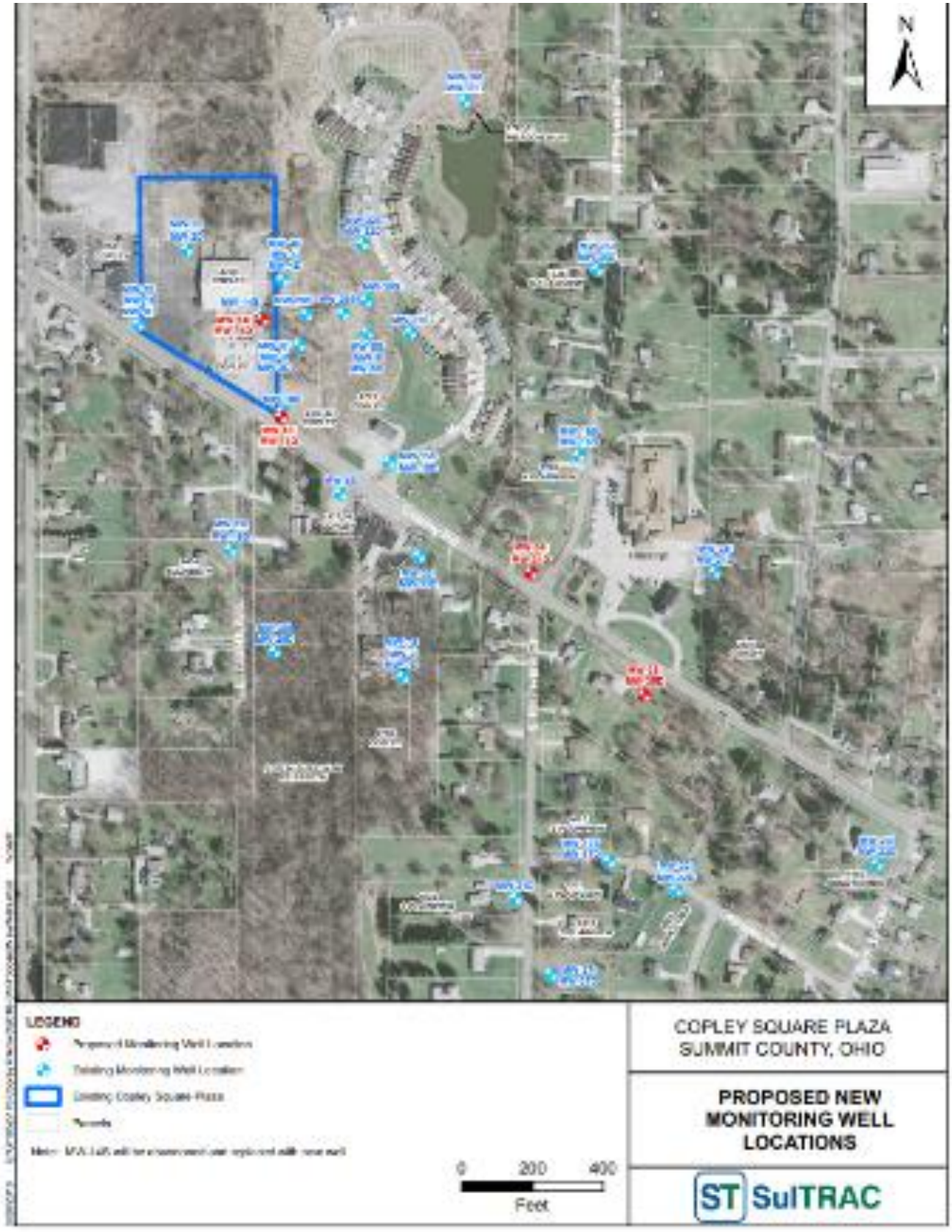


FIGURE 14: Groundwater Monitoring Well Network



APPENDIX C—FIVE-YEAR REVIEW START NOTICE

FYR Start Notice Tear Sheet from the Akron Beacon Journal

the board their letter, an anonymous account sent the allegations to local Akron media.

The Beacon Journal spoke Thursday with 10 former and current employees who verified the authenticity of the letter. Like Mullen, the Beacon Journal will not name them as they express a fear of retaliation for coming forward.

The letter writers and those who back their claims appear to be who they say they are: former employees with stories to tell. They seek no legal action. They do not believe the board's investigator is independent. And some of them are not participating in that investigation.

"We are a group of individuals who strongly believe in the mission of UWSMC of improving lives by mobilizing the caring power of our community to advance the common good," the letter says. "We fully support the vision that all individuals and families achieve their human potential through education, financial stability and healthy

EPA

EPA Begins Review of Copley Square Plaza Superfund Site

Copley Township, Ohio

U.S. Environmental Protection Agency is conducting its second five-year review of the Copley Square Plaza Superfund site (Site) to ensure groundwater and source area cleanup remedies at operable unit 1 at 2757 and 2799 Copley Road. The Superfund law requires regular checkups of sites that have been, or are in the process of being, cleaned up to make sure that the cleanup continues to protect people and the environment.

EPA's cleanup of dry-cleaning waste in shallow groundwater consisted of:

- Installing eight residential vapor intrusion mitigation systems;
- Connecting 28 residences to Akron municipal water;
- Injecting chemical compounds into the groundwater.

More information is available at the Copley Township Trustee Office, 1540 S. Cleveland-Massillon Road, at Fairlawn Bath Public Library, 3101 South Road, Akron, and at www.epa.gov/superfund/copley-square. The review should be completed by August 2021.

The five-year review report is an opportunity for you to tell EPA about site conditions and any concerns you have. Contact:

Susan Pastor	Margaret Gielniewski
Community Involvement Coordinator	Remedial Project Manager
312-353-1325	312-886-6244
pastor.susan@epa.gov	gielniewski.margaret@epa.gov

You may call EPA toll-free at 800-621-8431, 9 a.m. to 5:30 p.m., weekdays.

APPENDIX D—FIVE-YEAR REVIEW CHECKLIST