The Dow Chemical Company
633 Washington Avenue
1803 Building
Midland, MI 48674

October 22, 2021

Ms. Gail Dieter

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau E, Section B
625 Broadway, 12th Floor
Albany, NY 12233-7017

Subject: 2020 Groundwater Monitoring and MNA Performance Report - Former Hampshire Chemical Corp. Facility, Waterloo, New York- Site No. 850001A

Dear Ms. Dieter:

Hampshire Chemical Corp. (HCC) is pleased to submit one hard copy and one electronic copy of the 2020 Groundwater Monitoring Results and MNA Performance Report for the Former Hampshire Chemical Corp. Facility, Waterloo, New York for Site No. 850001A.

These corrective measures activities were conducted pursuant to a Second Amended Order on Consent executed between Hampshire Chemical Corp. (HCC) and the NYSDEC under Index Number 8-20000218-3281, August 12, 2011.

If you have any questions about this Periodic Review Report, please contact me at 519-939-7595, or Brian Carling at 610-384-0747.

Sincerely,

Robert Stuetzle
Senior Remediation Specialist

Copy To: Ms. Gail Dieter, NYSDEC Central Office (Disc and Hard Copy)
Mr. Matthew Gillette, NYSDEC Region 8 (Disc)
Mr. David Pratt, NYSDEC Region 8 (Disc)
Mr. David Breyette, Evans Chemetics LP (Disc)
Jacobs Project File

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Former Hampshire Chemical Corp. Facility
Waterloo, New York
Site No. 850001A

2020 Groundwater Monitoring Results and MNA Performance Evaluation Report

Final Report

October 2021

The Dow Chemical Company

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Acronyms and Abbreviations

µg/L	microgram(s) per liter
Alpha Analytical	Alpha Analytical, Inc.
AOC	area of concern
As III	trivalent arsenite
As V	pentavalent arsenate
canal	Cayuga-Seneca Canal
CH2M	CH2M HILL Engineers, Inc.
COC	constituent of concern
Cr III	trivalent chromium
Cr VI	hexavalent chromium
DO	dissolved oxygen
Eh	redox potential
EPA	U.S. Environmental Protection Agency
ft/day	feet per day
ft/ft	feet per foot
GWMP	Groundwater Monitoring Work Plan
HAO	hydrous aluminum oxide
HCC	Hampshire Chemical Corp.
HDPE	high-density polyethylene
HFO	hydrous ferric oxide
ID	identification
IDW	investigation-derived waste
Jacobs	Jacobs Engineering Group Inc.
LTMWP	Long-term Monitoring Work Plan
MDL	method detection limit
mg/L	milligram(s) per liter
MIBK	methyl isobutyl ketone (4-methyl-2-pentanone)
MNA	monitored natural attenuation
MS	matrix spike
MSD	matrix spike duplicate
MW	monitoring well
NaHS	sodium hydrosulfide
NaOH	sodium hydroxide

ng/L	nanogram(s) per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OBWZ	overburden water-bearing zone
ORP	oxidation-reduction potential
PAH	polycyclic aromatic hydrocarbon
PVC	polyvinyl chloride
PZ	piezometer
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RFI	Resource Conservation and Recovery Act facility investigation
site	former Hampshire Chemical Corp. facility (now known as the Evans Chemetics Facility) in Waterloo, New York
SU	standard unit
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TAL	target analyte list
TOGS Class GA	Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values – Class GA
USDOT	U.S. Department of Transportation
USGS	U.S. Geological Survey
VOC	volatile organic compound

1. Introduction

This report presents the results of the sitewide groundwater monitoring activities conducted during September 2020 (reporting period) at the former Hampshire Chemical Corp. (HCC) facility in Waterloo, New York (site). Additionally, the report summarizes the findings from Year Six of a monitored natural attenuation (MNA) study, involving Areas of Concern (AOCs) B and D at the site. The report discusses how natural hydrologic, biological, mineralogical, and geochemical conditions prevalent in the shallow subsurface reduce concentrations for constituents of concern (COCs), and attenuate COC migration in groundwater.

The site is regulated under Title 6 of the New York Code of Rules and Regulations Part 373 and the Resource Conservation and Recovery Act (RCRA) with the New York State Department of Environmental Conservation (NYSDEC) as the lead agency. RCRA facility investigations (RFIs) have been performed at the site since 1993 to evaluate the nature and extent of releases to the environment. Pursuant to the Administrative Order on Consent executed between HCC and NYSDEC (NYSDEC 2011), sitewide groundwater monitoring was proposed in the Groundwater Monitoring Work Plan (GWMP; CH2M HILL Engineers, Inc. [CH2M] 2008), to support evaluating the most appropriate long-term strategy for remediating groundwater. NYSDEC approved the GWMP for the monitoring period running from 2009 through 2013. HCC subsequently submitted a revised Site Groundwater Long-term Monitoring Work Plan (LTMWP; CH2M 2013a, 2013b, 2013c, 2014) to continue groundwater monitoring, which was approved in early 2016 (NYSDEC 2016). NYSDEC selected MNA as an appropriate interim corrective measure for AOCs B and D in their correspondence dated April 21, 2015, and June 29, 2015 (NYSDEC 2015a, 2015b).

Field data were collected following NYSDEC Division of Environmental Remediation-10/Technical Guidance for Site Investigation and Remediation (NYSDEC 2010).

1.1 Site Setting and Background

The site is located at 228 East Main Street in the village of Waterloo, Seneca County, New York. Figure 1-1 shows the site location (all figures and tables are located at the end of this report). The facility is bordered to the north by East Main Street, to the east by Gorham Street, and to the west by East Water Street. The Cayuga-Seneca Canal (canal) flows west to east along the southern boundary of the property. The site is located within the watershed of the Seneca River. The site comprises several interconnected buildings that house offices, a quality control (QC) laboratory, a chemical treatment plant, and manufacturing, maintenance, and shipping/receiving operations (Figure 1-2). The site also includes outside drum storage areas and several tank farms. The RFI Report (CH2M 2006) and RFI Report Addendum (CH2M 2008) present additional information regarding site setting, history, and manufacturing processes.

The site lies on an alluvial plain, underlain by silts and clays with lenses of sand and gravel overlying glacial till comprised of hard to very hard silt and clay. Historical fill material overlies the native alluvium and till deposits. Bedrock occurs at depths ranging from approximately 15 to 35 feet below ground surface. The bedrock surface depth generally increases with depth from north to south. Groundwater flow in the overburden follows the topography of the land from north to south toward the canal.

Thirty-one groundwater monitoring wells support the LTMWP implementation. Groundwater elevation measurements and samples were previously collected from the Building 4 Pit Sump, which was approved for decommissioning by NYSDEC and then abandoned on December 15–16, 2014, as described in a technical memorandum submitted to NYSDEC on January 25, 2015 (CH2M 2015). Groundwater elevation measurements from two stilling wells (SG-01 and SG-02) were used prior to 2012 to record water elevations in the Cayuga-Seneca Canal Raceway and Canal, respectively. SG-01 was destroyed in fall 2011 during facility activities, and SG-02 was removed for AOC A remedial activities. Sixteen

groundwater monitoring wells were decommissioned as part of the LTMWP during November 2015 and September 2016 (CH2M 2017).

1.2 Site Activities Performed

The following activities were completed during this reporting period:

- Measured the depth-to-water from 31 groundwater monitoring wells on September 3, 2020.
- Conducted groundwater sampling of 31 groundwater monitoring wells for laboratory analysis from September 4 to September 17, 2020.

1.3 Report Organization

This groundwater monitoring and MNA report contains the following sections:

- Section 1, Introduction
- Section 2, Groundwater Monitoring Activities
- Section 3, Groundwater Sampling Results
- Section 4, Monitored Natural Attenuation at the Site
- Section 5, Monitored Natural Attenuation Results for Year Six
- Section 6, Conclusions
- Section 7, References

Supporting tables, figures, and appendixes are included at the end of this report.

2. Groundwater Monitoring Activities

This section provides summaries of the groundwater elevation measurements, sampling activities, and activities conducted as part of the data quality review.

2.1 Groundwater Flow Evaluation

On September 3, 2020, depth-to-water was measured in groundwater monitoring wells to evaluate the potentiometric surface, groundwater flow directions and hydraulic gradients in the overburden water-bearing zone (OBWZ). Measurements were collected in accordance with the LTMWP (CH2M 2014) using an electronic water level meter with 0.01-foot graduations, which was decontaminated between wells. The depth-to-water measurements and calculated groundwater elevations are presented and discussed in Section 3.1. A groundwater flow evaluation specific to AOCs B and D appears in Section 5.1.

2.2 Groundwater Sampling

During September 2020, groundwater samples were collected from 31 monitoring wells associated with the site in accordance with LTMWP and the U.S. Environmental Protection Agency (EPA) Region 2 *Groundwater Sampling Procedure—Low Stress (Low Flow) Purging and Sampling* (sampling procedures) (EPA 1998). All sampling activities were conducted in accordance with the project's Quality Assurance Project Plan (QAPP; CH2M 2009). All groundwater monitoring wells included in the LTMWP are shown on Figure 1-2, of which all available wells were scheduled for sampling in 2020. Table 2-1 summarizes information on each groundwater sample collected in 2020. The analytical results for the groundwater samples are included in Appendix A and discussed in Section 3.2.

A variable-speed peristaltic pump equipped with Teflon-lined polyethylene tubing was used to purge groundwater from the monitoring wells. Field chemistry parameters were measured during purging using a Horiba U-52 water quality meter with an inline flow-through cell; the parameters recorded included pH (as standard units [SUs]), temperature (as degrees Celsius), dissolved oxygen (DO; as milligrams per liter [mg/L]), oxidation-reduction potential (ORP; as millivolts), and specific conductance (as milliSiemens per centimeter). Turbidity was measured in the field using a standalone LaMotte turbidity meter. To avoid cross-contamination, new tubing was used at each sampling location and disposed of after a single use. Field measurements were recorded on groundwater sampling forms, which are included in Appendix B.

In general, groundwater was removed from each well until the water quality parameters stabilized to within criteria established in the sampling procedures; however, several monitoring wells required additional attention to obtain field chemistry measurements and collect the laboratory sample. Field chemistry parameters at piezometer 06 (PZ-06) and monitoring well 18 (MW-18 never stabilized because the well failed to recharge at even the lowest purging rates). At PZ-06 minimum groundwater sample volumes were collected for analysis. Monitoring wells MW-10, MW-24 and MW-31 were purged dry and had to recharge at least once prior to sampling. In these cases, the wells were purged dry and groundwater samples were collected within 24 hours. Groundwater samples were containerized in separate clean, laboratory-prepared containers, placed in ice-filled insulated coolers, and transported to a laboratory for analysis under chain-of-custody control. Additional sample volume was collected at each monitoring well to measure ferrous iron concentrations in the field using a Hach 8290 field measurement kit and ferrous iron powdered reagent packets. The groundwater samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polycyclic aromatic hydrocarbons (PAHs), metals, and/or parameters for MNA (Table 2-1).

Additional groundwater samples were collected and analyzed for quality assurance (QA)/QC purposes. QA/QC samples collected during the reporting period included:

- Seven field duplicates
- Five matrix spike (MS)/matrix spike duplicates (MSDs)
- Four field blanks
- Three equipment blanks
- Seven trip blanks

The field duplicate and MS/MSD samples were collected from monitoring wells using methodologies described previously and analyzed for parameters listed in Table 2-1. The field blank was collected in the solid waste management unit 1 (SWMU 1) area near MW-17. The field blank was collected by pouring laboratory-provided deionized water into laboratory-provided sampling containers at a sampling location in that AOC. The field blank was submitted to the laboratory for the same parameters sampled at the AOC. Trip blanks accompanied all samples intended for VOC analysis and each sample cooler containing the empty (pre-sample) and filled (post-sample) VOC bottleware. Trip blanks confirm that the samples were not exposed to VOCs from environmental conditions during sampling or transit to the laboratory. The trip blank remained unopened until received at the laboratory with the samples.

The groundwater and QA/QC water samples were submitted under chain-of-custody to Alpha Analytical, Inc. of Westborough, Massachusetts (Alpha Analytical) (New York State Laboratory Identification [ID] No. 11148). Alpha Analytical is an approved laboratory under the New York State Environmental Laboratory Accreditation Program.

Alpha Analytical performed the following analyses as specified in the LTMWP and QAPP (CH2M 2014, 2009):

- VOCs by EPA SW-846 Method SW8260C
- PAHs by EPA Method SW8270D SIM
- SVOCs by EPA Method SW8270D/SW8270D SIM
- Total and dissolved target analyte list (TAL) metals by EPA Method SW6020B

Groundwater samples were analyzed for total metals and dissolved metals. Dissolved metals samples were collected after the other sample bottles were filled by passing groundwater through a 0.45-micron filter. In addition, samples from AOCs B and D were collected to assess groundwater for natural attenuation via the following analyses performed by Alpha Analytical:

- Alkalinity by EPA Method SM2320B
- Ammonia by EPA Method EPA 350.1
- Nitrate by EPA Method E353.2
- Nitrite by EPA Method E353.2
- Total phosphorus by EPA Method SM4500 P-E
- Chloride and sulfate by EPA Method E300.0
- Total organic carbon by EPA Method SM5310C
- Orthophosphate by EPA Method SM4500 P-E
- Total dissolved solids by EPA Method SM2540C
- Total sulfide by EPA Method SM4500-S2 D
- Total Kjeldahl nitrogen by EPA Method 351.3
- Silica by EPA Method 200.7

In addition, the NYSDEC required that the emergent contaminants 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) be sampled at a subset of monitoring wells in 2020 (NYSDEC 2020a). However, 1,4-dioxane and PFAS are not COC for the site and are not included in the LTMWP. The following

additions to the standard groundwater sampling procedures described above were made during PFAS sample collection:

- Unlined PFAS-free high-density polyethylene (HDPE) sample tubing and PFAS-free flexible peristaltic pump tubing were used.
- Groundwater samples were contained in HDPE bottles with HDPE screwcaps.
- Groundwater samples from each location were stored in separate plastic bags.
- Groundwater samples for PFAS analysis were not stored or transported with samples collected for other analyses.
- Laboratory-prepared deionized, certified PFAS-free water was used for field blank collection.
- Groundwater sampling forms were printed on paper without a waterproof coating and attached to a metal clipboard.
- Only ballpoint pens were used for note taking and sample container labeling.
- Field personnel wore nitrile gloves, and 100 percent cotton coveralls washed before use and dried without fabric softener sheets.
- Sunscreen, insect repellent, cosmetic, and deodorant products were not used by field personnel during PFAS sampling.

Samples collected to assess concentrations of emergent contaminants were analyzed by the following methods:

- 1,4-dioxane by EPA Method 8270D SIM isotope dilution
- PFAS by EPA Method 537 isotope dilution-liquid chromatography-tandem mass spectrometry

2.3 Waste Management

Investigation-derived waste (IDW) from the 2020 field activities was containerized and stored onsite for offsite disposal. Liquid wastes from monitoring well purging and equipment decontamination were containerized in U.S. Department of Transportation (USDOT)-approved 55-gallon drums on wooden pallets in a secondary containment area. Solid wastes from field activities (e.g., personal protective equipment and sample tubing) were also containerized in USDOT-approved 55-gallon drums. The IDW was removed for offsite disposal by Clean Harbors, Inc. on October 20, 2020.

2.4 Data Quality Review

Alpha Analytical performed laboratory analysis of the water samples and provided electronic reports of the results to Jacobs Engineering Group Inc. (Jacobs). A Jacobs chemist reviewed the results and data packages to evaluate the quality and usability of the analytical data. Based on the results of the data quality review, laboratory qualifiers were added to summary tables for specific analytes where appropriate, and the data reported by the laboratory were found to be suitable for its intended purpose. Data quality review technical memoranda are provided in Appendix C and discussed in detail in Section 3.4.

3. Groundwater Sampling Results

Section 3 presents the results of the water level monitoring and groundwater sampling field activities described in Section 2.

3.1 Groundwater Flow Evaluation

Table 3-1 summarizes the results of the groundwater elevation monitoring event during the reporting period. Figure 3-1 presents the potentiometric surface map (contour map) in the OBWZ for the 2020 monitoring events. As inferred from the contour map, groundwater flowed south toward the canal, consistent with historical conditions observed at the site. The horizontal hydraulic gradients calculated for selected well pairs were consistent with previous data as follows:

- 0.0277 feet per foot (ft/ft) for the MW-10/09R well pair (east side of site)
- 0.0623 ft/ft for the MW-06/18 well pair (west side of site)

A groundwater flow evaluation specific to AOCs B and D with respect to MNA appears in Section 5.1.

3.2 Groundwater Sampling Results

Table 3-2 presents the monitoring wells, sampling frequency, and categories included in the LTMWP for 2020 to 2025 (CH2M 2014). Tables 3-3 through 3-6 provide VOCs, SVOCs, metals, and MNA parameters results for the reporting period. Table 3-7 provides emerging contaminants (1,4-dioxane and PFAS) results for the selected wells. Analytical reports received from the laboratory are included in Appendix A. Additionally, an electronic copy of the analytical data in the format required for the NYSDEC EQuIS database is included in Appendix A. The analytical data tables for this report are grouped by SWMU, AOC, or site-specific areas, as shown in Tables 3-3 to 3-5.

Concentrations of analytes except methyl isobutyl ketone (MIBK) were compared to the Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values Class GA (TOGS Class GA) Standards (NYSDEC 1998 and 2004). However, NYSDEC has not issued a TOGS Class GA Standard for MIBK. Per NYSDEC (2005), the New York State Department of Health (NYSDOH) guidance value for MIBK is based on the maximum contaminant level for unspecified organic contaminants Part 5 Sanitary Code for Public Water System and is 50 micrograms per liter (µg/L) (NYSDOH 2011). Figures 3-2 through 3-5 summarize the groundwater analytical exceedances per SWMU, AOC, and other site groupings.

3.2.1 Groundwater Results—SWMU 1

Five monitoring wells (MW-16I, MW-17, MW-18, MW-26, and TW-01) are associated with SWMU 1. All five monitoring wells were sampled during the September 2020 monitoring event. Table 3-3 summarizes the analytical results for groundwater samples collected from SWMU 1 during September 2020. Figure 3-2 summarizes the constituent concentrations exceeding the TOGS Class GA standards for the reporting period.

The following analytes were detected at concentrations exceeding the TOGS Class GA standards in groundwater samples from SWMU 1 wells during the reporting period:

- Total arsenic (MW-17), total iron (MW-17, MW-18, MW-26, and TW-01), total magnesium (TW-01), total manganese (MW-16I, MW-17, and MW-18), total sodium (MW-16I, MW-17, MW-18, MW-26, and

TW-01), dissolved arsenic (MW-17), dissolved iron (MW-16I, MW-17, MW-18, MW-26, and TW-01) and/or dissolved manganese (MW-16I, MW-17, and MW-18).

As discussed in Section 2.2, MW-18 was allowed to recharge several times throughout the sample collection; because of this, the sample turbidity exceeded 30 NTU.

3.2.2 Groundwater Results—AOC-B

Five monitoring wells (MW-01, MW-02, MW-03, MW-33, and MW-34) and five piezometers (PZ-01, PZ-03, PZ-04, PZ-06, and PZ-07R) are associated with AOC-B. During the September 2020 sampling event, all five monitoring wells and all five piezometers were sampled. MW-03 was only sampled for VOCs as the upper 3 inches of the polyvinyl chloride (PVC) well casing were found to be sheared from the underlying casing and it appeared that soil may have fallen into the well. MW-03 will be repaired prior to the 2021 groundwater sampling event by building a 1-inch stainless steel well inside the existing 2-inch PVC casing. Table 3-4 summarizes the analytical results for groundwater samples collected from AOC-B during September 2020. Figure 3-3 summarizes concentrations of constituents exceeding the TOGS Class GA standards. Section 5.1 evaluates the groundwater chemistry from AOC B regarding COC attenuation since the start of MNA activities in November 2014.

The analytes associated with the following constituent classes were detected at concentrations exceeding the TOGS Class GA standards in groundwater samples from AOC B wells during the reporting period:

- VOCs at MW-03 (MIBK and toluene), MW-33 (1,2-dichloropropane, benzene, and toluene), and PZ-03 (1,2-DCA).
- Total arsenic (MW-33 and PZ-03), total chromium (MW-33), total iron (MW-01, MW-02, MW-34, PZ-01, PZ-03, PZ-06, and PZ-07R), total magnesium (MW-33, MW-34, PZ-01, PZ-03, and PZ-07R), total manganese (MW-33, PZ-06, and PZ-07R), total sodium (all sampled locations), and/or dissolved arsenic (MW-33 and PZ-03), dissolved chromium (MW-33), dissolved iron (MW-01, MW-34, PZ-01, PZ-03, and PZ-07R) and dissolved manganese (MW-33 and PZ-07R).
- Chloride (MW-01, MW-02, MW-33, PZ-03, PZ-04, PZ-06, and PZ-07R), sulfate (MW-02, PZ-03, and PZ-04), and/or sulfide (all sampled locations).

Although multiple analytes (iron, manganese, sodium, chloride, and arsenic) display concentrations exceeding the TOGS Class GA standards a large fraction represent constituents that occur naturally in shallow groundwater beneath the area, as discussed in Section 5.

3.2.3 Groundwater Results—AOC-D

Nine monitoring wells (MW-11S, MW-21, MW-23, MW-24, MW-30, MW-31, MW-35, MW-36, and MW-37) are associated with AOC-D. During the September 2020 sampling event, all nine monitoring wells were sampled. Table 3-5 summarizes the analytical results for groundwater samples collected from AOC-D during September 2020. Figure 3-4 shows constituent concentrations exceeding the TOGS Class GA standards for the reporting period. Section 4.2 evaluates the AOC-D groundwater results with respect to MNA performance.

Analytes associated with the following constituent classes were detected at concentrations exceeding the TOGS Class GA standards in groundwater samples from AOC-D wells during the reporting period:

- Total arsenic (MW-11S, MW-21, MW-23, MW-31, and MW-35), total iron (MW-21, MW-23, MW-24, and MW-37), total magnesium (MW-24, MW-35, MW-36, and MW-37), total manganese (MW-37), total sodium (all sampled locations), dissolved arsenic (MW-11S, MW-21, MW-23, MW-31, and MW-35), and dissolved iron (MW-21 and MW-24)

- General chemistry parameters chloride (all sampled locations except MW-35), sulfate (MW-21, MW-23, MW-24, MW-30, MW-31, and MW-37), and/or sulfide (MW-11S, MW-21, MW-23, MW-24, MW-30, and MW-31).

3.2.4 Groundwater Results—Supplemental Monitoring Wells

Seven monitoring wells (MW-05I, MW-06, MW-07, MW-09R, MW_10, MW-19, and MW-20) are located outside the boundaries of site AOCs and are classified as supplemental wells in the LTMWP. All seven wells were sampled during the September 2020 monitoring event. Table 3-6 summarizes the analytical results for groundwater samples collected from the supplemental wells during September 2020. Figure 3-5 summarizes constituent concentrations exceeding the TOGS Class GA standards for the reporting period.

The following analytes were detected at concentrations exceeding the TOGS Class GA standards in groundwater samples from supplemental wells during the reporting period:

- One VOC (trans-1,2-DCE) at MW-19.
- Two SVOCs, (benzo(b)fluoranthene and indeno(1,2,3-c,d)pyrene both at MW-07.
- Total iron (MW-09R, MW-10, MW-19, and MW-20), total magnesium (MW-09R, MW-19, and MW-20), total manganese (MW-07, MW-09R, and MW-19), total sodium (all sampled locations), dissolved iron (MW-09R and MW-19), and dissolved manganese (MW-07, MW-09R, and MW-19).

3.2.5 Emerging Contaminants in Groundwater

Samples from six monitoring wells (MW-02, MW-11S, MW-17, MW-20, MW-30, and PZ-01) were analyzed for 1,4-dioxane and PFAS during the September 2020 monitoring event. Table 3-7 and Figure 3-6 summarizes the concentrations for the constituents during the reporting period.

Until such time as aquifer water quality standards for PFAS and 1,4-dioxane are published, the substances should be further assessed and considered as potential COC in groundwater or surface water if detected in any water sample at or above 10 nanograms per liter (ng/L) and 1 µg/L, respectively, and they are determined to be attributable to the site, either by a comparison of upgradient and downgradient levels (NYSDEC 2020b).

- Total PFAS was detected at concentrations greater than 10 ng/L in groundwater samples from the upgradient well MW-20 and downgradient wells MW-02 and MW-30 at AOC-B and AOC-D, respectively.
- 1,4-Dioxane was not detected at concentrations greater than 1 µg/L in groundwater samples from the six monitoring wells.

Because the second highest concentration of PFAS was detected at the background/upgradient monitoring well MW-20, PFAS does not appear to be a potential COC attributable to the site and sampling for these COCs will be terminated.

3.3 Quality Assurance/Quality Control Samples

Table 2-1 presents the sample IDs and sample delivery groups for the QA/QC samples. Table 3-8 presents the analytical results of the field blanks and trip blanks for the reporting period. Except for sample blanks analyzed for low-level PFAS, there were no detections of analytes in field or trip blanks.

3.4 Data Quality Review Summary

Appendix C contains a detailed data quality evaluation for groundwater samples collected during the September 2020 sampling events. The following conclusions also appear in the data quality evaluation:

- Precision was generally acceptable; however, sulfide was qualified as estimated in one sample due to laboratory duplicate relative percent difference.
- Accuracy was generally acceptable; however, a few analytes were qualified as estimated due to calibration, laboratory control spiking, surrogate, MS/MSD and/or method QC requirements. In addition, benzoic acid was rejected for project use in several SVOC samples due to LCS/LCSD issues.
- Analytes that were qualified as not detected or rejected due to calibration/method and/or equipment blank contamination are tabulated in Appendix C.
- Representativeness of the data was verified through the sample's collection, storage and preservation procedures and the verification of holding-time compliance. The sample containers associated with the metals, ammonia, TKN and phosphorus analyses were received with a pH greater than criteria for sample MW21-090920, resulting in the data being qualified as estimated. Orthophosphate was analyzed outside of hold time criteria in a few samples, resulting in the data being qualified as estimated. The remaining data were reported from analyses within the EPA recommended holding time.
- The completeness goal of 95 percent was met for all method/analytes combinations except for benzoic acid, which was 13 percent complete.
- The data appears acceptable for decision making, other than the rejected data noted above and in the data quality evaluation, taking into consideration the validation flags applied.

4. Monitored Natural Attenuation at the Site

Natural attenuation relies on natural processes to attenuate concentrations for COCs to achieve site-specific remediation objectives within a reasonable timeframe as compared with active remedial methods. Natural attenuation comprises a variety of physical, chemical, or biological processes that work without human intervention to reduce the mass, toxicity, mobility, and volume of constituent concentrations in groundwater. As such, performance monitoring to evaluate the effectiveness of MNA as a remedy to protect human health and the environment is critical.

This report describes attenuation of COCs in groundwater at AOC-B and AOC-D for Year Six of the long-term monitoring program. The MNA groundwater sampling frequency for specific monitoring wells from 2014 (Year One) to 2020 (Year Six) appear in Table 4-1 with results described in the reports listed in Section 3.1. Long-term monitoring sampling events for 2020 to 2025 will be conducted according to the schedule in Table 3-2. The following sections describe monitoring wells, sampling frequency, and analytes specific to AOCs B and D.

4.1 AOC-B MNA Sampling Summary

The main COCs in groundwater at AOC-B include MIBK, acetone, and chromium. Elevated concentrations of the three COCs appear in the same monitoring wells, forming a smaller groundwater plume beneath Building 4.

During Year Six, groundwater samples for MNA analysis were collected at the AOC-B monitoring wells described in Section 3.2.2. These samples were analyzed for TAL metals (total and dissolved), VOCs, cations, anions, nutrients, and general water quality constituents (Tables 3-4a to 3-4c). In addition to laboratory analytes, field parameters were measured while purging the monitoring wells, including temperature, pH, DO, specific conductance, ORP, ferrous iron, sulfide, and/or sulfate (Table 4-2). Together, the field and laboratory analyses supported evaluating MNA effectiveness at AOC-B.

The groundwater sampled collected at MW-03 was analyzed only for VOCs during 2020 because the upper 3 inches of the PVC well casing were found to be sheared from the underlying casing and it appeared that soil may have fallen into the well. MW-03 is scheduled for repair prior to the 2021 groundwater sampling event by building a 1-inch stainless steel well inside the existing 2-inch PVC casing.

4.2 AOC-D MNA Sampling Summary

During Year Six, groundwater samples for MNA analysis were collected at the AOC-D monitoring wells described in Section 3.2.3. Samples were analyzed for TAL metals, cations, anions, nutrients, and general water quality constituents (Tables 3-5a and 3-5b). Field parameters also were measured while purging the monitoring wells, including temperature, pH, DO, specific conductance, ORP, ferrous iron, sulfide, and/or sulfate (Table 4-2). Together, the field and laboratory analyses were used to evaluate MNA effectiveness at AOC-D.

At AOC-D, arsenic in groundwater represents the only COC. Spills of caustic sodium hydroxide (NaOH) and sodium hydrosulfide (NaHS) in Building 3 infiltrated to groundwater, increasing its pH from approximately 6.5 SU to 12 SU. The alkaline pH alters the surface charge on common, metal oxide mineral surfaces like hydrous ferric oxide (HFO) and hydrous aluminum oxide (HAO) from positive to negative. As a result, negatively charged oxyanions, like arsenic, previously adsorbed to these surfaces are repelled, desorbing from the surfaces, and increasing arsenic concentrations in groundwater. Accordingly, laboratory analytes and field chemistry measurements were tailored to evaluate arsenic concentrations with time, constituents

that influence its mobility, along with characterizing geochemical conditions beneath AOC-D that influence arsenic persistence and migration.

5. Monitored Natural Attenuation Results for Year Six

This section describes the results of synoptic surveys and groundwater sampling conducted during Year Six with respect to MNA performance monitoring at AOCs B and D, performed in September 2020.

5.1 AOC-B Monitoring Results

Data from the annual synoptic surveys and groundwater sampling were evaluated as part of the Year Six MNA study. The synoptic survey was conducted to characterize groundwater flow directions, gradients, and velocities across AOC-B in September 2020, prior to collecting of the groundwater samples. The survey also documented the range in groundwater elevations in the OBWZ across the AOC.

Groundwater sampling data were evaluated to examine COC concentrations (MIBK and chromium), distribution, and temporal trends. As a product of MIBK degradation, acetone concentrations were also assessed. Concentrations with time were assessed at individual monitoring wells and as part of contiguous COC plumes. Analytical data supported characterizing geochemical conditions in the OBWZ at AOC-B, including major ion chemistry, redox potential (Eh), ionic strength, nutrients, and abundance of trace metals. These factors, individually or in combination, can influence the attenuation of COCs at AOC-B.

5.1.1 AOC-B Hydraulic Monitoring Results

On September 3, 2020, groundwater flowed toward the canal (Figure 5-1) at gradients ranging from 0.04 to 0.08 ft/ft. Like previous water level surveys, the flowable cement mass used in abandoning BLDG4-PIT-SSP influenced the potentiometric surface from September 2020, by elevating equi-potentials behind the structure, while increasing the gradient downgradient of BLDG4-PIT-SSP, inferring a mound. The pattern appeared during every previous synoptic event at AOC-B.

Using the average hydraulic conductivity of 4 feet per day (ft/day) determined from aquifer testing conducted at the former BLDG4-PIT-SSP (CH2M 2013a), the hydraulic gradients from the synoptic surveys, and a porosity of 0.35 corresponding to heterogenous material, approximating silty sands (Walton 1989), groundwater velocities across the area during 2019 varied from 0.5 to 0.9 ft/day, relatively rapid velocities, but, consistent with the elevated hydraulic gradients adjacent to a major surface water body (Fetter 1986).

5.1.2 AOC-B Groundwater Analytical Results

5.1.2.1 MIBK

MIBK concentrations at MW-03 equaled 320 J µg/L in September 2020 (Figure 5-2), the lowest concentrations exhibited since 2011, when concentrations reached a maximum of 36,000 µg/L. Acetone, a degradation product of MIBK, fell below method detection limits (MDL) in MW-03. Similarly, MW-33, located upgradient of MW-03, displayed MIBK concentrations around 4,000 µg/L in early 2015, 30 µg/L in the fall of 2019, and now exhibits concentrations below MDLs.

MW-02, located downgradient of MW-03, exhibited concentrations below the MDL, continuing a downward trend in MIBK concentrations since late 2015 (Figure 5-2). Acetone exceeded MIBK concentrations in MW-02 in December 2016 but has remained below MDLs since August 2017. The absence of MIBK in MW-02 demonstrates the success of the MNA program in rapidly attenuating the COC. Maximum concentrations of MIBK in MW-02 had exceeded 500 µg/L in 2014.

Samples collected at MW-02, PZ-04, PZ-06 and PZ-07 facilitated characterizing the downgradient edge of the MIBK plume along the canal. MIBK concentrations encountered at monitoring wells, situated along

the transect remained below MDLs in 2020, replicating the concentrations encountered during the 2018 and 2019 sampling events (Figure 5-3). The absence of MIBK adjacent to the canal, in monitoring wells that previously exhibited concentrations exceeding the 500 µg/L, demonstrates that the MIBK plume is shrinking, receding upgradient toward the source area beneath Building 4. Further, this data indicates that only the source well (MW-03) exceeds the NYSDOH guidance value for MIBK (50 ug/L).

5.1.2.2 Chromium

Total chromium concentrations in groundwater samples collected in 2020, exceeded the TOGS Class GA Standard in only MW-33 at 152.1 µg/L, significantly lower than 2,844 µg/L recorded upon beginning the MNA study in November 2014 (Figure 5-4). Although not sampled for metals in 2020, MW-03, once recorded the highest chromium at 22,700 µg/L, but concentrations dropped below the TOGS Class GA Standard (50 µg/L) in 2018, to 48 µg/L.

Of monitoring wells positioned downgradient of MW-03 and MW-33, chromium concentrations at MW-02 declined from 200 µg/L in June 2015 to less than 3 µg/L (Figure 5-4) in 2019 and remains below 3 µg/L in 2020.

Historically, chromium concentrations at PZ-06 have been below 10 µg/L for the duration of the MNA program. However, during 2020 the concentration of total chromium at PZ-06 was 31 µg/L (Figure 5-5). Increasing chromium concentrations at PZ-06 may originate from elevated turbidity, which reached 30 NTU at the time of sampling, the highest turbidity displayed in monitoring wells at AOC-B. PZ-06 was purged dry and required several recharge cycles to collect the minimum sample volume. Moreover, dissolved chromium concentrations at PZ-06 were 1 µg/L, an order of magnitude less than total concentrations. Thus, chromium concentrations at PZ-06 likely reflect an artifact of sampling rather than dissolved groundwater concentrations. At other monitoring wells along the canal, chromium concentrations have remained below 10 µg/L from November 2015 through September 2020 (Figure 5-6).

5.1.2.3 Geochemical Conditions

Geochemical conditions remained stable during Year Six, resembling conditions encountered during Years One through Five. Groundwater displayed a circum-neutral pH ranging from 6.29 to 7.23 at PZ-07R and MW-33/PZ-06, respectively. Except for MW-34 and PZ-01, total dissolved solids (TDS) concentrations at monitoring wells exceed 1,000 mg/L, defining the groundwater as brackish (Hem, 1985). TDS concentrations at MW-34 and PZ-01 fell just below the fresh/brackish threshold at 840 and 920 mg/L, respectively.

The ionic groundwater chemistry from Year Six exhibited some variation, ranging from mixed cation to a sodium–chloride or mixed anion chemistry. The anionic chemistry varied more than cations. MW-01, MW-33, PZ-03, and PZ-07R exhibited a chloride anionic chemistry; MW-02 and PZ-04 displayed a mixed anion chemistry (Figure 5-7); and MW-34, PZ-01 and PZ-06 showed a bicarbonate chemistry.

Redox conditions influence the ionic character of chromium in groundwater along with other factors that affect its migration (complexation, adsorption, and precipitation). Hexavalent chromium (Cr VI), the more toxic of the two chromium ions that occur in natural waters, exhibits greater stability under oxic conditions (Palmer and Puls 1994), but transitions to trivalent chromium (Cr III) under reducing conditions. Cr III precipitates as a relatively insoluble hydroxide ($Cr[OH]_3$). Accordingly, only Cr VI occurs as a dissolved ion or oxyanion in natural waters.

PHREEPLOT (Kinniburgh and Cooper, 2011), a computer program combining the thermodynamic equilibrium model PHREEQC (Parkhurst 1996) with a powerful plotting algorithm, was employed to

characterize the chromium-oxygen- -iron system (Figure 5-8). Groundwater chemistry (pH, cations, anions, iron, silica, nutrients) from MW-33, the only monitoring well exhibiting chromium concentrations exceeding the TOGS Class GA Standard, was used as input to the PHREEQC portion of PHREEPLOT.

In addition to considering the phases of chromium, sulfide, carbonate, and iron in this system, PHREEPLOT characterizes the stability of HFO surfaces, a common adsorptive surface in shallow groundwater systems. HFO surfaces display a considerable surface charge. Depending on pH, HFO can adsorb large amounts (Dzomback and Morel 1990) of cationic (cadmium, manganese, cobalt, nickel, lead, and zinc) or anionic metals (chromium, arsenic, uranium, molybdenum, and selenium).

pH and ORP measured in the groundwater samples collected in September 2020 were plotted on phase diagrams of the chromium and iron system (Figure 5-8). ORP was converted to the standard hydrogen electrode by adding 0.2 volts to the field measurement (Hem 1985). On the chromium diagram, of the ten points representing the monitoring wells, seven plotted in the chromium(III)-aqua [$Cr(OH_2)^{1+}$] field, one in the chromium(III) hydroxide field, and two in a field in equilibrium with methane. All the points imply equilibrium with trivalent chromium rather than Cr VI. Moreover, none of the monitoring wells plotted in fields suggesting equilibrium with HFO.

Considering the iron-oxide system, depicted in a separate phase diagram, 7 of the 10 points displayed equilibrium with ferrous iron an aqueous phase in groundwater beneath AOC-B, confirming groundwater chemistry was not equilibrated with HFO (Figure 5-8). The remaining three monitoring wells displayed very reducing Eh values suggesting equilibrium with methane gas.

The absence of equilibrium with HFO discounts the potential for chromium adsorbing to HFO surfaces as a mechanism for chromium attenuation in groundwater; however, elevated concentrations of dissolved chromium in groundwater conflicts with the equilibrium conditions favoring Cr III. The relationship suggests disequilibrium in the shallow groundwater system, and consequently, that ORP does not provide a reliable indicator to the speciation of chromium in groundwater beneath AOC-B.

In the absence of strong reductants, kinetically the reduction of Cr VI to Cr III occurs relatively slowly in groundwater (Stanin 2004); however, common reductants like ferrous iron at concentrations exceeding 5 mg/L can accelerate reducing Cr VI to Cr III, but dissolved iron concentrations rarely exceeded 1 mg/L, let alone 5 mg/L, in groundwater samples from AOC-B, with most exhibiting concentrations less than 0.5 mg/L.

A computer program developed by U.S. Geological Survey (USGS; Jurgens et al. 2009) characterized the primary redox category and process (Tables 5-1 and 5-2) by evaluating concentrations of redox constituents (DO, nitrate, iron, manganese, sulfate, and sulfide). These constituents were measured as field and laboratory analytical parameters during the September 2020 sampling event. The program offers an alternative to relying on ORP measured in the field. ORP measurements represent a simple measure of electrical potential. Yet, disequilibrium in a system often reduces the effectiveness of ORP as a reliable indicator of redox.

Running the program produced a mixed suboxic to oxic-anoxic chemistry with manganese, ferric iron, and sulfate reduction constituting the primary redox processes (Tables 5-1 and 5-2). The screens of monitoring wells and piezometers measuring 10 feet or longer, spanning shallow systems can often extend across several redox zones. Thus, elevated concentrations of DO associated with oxidizing conditions can appear in the same sample that exhibits elevated concentrations of iron, manganese, or sulfide, indicative of reducing conditions.

The mostly reducing conditions in groundwater below AOC-B favor the progressive (if not rapid) reduction of Cr VI to Cr III. Conversely, reducing conditions are not documented to attenuate MIBK or acetone in groundwater. However, degradation of MIBK could promote the conditions that reduce Cr VI to Cr III.

5.1.2.4 Summary of MNA Effectiveness at AOC-B

Despite mixed geochemical conditions, MIBK and chromium concentrations have declined over the relatively short time period since starting MNA studies. Concentrations of chromium now only exceed the TOGS Class GA Standard at two monitoring wells, MW-33 and PZ-06. However, elevated turbidity and the absence of a correlation between dissolved and total concentrations suggests that chromium in PZ-06 represents a sampling artifact rather than chromium dissolved in groundwater.

MIBK exceeded the TOGS Class GA Standard at one monitoring well sampled during 2020 (MW-03). Also, MIBK and chromium have declined below MDLs in monitoring wells located adjacent to the canal. Concentrations for both constituents have decreased and the contiguous plumes for both constituents have retreated from their maximum downgradient extents, receding to hot spots at individual wells. The pattern indicates that MNA has proven effective in reducing the constituent plumes at AOC-B.

5.2 AOC-D MNA Evaluation

Year Six of the MNA study at AOC-D, like previous years, focused on evaluating data from a synoptic survey and groundwater sampling event. The synoptic survey was conducted to determine the groundwater flow direction, gradients, and velocities across AOC-D during September 2020.

5.2.1 AOC-D Hydraulic Monitoring Results

During September 2020, groundwater flowed from northeast to southwest through AOC-D toward the canal (Figure 5-1) at a gradient around 0.05 ft/ft. Unlike the mounding at AOC-B, equi-potential contours were relatively straight, trending subparallel to the orientation of the canal. Applying the average hydraulic conductivity of 6 ft/day determined from slug tests conducted at AOC-D (CH2M 2014), the hydraulic gradients from the synoptic survey, and a porosity of 0.35 for silty sands (Walton 1989), the groundwater velocities across the area during 2020 ranged around 0.7 ft/day, a relatively rapid rate, but typical of gradients proximal to a large surface water body (Fetter 1986).

5.2.2 AOC-D Groundwater Results

5.2.2.1 Arsenic

At MW-21, the monitoring well historically exhibiting the highest arsenic concentrations. Arsenic concentrations at MW-21 declined to less than 2,200 µg/L (Figure 5-9) during 2020, which is near the lowest concentration historically observed at the monitoring well. At MW-11S, the second most affected monitoring well, arsenic concentrations climbed slightly from 920 µg/L in 2019 to 1,040 µg/L in 2020. Plotted on a transect trending parallel to the canal, arsenic concentrations varied by monitoring well (Figure 5-10). Arsenic concentrations also fell significantly at MW-30 from more than 30 µg/L in late 2016 to less than 3 µg/L in September 2020.

Spills of caustic products including NaOH and NaHS increased the pH of groundwater from circum-neutral pH (6.5 to 7.5 SU) to more than 11. At the elevated pH, the charge on adsorptive HFO surfaces changes from positive to negative, repelling negatively charged oxyanions like arsenic (desorption), thus increasing the arsenic concentration in groundwater.

During the Year Six sampling event, pH measurements in AOC-D monitoring wells were all below 10 (Figure 5-11). Since evaluating pH measurements starting in Year One, pH values have not exceeded

11 SU at MW-21 since June 2016, and 10 SU at MW-11S since 2009. pH measurements at MW-11S fell from 9.5 in 2019 to 8.5 in 2020. Moreover, six of the eight wells displayed either a measurable decline in pH between 2019 and 2020 (MW-11S, MW-31, MW-35 and MW-36), or when compared against pH measured during the most recent sampling event (MW-23 and MW-24). The remaining two wells (MW-21 and MW-30) displayed roughly equivalent pH compared against the previous sampling event. Thus, data from Year Six of the MNA study reinforces a fluctuating, yet declining profile for pH at AOC-D.

5.2.2.2 Geochemical Conditions at AOC-D

Like AOC-B, geochemical conditions remained stable over the study period and resembled conditions described by sampling events since the Year One sampling event. Groundwater displayed a strongly sodium to mixed cation—bicarbonate-mixed anion-chloride chemistry (Figure 5-12). The chemistry of groundwater samples remained roughly equivalent during September 2020 and compared favorably with samples from during the Year One study. The strongly sodic chemistry likely reflects the influence of released NaOH and NaHS on the groundwater chemistry at AOC-D.

Redox conditions at AOC-D were evaluated using the computer program developed by USGS. Redox conditions strongly influence the ionic character of arsenic in groundwater; however, unlike other oxyanions, both ions of arsenic, including trivalent arsenite (As III) and pentavalent arsenate (As V), remain soluble under normal (pH 6 to 8 SU; Eh -100 to +300 millivolts) physiochemical conditions in groundwater (Hem 1986), rather than the reduced ion (As III) precipitating as an insoluble oxide, hydroxide, or sulfide.

Arsenic-bearing minerals can precipitate under conditions more severe than normally encountered in a natural groundwater environment. As an example, a zero valent-iron environment can co-precipitate arsenic and iron in oxide minerals. The redox program developed by USGS (Jurgens et al. 2009) produced mostly anoxic redox (Table 5-3) with ferric iron-, and sulfate-reducing conditions describing the prevailing redox processes.

In addition to the redox program, PHREEPLOT was employed to assess arsenic equilibria. The MW-21 chemistry (pH, cations, anions, iron, silica, and nutrients) was used as the PHREEPLOT input because the monitoring well had the greatest measured concentration of arsenic for AOC-D in 2020. In addition to arsenic, iron, carbonate, and sulfide were considered as dissolved and mineral phases in this system. Although As III and As V do not readily precipitate under groundwater conditions, adsorption to HFO attenuates arsenic migration in groundwater. Databases available in PHREEQC contain many equations and thermodynamic data for simulating the adsorption of As III and As V to HFO surfaces.

The pH and ORP measurement of samples were plotted on phase diagrams that evaluate arsenic speciation, the stability of HFO, common adsorbent surfaces in groundwater, iron, and the potential for oxyanions of arsenic to adsorb to HFO. Iron was plotted separately to check that HFO corresponds to a mineral phase in the iron and arsenic systems. Figure 5-13 shows that the area of the $Fe(OH)_3(a)$ field (~HFO) on the iron diagram coincides with the range of the HFO field on the diagram of the arsenic-sulfide-water system.

At pH less than 8.5 SU, the As V fields like $HAsO_4^{-2}$, AsO_4^{-3}, and $OHAsO_4^{-3}$ appear in equilibrium with HFO surfaces, while As III fields including $H2AsO_3^{-1}$ and $HAsO_3^{-2}$ equilibrate with HFO. The diagram conveys the mechanism for arsenic mobilization at AOC-D with elevated arsenic concentrations in groundwater appearing at alkaline pH. The phase diagram suggests As V is not in equilibrium with HFO at a pH greater than 10.5 SU and thus may desorb from these surfaces. Also, the higher sodium concentrations in groundwater at AOC-D have affected arsenic speciation at more alkaline pH values. Points representing MW-11S, MW-21, and single samples from other monitoring wells (MW-24, MW-31, MW-36, and MW-37)

plot in the arsenate fields, suggesting arsenic in these samples is dominated by As V, while MW-23 and MW-30 plot in arsenite fields.

5.2.2.3 MNA and Arsenic at AOC-D

The results of the MNA Year Six study, including equilibrium plots of arsenic and iron, correspond with the findings from an arsenic adsorption study conducted in 2012 (CH2M 2013c). Samples tested during the adsorption study exhibited measurable capacity to adsorb arsenic, ranging from 0.07 to 1.77 milligrams of arsenic per gram of soil. Modeling showed that even the minimum capacity could more than sufficiently adsorb all arsenic presently found in groundwater and reduce concentrations to less than the TOGS Class GA Standard. Moreover, arsenic adsorption capacity correlated well with the sample's iron content (correlation coefficient of 0.78), replicating the relationship between oxyanions of As and HFO seen on the phase diagrams.

Findings during the MNA Year Six study regarding arsenic concentrations and pH show measurable stability or declines compared to the Year Five results. In the absence of further NaOH and NaHS spills that elevate groundwater pH, ambient groundwater flow through the area should continue to lower the pH to less than 7.0 SU. In confirming this trend, Year Six results displayed strong declines in pH at six of the eight monitoring wells sampled. Declining pH will improve the adsorption capacity of soils, while attenuating arsenic concentrations in groundwater.

6. Conclusions

The following conclusions were developed from the MNA Year Six study at AOCs B and D.

6.1 AOC-B

MIBK concentrations exceeded the TOGS Class GA Standard in only MW-03, at 320 µg/L in 2020, down from the historic maximum of 36,000 µg/L in 2011.

- MIBK concentrations remained below MDLs in monitoring wells located adjacent to the canal.
- The reducing redox conditions favor the reduction of Cr VI to Cr III, a relatively insoluble precipitate.
- Except for PZ-06, chromium concentrations remained below 10 µg/L in monitoring wells situated adjacent to the canal for Year Six. Given the elevated turbidity and low dissolved concentrations, total chromium displayed in PZ-06, the chromium appears as an artifact of sampling rather than chromium migrating in groundwater.
- In AOC-B north of the canal, chromium remained above the TOGS Class GA Standard in only MW-33 at 152 µg/L, declining from 203 µg/L in 2019, down from its historic maximum concentration of 10,000 µg/L in late 2015.
- Although the sample collected from MW-03 in 2020 was not analyzed from chromium, chromium concentrations had declined from 22,700 µg/L in 2013 to less than the TOGS Class GA Standard by 2015. Concentrations remained below the standard in 2018, the last time groundwater samples from MW-03 were analyzed for chromium.
- Concentrations of both MIBK and chromium appear to be declining; this trend supports the efficacy of MNA at this AOC.

6.2 AOC-D

- Arsenic displayed relatively stable concentrations at MW-11S and MW-21 between Years Five and Six.
- Despite recent fluctuations, arsenic concentrations have decreased nearly an order of magnitude at MW-11S and MW-21 since 2005 and 2012, respectively.
- The pH in groundwater at AOC-D continued its declining trend with samples no longer displaying measurements exceeding 10.
- Six of the eight monitor wells (MW-11S, MW-23, MW-24, MW-31, MW-35, and MW-36) displayed marked declines in pH between 2019 and 2020, or between the last sampling event and September 2020. As an example, the pH at MW-11S declined from 9.5 to 8.5 between 2019 and 2020.
- MW-21 and MW-30 displayed stable pH between 2019 and 2020.
- The geochemical conditions in groundwater at AOC-D appeared mixed, when considering the attenuation of arsenic. Although declining since 2005, the pH remains alkaline at MW-11S and MW-21, the most impacted monitoring wells.
- Managing the groundwater pH by preventing spills of NaOH and NaHS will allow pH to return to ambient levels, improving the adsorption capacity of saturated soils.
- Concentrations of arsenic appear to be stable or declining; this trend supports the efficacy of MNA at this AOC.

6.3 SWMU 1 and Sitewide Wells

The groundwater monitoring results for management and assessment of the remedial action objectives for SMWU 1 and sitewide groundwater continue to be stable or decreasing. No new releases were detected to the groundwater.

6.4 Emerging Contaminants

The second highest concentration of PFAS was detected at background/upgradient monitoring well MW-20, located north of the property boundary, across North Main Street. Thus, PFAS does not appear to originate from activities performed at the site and should not be considered a COC for the site.

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Tables

Table 2-1. Summary of Groundwater Samples Collected

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sampling Location	Sample Identification	Laboratory Analysis	Sample Delivery Group	Sample Type	Sampling Method	Pump Placement Depth (ft. from TIC)	Sample Date	Sample Time
MW-03	MW03-090320	VOCs	L2036638	N	Peristaltic	14	09/03/2020	16:00
MW-33	MW33-090220	VOCs, Metals[1], MNA	L2036638	N	Peristaltic	8	09/02/2020	18:00
MW-33	MW33-090220-MS	Metals[1]	L2036638	MS	Peristaltic	8	09/02/2020	18:00
MW-34	MW34-090220	VOCs, Metals[1], MNA	L2036638	N	Peristaltic	14	09/03/2020	10:10
MW-34	MW34-090220-MS	MNA	L2036638	MS	Peristaltic	14	09/03/2020	10:10
PZ-01	PZ01-090220	VOCs, Metals[1], Low-Level SVOCs, PFAS, MNA	L2036638	N	Peristaltic	8	09/03/2020	12:34
PZ-01	PZ01-090220-MS	MNA	L2036638	MS	Peristaltic	8	09/03/2020	12:34
TB	TB-090220	VOCs	L2036638	TB	N/A	N/A	09/02/2020	08:00
FB	FB-090320	PFAS	L2036638	FB	N/A	N/A	09/03/2020	16:50
MW-20	MW20-090420	VOCs, Metals[1], SVOCs, Low-Level SVOCs, PFAS	L2036937	N	Peristaltic	13.5	09/04/2020	12:55
MW-20	MW20-090420-MS	Metals[1], Low-Level SVOCs, PFAS	L2036937	MS	Peristaltic	13.5	09/04/2020	12:55
MW-20	MW20-090420-MSD	Low-Level SVOCs, PFAS	L2036937	SD	Peristaltic	13.5	09/04/2020	12:55
MW-11S	MW11S-090420	Metals[1], Low-Level SVOCs, PFAS, MNA	L2036947	N	Peristaltic	12	09/04/2020	12:30
MW-11S	MW11S-090420-MS	Metals[1], PFAS	L2036947	MS	Peristaltic	12	09/04/2020	12:30
MW-30	MW30-090420	Metals[1], Low-Level SVOCs, PFAS, MNA	L2036947	N	Peristaltic	10	09/04/2020	10:55
FB	FB-090420	PFAS	L2036947	FB	N/A	N/A	09/04/2020	11:00
MW-02	MW02-090420	VOCs, Metals[1], Low-Level SVOCs, PFAS, MNA	L2036952	N	Peristaltic	9.5	09/04/2020	10:25
MW-02	DUP-GW-090420	Metals[1], Low-Level SVOCs, PFAS	L2036952	FD	Peristaltic	9.5	09/04/2020	10:00
MW-02	MW02-090420-MS	Metals[1]	L2036952	MS	Peristaltic	9.5	09/04/2020	10:25
TB	TB-090420	VOCs	L2036952	TB	N/A	N/A	09/04/2020	08:00
PZ-04	PZ04-090820	VOCs, Metals[1], MNA	L2037136	N	Peristaltic	8	09/08/2020	15:20
PZ-07R	PZ07R-090820	VOCs, Metals[1], MNA	L2037136	N	Peristaltic	8.5	09/08/2020	13:40
PZ-07R	PZ07R-090820-MS	VOCs, Metals[1], MNA	L2037136	MS	Peristaltic	8.5	09/08/2020	13:40
PZ-07R	PZ07R-090820-MSD	VOCs, Metals[1]	L2037136	SD	Peristaltic	8.5	09/08/2020	13:40
TB	TB-090820	VOCs	L2037136	TB	N/A	N/A	09/08/2020	08:00
MW-21	MW21-090920	Metals[1], MNA	L2037338	N	Peristaltic	10	09/09/2020	15:15
MW-21	MW21-090920-MS	MNA	L2037338	MS	Peristaltic	10	09/09/2020	15:15
MW-23	MW23-090920-MSD	Metals[1]	L2037338	SD	Peristaltic	8	09/09/2020	09:40
MW-23	MW23-090920	Metals[1], MNA	L2037338	N	Peristaltic	8	09/09/2020	09:40
MW-23	MW23-090920-MS	Metals[1]	L2037338	MS	Peristaltic	8	09/09/2020	09:40
MW-01	MW01-09020	VOCs, Metals[1], MNA	L2037348	N	Peristaltic	9.5	09/09/2020	11:30
MW-01	MW01-09020-MS	MNA	L2037348	MS	Peristaltic	9.5	09/09/2020	11:30
PZ-03	PZ03-09020	VOCs, Metals[1], MNA	L2037348	N	Peristaltic	8	09/09/2020	15:00
PZ-03	DUP-GW-09020-1	VOCs	L2037348	FD	Peristaltic	8	09/09/2020	15:00
PZ-03	PZ03-09020-MS	MNA	L2037348	MS	Peristaltic	8	09/09/2020	15:00
TB	TB-09020	VOCs	L2037348	TB	N/A	N/A	09/09/2020	08:00
MW-09R	MW09R-090920	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037355	N	Peristaltic	12	09/09/2020	14:05
MW-09R	DUP-GW-090920-2	Metals[1]	L2037355	FD	Peristaltic	12	09/09/2020	14:05
MW-05I	MW05I-091020	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037645	N	Peristaltic	27.5	09/10/2020	12:04
MW-05I	MW05I-091020-MS	Metals[1], SVOCs, Low-Level SVOCs	L2037645	MS	Peristaltic	27.5	09/10/2020	12:04
MW-05I	MW05I-091020-MSD	SVOCs, Low-Level SVOCs	L2037645	SD	Peristaltic	27.5	09/10/2020	12:04
MW-06	MW06-091020	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037645	N	Peristaltic	9	09/10/2020	15:52
MW-07	MW07-091020	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037645	N	Peristaltic	8.5	09/10/2020	14:56
MW-10	MW10-091020	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037645	N	Peristaltic	12	09/10/2020	16:40
MW-19	MW19-091020	VOCs, Metals[1], SVOCs, Low-Level SVOCs	L2037645	N	Peristaltic	15.5	09/10/2020	09:50
MW-19	DUP-GW-091020	Metals[1], SVOCs, Low-Level SVOCs	L2037645	FD	Peristaltic	15.5	09/10/2020	09:55
TB	TB-091020	VOCs	L2037645	TB	N/A	N/A	09/10/2020	08:00
PZ-06	PZ06-091020	VOCs, Metals[1], MNA	L2037712	N	Peristaltic	8	09/10/2020	09:10
PZ-06	PZ06-091020-MS	Metals[1], MNA	L2037712	MS	Peristaltic	8	09/10/2020	09:10
MW-24	MW24-091020	Metals[1], MNA	L2037713	N	Peristaltic	12.5	09/10/2020	09:30
MW-24	MW24-091020-MS	MNA	L2037713	MS	Peristaltic	12.5	09/10/2020	09:30
MW-37	MW37-091020	Metals[1], MNA	L2037713	N	Peristaltic	9	09/10/2020	16:00
MW-35	MW35-091120	Metals[1], MNA	L2037896	N	Peristaltic	9	09/11/2020	11:02
MW-35	MW35-091120-MS	Metals[1], MNA	L2037896	MS	Peristaltic	9	09/11/2020	11:02
MW-36	MW36-091120	Metals[1], MNA	L2037896	N	Peristaltic	9	09/11/2020	11:00
MW-36	MW36-091120-MS	MNA	L2037896	MS	Peristaltic	9	09/11/2020	11:00
MW-31	MW31-091720	Metals[1], MNA	L2039067	N	Peristaltic	12	09/17/2020	09:00
MW-31	MW31-091720-MS	Metals[1]	L2039067	MS	Peristaltic	12	09/17/2020	09:00
MW-17	MW17-091720	VOCs, Metals[1], Low-Level SVOCs, PFAS	L2039070	N	Peristaltic	13.5	09/17/2020	11:38
MW-17	MW17-091720-MS	VOCs, PFAS	L2039070	MS	Peristaltic	13.5	09/17/2020	11:38
MW-17	MW17-091720-MSD	VOCs	L2039070	SD	Peristaltic	13.5	09/17/2020	11:38
MW-18	MW18-091720	VOCs, Metals[1], Low-Level SVOCs	L2039070	N	Peristaltic	12	09/17/2020	13:30
MW-26	MW26-091720	VOCs, Metals[1], Low-Level SVOCs	L2039070	N	Peristaltic	14.5	09/17/2020	10:25
MW-26	DUP-GW-091720-2	VOCs, Metals[1], Low-Level SVOCs	L2039070	FD	Peristaltic	14.5	09/17/2020	10:30

Table 2-1. Summary of Groundwater Samples Collected

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sampling Location	Sample Identification	Laboratory Analysis	Sample Delivery Group	Sample Type	Sampling Method	Pump Placement Depth (ft. from TIC)	Sample Date	Sample Time
TW-01	TW01-091720	VOCs, Metals[1], Low-Level SVOCs	L2039070	N	Peristaltic	18	09/17/2020	09:45
TW-01	DUP-GW-091720-1	VOCs	L2039070	FD	Peristaltic	18	09/17/2020	10:00
TB	TB-091720-2	VOCs	L2039070	TB	N/A	N/A	09/17/2020	08:00
FB	FB-091720	PFAS	L2039070	FB	N/A	N/A	09/17/2020	12:00
MW-16I	MW16I-091720	VOCs, Metals[1], Low-Level SVOCs	L2039387	N	Bladder Pump	29	09/17/2020	16:50
MW-16I	DUP-GW-091720-3	VOCs	L2039387	FD	Bladder Pump	29	09/17/2020	17:00
TB	TB-091720	VOCs	L2039387	TB	N/A	N/A	09/17/2020	00:00
FB	FB-091820	VOCs	L2039387	FB	N/A	N/A	09/18/2020	08:15

Notes:

1. All normal environmental samples were analyzed for total and dissolved metals

MNA - Natural Attenuation Parameters, and includes sulfates, nitrates, methane, carbon dioxide, alkalinity, phosphorus, and total organic carbon

PAH - Polycyclic Aromatic Hydrocarbons

PFAS - Per- and Polyfluoroalkyl Substances

VOC - Volatile Organic Compounds

SVOC - Semivolatile Organic Compounds

TOC - Total Organic Carbon

TDS - Total Dissolved Solids

TIC - Top of Inner Casing

TB - Trip Blank

ft = feet

FB - Field Blank

FD - Field Duplicate Sample

N - Normal Environmental Sample

MS - Matrix Spike

SD - Matrix Spike Duplicate

N/A - Not Applicable

TABLE 3-1
Groundwater Elevation Measurements
2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Well Number	Date	Ground Elevation (ft amsl)	Inner Casing Elevation (ft amsl)	Depth to Water (ft from TIC)	Groundwater Elevation (ft amsl)
MW-01	9/3/20	434.03	433.80	5.17	428.63
MW-02	9/3/20	433.33	432.93	4.06	428.87
MW-03	9/3/20	434.44	434.02	2.78	431.24
MW-05I	9/3/20	445.24	444.79	13.12	431.67
MW-06	9/3/20	446.57	446.21	5.31	440.90
MW-07	9/3/20	437.88	437.37	5.21	432.16
MW-09R	9/3/20	434.84	434.40	5.60	428.80
MW-10	9/3/20	445.34	445.06	7.91	437.15
MW-11S	9/3/20	433.52	432.95	13.71	419.24
MW-16I	9/3/20	454.27	455.99	27.03	428.96
MW-17	9/3/20	449.92	452.13	23.01	429.12
MW-18	9/3/20	440.04	442.07	12.80	429.27
MW-19	9/3/20	445.64	445.25	9.65	435.60
MW-20	9/3/20	448.76	448.53	9.91	438.62
MW-21	9/3/20	433.46	433.10	4.00	429.10
MW-23	9/3/20	432.67	432.35	3.61	428.74
MW-24	9/3/20	433.98	433.75	4.55	429.20
MW-25[a]	9/3/20	441.47	441.14	--	--
MW-26	9/3/20	439.29	441.76	12.90	428.86
MW-30	9/3/20	433.38	433.02	4.56	428.46
MW-31	9/3/20	433.13	432.65	3.92	428.73
MW-33	9/3/20	434.29	433.87	0.55	433.32
MW-34	9/3/20	434.36	433.79	2.42	431.37
MW-35	9/3/20	433.60	433.43	2.18	431.25
MW-36	9/3/20	433.26	432.80	1.55	431.25
MW-37	9/3/20	433.32	433.02	1.90	431.12
PZ-01	9/3/20	434.49	434.25	2.98	431.27
PZ-03	9/3/20	434.41	434.06	3.62	430.44
PZ-04	9/3/20	432.73	432.14	3.42	428.72
PZ-06	9/3/20	433.06	432.77	3.51	429.26
PZ-07R	9/3/20	433.07	432.57	4.26	428.31
TW-01	9/3/20	447.33	449.01	17.76	431.25

Notes:

[a] Water level measurements were not collected because the well could not be located.

1. Water level measurements were collected on October 29th through October 31, 2019.
2. All wells were surveyed to the New York Central state plane coordinate system (NAD 1983).

amsl - above mean sea level
bgs - below ground surface
ft - feet

TABLE 3-2. LTMWP Groundwater Sampling Schedule, 2020 to 2025

Sitewide Groundwater Sampling Event Project Instructions

Former Hampshire Chemical Corp., Waterloo, NY

Location	Site Area	2020	2021	2022	2023	2024	2025
MW-01	AOC B	x					x
MW-02	AOC B	x	x	x	x	x	x
MW-03	AOC B	x	x	x	x	x	x
MW-33	AOC B	x	x	x	x	x	x
MW-34	AOC B	x					x
PZ-01	AOC B	x					x
PZ-03	AOC B	x	x	x	x	x	x
PZ-04	AOC B	x	x	x	x	x	x
PZ-06	AOC B	x	x	x	x	x	x
PZ-07R	AOC B	x					x
MW-11S	AOC D	x	x	x	x	x	x
MW-21	AOC D	x	x	x	x	x	x
MW-23	AOC D	x					x
MW-24	AOC D	x					x
MW-30	AOC D	x	x	x	x	x	x
MW-31	AOC D	x	x	x	x	x	x
MW-35	AOC D	x	x	x	x	x	x
MW-36	AOC D	x	x	x	x	x	x
MW-37	AOC D	x					x
MW-06	Suppl.	x	x	x	x	x	x
MW-07	Suppl.	x	x	x	x	x	x
MW-10	Suppl.	x	x	x	x	x	x
MW-19	Suppl.	x	x	x	x	x	x
MW-20	Suppl.	x	x	x	x	x	x
MW-05I	Suppl.	x	x	x	x	x	x
MW-09R	Suppl.	x	x	x	x	x	x
MW-16I	SWMU 1	x	x	x	x	x	x
MW-17	SWMU 1	x	x	x	x	x	x
MW-18	SWMU 1	x	x	x	x	x	x
MW-26	SWMU 1	x	x	x	x	x	x
TW-01	SWMU 1	x	x	x	x	x	x

Table 3-3a. Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-16I		MW-17	MW-18	MW-26		TW-01	
		Sample ID:	MW16I-091720	DUP-GW-091720-3	MW17-091720	MW18-091720	MW26-091720	DUP-GW-091720-2	TW01-091720	DUP-GW-091720-1
		Sample Date:	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
VOC (ug/l)										
1,1,1-Trichloroethane	71-55-6	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1,2-Trichloroethane	79-00-5	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	75-34-3	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1-Dichloroethene	75-35-4	5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,2,3-Trichlorobenzene	87-61-6	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2,4-Trichlorobenzene	120-82-1	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dibromo-3-chloropropane	96-12-8	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dibromoethane	106-93-4	--	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
1,2-Dichlorobenzene	95-50-1	3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethane	107-06-2	0.6	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
1,2-Dichloroethene, cis-	156-59-2	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethene, trans-	156-60-5	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethene, Total	540-59-0	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloropropane	78-87-5	1	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,3-Dichlorobenzene	541-73-1	3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1,3-Dichloropropene, Total	542-75-6	--	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,4-Dichlorobenzene	106-46-7	3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
2-Butanone	78-93-3	50	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
2-Hexanone	591-78-6	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone (MIBK)	108-10-1	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	67-64-1	50	1.5 U	1.5 U	1.5 U	1.5 UJ	1.5 UJ	1.5 UJ	**8.6 J**	**8.8 J**
Benzene	71-43-2	1	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Bromochloromethane	74-97-5	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Bromodichloromethane	75-27-4	50	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Bromoform	75-25-2	50	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
Bromomethane	74-83-9	5	0.7 U	0.7 U	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ
Carbon Disulfide	75-15-0	60	1 UJ	1 UJ	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	56-23-5	5	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chlorobenzene	108-90-7	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Chloroethane	75-00-3	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Chloroform	67-66-3	7	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Chloromethane	74-87-3	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Cyclohexane	110-82-7	--	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Dibromochloromethane	124-48-1	50	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Dichlorodifluoromethane	75-71-8	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Isopropylbenzene	98-82-8	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Methyl Acetate	79-20-9	--	0.23 UJ	0.23 UJ	0.23 U	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ
Methylcyclohexane	108-87-2	--	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene Chloride	75-09-2	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Styrene	100-42-5	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
tert-Butyl Methyl Ether	1634-04-4	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Tetrachloroethene	127-18-4	5	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U

Table 3-3a. Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-16I		MW-17	MW-18	MW-26		TW-01	
		Sample ID:	MW16I-091720	DUP-GW-091720-3	MW17-091720	MW18-091720	MW26-091720	DUP-GW-091720-2	TW01-091720	DUP-GW-091720-1
		Sample Date:	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
Toluene	108-88-3	5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Trichloroethene	79-01-6	5	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Trichlorofluoromethane	75-69-4	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Vinyl Chloride	75-01-4	2	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
Xylene, m- and p-	179601-23-1	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Xylene, o-	95-47-6	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Xylene, Total	1330-20-7	--	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
VOC TICs (ug/l)										
Unknown With Highest Concentration	UNKNOWN1	--	- -	- -	**1.98 N**	**1.97 N**	**1.9 N**	**1.81 N**	**1.98 N**	**2.08 N**
Total Unknown VOCs	TOTAL VOC TICS	--	- -	- -	**1.98 N**	**1.97 N**	**1.9 N**	**1.81 N**	**1.98 N**	**2.08 N**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA), June 1998. Modified January 1999, April 2000, and June 2004.

** - There is no TOGS Class GA Standard for MIBK. Per the NYSDEC (2005), the New York State Department of Health (NYSDOH) guidance value for MIBK

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

MIBK = Methyl Isobutyl Ketone

NJ = The TIC numerical value is an approximate concentration.

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

UN = The analyte is a Tentatively Identified Compound, and was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

VOC = Volatile Organic Compound

Table 3-3b. Groundwater Sampling Results for SWMU 1 — Semivolatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-16I		MW-17	MW-18	MW-26		TW-01	
		Sample ID:	MW16I-091720	DUP-GW-091720-3	MW17-091720	MW18-091720	MW26-091720	DUP-GW-091720-2	TW01-091720	DUP-GW-091720-1
		Sample Date:	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
Low-Level SVOC (ug/l)										
1,4-Dioxane	123-91-1	--	- -	- -	0.0339 U	- -	- -	- -	- -	- -
2-Chloronaphthalene	91-58-7	10	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	- -
2-Methylnaphthalene	91-57-6	--	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	- -
Acenaphthene	83-32-9	20	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	- -
Acenaphthylene	208-96-8	--	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	- -
Anthracene	120-12-7	50	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	- -
Benzo(a)anthracene	56-55-3	0.002	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.03 U	0.02 U	- -
Benzo(a)pyrene	50-32-8	0.002	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.04 U	0.02 U	- -
Benzo(b)fluoranthene	205-99-2	0.002	0.01 U	- -	0.01 U	0.04 U	0.01 U	0.06 U	0.03 U	- -
Benzo(g,h,i)perylene	191-24-2	--	0.01 U	- -	0.01 U	0.07 U	0.01 U	0.03 U	0.03 U	- -
Benzo(k)fluoranthene	207-08-9	0.002	0.01 U	- -	0.01 U	0.04 U	0.01 U	0.02 U	0.01 U	- -
Chrysene	218-01-9	0.002	0.01 U	- -	0.01 U	0.02 U	0.01 U	0.05 U	0.01 U	- -
Dibenzo(a,h)anthracene	53-70-3	--	0.01 U	- -	0.01 U	**0.07 J**	0.01 U	0.01 U	0.01 U	- -
Fluoranthene	206-44-0	50	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	- -
Fluorene	86-73-7	50	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	- -
Indeno(1,2,3-c,d)pyrene	193-39-5	0.002	0.01 U	- -	0.01 U	0.07 U	0.01 U	0.03 U	0.03 U	- -
Naphthalene	91-20-3	10	0.05 U	- -	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	- -
Phenanthrene	85-01-8	50	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	- -
Pyrene	129-00-0	50	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	- -

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA), June 1998. Modified January 1999, April 2000, and June 2004.

Bold indicates the analyte was detected

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

NJ = The TIC numerical value is an approximate concentration.

R = The analyte was analyzed for, but rejected for data quality reasons.

SVOC = Semivolatile Organic Compound

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

ug/l = micrograms per liter

Table 3-3c. Groundwater Sampling Results for SWMU 1 — Metals, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-16I		MW-17	MW-18	MW-26		TW-01	
		Sample ID:	MW16I-091720	DUP-GW-091720-3	MW17-091720	MW18-091720	MW26-091720	DUP-GW-091720-2	TW01-091720	DUP-GW-091720-1
		Sample Date:	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020	09/17/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
Metals (ug/l)										
Aluminum	7429-90-5	--	**76.8**	- -	3.27 U	**248**	3.27 U	3.27 U	**14.7**	- -
Arsenic	7440-38-2	25	**2.92**	- -	**38.57**	**1.32**	**0.59**	**0.53**	**4.66**	- -
Calcium	7440-70-2	--	**107,000**	- -	**134,000**	**142,000**	**67,100**	**62,600**	**165,000**	- -
Iron	7439-89-6	300	11,800 U	- -	**15,500**	**17,100**	**588**	**606**	**52,200**	- -
Magnesium	7439-95-4	35,000	**19,400**	- -	**31,000**	**21,800**	**14,400**	**13,600**	**43,600**	- -
Manganese	7439-96-5	300	**567.8**	- -	**695.4**	**1,022**	**217.8**	**208.8**	**188**	- -
Potassium	7440-09-7	--	**5,300**	- -	**8,180**	**8,190**	**3,570**	**3,320**	**12,100**	- -
Sodium	7440-23-5	20,000	**91,600**	- -	**135,000**	**217,000**	**82,600**	**78,100**	**144,000**	- -
**Metals, Dissolved (ug/l) ** **										
Aluminum, Dissolved	7429-90-5	--	**5.57 J**	- -	**3.85 J**	**3.58 J**	3.27 U	3.27 U	3.27 U	- -
Arsenic, Dissolved	7440-38-2	25	**1.02**	- -	**38.31**	**0.85**	**0.58**	**0.6**	**4.3**	- -
Iron, Dissolved	7439-89-6	300	**9,170**	- -	**15,100**	**15,000**	**535**	**561**	**50,100**	- -
Manganese, Dissolved	7439-96-5	300	**550.1**	- -	**693.7**	**981.9**	**208**	**207.7**	**187.3**	- -

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

** - The TOGS Class GA Standards for total metals were used as screening criteria for dissolved metals

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

Table 3-4a. Groundwater Sampling Results for AOC B — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-01	MW-02		MW-03	MW-33	MW-34	PZ-01	PZ-03		PZ-04	PZ-06	PZ-07R
		Sample ID:	MW01-09020	MW02-090420	DUP-GW-090420	MW03-090320	MW33-090220	MW34-090220	PZ01-090220	PZ03-09020	DUP-GW-09020-1	PZ04-090820	PZ06-091020	PZ07R-090820
		Sample Date:	09/09/2020	09/04/2020	09/04/2020	09/03/2020	09/02/2020	09/03/2020	09/03/2020	09/09/2020	09/09/2020	09/08/2020	09/10/2020	09/08/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***												
VOC (ug/l)														
1,1,1-Trichloroethane	71-55-6	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.17 U	0.17 UJ	- -	0.42 UJ	0.17 UJ	0.17 UJ	0.17 UJ	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1,2-Trichloroethane	79-00-5	1	0.5 U	0.5 U	- -	1.2 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	75-34-3	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,1-Dichloroethene	75-35-4	5	0.17 U	0.17 U	- -	0.42 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U
1,2,3-Trichlorobenzene	87-61-6	--	0.7 U	0.7 UJ	- -	1.8 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 U	0.7 U	0.7 U	0.7 UJ	0.7 U
1,2,4-Trichlorobenzene	120-82-1	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dibromo-3-chloropropane	96-12-8	--	0.7 U	0.7 UJ	- -	1.8 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dibromoethane	106-93-4	--	0.65 U	0.65 U	- -	1.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
1,2-Dichlorobenzene	95-50-1	3	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethane	107-06-2	0.6	0.13 U	0.13 U	- -	0.33 U	0.13 U	0.13 U	0.13 U	**3.8**	**3.8**	0.13 U	0.13 U	0.13 U
1,2-Dichloroethene, cis-	156-59-2	5	0.7 U	0.7 U	- -	**3 J**	**1.9 J**	0.7 U	**2.5**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethene, trans-	156-60-5	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloroethene, Total	540-59-0	--	0.7 U	0.7 U	- -	**3 J**	**1.9 J**	0.7 U	**2.5**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,2-Dichloropropane	78-87-5	1	**0.21 J**	0.14 U	- -	**0.62 J**	**1.1**	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,3-Dichlorobenzene	541-73-1	3	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.14 U	0.14 U	- -	0.36 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.16 U	0.16 U	- -	0.41 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
1,3-Dichloropropene, Total	542-75-6	--	0.14 U	0.14 U	- -	0.36 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U
1,4-Dichlorobenzene	106-46-7	3	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
2-Butanone	78-93-3	50	1.9 U	1.9 UJ	- -	**33 J**	1.9 UJ	1.9 UJ	1.9 UJ	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
2-Hexanone	591-78-6	50	1 UJ	1 UJ	- -	**11 J**	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ
4-Methyl-2-Pentanone (MIBK)	108-10-1	50	1 UJ	1 UJ	- -	**320 J**	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	**1.2 J**
Acetone	67-64-1	50	1.5 U	1.5 UJ	- -	3.6 UJ	**3.6 J**	1.5 UJ	1.5 UJ	**1.7 J**	**1.8 J**	1.5 U	**6.7**	**2.9 J**
Benzene	71-43-2	1	0.16 U	0.16 U	- -	**0.82 J**	**2.5**	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Bromochloromethane	74-97-5	--	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Bromodichloromethane	75-27-4	50	0.19 U	0.19 U	- -	0.48 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
Bromoform	75-25-2	50	0.65 U	0.65 U	- -	1.6 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U
Bromomethane	74-83-9	5	0.7 UJ	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ
Carbon Disulfide	75-15-0	60	1 U	**4.8 J**	- -	2.5 U	**2.1 J**	1 U	1 U	1 U	1 U	**13**	1 U	1 U
Carbon Tetrachloride	56-23-5	5	0.13 U	0.13 U	- -	0.34 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U
Chlorobenzene	108-90-7	5	0.7 U	0.7 U	- -	**4.3 J**	**2.6**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**1.1 J**
Chloroethane	75-00-3	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Chloroform	67-66-3	7	**1.1 J**	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**1.3 J**	0.7 U	0.7 U
Chloromethane	74-87-3	5	0.7 UJ	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ
Cyclohexane	110-82-7	--	0.27 U	0.27 U	- -	0.68 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Dibromochloromethane	124-48-1	50	0.15 U	0.15 U	- -	0.37 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Dichlorodifluoromethane	75-71-8	--	1 U	1 U	- -	2.5 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	100-41-4	5	0.7 U	0.7 U	- -	**3 J**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Isopropylbenzene	98-82-8	--	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Methyl Acetate	79-20-9	--	0.23 UJ	0.23 UJ	- -	0.58 UJ	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ	0.23 U	0.23 UJ
Methylcyclohexane	108-87-2	--	0.4 U	0.4 U	- -	0.99 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Methylene Chloride	75-09-2	5	0.7 U	0.7 U	- -	**3.2 J**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**1.7 J**	0.7 U	0.7 U
Styrene	100-42-5	5	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
tert-Butyl Methyl Ether	1634-04-4	--	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Tetrachloroethene	127-18-4	5	0.18 U	0.18 U	- -	0.45 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U

Table 3-4a. Groundwater Sampling Results for AOC B — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-01	MW-02		MW-03	MW-33	MW-34	PZ-01	PZ-03		PZ-04	PZ-06	PZ-07R
		Sample ID:	MW01-09020	MW02-090420	DUP-GW-090420	MW03-090320	MW33-090220	MW34-090220	PZ01-090220	PZ03-09020	DUP-GW-09020-1	PZ04-090820	PZ06-091020	PZ07R-090820
		Sample Date:	09/09/2020	09/04/2020	09/04/2020	09/03/2020	09/02/2020	09/03/2020	09/03/2020	09/09/2020	09/09/2020	09/08/2020	09/10/2020	09/08/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***												
Toluene	108-88-3	5	0.7 U	0.7 U	- -	**63**	**5.2**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Trichloroethene	79-01-6	5	0.18 U	0.18 U	- -	**0.68 J**	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U
Trichlorofluoromethane	75-69-4	--	0.7 U	0.7 U	- -	1.8 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Vinyl Chloride	75-01-4	2	0.07 U	0.07 U	- -	0.18 U	0.07 U	0.07 U	**0.69 J**	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U
Xylene, m- and p-	179601-23-1	--	0.7 U	0.7 U	- -	**19**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**0.98 J**	0.7 U	0.7 U
Xylene, o-	95-47-6	--	0.7 U	0.7 U	- -	**17**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U
Xylene, Total	1330-20-7	--	0.7 U	0.7 U	- -	**36**	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	**0.98 J**	0.7 U	0.7 U
VOC TICs (ug/l)														
Isopropyl Ether	108-20-3	--	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	**1.04 N**
Unknown With Highest Concentration	UNKNOWN1	--	**2.97 N**	**52.8 N**	- -	**230 N**	**32.9 N**	**4.08 N**	**4.18 N**	**1.29 N**	**1.46 N**	**16.9 N**	**2.26 N**	**4.53 N**
Unknown With Second Highest Concentration	UNKNOWN2	--	- -	**25 N**	- -	**81.9 N**	**14.2 N**	**1.2 N**	**1.14 N**	- -	- -	**4.91 N**	- -	**1.25 N**
Unknown With Third Highest Concentration	UNKNOWN3	--	- -	**13.4 N**	- -	**44.2 N**	**6.38 N**	- -	- -	- -	- -	**4.15 N**	- -	**1.01 N**
Unknown With Fourth Highest Concentration	UNKNOWN4	--	- -	**10.6 N**	- -	**25 N**	**6.04 N**	- -	- -	- -	- -	**4.04 N**	- -	- -
Unknown With Fifth Highest Concentration	UNKNOWN5	--	- -	**8.16 N**	- -	**21.5 N**	**4.6 N**	- -	- -	- -	- -	**3.44 N**	- -	- -
Unknown With Sixth Highest Concentration	UNKNOWN6	--	- -	**7.87 N**	- -	- -	- -	- -	- -	- -	- -	**2.84 N**	- -	- -
Unknown With Seventh Highest Concentration	UNKNOWN7	--	- -	**4.39 N**	- -	- -	- -	- -	- -	- -	- -	**1.54 N**	- -	- -
Unknown With Eighth Highest Concentration	UNKNOWN8	--	- -	**3.72 N**	- -	- -	- -	- -	- -	- -	- -	**1.27 N**	- -	- -
Unknown With Ninth Highest Concentration	UNKNOWN9	--	- -	**3.36 N**	- -	- -	- -	- -	- -	- -	- -	**1.15 N**	- -	- -
Unknown With Tenth Highest Concentration	UNKNOWN10	--	- -	**2.97 N**	- -	- -	- -	- -	- -	- -	- -	**1.11 N**	- -	- -
Total Unknown VOCs	TOTAL VOC TICS	--	**2.97 N**	**132 N**	- -	**851 N**	**90.8 N**	**5.28 N**	**5.32 N**	**1.29 N**	**1.46 N**	**62 N**	**2.26 N**	**7.83 N**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA), June 1998. Modified January 1999, April 2000, and June 2004.

** - There is no TOGS Class GA Standard for MIBK. Per the NYSDEC (2005), the New York State Department of Health (NYSDOH) guidance value for MIBK

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

-- = Not available

AOC = area of concern

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

MIBK = Methyl Isobutyl Ketone

NJ = The TIC numerical value is an approximate concentration.

R = The analyte result was rejected due to quality control issues.

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

UN = The analyte is a Tentatively Identified Compound, and was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

VOC = Volatile Organic Compound

Table 3-4b. Groundwater Sampling Results for AOC B —Metals, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-01	MW-02		MW-03	MW-33	MW-34	PZ-01	PZ-03		PZ-04	PZ-06	PZ-07R
		Sample ID:	MW01-09020	MW02-090420	DUP-GW-090420	MW03-090320	MW33-090220	MW34-090220	PZ01-090220	PZ03-09020	DUP-GW-09020-1	PZ04-090820	PZ06-091020	PZ07R-090820
		Sample Date:	09/09/2020	09/04/2020	09/04/2020	09/03/2020	09/02/2020	09/03/2020	09/03/2020	09/09/2020	09/09/2020	09/08/2020	09/10/2020	09/08/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***												
Metals (ug/l)														
Aluminum	7429-90-5	--	16.4 U	**15.5**	**15**	- -	**43.4**	**43.8**	**182**	16.4 U	- -	80.2 U	**7,830**	69.1 U
Arsenic	7440-38-2	25	**15.74**	**0.5 J**	**0.59 J**	- -	**35.93**	**7.67**	**14.81**	**41.31**	- -	0.82 U	**15.59**	**14.89**
Calcium	7440-70-2	--	**108,000**	**201,000**	**202,000**	- -	**289,000**	**68,200**	**101,000**	**172,000**	- -	**161,000**	**115,000**	**258,000**
Chromium	7440-47-3	50	**1.58 J**	**2.77**	**2.79**	- -	**152.1**	**0.38 J**	**0.49 J**	**0.98 J**	- -	**2.58 J**	**31.46**	**5.33**
Iron	7439-89-6	300	**1,700**	**620**	**586**	- -	**148**	**501**	**2,700**	**1,630**	- -	95.5 U	**16,500**	**2,980**
Magnesium	7439-95-4	35,000	**16,800**	**17,500**	**18,100**	- -	**90,000**	**71,200**	**82,600**	**102,000**	- -	**31,600**	**32,400**	**41,700**
Manganese	7439-96-5	300	**174.2**	**35.72**	**35.73**	- -	**374.3**	**12.83**	**47.41**	**188**	- -	**17.24**	**472.2**	**453.6**
Potassium	7440-09-7	--	**5,020**	**6,940**	**6,980**	- -	**25,300**	**3,350**	**3,930**	**10,300**	- -	**11,800**	**5,190**	**18,100**
Silica	7631-86-9	--	**12,800**	**37,800**	- -	- -	**28,700**	**25,400**	**25,500**	**26,900**	- -	**83,500**	**39,500**	**23,000**
Sodium	7440-23-5	20,000	**328,000**	**653,000**	**659,000**	- -	**1,760,000**	**110,000**	**87,900**	**1,180,000**	- -	**802,000**	**488,000**	**1,620,000**
**Metals, Dissolved (ug/l) ** **														
Aluminum, Dissolved	7429-90-5	--	16.4 U	**6.58 J**	**7.18 J**	- -	**38.2 J**	**3.81 J**	**3.67 J**	16.4 U	- -	16.4 U	**21.8 J**	16.4 U
Arsenic, Dissolved	7440-38-2	25	**11.83**	**0.62 J**	**0.83 J**	- -	**36.7**	**2.99**	**14.59**	**32.04**	- -	0.82 U	**3.69**	**11.89**
Chromium, Dissolved	7440-47-3	50	**1.24 J**	**2.3**	**2.65**	- -	**156.8**	**0.26 J**	**0.32 J**	0.89 U	- -	**2.09 J**	**1 J**	**4.16 J**
Iron, Dissolved	7439-89-6	300	**1,200**	19.1 U	106 U	- -	95.5 U	**483**	**1,690**	**1,490**	- -	95.5 U	**232 J**	**2,840**
Manganese, Dissolved	7439-96-5	300	**178.4**	**28.92**	**32.36**	- -	**412.6**	**12.74**	**28.53**	**151.6**	- -	**13.82**	**22.34**	**388.1**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

** - The TOGS Class GA Standards for total metals were used as screening criteria for dissolved metals

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

- - = Not analyzed

-- = Not available

AOC = area of concern

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

Table 3-4c. Groundwater Sampling Results for AOC B — General Chemistry, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-01	MW-02		MW-03	MW-33	MW-34	PZ-01	PZ-03		PZ-04	PZ-06	PZ-07R
		Sample ID:	MW01-09020	MW02-090420	DUP-GW-090420	MW03-090320	MW33-090220	MW34-090220	PZ01-090220	PZ03-09020	DUP-GW-09020-1	PZ04-090820	PZ06-091020	PZ07R-090820
		Sample Date:	09/09/2020	09/04/2020	09/04/2020	09/03/2020	09/02/2020	09/03/2020	09/03/2020	09/09/2020	09/09/2020	09/08/2020	09/10/2020	09/08/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***												
Wet Chemistry (ug/l)														
Alkalinity, Total	ALK	--	**293,000**	**571,000**	- -	- -	**1,050,000**	**533,000**	**515,000**	**444,000**	- -	**1,150,000**	**716,000**	**848,000**
Ammonia	7664-41-7	--	**652**	**2,250**	- -	- -	**26,900**	**205**	**1,060**	**1,510**	- -	**7,350**	**1,340**	**10,500**
Chloride	16887-00-6	250,000	**472,000**	**437,000**	- -	- -	**2,840,000**	**83,600**	**216,000**	**1,780,000**	- -	**415,000**	**309,000**	**2,000,000**
Nitrate	14797-55-8	--	**23 J**	**88 J**	- -	- -	**57 J**	**340**	**55 J**	**40 J**	- -	**37 J**	**50 J**	**54 J**
Nitrite	14797-65-0	--	14 U	14 U	- -	- -	14 U	**37 J**	**47 J**	**29 J**	- -	14 U	**30 J**	33 U
Nitrogen, Total Kjeldahl	KN	--	**801**	**2,540**	- -	- -	**26,500**	**338**	**1,120 J**	**1,740**	- -	**8,080**	**5,070**	**11,000**
Orthophosphate	PORTHO	--	**5**	**119 J**	- -	- -	**214 J**	**5**	**1 J**	**4 J**	- -	**90 J**	**180 J**	**8**
Phosphorus, Total	7723-14-0	--	**158**	**295**	- -	- -	**484**	**38**	**84**	**126**	- -	**244**	**1,030**	**689**
Sulfate	14808-79-8	250,000	**87,300**	**595,000**	- -	- -	**232,000**	**102,000**	**94,200**	**287,000**	- -	**428,000**	**129,000**	**162,000**
Sulfide	18496-25-8	50	**650**	**35,000**	- -	- -	**44,000 J**	**3,200**	**11,000**	**440**	- -	**26,000**	**1,100**	**18,000**
Total Dissolved Solids	TDS	--	**1,200,000**	**2,300,000**	- -	- -	**5,900,000**	**840,000**	**920,000**	**3,700,000**	- -	**2,600,000**	**1,400,000**	**4,000,000**
Total Organic Carbon	TOC	--	**9,720**	**7,590**	- -	- -	**20,100**	**2,110**	**1,810**	**9,450**	- -	**13,800**	**8,560**	**14,400**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

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-- = Not available

AOC = area of concern

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

Table 3-5a. Groundwater Sampling Results for AOC D — Metals, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-11S	MW-21	MW-23	MW-24	MW-30	MW-31	MW-35	MW-36	MW-37
		Sample ID:	MW11S-090420	MW21-090920	MW23-090920	MW24-091020	MW30-090420	MW31-091720	MW35-091120	MW36-091120	MW37-091020
		Sample Date:	09/04/2020	09/09/2020	09/09/2020	09/10/2020	09/04/2020	09/17/2020	09/11/2020	09/11/2020	09/10/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
Low-Level SVOC (ug/l)											
1,4-Dioxane	123-91-1	--	**0.856**	- -	- -	- -	**0.155**	- -	- -	- -	- -
Metals (ug/l)											
Aluminum	7429-90-5	--	**15.5**	**1,200 J**	**59.1**	**53**	**57.8**	**1,270**	**23.8**	**73.8**	**734**
Arsenic	7440-38-2	25	**1,037**	**2,178 J**	**58.78**	**6.32**	**2.87**	**85.88**	**127.5**	**10.63**	**2.08 J**
Calcium	7440-70-2	--	**9,150**	**1,880 J**	**202,000**	**171,000**	**47,300**	**18,900**	**92,900**	**142,000**	**177,000**
Iron	7439-89-6	300	**248**	**362 J**	**648**	**7,060**	**202**	6,540 U	4,040 U	1,470 U	**1,350**
Magnesium	7439-95-4	35,000	**11,300**	**1,860 J**	**23,100**	**67,100**	**22,900**	**8,100**	**73,000**	**81,800**	**69,000**
Manganese	7439-96-5	300	**29.52**	**6.21 J**	**161.7**	**247.2**	**35.77**	**44.41**	**27.42**	**153.8**	**352.4**
Potassium	7440-09-7	--	**2,220**	**2,820 J**	**12,700**	**8,110**	**9,610**	**17,900**	**5,570**	**4,320**	**7,770**
Silica	7631-86-9	--	**18,800**	**18,700 J**	**48,600**	**33,700**	**28,800**	**51,800**	**22,800**	**20,800**	**22,200**
Sodium	7440-23-5	20,000	**556,000**	**5,640,000 J**	**1,080,000**	**884,000**	**657,000**	**5,310,000**	**238,000**	**244,000**	**773,000**
Metals, Dissolved (ug/l) ****											
Aluminum, Dissolved	7429-90-5	--	16.4 U	**1,220 J**	**21.6 J**	16.4 U	**18.9 J**	**918**	**10.5**	3.27 U	**18 J**
Arsenic, Dissolved	7440-38-2	25	**1,031**	**1,892 J**	**57.24**	**4.11**	**2.36 J**	**81.06**	**118.3**	**8**	**1.7 J**
Iron, Dissolved	7439-89-6	300	95.5 U	**335 J**	95.5 U	**6,690**	**121 J**	5,000 U	3,490 U	1,050 U	**288 J**
Manganese, Dissolved	7439-96-5	300	**29.66**	**6.31 J**	**168.1**	**236**	**38.77**	**20.35**	**28.82**	**170.9**	**284.6**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

** - The TOGS Class GA Standards for total metals were used as screening criteria for dissolved metals

Bold indicates the analyte was detected

- - = Not analyzed

-- = Not available

AOC = area of concern

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

Table 3-5b. Groundwater Sampling Results for AOC D — General Chemistry, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-11S	MW-21	MW-23	MW-24	MW-30	MW-31	MW-35	MW-36	MW-37
		Sample ID:	MW11S-090420	MW21-090920	MW23-090920	MW24-091020	MW30-090420	MW31-091720	MW35-091120	MW36-091120	MW37-091020
		Sample Date:	09/04/2020	09/09/2020	09/09/2020	09/10/2020	09/04/2020	09/17/2020	09/11/2020	09/11/2020	09/10/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
Wet Chemistry (ug/l)											
Alkalinity, Total	ALK	--	**417,000**	**10,500,000**	**1,110,000**	**1,100,000**	**518,000**	**4,540,000**	**446,000**	**330,000**	**288,000**
Ammonia	7664-41-7	--	**325**	**14,100 J**	**4,680**	**2,660**	**679**	6,680 U	**270**	**152**	**283**
Chloride	16887-00-6	250,000	**532,000**	**338,000**	**339,000**	**399,000**	**399,000**	**665,000**	**230,000**	**648,000**	**852,000**
Nitrate	14797-55-8	--	**62 J**	230 U	23 U	**100**	23 U	230 U	**46 J**	23 U	**62 J**
Nitrite	14797-65-0	--	**29 J**	**200 J**	14 U	14 U	14 U	**420 J**	- -	- -	**29 J**
Nitrogen, Total Kjeldahl	KN	--	**470**	**49,700 J**	**6,720**	**3,130**	**1,120**	**12,300**	395 U	247 U	**1,120**
Orthophosphate	PORTHO	--	**231**	**16,200**	**1,150**	1 U	**271**	**6,130 J**	2 U	2 U	1 U
Phosphorus, Total	7723-14-0	--	**549**	**15,500 J**	**1,190**	**917**	**301**	**7,330**	**61**	**12**	**51**
Sulfate	14808-79-8	250,000	**237,000**	**598,000**	**1,430,000**	**1,010,000**	**590,000**	**398,000**	**239,000**	**238,000 J**	**746,000**
Sulfide	18496-25-8	50	**730**	**10,000**	**19,000**	**450**	**3,100**	**3,900**	100 U	100 U	100 U
Total Dissolved Solids	TDS	--	**1,600,000**	**13,000,000**	**3,700,000**	**3,300,000**	**2,100,000**	**6,600,000**	**1,200,000**	**1,400,000**	**2,800,000**
Total Organic Carbon	TOC	--	**1,420**	**195,000**	**16,000**	**16,400**	**6,990**	**84,600**	**1,550**	**770**	**5,200**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

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Shading indicates the result exceeded screening criteria

-- = Not available

AOC = area of concern

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

Table 3-6a. Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-05I	MW-06	MW-07	MW-09R		MW-10	MW-19		MW-20
		Sample ID:	MW05I-091020	MW06-091020	MW07-091020	MW09R-090920	DUP-GW-090920-2	MW10-091020	MW19-091020	DUP-GW-091020	MW20-090420
		Sample Date:	09/10/2020	09/10/2020	09/10/2020	09/09/2020	09/09/2020	09/10/2020	09/10/2020	09/10/2020	09/04/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
VOC (ug/l)											
1,1,1-Trichloroethane	71-55-6	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.17 U	0.17 U	0.17 U	0.17 U	- -	0.17 U	0.17 U	- -	0.17 UJ
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,1,2-Trichloroethane	79-00-5	1	0.5 U	0.5 U	0.5 U	0.5 U	- -	0.5 U	0.5 U	- -	0.5 U
1,1-Dichloroethane	75-34-3	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,1-Dichloroethene	75-35-4	5	0.17 U	0.17 U	0.17 U	0.17 U	- -	0.17 U	0.17 U	- -	0.17 U
1,2,3-Trichlorobenzene	87-61-6	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 UJ
1,2,4-Trichlorobenzene	120-82-1	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,2-Dibromo-3-chloropropane	96-12-8	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 UJ
1,2-Dibromoethane	106-93-4	--	0.65 U	0.65 U	0.65 U	0.65 U	- -	0.65 U	0.65 U	- -	0.65 U
1,2-Dichlorobenzene	95-50-1	3	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,2-Dichloroethane	107-06-2	0.6	0.13 U	0.13 U	0.13 U	0.13 U	- -	0.13 U	0.13 U	- -	0.13 U
1,2-Dichloroethene, cis-	156-59-2	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	**4.3**	- -	0.7 U
1,2-Dichloroethene, trans-	156-60-5	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	**6**	- -	0.7 U
1,2-Dichloroethene, Total	540-59-0	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	**10**	- -	0.7 U
1,2-Dichloropropane	78-87-5	1	0.14 U	0.14 U	0.14 U	0.14 U	- -	0.14 U	0.14 U	- -	0.14 U
1,3-Dichlorobenzene	541-73-1	3	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.14 U	0.14 U	0.14 U	0.14 U	- -	0.14 U	0.14 U	- -	0.14 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.16 U	0.16 U	0.16 U	0.16 U	- -	0.16 U	0.16 U	- -	0.16 U
1,3-Dichloropropene, Total	542-75-6	--	0.14 U	0.14 U	0.14 U	0.14 U	- -	0.14 U	0.14 U	- -	0.14 U
1,4-Dichlorobenzene	106-46-7	3	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
2-Butanone	78-93-3	50	1.9 U	1.9 U	1.9 U	1.9 U	- -	1.9 U	1.9 U	- -	1.9 UJ
2-Hexanone	591-78-6	50	1 UJ	1 UJ	1 UJ	1 UJ	- -	1 UJ	1 UJ	- -	1 UJ
4-Methyl-2-Pentanone (MIBK)	108-10-1	50	1 UJ	1 UJ	1 UJ	1 UJ	- -	1 UJ	1 UJ	- -	1 UJ
1,4-Dioxane	123-91-1	--	61 U	61 U	61 U	61 U	- -	61 U	61 U	- -	- -[1]
Acetone	67-64-1	50	1.5 U	1.5 U	1.5 U	1.5 U	- -	**2.6 J**	1.5 U	- -	1.5 UJ
Benzene	71-43-2	1	0.16 U	0.16 U	0.16 U	0.16 U	- -	0.16 U	0.16 U	- -	0.16 U
Bromochloromethane	74-97-5	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Bromodichloromethane	75-27-4	50	0.19 U	0.19 U	0.19 U	0.19 U	- -	0.19 U	0.19 U	- -	0.19 U
Bromoform	75-25-2	50	0.65 U	0.65 U	0.65 U	0.65 U	- -	0.65 U	0.65 U	- -	0.65 U
Bromomethane	74-83-9	5	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	- -	0.7 UJ	0.7 UJ	- -	0.7 U
Carbon Disulfide	75-15-0	60	1 U	1 U	1 U	1 U	- -	1 U	1 U	- -	1 U
Carbon Tetrachloride	56-23-5	5	0.13 U	0.13 U	0.13 U	0.13 U	- -	0.13 U	0.13 U	- -	0.13 U
Chlorobenzene	108-90-7	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Chloroethane	75-00-3	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Chloroform	67-66-3	7	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Chloromethane	74-87-3	5	0.7 UJ	0.7 UJ	0.7 UJ	0.7 UJ	- -	0.7 UJ	0.7 UJ	- -	0.7 U
Cyclohexane	110-82-7	--	0.27 U	0.27 U	0.27 U	0.27 U	- -	0.27 U	0.27 U	- -	0.27 U
Dibromochloromethane	124-48-1	50	0.15 U	0.15 U	0.15 U	0.15 U	- -	0.15 U	0.15 U	- -	0.15 U
Dichlorodifluoromethane	75-71-8	--	1 U	1 U	1 U	1 U	- -	1 U	**14**	- -	1 U
Ethylbenzene	100-41-4	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Isopropylbenzene	98-82-8	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Methyl Acetate	79-20-9	--	0.23 UJ	0.23 UJ	0.23 UJ	0.23 UJ	- -	0.23 UJ	0.23 UJ	- -	0.23 UJ
Methylcyclohexane	108-87-2	--	0.4 U	0.4 U	0.4 U	0.4 U	- -	0.4 U	0.4 U	- -	0.4 U
Methylene Chloride	75-09-2	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Styrene	100-42-5	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
tert-Butyl Methyl Ether	1634-04-4	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U

Table 3-6a. Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-05I	MW-06	MW-07	MW-09R		MW-10	MW-19		MW-20
		Sample ID:	MW05I-091020	MW06-091020	MW07-091020	MW09R-090920	DUP-GW-090920-2	MW10-091020	MW19-091020	DUP-GW-091020	MW20-090420
		Sample Date:	09/10/2020	09/10/2020	09/10/2020	09/09/2020	09/09/2020	09/10/2020	09/10/2020	09/10/2020	09/04/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
Tetrachloroethene	127-18-4	5	0.18 U	0.18 U	0.18 U	0.18 U	- -	0.18 U	0.18 U	- -	0.18 U
Toluene	108-88-3	5	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Trichloroethene	79-01-6	5	0.18 U	0.18 U	0.18 U	0.18 U	- -	0.18 U	**0.38 J**	- -	0.18 U
Trichlorofluoromethane	75-69-4	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Vinyl Chloride	75-01-4	2	0.07 U	0.07 U	0.07 U	0.07 U	- -	0.07 U	**0.42 J**	- -	0.07 U
Xylene, m- and p-	179601-23-1	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Xylene, o-	95-47-6	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
Xylene, Total	1330-20-7	--	0.7 U	0.7 U	0.7 U	0.7 U	- -	0.7 U	0.7 U	- -	0.7 U
VOC TICs (ug/l)											
Sulfur Dioxide	7446-09-5	--	- -	- -	**2.76 N**	- -	- -	**2.09 N**	- -	- -	- -
Unknown With Highest Concentration	UNKNOWN1	--	**4.6 N**	**3.76 N**	- -	**20.3 N**	- -	- -	**1.66 N**	- -	**3.68 N**
Unknown With Second Highest Concentration	UNKNOWN2	--	- -	- -	- -	**1.64 N**	- -	- -	- -	- -	- -
Total Unknown VOCs	TOTAL VOC TICS	--	**4.6 N**	**3.76 N**	**2.76 N**	**21.9 N**	- -	**2.09 N**	**1.66 N**	- -	**3.68 N**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA), June 1998. Modified January 1999, April 2000, and June 2004.

** - There is no TOGS Class GA Standard for MIBK. Per the NYSDEC (2005), the New York State Department of Health (NYSDOH) guidance value for MIBK

1) 1,4-dioxane for the MW-20 sample was analyzed by Method 8270D SIM isotope dilution and is reported with the low-level SVOCs in Table 3-6b

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

MIBK = Methyl Isobutyl Ketone

NJ = The TIC numerical value is an approximate concentration.

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

UN = The analyte is a Tentatively Identified Compound, and was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

VOC = Volatile Organic Compound

Table 3-6b. Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-05I	MW-06	MW-07	MW-09R		MW-10	MW-19		MW-20
		Sample ID:	MW05I-091020	MW06-091020	MW07-091020	MW09R-090920	DUP-GW-090920-2	MW10-091020	MW19-091020	DUP-GW-091020	MW20-090420
		Sample Date:	09/10/2020	09/10/2020	09/10/2020	09/09/2020	09/09/2020	09/10/2020	09/10/2020	09/10/2020	09/04/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
SVOC (ug/l)											
1,1'-Biphenyl	92-52-4	--	0.46 U	0.46 U	0.46 U	0.46 U	- -	0.46 U	0.46 U	0.46 U	0.46 U
2,4,5-Trichlorophenol	95-95-4	--	0.77 U	0.77 U	0.77 U	0.77 U	- -	0.77 U	0.77 U	0.77 U	0.77 U
2,4,6-Trichlorophenol	88-06-2	--	0.61 U	0.61 U	0.61 U	0.61 U	- -	0.61 U	0.61 U	0.61 U	0.61 U
2,4-Dichlorophenol	120-83-2	5	0.41 U	0.41 U	0.41 U	0.41 U	- -	0.41 U	0.41 U	0.41 U	0.41 U
2,4-Dimethylphenol	105-67-9	50	1.8 U	1.8 U	1.8 U	1.8 U	- -	1.8 U	1.8 U	1.8 U	1.8 U
2,4-Dinitrophenol	51-28-5	1	6.6 U	6.6 U	6.6 U	6.6 U	- -	6.6 U	6.6 U	6.6 U	6.6 U
2,4-Dinitrotoluene	121-14-2	5	1.2 U	1.2 U	1.2 U	1.2 U	- -	1.2 U	1.2 U	1.2 U	1.2 U
2,6-Dinitrotoluene	606-20-2	5	0.93 U	0.93 U	0.93 U	0.93 U	- -	0.93 U	0.93 U	0.93 U	0.93 U
2-Chlorophenol	95-57-8	--	0.48 U	0.48 U	0.48 U	0.48 U	- -	0.48 U	0.48 U	0.48 U	0.48 U
2-Nitroaniline	88-74-4	5	0.5 U	0.5 U	0.5 U	0.5 U	- -	0.5 U	0.5 U	0.5 U	0.5 U
2-Nitrophenol	88-75-5	--	0.85 U	0.85 U	0.85 U	0.85 U	- -	0.85 U	0.85 U	0.85 U	0.85 U
3,3'-Dichlorobenzidine	91-94-1	5	1.6 U	1.6 U	1.6 U	1.6 U	- -	1.6 U	1.6 U	1.6 U	1.6 U
3-Nitroaniline	99-09-2	5	0.81 U	0.81 U	0.81 U	0.81 U	- -	0.81 U	0.81 U	0.81 U	0.81 U
4-Bromophenyl Phenyl Ether	101-55-3	--	0.38 U	0.38 U	0.38 U	0.38 U	- -	0.38 U	0.38 U	0.38 U	0.38 U
4-Chloroaniline	106-47-8	5	1.1 U	1.1 U	1.1 U	1.1 U	- -	1.1 U	1.1 U	1.1 U	1.1 U
4-Nitrophenol	100-02-7	--	0.67 U	0.67 U	0.67 U	0.67 U	- -	0.67 U	0.67 U	0.67 U	0.67 U
Benzoic Acid	65-85-0	--	2.6 R	2.6 R	2.6 R	2.6 R	- -	2.6 R	2.6 R	2.6 R	2.6 U
Benzyl Alcohol	100-51-6	--	0.59 U	0.59 U	0.59 U	0.59 U	- -	0.59 U	0.59 U	0.59 U	0.59 U
Bis (2-Chloroethoxy) Methane	111-91-1	5	0.5 U	0.5 U	0.5 U	0.5 U	- -	0.5 U	0.5 U	0.5 U	0.5 U
Bis (2-Chloroethyl) Ether	111-44-4	1	0.5 U	0.5 U	0.5 U	0.5 U	- -	0.5 U	0.5 U	0.5 U	0.5 U
Bis (2-Ethylhexyl) Phthalate	117-81-7	5	1.5 UJ	1.5 UJ	1.5 UJ	1.5 U	- -	1.5 UJ	1.5 UJ	1.5 UJ	1.5 U
Butyl Benzyl Phthalate	85-68-7	50	1.2 U	1.2 U	1.2 U	1.2 U	- -	1.2 U	1.2 U	1.2 U	1.2 U
Carbazole	86-74-8	--	0.49 U	0.49 U	0.49 U	0.49 U	- -	0.49 U	0.49 U	0.49 U	0.49 U
Dibenzofuran	132-64-9	--	0.5 U	0.5 U	0.5 U	0.5 U	- -	0.5 U	0.5 U	0.5 U	0.5 U
Diethylphthalate	84-66-2	50	0.38 U	0.38 U	0.38 U	0.38 U	- -	0.38 U	**0.54 J**	**0.52 J**	0.38 U
Dimethylphthalate	131-11-3	50	1.8 U	1.8 U	1.8 U	1.8 UJ	- -	1.8 U	1.8 U	1.8 U	1.8 U
Di-n-Butylphthalate	84-74-2	50	0.39 U	0.39 U	0.66 U	0.39 U	- -	0.39 U	0.39 U	0.39 U	0.39 U
Di-n-Octylphthalate	117-84-0	50	1.3 U	1.3 U	1.3 U	1.3 U	- -	1.3 U	1.3 U	1.3 U	1.3 U
Hexachlorocyclopentadiene	77-47-4	5	0.69 U	0.69 U	0.69 U	0.69 U	- -	0.69 U	0.69 U	0.69 U	0.69 U
Isophorone	78-59-1	50	1.2 UJ	1.2 UJ	1.2 UJ	1.2 U	- -	1.2 UJ	1.2 UJ	1.2 UJ	1.2 U
Methylphenol, 2-	95-48-7	--	0.49 U	0.49 U	0.49 U	0.49 U	- -	0.49 U	0.49 U	0.49 U	0.49 U
Methylphenol, 3- and 4-	65794-96-9	--	0.48 U	0.48 U	0.48 U	0.48 U	- -	0.48 U	0.48 U	0.48 U	0.48 U
Nitrobenzene	98-95-3	0.4	0.77 U	0.77 U	0.77 U	0.77 U	- -	0.77 U	0.77 U	0.77 U	0.77 U
Nitrosodiphenylamine, n-	86-30-6	50	0.42 U	0.42 U	0.42 U	0.42 U	- -	0.42 U	0.42 U	0.42 U	0.42 U
Phenol	108-95-2	1	0.57 U	0.57 U	0.57 U	0.57 U	- -	0.57 U	0.57 U	0.57 U	0.57 U
Low-Level SVOC (ug/l)											
1,4-Dioxane	123-91-1	--	- -	- -	- -	- -	- -	- -	- -	- -	0.0339 U
2-Chloronaphthalene	91-58-7	10	0.02 U	0.02 U	0.02 U	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U
2-Methylnaphthalene	91-57-6	--	0.02 U	0.02 U	0.02 U	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U
Acenaphthene	83-32-9	20	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	**0.04 J**	**0.03 J**	0.01 U
Acenaphthylene	208-96-8	--	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Anthracene	120-12-7	50	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	**0.02 J**	0.01 U	0.01 U
Benzo(a)anthracene	56-55-3	0.002	0.02 U	0.02 U	0.02 U	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	50-32-8	0.002	0.02 U	0.02 U	0.02 U	0.02 U	- -	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(b)fluoranthene	205-99-2	0.002	0.01 U	0.01 U	**0.02 J**	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	191-24-2	--	0.01 U	0.01 U	**0.02 J**	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene	207-08-9	0.002	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U

Table 3-6b. Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-05I	MW-06	MW-07	MW-09R		MW-10	MW-19		MW-20
		Sample ID:	MW05I-091020	MW06-091020	MW07-091020	MW09R-090920	DUP-GW-090920-2	MW10-091020	MW19-091020	DUP-GW-091020	MW20-090420
		Sample Date:	09/10/2020	09/10/2020	09/10/2020	09/09/2020	09/09/2020	09/10/2020	09/10/2020	09/10/2020	09/04/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
Chrysene	218-01-9	0.002	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Dibenzo(a,h)anthracene	53-70-3	--	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	206-44-0	50	**0.04 J**	0.02 U	**0.02 J**	0.02 U	- -	**0.02 J**	**0.23 J**	**0.14**	0.02 U
Fluorene	86-73-7	50	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	**0.02 J**	0.01 U	0.01 U
Hexachlorobenzene	118-74-1	0.04	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Hexachlorobutadiene	87-68-3	0.5	0.05 U	0.05 U	0.05 U	0.05 U	- -	0.05 U	0.05 U	0.05 U	0.05 U
Hexachloroethane	67-72-1	5	0.06 U	0.06 U	0.06 U	0.06 U	- -	0.06 U	0.06 U	0.06 U	0.06 U
Indeno(1,2,3-c,d)pyrene	193-39-5	0.002	0.01 U	0.01 U	**0.02 J**	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Naphthalene	91-20-3	10	0.05 U	0.05 U	0.05 U	0.05 U	- -	0.05 U	0.05 U	0.05 U	0.05 U
Pentachlorophenol	87-86-5	1	0.01 U	0.01 U	0.01 U	0.01 U	- -	0.01 U	0.01 U	0.01 U	0.01 U
Phenanthrene	85-01-8	50	**0.04 J**	**0.04 J**	**0.03 J**	0.02 U	- -	**0.04 J**	**0.03 J**	0.02 U	0.03 U
Pyrene	129-00-0	50	**0.03 J**	0.02 U	**0.02 J**	0.02 U	- -	**0.02 J**	**0.17 J**	**0.1 J**	0.02 U
SVOC TICs (ug/l)											
Cyclic Octaatomic Sulfur	10544-50-0	--	- -	- -	- -	**111 N**	- -	**1.45 N**	- -	- -	- -
Unknown With Highest Concentration	UNKNOWN1	--	**3.05 N**	**3.74 N**	**3.93 N**	**759 N**	- -	**3.31 N**	**2.25 N**	**2.58 N**	**27.3 N**
Unknown With Second Highest Concentration	UNKNOWN2	--	- -	- -	**1.64 N**	**71.3 N**	- -	- -	- -	**2.29 N**	**14.5 N**
Unknown With Third Highest Concentration	UNKNOWN3	--	- -	- -	**1.49 N**	**20.1 N**	- -	- -	- -	**2.18 N**	- -
Unknown With Fourth Highest Concentration	UNKNOWN4	--	- -	- -	- -	**14.2 N**	- -	- -	- -	**1.85 N**	- -
Unknown With Fifth Highest Concentration	UNKNOWN5	--	- -	- -	- -	- -	- -	- -	- -	**1.78 N**	- -
Total Unknown SVOCs	ADR-01-001	--	**4.83 N**	**9.52 N**	**12.9 N**	**989 N**	- -	**15 N**	**4.39 N**	**15.3 N**	**59.3 N**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA), June 1998. Modified January 1999, April 2000, and June 2004.

Bold indicates the analyte was detected

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

NJ = The TIC numerical value is an approximate concentration.

R = The analyte was analyzed for, but rejected for data quality reasons.

SVOC = Semivolatile Organic Compound

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

UJ = The analyte was below the reported sample quantitation limit. However, the reported value is approximate.

ug/l = micrograms per liter

Table 3-6c. Groundwater Sampling Results for Supplemental Wells — Metals, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-05I	MW-06	MW-07	MW-09R		MW-10	MW-19		MW-20
		Sample ID:	MW05I-091020	MW06-091020	MW07-091020	MW09R-090920	DUP-GW-090920-2	MW10-091020	MW19-091020	DUP-GW-091020	MW20-090420
		Sample Date:	09/10/2020	09/10/2020	09/10/2020	09/09/2020	09/09/2020	09/10/2020	09/10/2020	09/10/2020	09/04/2020
Analyte	**CAS#**	**TOGS 1.1.1 GA***									
Metals (ug/l)											
Aluminum	7429-90-5	--	**7.72 J**	**40.2**	**70.8**	**26.6 J**	**29.2 J**	**1,580**	**26.4**	**32.1**	**149**
Arsenic	7440-38-2	25	**0.86**	**0.47 J**	**1.68**	**5.47**	**5.03**	**2**	**6.25**	**6.33**	0.61 U
Calcium	7440-70-2	--	**66,600**	**133,000**	**100,000**	**246,000**	**248,000**	**132,000**	**141,000**	**139,000**	**118,000**
Iron	7439-89-6	300	63.9 U	74.6 U	160 U	**2,520**	**2,480**	**1,820**	**2,420**	**2,360**	**305**
Magnesium	7439-95-4	35,000	**18,600**	**29,400**	**15,600**	**102,000**	**105,000**	**31,800**	**49,300**	**49,000**	**36,100**
Manganese	7439-96-5	300	**55.97**	**164.4**	**331.9**	**443.9**	**447.5**	**128.5**	**701.4**	**691.9**	**23.1**
Potassium	7440-09-7	--	**3,440**	**2,300**	**4,270**	**8,020**	**8,090**	**2,420**	**1,340**	**1,360**	**2,950**
Sodium	7440-23-5	20,000	**80,500**	**53,200**	**522,000**	**569,000**	**577,000**	**261,000**	**116,000**	**116,000**	**24,800**
Metals, Dissolved (ug/l) **											
Aluminum, Dissolved	7429-90-5	--	**3.36 J**	3.27 U	16.4 U	16.4 U	16.4 U	**8.66 J**	3.27 U	3.27 U	**3.46 J**
Arsenic, Dissolved	7440-38-2	25	**0.86**	**0.49 J**	**1.86 J**	**4.9**	**4.51**	**0.93**	**6.21**	**6.21**	0.41 U
Iron, Dissolved	7439-89-6	300	51 U	40.6 U	157 U	**2,600**	**2,340**	43 U	**2,290**	**2,300**	19.1 U
Manganese, Dissolved	7439-96-5	300	**56.18**	**152.2**	**350.8**	**472.4**	**451.6**	**113.8**	**671.5**	**687.5**	**2.55**

Notes:

* - Technical & Operational Guidance Series (TOGS) 1.1.1, New York State Ambient Water Quality Standards and Guidance Values, and Ground Water Effluent Limitations (Class GA). June 1998; modified January 1999; modified April 2000; modified June 2004.

** - The TOGS Class GA Standards for total metals were used as screening criteria for dissolved metals

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

Table 3-7. Groundwater Sampling Results for PFAS and 1,4-Dioxane, September 2020

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

		Location:	MW-02		MW-11S	MW-17	MW-20	MW-30	PZ-01
		Sample ID:	MW02-090420	DUP-GW-090420	MW11S-090420	MW17-091720	MW20-090420	MW30-090420	PZ01-090220
		Sample Date:	09/04/2020	09/04/2020	09/04/2020	09/17/2020	09/04/2020	09/04/2020	09/03/2020
Analyte		**CAS#**							
PFAS (ng/L)	**MCL[1] (ng/L)**								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	--	27619-97-2	**12.9**	**11.3**	**14.5 J**	1.37 U	13.3 U	**15.8 J**	1.31 U
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	--	39108-34-4	**2.92 J**	**2.8 J**	1.2 U	1.24 U	12.1 U	1.19 U	1.19 U
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	--	2991-50-6	0.811 U	0.809 U	0.794 U	0.826 U	8.04 U	0.79 U	0.79 U
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	--	2355-31-9	0.653 U	0.652 U	0.64 U	0.666 U	6.48 U	0.637 U	0.636 U
Perfluorobutane sulfonic acid (PFBS)	--	375-73-5	**1.45 J**	**1.77 J**	0.235 U	**0.732 J**	2.38 U	**1.2 J**	0.234 U
Perfluorobutanoic acid (PFBA)	--	375-22-4	**28**	**28**	**1.9 J**	**4.89**	4.08 U	**6.15**	**0.888 J**
Perfluorodecane sulfonic acid (PFDS)	--	335-77-3	0.988 U	0.986 U	0.968 U	1.01 U	9.8 U	0.963 U	0.962 U
Perfluorodecanoic acid (PFDA)	--	335-76-2	**2.41**	**2.31**	0.3 U	0.312 U	3.04 U	0.299 U	0.298 U
Perfluorododecanoic acid (PFDoDA)	--	307-55-1	0.375 U	0.374 U	0.368 U	0.382 U	3.72 U	0.365 U	0.365 U
Perfluoroheptane sulfonate (PFHpS)	--	375-92-8	0.694 U	0.692 U	0.68 U	0.707 U	6.88 U	0.676 U	0.676 U
Perfluoroheptanoic acid (PFHpA)	--	375-85-9	**22**	**22.5**	**0.288 J**	**0.896 J**	2.25 U	**1.94 J**	0.221 U
Perfluorohexane sulfonic acid (PFHxS)	--	355-46-4	0.379 U	0.378 U	0.371 U	**1.95 J**	3.76 U	**0.9 J**	0.369 U
Perfluorohexanoic acid (PFHxA)	--	307-24-4	**35.1**	**36.3**	**1 J**	**1.69 J**	3.28 U	**3.08**	0.464 U
Perfluorononanoic acid (PFNA)	--	375-95-1	**4.18**	**4.26**	0.308 U	**0.415 J**	3.12 U	**0.538 J**	0.306 U
Perfluorooctane sulfonamide (FOSA)	--	754-91-6	0.585 U	0.584 U	0.573 U	0.596 U	5.8 U	0.57 U	0.57 U
Perfluorooctane sulfonic acid (PFOS)	--	1763-23-1	**4.58 J**	**5.22 J**	**0.577 J**	**4.34**	5.04 U	**8.82 J**	0.495 U
Perfluorooctanoic acid (PFOA)	--	335-67-1	**14.8**	**15.2**	**2.42**	**3.19**	**18.2 J**	**7.2**	0.232 U
Perfluoropentanoic acid (PFPeA)	--	2706-90-3	**82.4**	**85.6**	**1.12 J**	**2.13**	3.96 U	**3.62**	0.389 U
Perfluorotetradecanoic acid (PFTeDA)	--	376-06-7	0.25 U	0.25 U	0.245 U	0.255 U	2.48 U	0.244 U	0.244 U
Perfluorotridecanoic acid (PFTrDA)	--	72629-94-8	0.33 U	0.329 U	0.323 U	0.336 U	3.27 U	0.321 U	0.321 U
Perfluoroundecanoic acid (PFUnDA)	--	2058-94-8	**0.468 J**	**0.467 J**	0.257 U	0.267 U	2.6 U	0.255 U	0.255 U
Sum of PFAS (PFOS + PFOA)	10	SUMPFOSPFOA	**19.4**	**20.4**	**3 J**	**7.53**	**18.2 J**	**16**	0.232 U
1,4-Dioxane (µg/l)	**MCL[1] (µg/L)**								
1,4-Dioxane	1	123-91-1	**0.0795 J**	**0.0666 J**	**0.856**	0.0339 U	0.0339 U	**0.155**	**0.322**

Notes:

1) New York State maximum contaminant level for drinking water systems used for screening purposes until development of AWQS criteria.

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

-- = Not available

PFAS = Per- and Polyfluoroalkyl Substances

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

µg/L = micrograms per liter

ng/L = nanograms per liter

Table 3-8. Summary of QA/QC Water Sample Results

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

	Sample ID:	TB-09020	TB-090220	TB-090420	TB-090820	TB-091020	TB-091720	TB-091720-2	FB-090320	FB-090420	FB-091720	FB-091820
	Sample Date:	09/09/2020	09/02/2020	09/04/2020	09/08/2020	09/10/2020	09/17/2020	09/17/2020	09/03/2020	09/04/2020	09/17/2020	09/18/2020
Analyte	**CAS#**											
VOC (µg/l)												
1,1,1-Trichloroethane	71-55-6	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,1,2,2-Tetrachloroethane	79-34-5	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	- -	- -	- -	0.17 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,1,2-Trichloroethane	79-00-5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	- -	- -	- -	0.5 U
1,1-Dichloroethane	75-34-3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,1-Dichloroethene	75-35-4	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	- -	- -	- -	0.17 U
1,2,3-Trichlorobenzene	87-61-6	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2,4-Trichlorobenzene	120-82-1	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dibromo-3-chloropropane	96-12-8	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dibromoethane	106-93-4	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	- -	- -	- -	0.65 U
1,2-Dichlorobenzene	95-50-1	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dichloroethane	107-06-2	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	- -	- -	- -	0.13 U
1,2-Dichloroethene, cis-	156-59-2	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dichloroethene, trans-	156-60-5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dichloroethene, Total	540-59-0	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,2-Dichloropropane	78-87-5	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	- -	- -	- -	0.14 U
1,3-Dichlorobenzene	541-73-1	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
1,3-Dichloropropene, cis-	10061-01-5	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	- -	- -	- -	0.14 U
1,3-Dichloropropene, trans-	10061-02-6	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	- -	- -	- -	0.16 U
1,3-Dichloropropene, Total	542-75-6	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	0.14 U	- -	- -	- -	0.14 U
1,4-Dichlorobenzene	106-46-7	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
2-Butanone	78-93-3	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	- -	- -	- -	1.9 U
2-Hexanone	591-78-6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	- -	- -	- -	1 U
4-Methyl-2-Pentanone (MIBK)	108-10-1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	- -	- -	- -	1 U
1,4-Dioxane	123-91-1	- -	- -	- -	- -	61 U	- -	- -	- -	- -	- -	- -
Acetone	67-64-1	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	- -	- -	- -	1.5 U
Benzene	71-43-2	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	- -	- -	- -	0.16 U
Bromochloromethane	74-97-5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Bromodichloromethane	75-27-4	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	- -	- -	- -	0.19 U
Bromoform	75-25-2	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	0.65 U	- -	- -	- -	0.65 U
Bromomethane	74-83-9	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Carbon Disulfide	75-15-0	1 U	1 U	1 U	1 U	1 U	1 U	1 U	- -	- -	- -	1 U
Carbon Tetrachloride	56-23-5	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	- -	- -	- -	0.13 U
Chlorobenzene	108-90-7	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Chloroethane	75-00-3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Chloroform	67-66-3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Chloromethane	74-87-3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Cyclohexane	110-82-7	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	- -	- -	- -	0.27 U
Dibromochloromethane	124-48-1	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	- -	- -	- -	0.15 U
Dichlorodifluoromethane	75-71-8	1 U	1 U	1 U	1 U	1 U	1 U	1 U	- -	- -	- -	1 U
Ethylbenzene	100-41-4	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Isopropylbenzene	98-82-8	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Methyl Acetate	79-20-9	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	- -	- -	- -	0.23 U
Methylcyclohexane	108-87-2	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	- -	- -	- -	0.4 U
Methylene Chloride	75-09-2	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Styrene	100-42-5	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
tert-Butyl Methyl Ether	1634-04-4	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Tetrachloroethene	127-18-4	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	- -	- -	- -	0.18 U

Table 3-8. Summary of QA/QC Water Sample Results

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

	Sample ID:	TB-09020	TB-090220	TB-090420	TB-090820	TB-091020	TB-091720	TB-091720-2	FB-090320	FB-090420	FB-091720	FB-091820
	Sample Date:	09/09/2020	09/02/2020	09/04/2020	09/08/2020	09/10/2020	09/17/2020	09/17/2020	09/03/2020	09/04/2020	09/17/2020	09/18/2020
Analyte	**CAS#**											
Toluene	108-88-3	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Trichloroethene	79-01-6	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	- -	- -	- -	0.18 U
Trichlorofluoromethane	75-69-4	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Vinyl Chloride	75-01-4	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	0.07 U	- -	- -	- -	0.07 U
Xylene, m- and p-	179601-23-1	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Xylene, o-	95-47-6	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
Xylene, Total	1330-20-7	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	0.7 U	- -	- -	- -	0.7 U
VOC TICs (µg/l)												
Sulfur Dioxide	7446-09-5	- -	**2.86 NJ**	- -	- -	- -	- -	- -	- -	- -	- -	- -
Unknown With Highest Concentration	UNKNOWN1	- -	- -	- -	**5.58 J**	**5.5 J**	- -	**1.09 J**	- -	- -	- -	- -
Total Unknown VOCs	TOTAL VOC TICS	- -	**2.86 J**	- -	**5.58 J**	**5.5 J**	- -	**1.09 J**	- -	- -	- -	- -
PFAS (ng/l)												
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	- -	- -	- -	- -	- -	- -	- -	1.27 U	1.32 U	1.36 U	- -
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	- -	- -	- -	- -	- -	- -	- -	1.16 U	1.2 U	1.24 U	- -
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	- -	- -	- -	- -	- -	- -	- -	0.767 U	0.8 U	0.824 U	- -
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	- -	- -	- -	- -	- -	- -	- -	0.618 U	0.645 U	0.664 U	- -
Perfluorobutane sulfonic acid (PFBS)	375-73-5	- -	- -	- -	- -	- -	- -	- -	0.227 U	0.237 U	0.244 U	- -
Perfluorobutanoic acid (PFBA)	375-22-4	- -	- -	- -	- -	- -	- -	- -	0.389 U	0.406 U	0.418 U	- -
Perfluorodecane sulfonic acid (PFDS)	335-77-3	- -	- -	- -	- -	- -	- -	- -	0.935 U	0.975 U	1 U	- -
Perfluorodecanoic acid (PFDA)	335-76-2	- -	- -	- -	- -	- -	- -	- -	0.29 U	0.302 U	0.311 U	- -
Perfluorododecanoic acid (PFDoDA)	307-55-1	- -	- -	- -	- -	- -	- -	- -	0.355 U	0.37 U	0.381 U	- -
Perfluoroheptane sulfonate (PFHpS)	375-92-8	- -	- -	- -	- -	- -	- -	- -	0.656 U	0.684 U	0.705 U	- -
Perfluoroheptanoic acid (PFHpA)	375-85-9	- -	- -	- -	- -	- -	- -	- -	0.215 U	0.224 U	0.231 U	- -
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	- -	- -	- -	- -	- -	- -	- -	0.358 U	0.374 U	0.385 U	- -
Perfluorohexanoic acid (PFHxA)	307-24-4	- -	- -	- -	- -	- -	- -	- -	**0.332 J**	0.326 U	**0.373 J**	- -
Perfluorononanoic acid (PFNA)	375-95-1	- -	- -	- -	- -	- -	- -	- -	0.298 U	0.31 U	0.32 U	- -
Perfluorooctane sulfonamide (FOSA)	754-91-6	- -	- -	- -	- -	- -	- -	- -	0.553 U	0.577 U	0.594 U	- -
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	- -	- -	- -	- -	- -	- -	- -	0.481 U	0.501 U	0.516 U	- -
Perfluorooctanoic acid (PFOA)	335-67-1	- -	- -	- -	- -	- -	- -	- -	0.225 U	0.235 U	0.242 U	- -
Perfluoropentanoic acid (PFPeA)	2706-90-3	- -	- -	- -	- -	- -	- -	- -	0.378 U	0.394 U	0.406 U	- -
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	- -	- -	- -	- -	- -	- -	- -	**0.698 J**	0.247 U	0.254 U	- -
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	- -	- -	- -	- -	- -	- -	- -	**0.629 J**	0.326 U	0.335 U	- -
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	- -	- -	- -	- -	- -	- -	- -	0.248 U	0.259 U	0.266 U	- -
Sum of PFAS (PFOS + PFOA)	SUMPFOSPFOA	- -	- -	- -	- -	- -	- -	- -	0.225 U	0.235 U	0.242 U	- -

Notes:

Bold indicates the analyte was detected

- - = Not analyzed

-- = Not available

CAS = Chemical Abstracts Service

J = The analyte was positively identified; the associated numerical value is the approximate concentration.

MIBK = Methyl Isobutyl Ketone

NJ = The TIC numerical value is an approximate concentration.

TIC = Tentatively Identified Compound

U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

ug/l = micrograms per liter

VOC = Volatile Organic Compound

TABLE 4-1. Historical Groundwater Sampling Events for Areas of Concern B and D

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location	Area of Concern	MNA Reporting Period																								
		Year One					Year Two				Year Three				Year Four				Year Five				Year Six			
		2014	2015				2016				2017				2018				2019				2020			
		Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
MW-01	AOC B	x		x		x				x						x									x	
MW-02	AOC B	x		x	x	x				x			x			x					x				x	
MW-03[a]	AOC B	x		x	x	x										x									x	
MW-33[a]	AOC B	x		x	x	x										x						x			x	
MW-34[a]	AOC B	x		x		x										x									x	
PZ-01[a]	AOC B	x		x		x										x									x	
PZ-03[a]	AOC B	x		x	x	x				x						x						x			x	
PZ-04	AOC B	x		x	x	x				x			x			x					x				x	
PZ-06	AOC B			x	x	x				x			x			x					x				x	
PZ-07R	AOC B	x		x		x				x						x									x	
MW-11S	AOC D	x	x	x	x	x		x	x	x			x			x					x				x	
MW-21	AOC D	x				x	x	x	x	x			x			x					x				x	
MW-23	AOC D	x				x				x						x									x	
MW-24	AOC D	x				x				x						x									x	
MW-30	AOC D	x				x	x	x	x	x			x			x					x				x	
MW-31	AOC D	x				x	x	x	x	x			x			x					x				x	
MW-35	AOC D					x	x	x	x	x			x			x					x				x	
MW-36	AOC D					x	x	x	x	x			x			x					x				x	
MW-37	AOC D					x				x						x									x	

Notes:

a) The sampling frequency of monitoring wells inside Building 4 varies based on the availability of Level B supplied air equipment.

Q1 - groundwater sampling event(s) conducted during January, February or March

Q2 - groundwater sampling event(s) conducted during April, May or June

Q3 - groundwater sampling event(s) conducted during July, August or September

Q4 - groundwater sampling event(s) conducted during October, November or December

Table 4-2. Summary of Groundwater Quality Parameters

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sampling Location	**Date**	**pH** (std units)	**Conductivity** (mS/cm)	**Turbidity** (NTU)	**DO** (mg/L)	**Temp** (Celsius)	**ORP** (mV)	**Ferrous Iron** (mg/L)
MW-01	9/9/2020	6.87	2.10	3.21	0.62	18.50	-303	1.27
MW-02	9/4/2020	6.91	3.44	4.02	0.26	23.50	-478	0.00
MW-03	9/3/2020	6.53	4.95	2.34	0.38	22.40	-469	0.20
MW-11S	9/4/2020	8.50	2.74	1.45	0.49	24.70	-307	0.12
MW-21	9/9/2020	9.54	15.5	1.62	0.25	27.21	-557	0.00
MW-23	9/9/2020	7.98	5.14	0.79	0.32	22.64	-468	0.07
MW-24	9/9/2020	6.12	4.04	6.89	1.15	22.23	-171	NA
MW-30	9/4/2020	7.19	3.39	3.34	5.99	23.34	-377	0.22
MW-31	9/10/2020	8.79	7.65	0.43	2.29	20.89	-429	0.14
MW-33	9/2/2020	7.23	10.30	15.30	0.56	22.19	-459	0.00
MW-34	9/3/2020	7.00	1.40	0.00	0.43	21.46	-432	0.50
MW-35	9/11/2020	6.66	1.82	4.21	0.55	19.91	-210	2.37
MW-36	9/11/2020	6.47	2.29	9.23	0.44	19.88	-184	0.00
MW-37	9/10/2020	6.84	3.76	3.39	0.57	21.71	-190	0.00
PZ-01	9/3/2020	6.74	1.59	2.81	0.37	21.87	-265	1.40
PZ-03	9/9/2020	6.73	8.56	2.10	0.43	21.5	-290	2.06
PZ-04	9/8/2020	6.59	3.99	10.00	2.00	25.39	-464	0.16
PZ-06	9/8/2020	7.23	1.45	29.80	1.20	25.92	-310	NA
PZ-07R	9/8/2020	6.29	10.10	4.16	0.85	22.76	-365	>3

Notes:

1. The data above were recorded after groundwater quality parameters stabilized, immediately before the groundwater sample was collected.

>3 - over range (greater than 3 mg/L)

DO - dissolved oxygen

mg/L - milligrams per liter

mS/cm - millisiemens per centimeter

mV - millivolts

NTU - nephelometric turbidity unit

ORP - oxidation reduction potential

std units - standard units

Table 5-1. Criteria and Threshold Concentrations for Identifying Redox Processes in Groundwater

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Redox category	Redox process	Electron acceptor (reduction) half-reaction	Criteria for inferring process from water-quality data					
			Dissolved Oxygen (mg/L)	Nitrate, as Nitrogen (mg/L)	Manganese (mg/L)	Iron (mg/L)	Sulfate (mg/L)	Iron/sulfide (mass ratio)
Oxic	O2	$O_2 + 4H^+ + 4e^- \rightarrow 2H_2O$	≥0.5	—	<0.05	<0.1	—	
Suboxic	Suboxic	Low O2; additional data needed to define redox process	<0.5	<0.5	<0.05	<0.1	—	
Anoxic	NO_3	$2NO_3^- + 12H^+ + 10e^- \rightarrow N_2(g) + 6H_2O$; $NO_3^- + 10H^+ + 8e^- \rightarrow NH_4^+ + 3H_2O$	<0.5	≥0.5	<0.05	<0.1	—	
Anoxic	Mn(IV)	$MnO_{2(s)} + 4H^+ + 2e^- \rightarrow Mn^{2+} + 2H_2O$	<0.5	<0.5	≥0.05	<0.1	—	
Anoxic	Fe(III)/SO_4	Fe(III) and (or) SO_4^{2-} reactions as described in individual element half reactions	<0.5	<0.5	—	≥0.1	≥0.5	no data
Anoxic	Fe(III)	$Fe(OH)_{3(s)} + H^+ + e^- \rightarrow Fe^{2+} + H_2O$; $FeOOH_{(s)} + 3H^+ + e^- \rightarrow Fe^{2+} + 2H_2O$	<0.5	<0.5	—	≥0.1	≥0.5	>10
Mixed(anoxic)	Fe(III)-SO_4	Fe(III) and SO_4^{2-} reactions as described in individual element half reactions	<0.5	<0.5	—	≥0.1	≥0.5	≥0.3, ≤10
Anoxic	SO_4	$SO_4^{2-} + 9H^+ + 8e^- \rightarrow HS^- + 4H_2O$	<0.5	<0.5	—	≥0.1	≥0.5	<0.3
Anoxic	CH_4gen	$CO_2(g) + 8H^+ + 8e^- \rightarrow CH_4(g) + 2H_2O$	<0.5	<0.5	—	≥0.1	<0.5	

Notes

Table was modified from McMahon and Chapelle, 2008

Abbreviations:

mg/L, milligram per liter

—, criteria do not apply because the species concentration is not affected by the redox process

≤, less than or equal to

≥, greater than or equal to

<, less than

>, greater than

Redox process:

CH_4gen, methanogenesis

O2, oxygen reduction

NO_3, nitrate reduction

Mn(IV), manganese reduction

Fe(III), iron reduction

SO_4, sulfate reduction

Chemical species:

$CH_4(g)$, methane gas.

$CO_2(g)$, carbon dioxide gas

Fe(OH)3(s), iron hydroxide with iron in 3+ oxidation state

FeOOH(s), iron oxyhydroxide with iron in 3+ oxidation state

O2, dissolved oxygen

NO_3^-, dissolved nitrate

MnO2(s), manganese oxide with manganese in 4+ oxidation state

SO_4^{2-}, dissolved sulfate

Table 5-2. Redox Assignments for Groundwater Samples in AOC B

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sample Location	Dissolved O_2	NO_3- (as Nitrogen)	Mn^{2+}	Fe^{2+}	SO_4^{2-}	Sulfide (sum of H_2S, HS^-, S^{2-})	Redox Assignment			Fe2+/ Sulfide, ratio	Eh (mV)	TOC (mg/L)	NH_3 (mg/L)
	(mg/L)	(mg/L)	(µg/L)	(µg/L)	(mg/L)	(mg/L)							
	0.5	0.5	50	100	0.5	none	Num of Params	General Redox Category	Redox Process				
MW-01	0.06	0.02	200	1200	87	0.7	6	Mixed(anoxic)	Fe(III)-SO_4	1.71	-101.00	9.2	0.7
MW-02	0.2	0.09	30	50	595	35	6	Suboxic	Suboxic		-278.00	7.6	2.3
MW-33	0.3	0.06	400	50	232	44	6	Anoxic	Mn(IV)		-269.00	20	27
MW-34	0.09	0.34	10	500	102	3.2	6	Anoxic	SO4	0.16	-259.00	2.1	0.2
PZ-01	0.05	0.06	30	1700	94	11	6	Anoxic	SO4	0.15	-232.00	1.8	1.1
PZ-03	0.03	0.04	200	1500	287	0.4	6	Mixed(anoxic)	Fe(III)-SO_4	3.75	-65.00	9.5	1.5
PZ-04	0.04	0.04	10	50	428	26	6	Suboxic	Suboxic		-90.00	13.8	7.4
PZ-06	0.2	0.05	20	230	129	1.1	6	Mixed(oxic-anoxic)	O_2-SO_4	0.21	-264.00	8.6	1.3
PZ-07R	1.2	0.05	400	2800	162	18	6	Anoxic	SO_4	0.16	-110.00	14.4	10.5

Abbreviations

Eh, oxidation/reduction potential
mg/L, milligram per liter
mV, millivolts
TOC, total organci carbon
µg/L, micrograms per liter

Redox process

O_2, oxygen reduction
NH_3, ammonia
NO_3, nitrate reduction
Mn(IV), manganese reduction
Fe(III), iron reduction
SO_4, sulfate reduction

Table 5-3. Redox Assignments for Groundwater Samples in AOC D
2020 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sample Location	Dissolved O_2	NO_3- (as Nitrogen)	Mn^{2+}	Fe^{2+}	SO_4^{2-}	Sulfide (sum of H_2S, HS^-, S^{2-})	Redox Assignment			Fe2+/ Sulfide, ratio	Eh (mV)	TOC (mg/L)	NH_3 (mg/L)
	(mg/L)	(mg/L)	(µg/L)	(µg/L)	(mg/L)	(mg/L)							
	0.5	**0.5**	**50**	**100**	**0.5**	**none**	Num of Params	General Redox Category	Redox Process				
MW-11S	0.05	0.06	30	50	237	0.7	6	Suboxic	Suboxic		-107	1.4	0.3
MW-21	0.03	0.13	6	300	598	10	6	Anoxic	SO_4	0.03	-337	195	14
MW-23	0.03	0.02	170	50	1430	19	6	Anoxic	Mn(IV)		-268	16	4.7
MW-24	0.12	0.1	240	6700	1010	0.5	6	Anoxic	Fe(III)	13.4	29	16.4	2.7
MW-30	0.06	0.02	40	120	590	3	6	Anoxic	SO_4	0.04	-177	6.9	0.7
MW-31	0.23	0.12	20	500	398	3.9	6	Anoxic	SO_4	0.128205128	-229	84.6	6.7
MW-35	0.06	0.05	30	300	239	0.1	6	Mixed(anoxic)	Fe(III)-SO_4	3	-10	1.6	0.3
MW-36	0.06	0.012	170	100	238	0.1	6	Mixed(anoxic)	Fe(III)-SO_4	1	16	0.8	0.2
MW-37	0.04	0.06	280	300	716	0.1	6	Mixed(anoxic)	Fe(III)-SO_4	3	10	5.2	0.3

Abbreviations

Eh, oxidation/reduction potential
mg/L, milligram per liter
mV, millivolts
TOC, total organci carbon
µg/L, micrograms per liter

Redox process

O_2, oxygen reduction
NH_3, ammonia
NO_3, nitrate reduction
Mn(IV), manganese reduction
Fe(III), iron reduction
SO_4, sulfate reduction

Figures

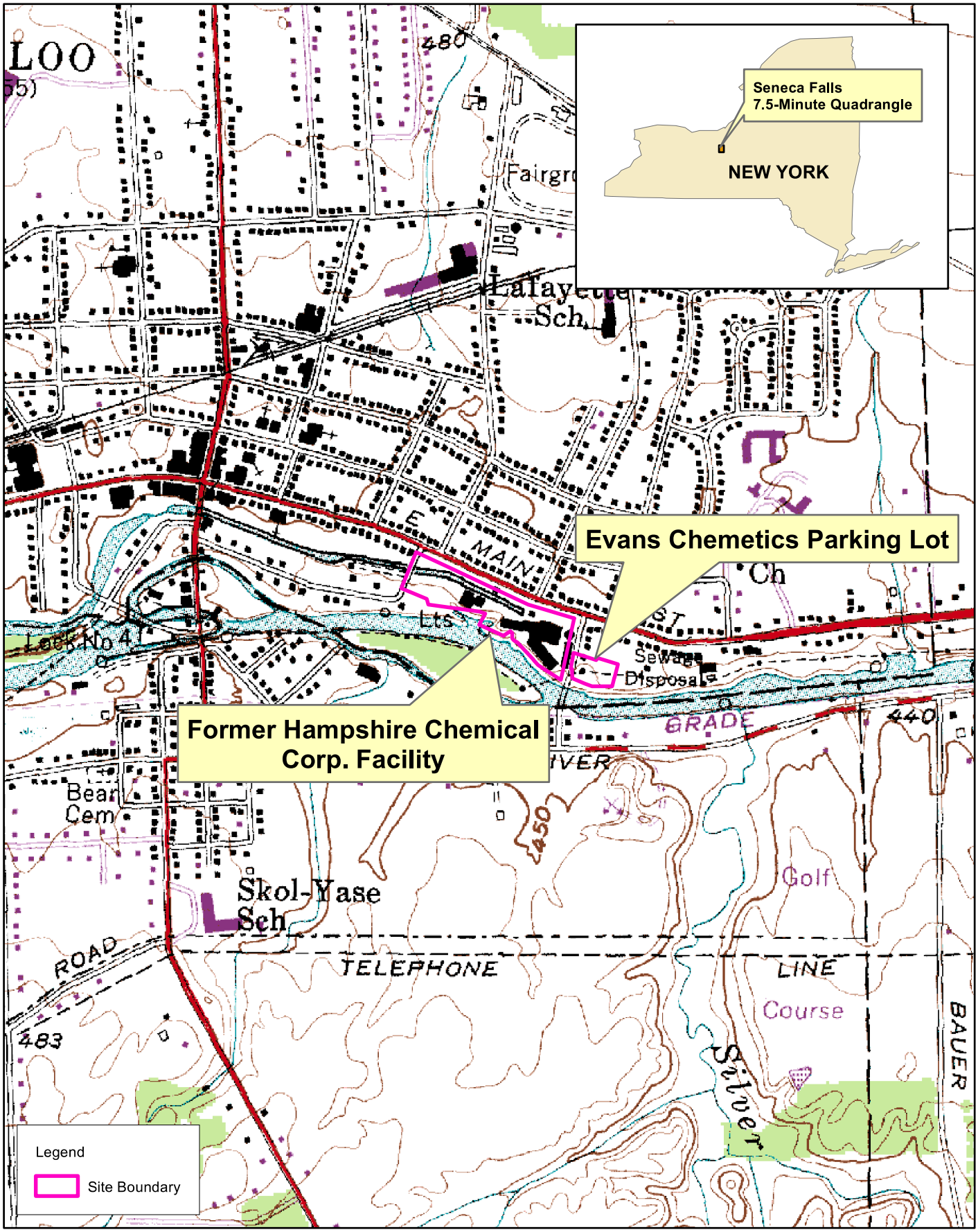


FIGURE 1-1
Site Location
Former Hampshire Chemical Corporation
Waterloo, New York

JACOBS

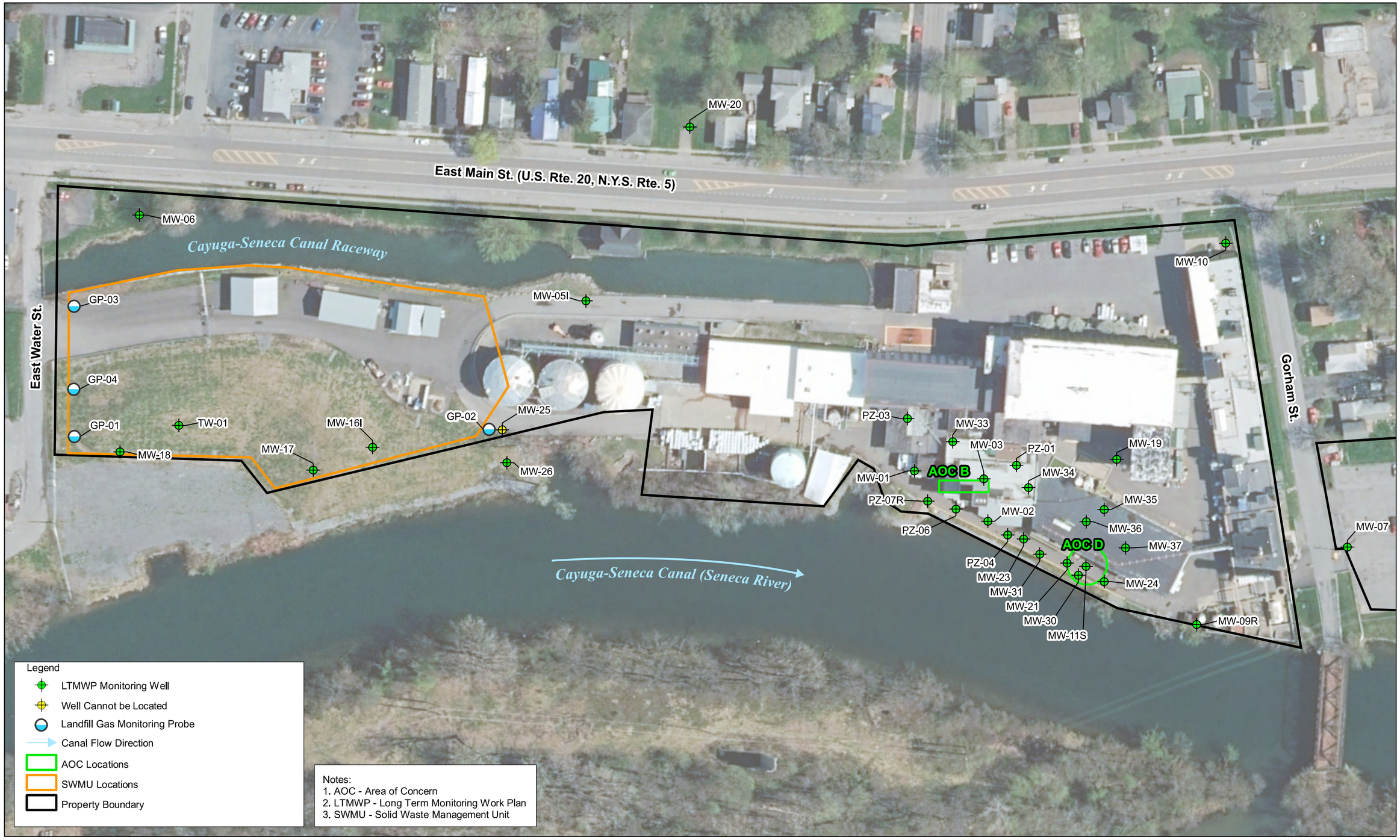
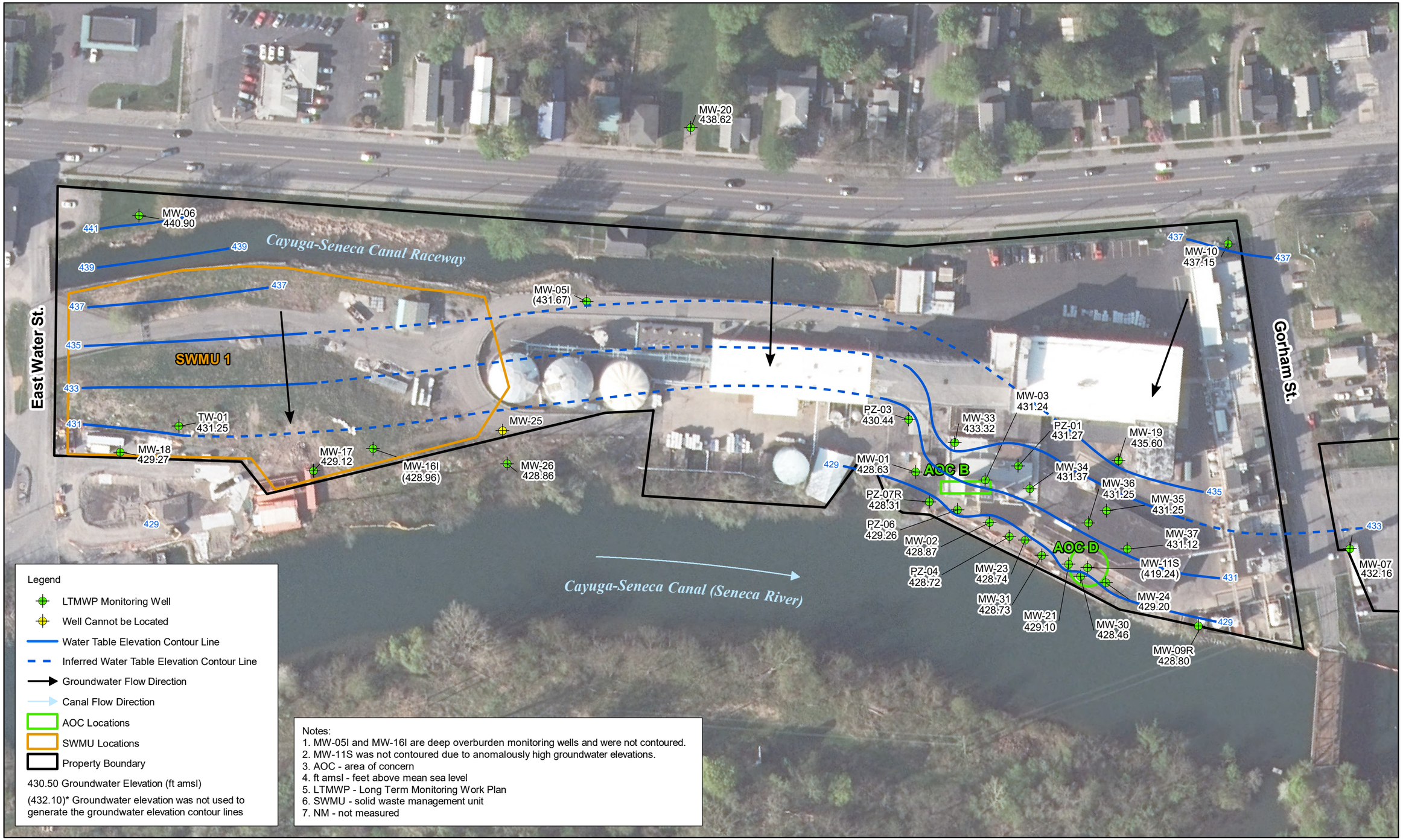


FIGURE 1-2
Site Layout Map
Former Hampshire Chemical Corporation
Waterloo, New York

JACOBS



Legend

- LTMWP Monitoring Well
- Well Cannot be Located
- Water Table Elevation Contour Line
- Inferred Water Table Elevation Contour Line
- Groundwater Flow Direction
- Canal Flow Direction
- AOC Locations
- SWMU Locations
- Property Boundary

430.50 Groundwater Elevation (ft amsl)

(432.10)* Groundwater elevation was not used to generate the groundwater elevation contour lines

Notes:
1. MW-05I and MW-16I are deep overburden monitoring wells and were not contoured.
2. MW-11S was not contoured due to anomalously high groundwater elevations.
3. AOC - area of concern
4. ft amsl - feet above mean sea level
5. LTMWP - Long Term Monitoring Work Plan
6. SWMU - solid waste management unit
7. NM - not measured

N

0 100 200

Feet

Figure 3-1. Groundwater Elevation Contour Map, September 2020
2020 Groundwater Monitoring Results and
Year 5 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

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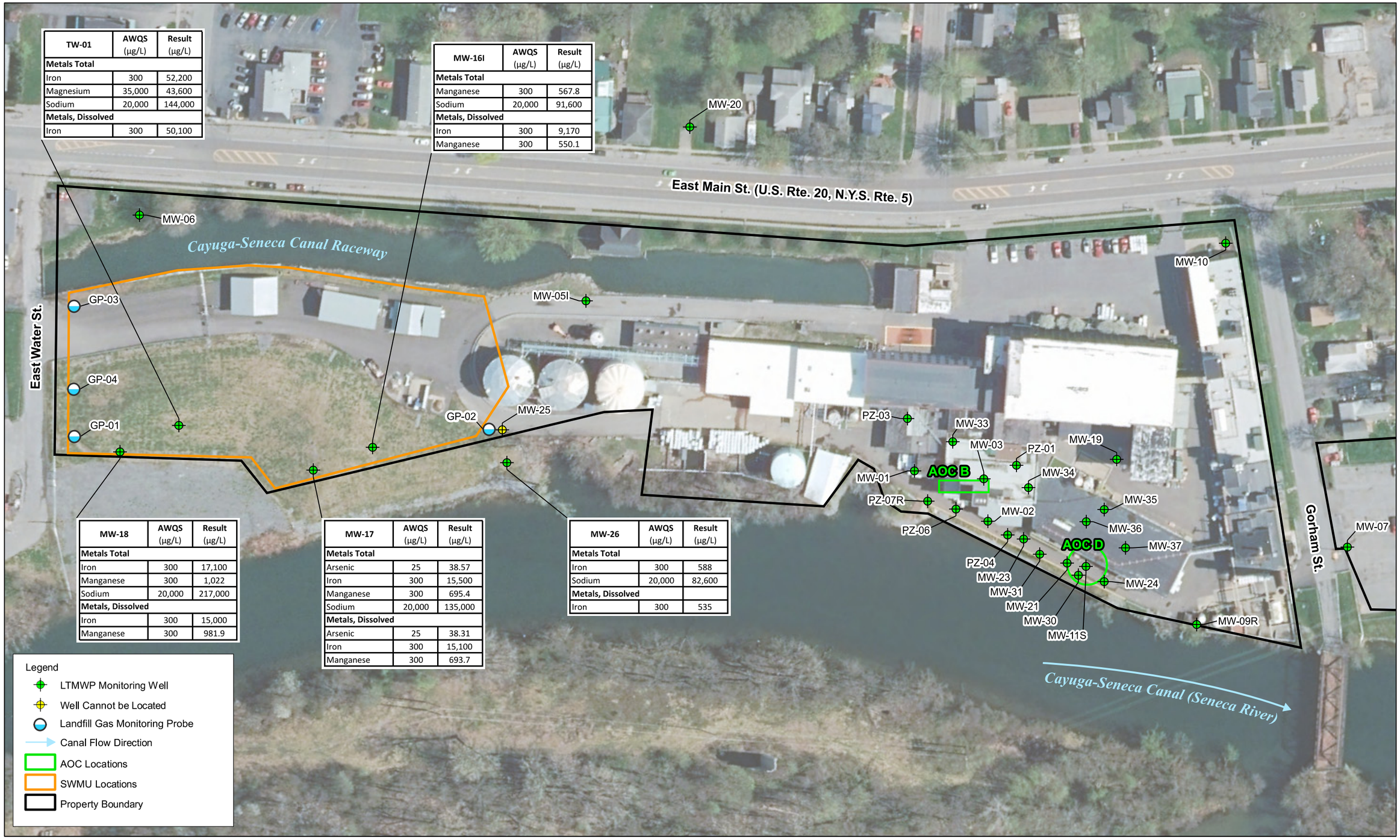
TW-01	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	52,200
Magnesium	35,000	43,600
Sodium	20,000	144,000
Metals, Dissolved		
Iron	300	50,100

MW-16I	AWQS (µg/L)	Result (µg/L)
Metals Total		
Manganese	300	567.8
Sodium	20,000	91,600
Metals, Dissolved		
Iron	300	9,170
Manganese	300	550.1

MW-18	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	17,100
Manganese	300	1,022
Sodium	20,000	217,000
Metals, Dissolved		
Iron	300	15,000
Manganese	300	981.9

MW-17	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	38.57
Iron	300	15,500
Manganese	300	695.4
Sodium	20,000	135,000
Metals, Dissolved		
Arsenic	25	38.31
Iron	300	15,100
Manganese	300	693.7

MW-26	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	588
Sodium	20,000	82,600
Metals, Dissolved		
Iron	300	535



N

0 100 200
feet

µg/L - micrograms per liter
AOC - area of concern
AWQS - ambient water quality standards
LTMWP -long term monitoring work plan
SWMU - solid waste management unit

FIGURE 3-2. Groundwater Analytical Exceedances at SWMU 1 Wells
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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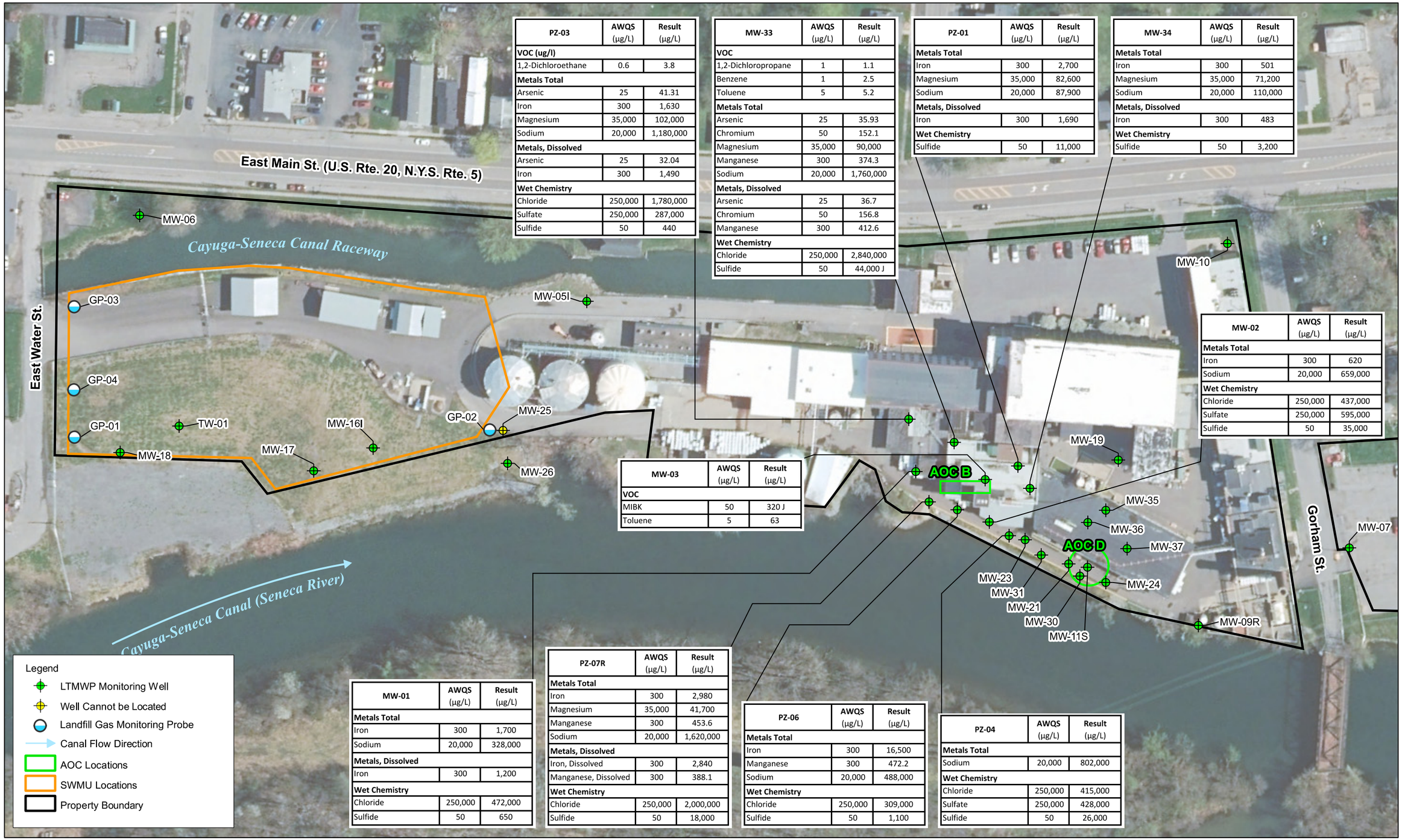

PZ-03	AWQS (µg/L)	Result (µg/L)
VOC (ug/l)		
1,2-Dichloroethane	0.6	3.8
Metals Total		
Arsenic	25	41.31
Iron	300	1,630
Magnesium	35,000	102,000
Sodium	20,000	1,180,000
Metals, Dissolved		
Arsenic	25	32.04
Iron	300	1,490
Wet Chemistry		
Chloride	250,000	1,780,000
Sulfate	250,000	287,000
Sulfide	50	440

MW-33	AWQS (µg/L)	Result (µg/L)
VOC		
1,2-Dichloropropane	1	1.1
Benzene	1	2.5
Toluene	5	5.2
Metals Total		
Arsenic	25	35.93
Chromium	50	152.1
Magnesium	35,000	90,000
Manganese	300	374.3
Sodium	20,000	1,760,000
Metals, Dissolved		
Arsenic	25	36.7
Chromium	50	156.8
Manganese	300	412.6
Wet Chemistry		
Chloride	250,000	2,840,000
Sulfide	50	44,000 J

PZ-01	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	2,700
Magnesium	35,000	82,600
Sodium	20,000	87,900
Metals, Dissolved		
Iron	300	1,690
Wet Chemistry		
Sulfide	50	11,000

MW-34	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	501
Magnesium	35,000	71,200
Sodium	20,000	110,000
Metals, Dissolved		
Iron	300	483
Wet Chemistry		
Sulfide	50	3,200

MW-02	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	620
Sodium	20,000	659,000
Wet Chemistry		
Chloride	250,000	437,000
Sulfate	250,000	595,000
Sulfide	50	35,000

MW-03	AWQS (µg/L)	Result (µg/L)
VOC		
MIBK	50	320 J
Toluene	5	63

MW-01	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	1,700
Sodium	20,000	328,000
Metals, Dissolved		
Iron	300	1,200
Wet Chemistry		
Chloride	250,000	472,000
Sulfide	50	650

PZ-07R	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	2,980
Magnesium	35,000	41,700
Manganese	300	453.6
Sodium	20,000	1,620,000
Metals, Dissolved		
Iron, Dissolved	300	2,840
Manganese, Dissolved	300	388.1
Wet Chemistry		
Chloride	250,000	2,000,000
Sulfide	50	18,000

PZ-06	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	16,500
Manganese	300	472.2
Sodium	20,000	488,000
Wet Chemistry		
Chloride	250,000	309,000
Sulfide	50	1,100

PZ-04	AWQS (µg/L)	Result (µg/L)
Metals Total		
Sodium	20,000	802,000
Wet Chemistry		
Chloride	250,000	415,000
Sulfate	250,000	428,000
Sulfide	50	26,000

0 100 200 feet

µg/L - micrograms per liter
AOC - area of concern
AWQS - ambient water quality standards
LTMWP -long term monitoring work plan
SWMU - solid waste management unit

FIGURE 3-3. Groundwater Analytical Exceedances at AOC B Wells
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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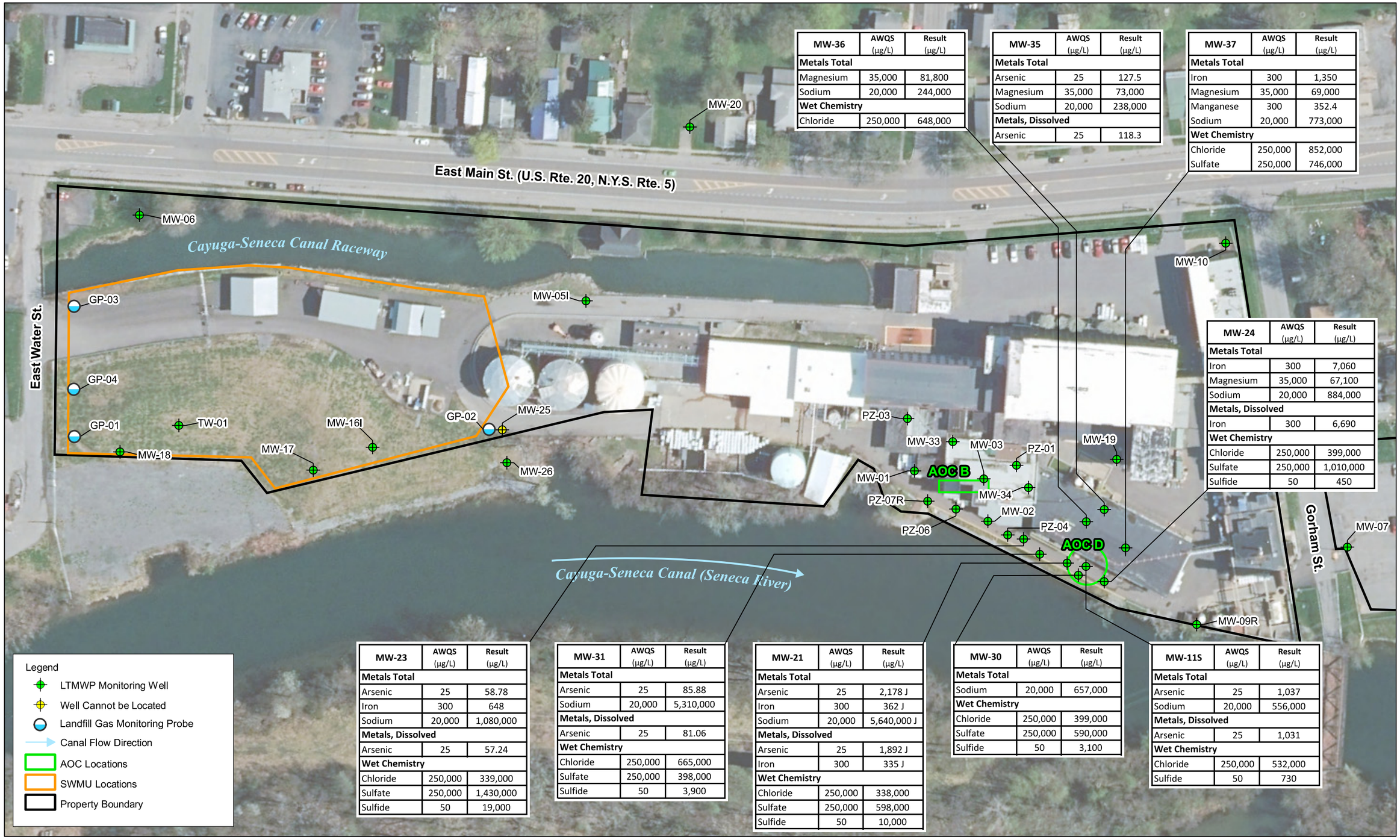

MW-36	AWQS (µg/L)	Result (µg/L)
Metals Total		
Magnesium	35,000	81,800
Sodium	20,000	244,000
Wet Chemistry		
Chloride	250,000	648,000

MW-35	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	127.5
Magnesium	35,000	73,000
Sodium	20,000	238,000
Metals, Dissolved		
Arsenic	25	118.3

MW-37	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	1,350
Magnesium	35,000	69,000
Manganese	300	352.4
Sodium	20,000	773,000
Wet Chemistry		
Chloride	250,000	852,000
Sulfate	250,000	746,000

MW-24	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	7,060
Magnesium	35,000	67,100
Sodium	20,000	884,000
Metals, Dissolved		
Iron	300	6,690
Wet Chemistry		
Chloride	250,000	399,000
Sulfate	250,000	1,010,000
Sulfide	50	450

MW-23	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	58.78
Iron	300	648
Sodium	20,000	1,080,000
Metals, Dissolved		
Arsenic	25	57.24
Wet Chemistry		
Chloride	250,000	339,000
Sulfate	250,000	1,430,000
Sulfide	50	19,000

MW-31	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	85.88
Sodium	20,000	5,310,000
Metals, Dissolved		
Arsenic	25	81.06
Wet Chemistry		
Chloride	250,000	665,000
Sulfate	250,000	398,000
Sulfide	50	3,900

MW-21	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	2,178 J
Iron	300	362 J
Sodium	20,000	5,640,000 J
Metals, Dissolved		
Arsenic	25	1,892 J
Iron	300	335 J
Wet Chemistry		
Chloride	250,000	338,000
Sulfate	250,000	598,000
Sulfide	50	10,000

MW-30	AWQS (µg/L)	Result (µg/L)
Metals Total		
Sodium	20,000	657,000
Wet Chemistry		
Chloride	250,000	399,000
Sulfate	250,000	590,000
Sulfide	50	3,100

MW-11S	AWQS (µg/L)	Result (µg/L)
Metals Total		
Arsenic	25	1,037
Sodium	20,000	556,000
Metals, Dissolved		
Arsenic	25	1,031
Wet Chemistry		
Chloride	250,000	532,000
Sulfide	50	730

0 100 200
feet

µg/L - micrograms per liter
AOC - area of concern
AWQS - ambient water quality standards
LTMWP -long term monitoring work plan
SWMU - solid waste management unit

FIGURE 3-4. Groundwater Analytical Exceedances at AOC D Wells
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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MW-06	AWQS (µg/L)	Result (µg/L)
Metals Total		
Sodium	20,000	53,200

MW-05I	AWQS (µg/L)	Result (µg/L)
Metals, Dissolved		
Sodium	20,000	80,500

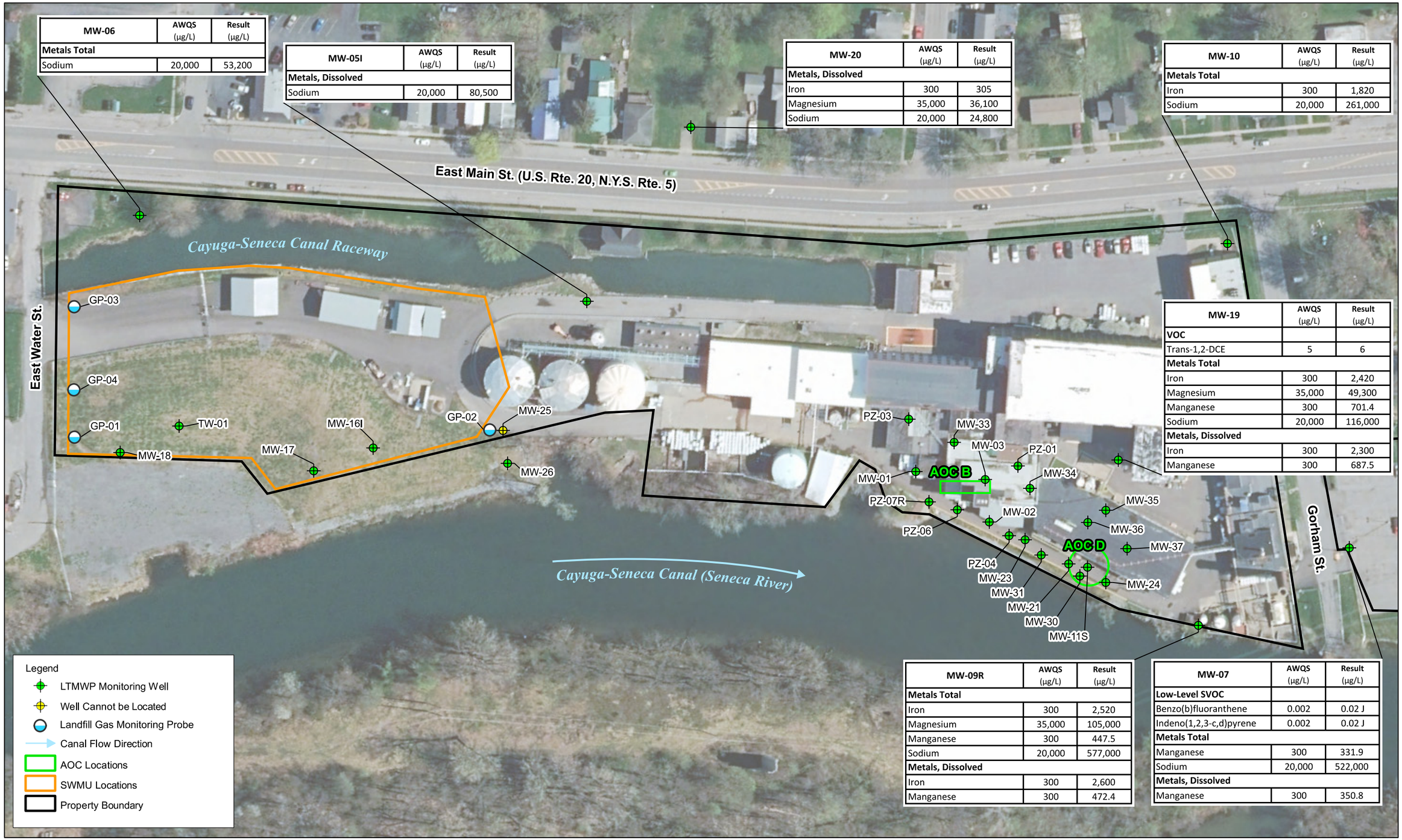
MW-20	AWQS (µg/L)	Result (µg/L)
Metals, Dissolved		
Iron	300	305
Magnesium	35,000	36,100
Sodium	20,000	24,800

MW-10	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	1,820
Sodium	20,000	261,000

MW-19	AWQS (µg/L)	Result (µg/L)
VOC		
Trans-1,2-DCE	5	6
Metals Total		
Iron	300	2,420
Magnesium	35,000	49,300
Manganese	300	701.4
Sodium	20,000	116,000
Metals, Dissolved		
Iron	300	2,300
Manganese	300	687.5

MW-09R	AWQS (µg/L)	Result (µg/L)
Metals Total		
Iron	300	2,520
Magnesium	35,000	105,000
Manganese	300	447.5
Sodium	20,000	577,000
Metals, Dissolved		
Iron	300	2,600
Manganese	300	472.4

MW-07	AWQS (µg/L)	Result (µg/L)
Low-Level SVOC		
Benzo(b)fluoranthene	0.002	0.02 J
Indeno(1,2,3-c,d)pyrene	0.002	0.02 J
Metals Total		
Manganese	300	331.9
Sodium	20,000	522,000
Metals, Dissolved		
Manganese	300	350.8



N

0 100 200
feet

µg/L - micrograms per liter
AOC - area of concern
AWQS - ambient water quality standards
LTMWP -long term monitoring work plan
SWMU - solid waste management unit

FIGURE 3-5. Groundwater Analytical Exceedances at Supplemental Wells
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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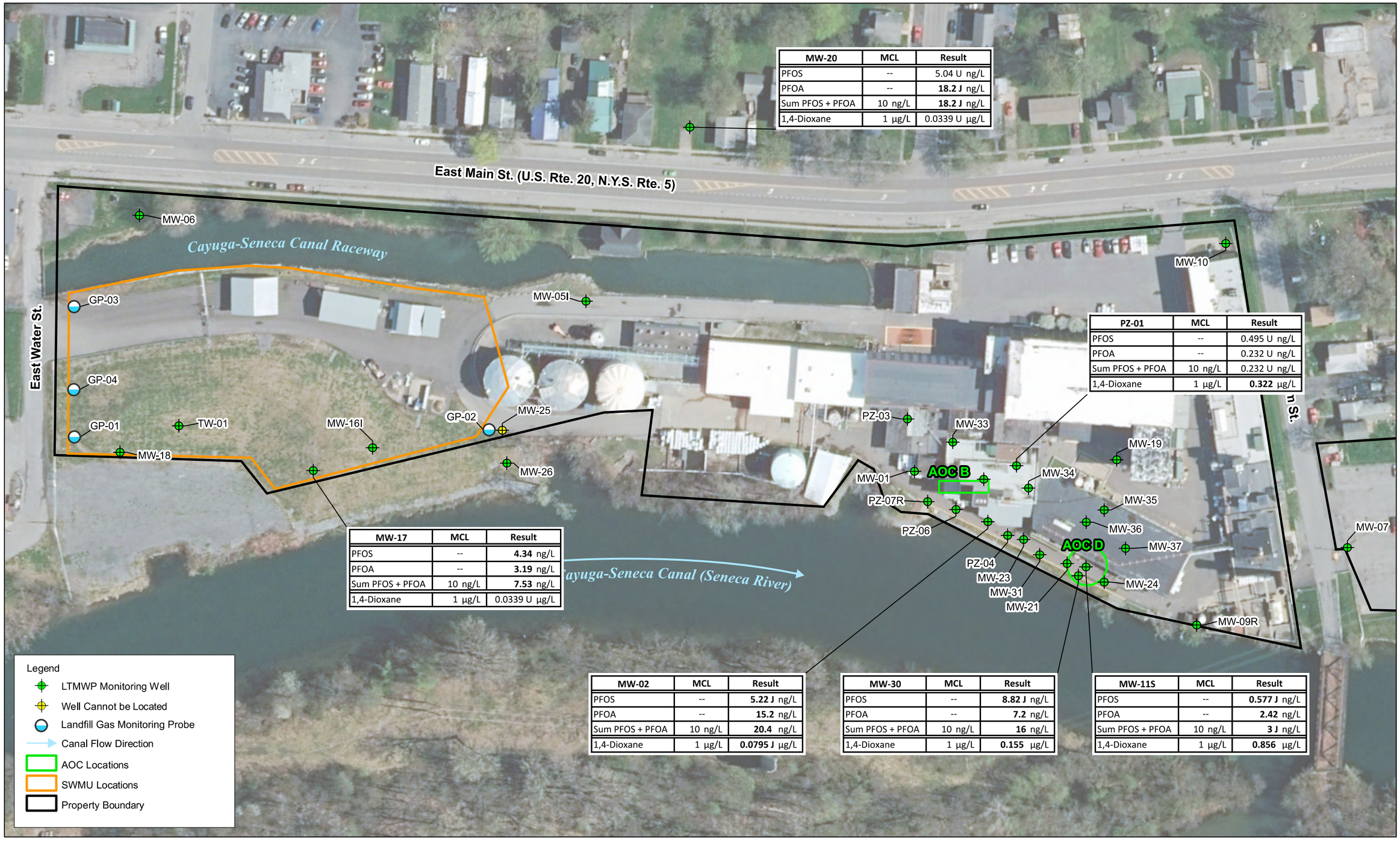

Notes:
1. New York State maximum contaminant level for drinking water systems used for screening purposes until development of AWQS criteria.

Abbreviations:
µg/L - micrograms per liter
AOC - area of concern
LTMWP -long term monitoring work plan
MCL - maximum contaminant level
ng/L - nanograms per liter
PFAS - per- and polyfluoroalkyl substances
PFOA - perfluorooctanoic acid
PFOS - perfluorooctane sulfonic acid
SWMU - solid waste management unit

Figure 3-6
2020 PFAS and 1,4-Dioxane Groundwater Results
Former Hampshire Chemical Corporation
Waterloo, New York

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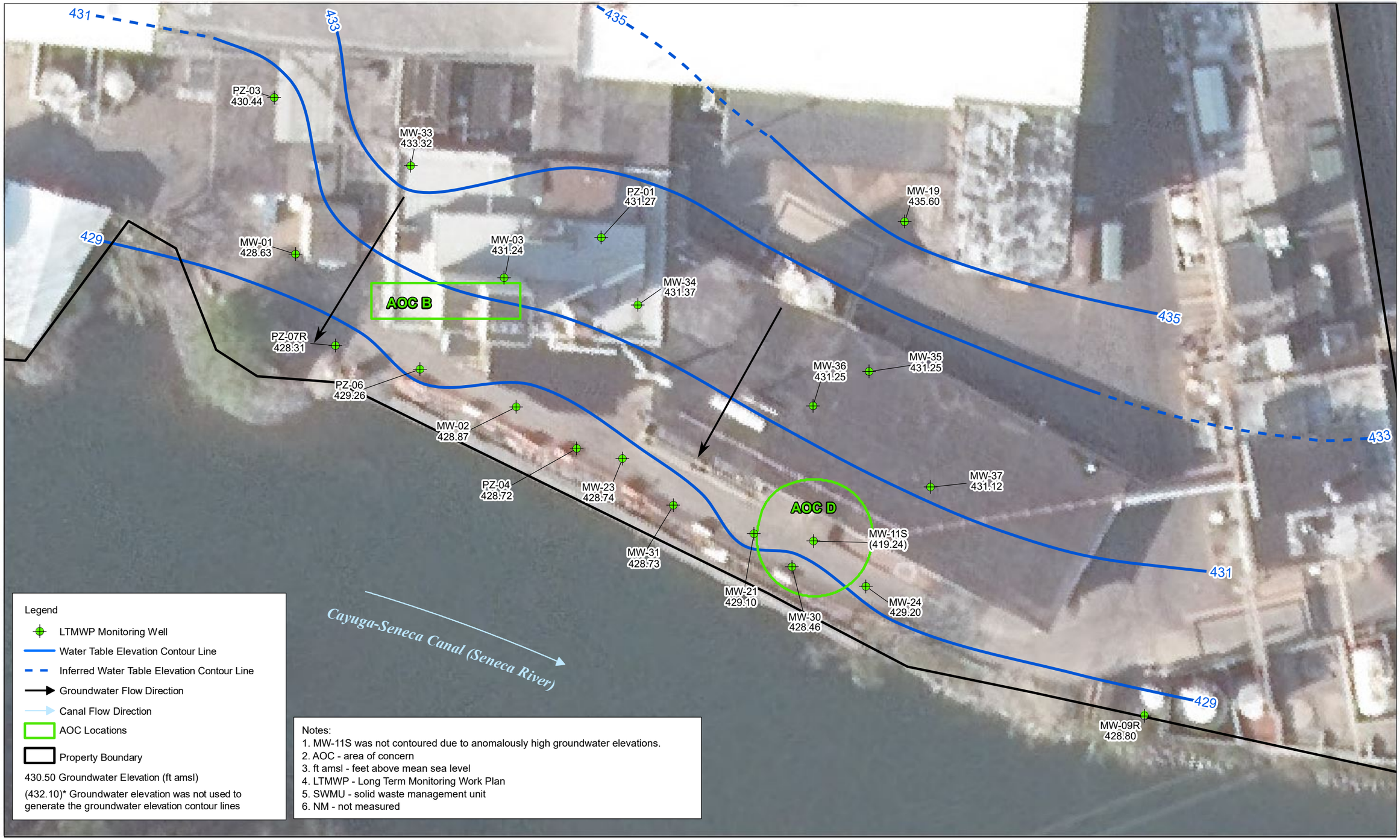

Figure 5-1. AOCs B and D Groundwater Elevation Contour Map September 2020
2020 Groundwater Monitoring Results and Monitoring
Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

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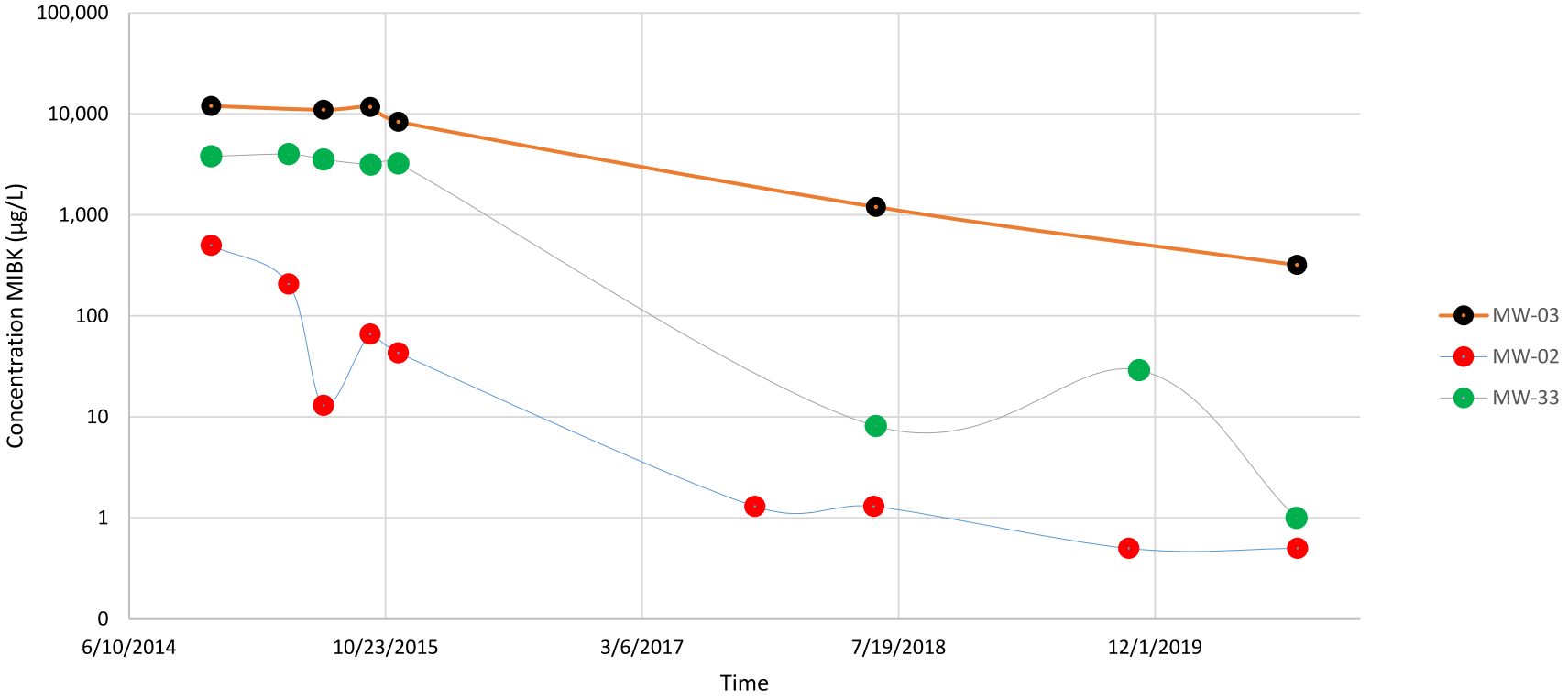

FIGURE 5-2. Time-Series Graph of MIBK Concentrations at MW-02, MW-03, and MW-33
2020 Groundwater Monitoring Results and Monitored Natural Attenuation Report
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Waterloo, New York

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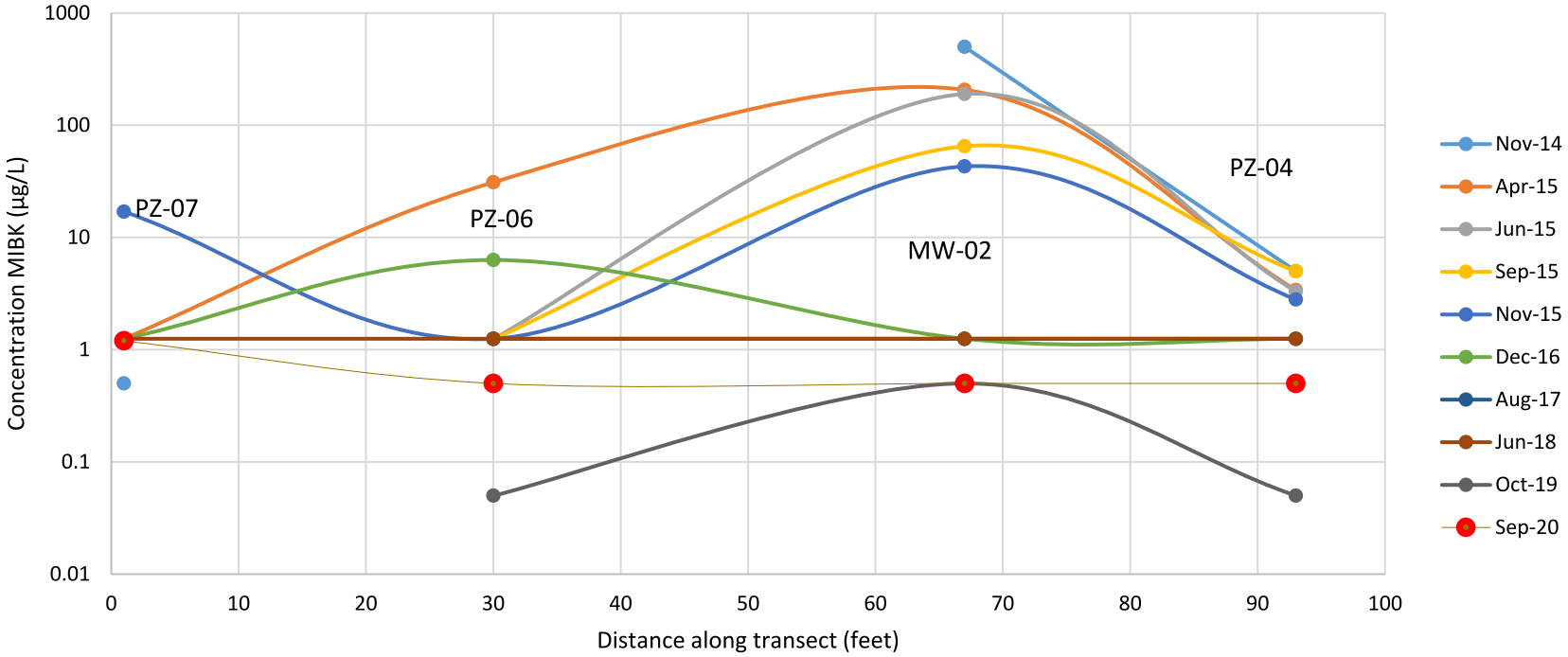

FIGURE 5-3. MIBK Concentrations Along Transect Parallel to the Canal, November 2014 to September 2020
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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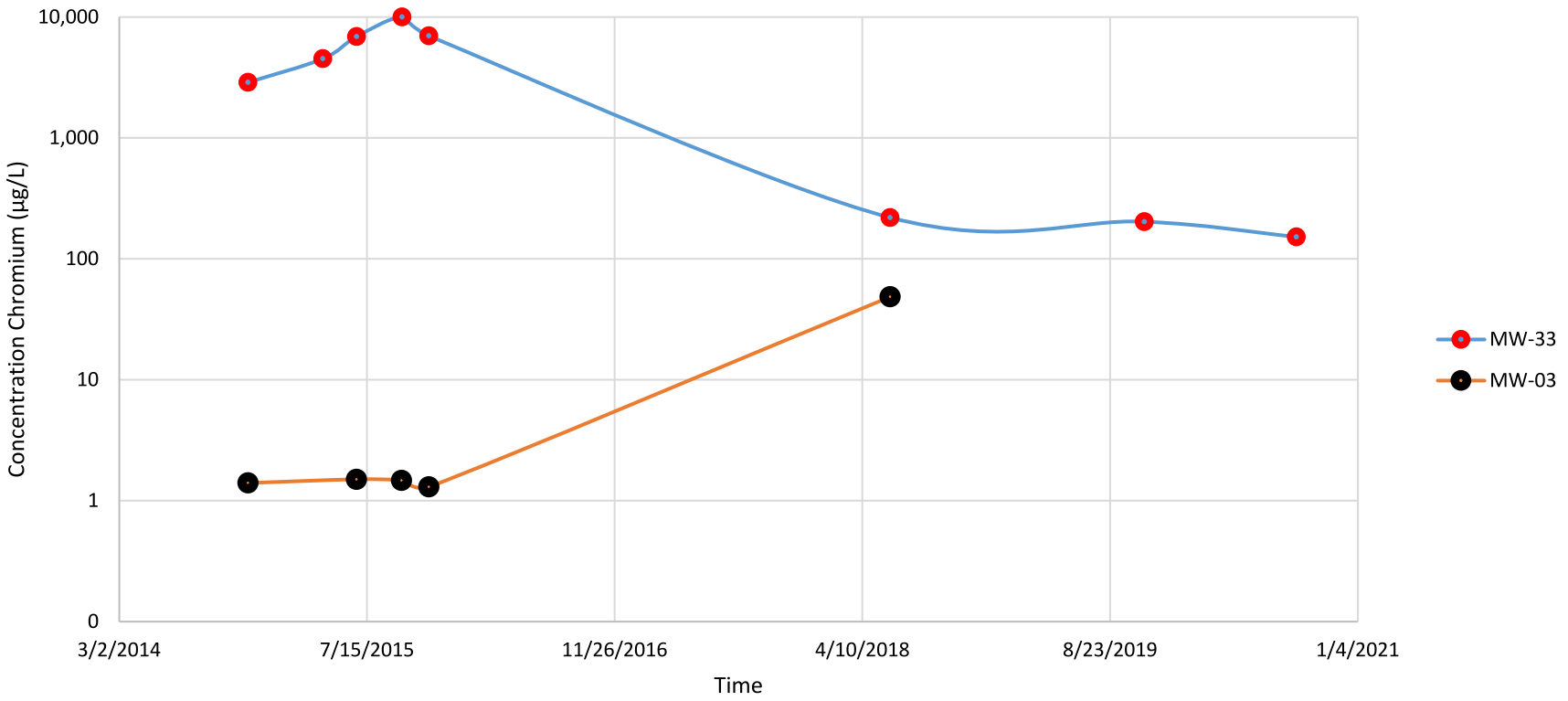

FIGURE 5-4. Time-Series Graph of Chromium Concentrations at MW-03 and MW-33
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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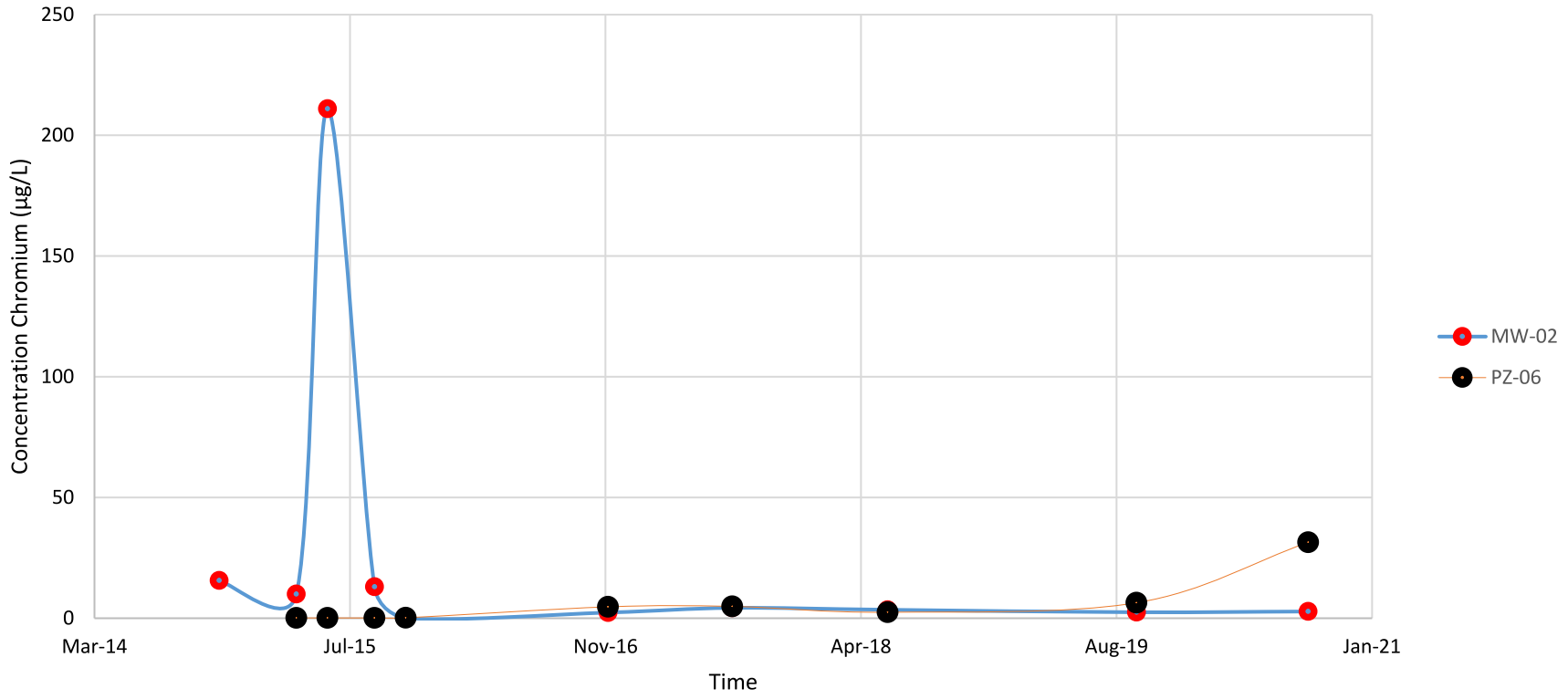

FIGURE 5-5. Time-Series Graph of Chromium Concentrations at MW-02 and PZ-06
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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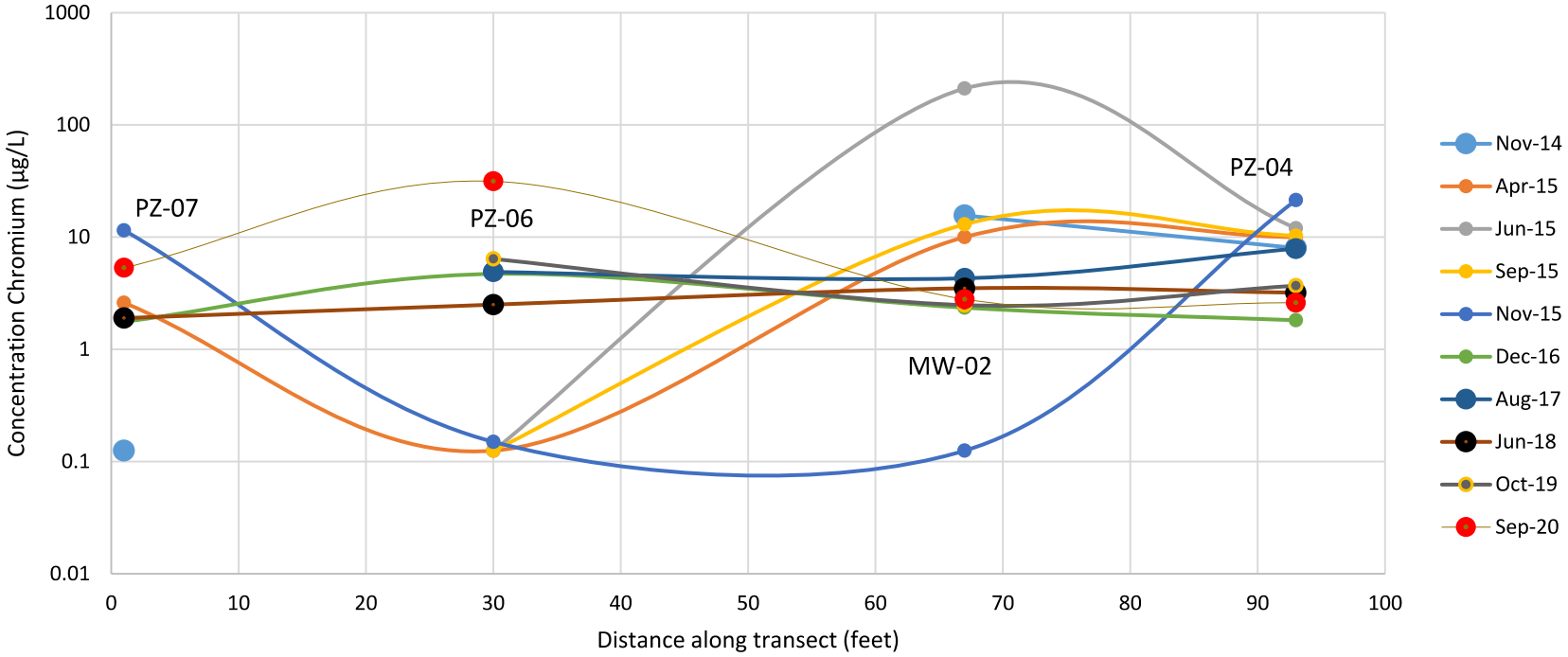

FIGURE 5-6. Chromium Concentrations Along Transect Parallel to the Canal, November 2014 to September 2020
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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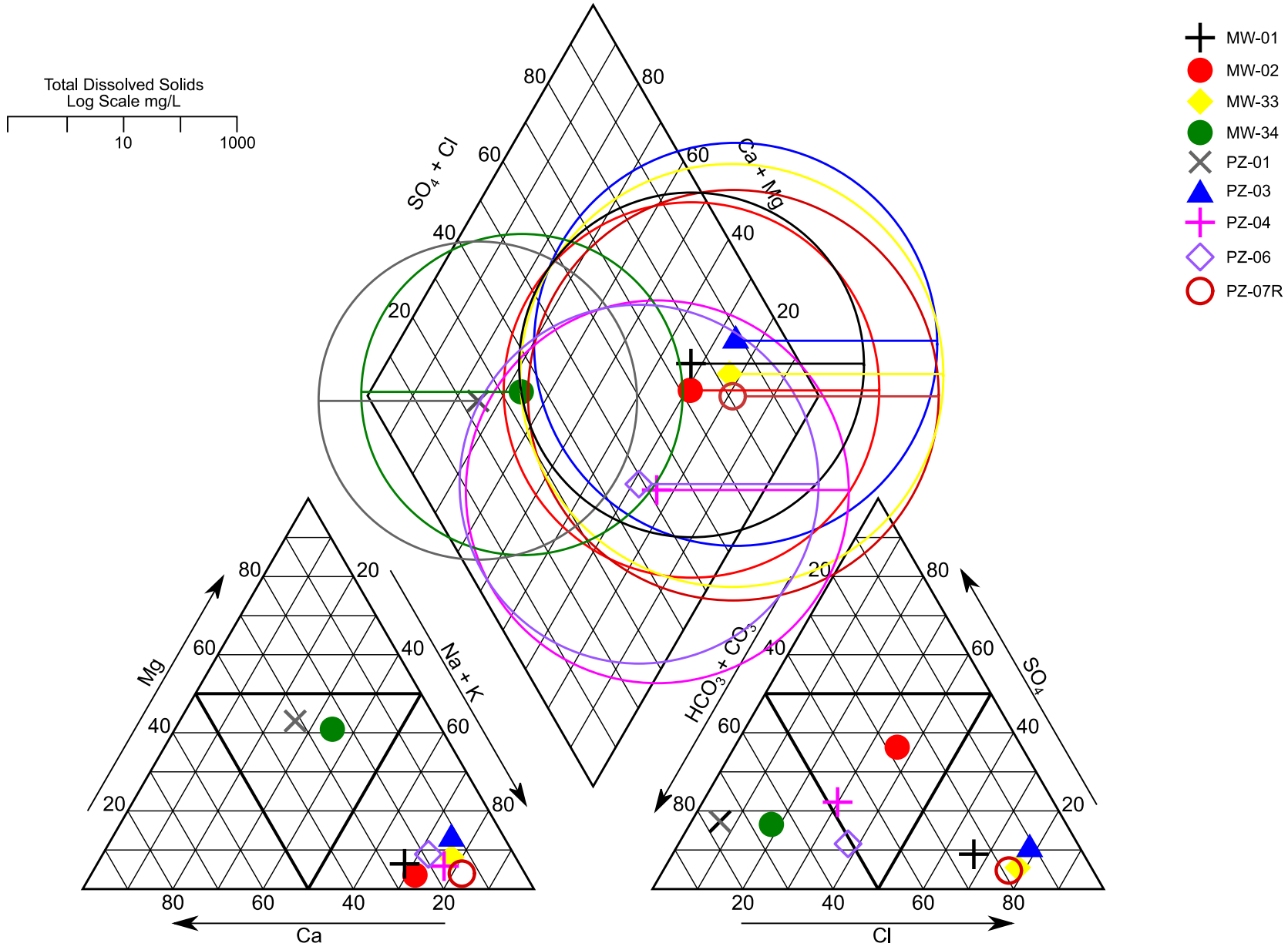

FIGURE 5-7. Piper Diagram of Major Ions in Groundwater at AOC B
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
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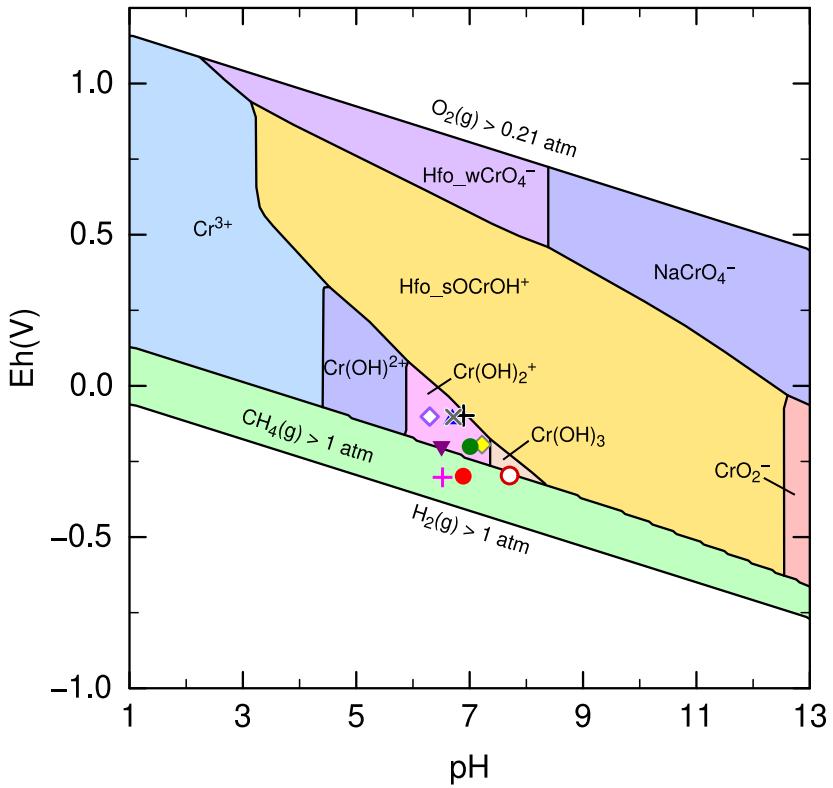

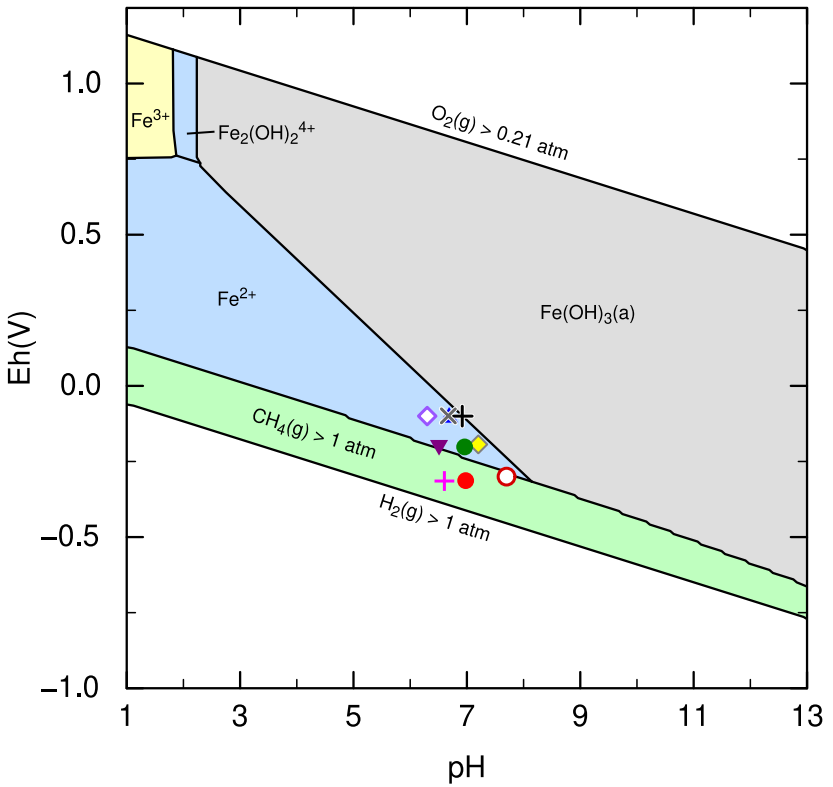

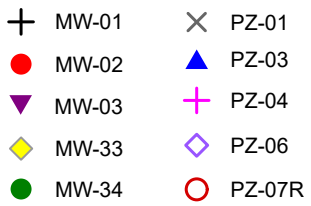

FIGURE 5-8. PhreePlot Diagram of Chromium-Iron-Oxide System for AOC B
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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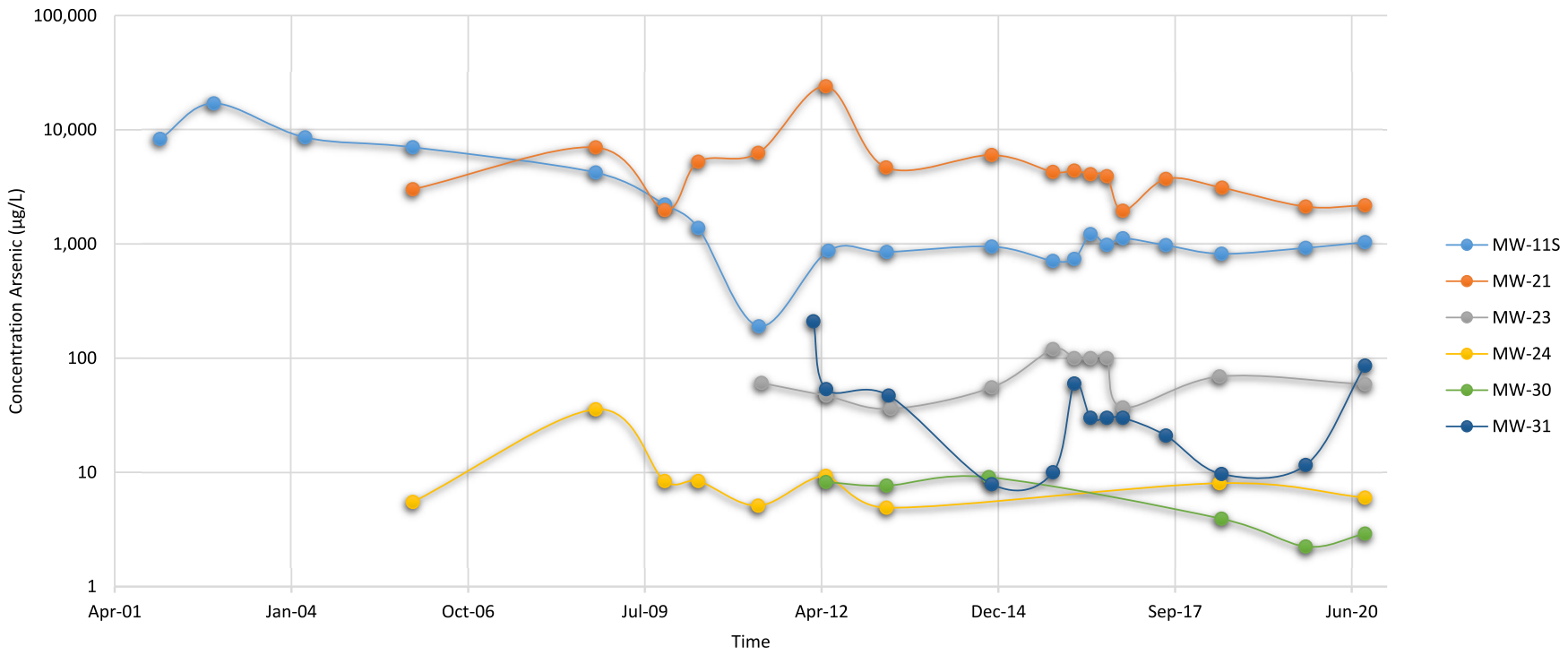

FIGURE 5-9. Time-Series Graph of Arsenic Concentrations in AOC D Monitoring Wells

2020 Groundwater Monitoring Results and Monitored Natural Attenuation Report

Former Hampshire Chemical Coporation
Waterloo, New York

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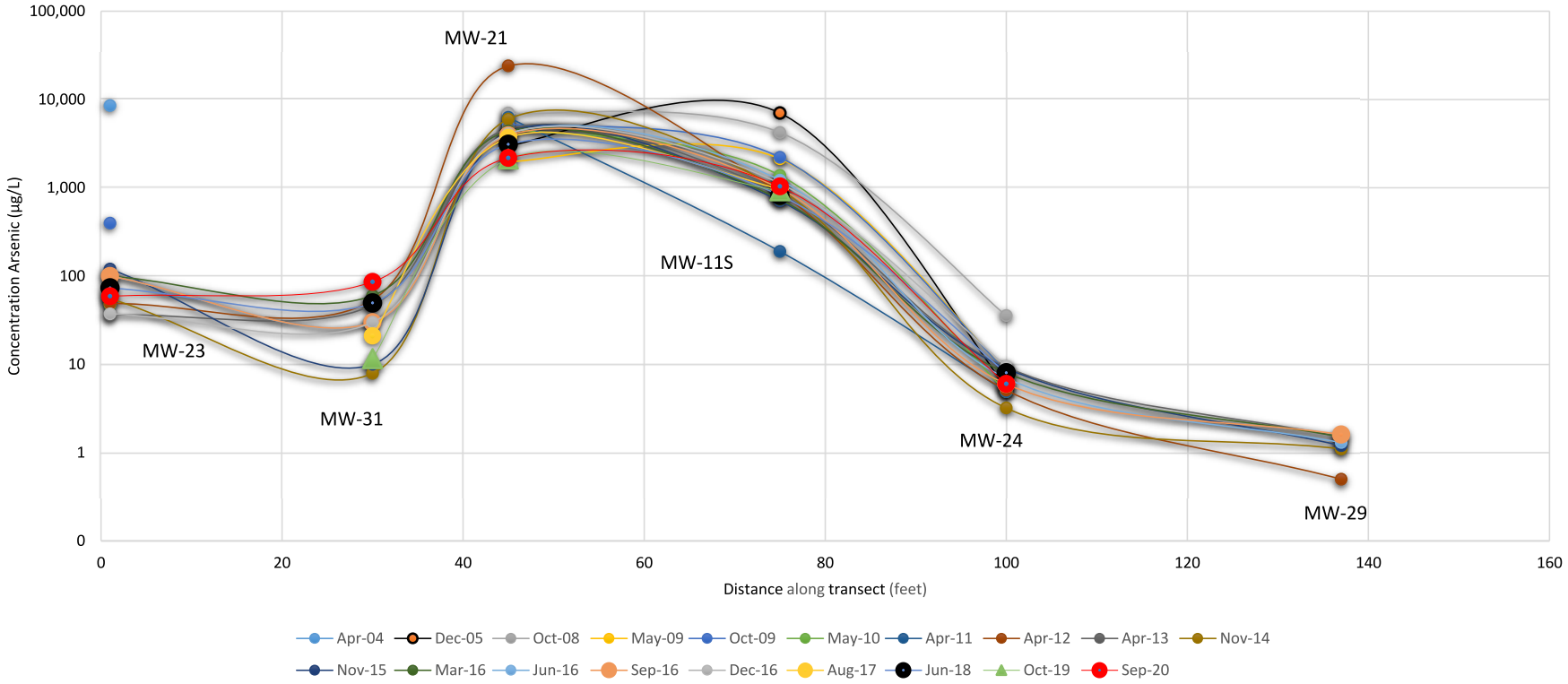

FIGURE 5-10. Arsenic Concentrations Along Transect Parallel to the Canal, April 2004 to September 2020
2020 Groundwater Monitoring Results and Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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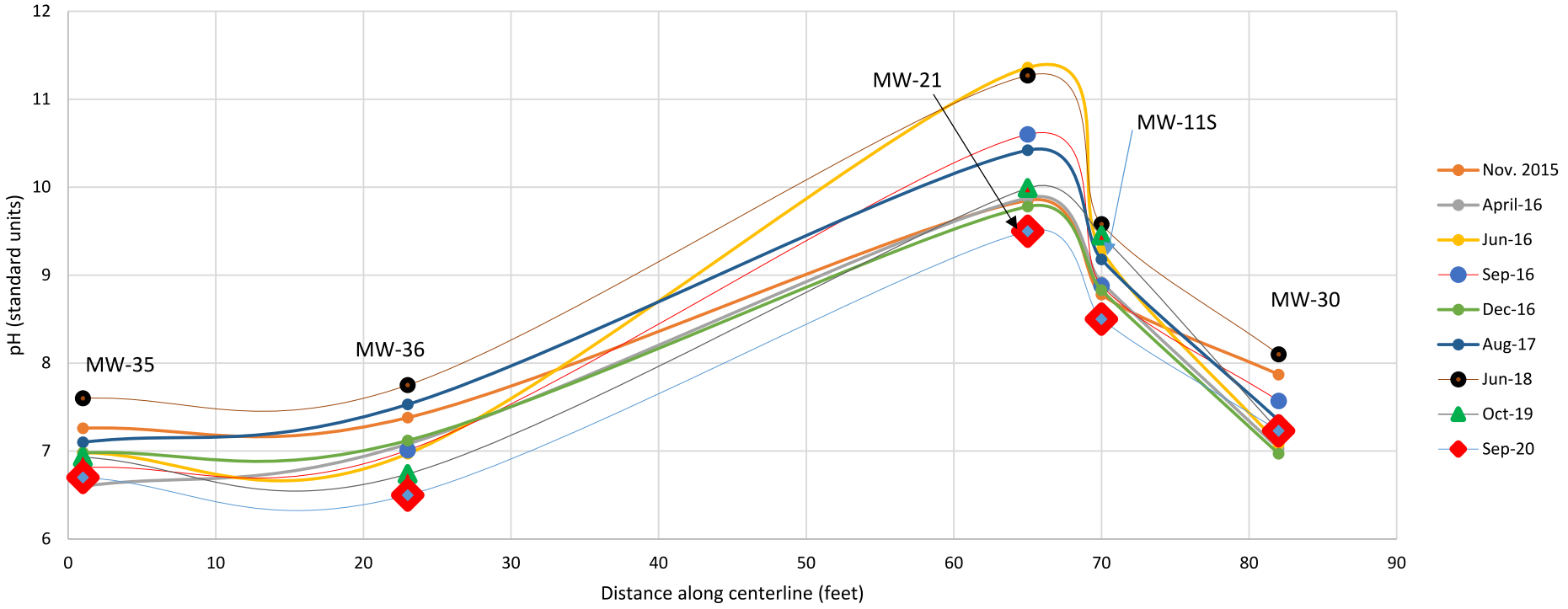

FIGURE 5-11. pH Along Center Line of Arsenic Plume
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
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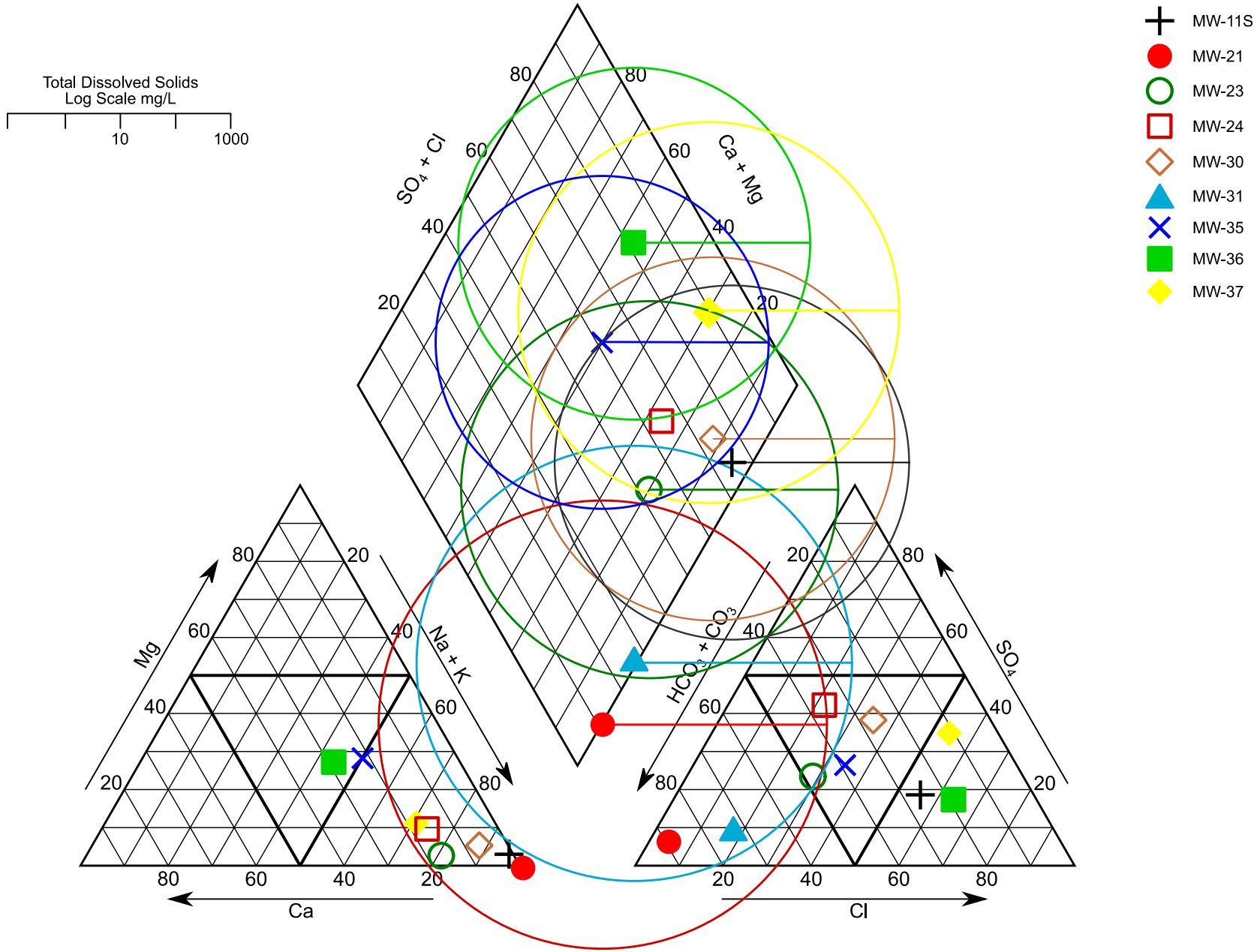

FIGURE 5-12. Piper Diagram of Major Ions in Groundwater at AOC D
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Report
Former Hampshire Chemical Coporation
Waterloo, New York

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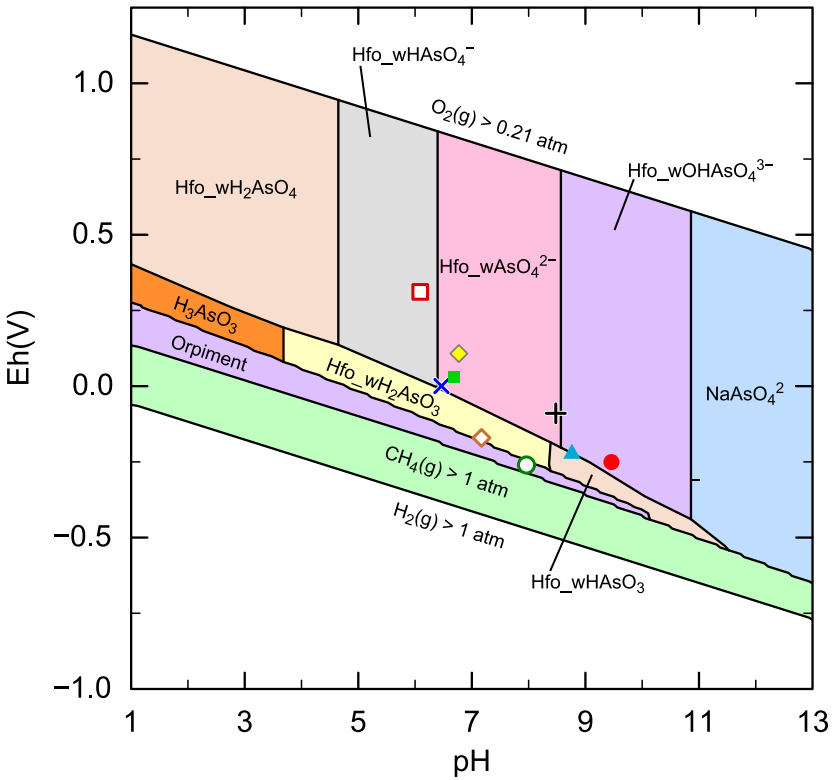

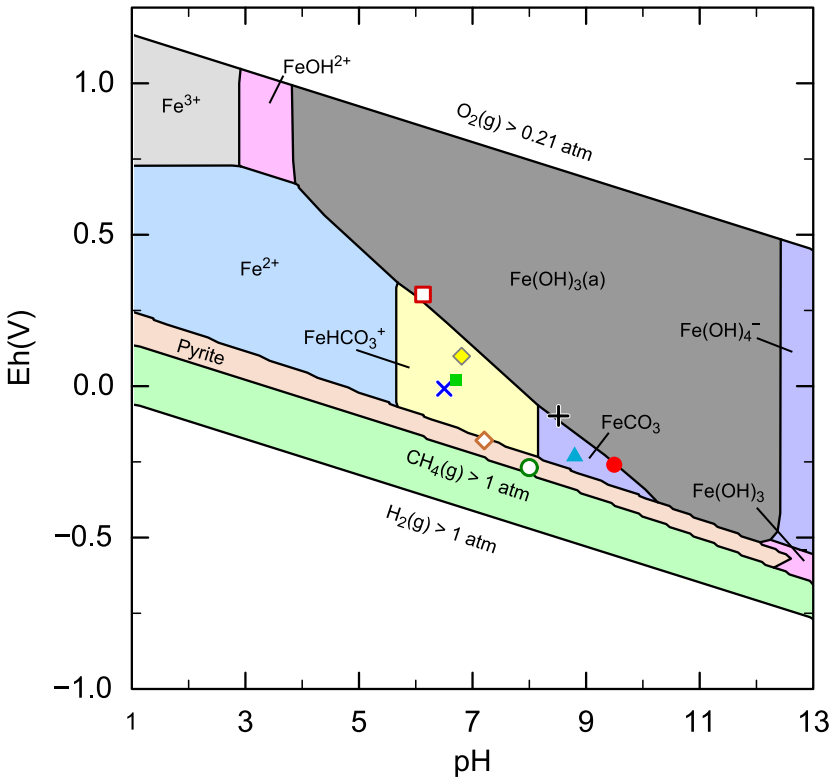

MW-11S
MW-21
MW-23
MW-24
MW-30
MW-31
MW-35
MW-36
MW-37

FIGURE 5-13. PhreePlot Diagram of Arsenic-Iron-Sulfide System for AOC D
2020 Groundwater Monitoring Results and
Monitored Natural Attenuation Evaluation Report
Former Hampshire Chemical Corporation
Waterloo, New York

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Appendix A
Analytical Data Packages and EQuIS Reports
(provided on compact disc)

Appendix B
Groundwater Sampling
Field Data Sheets

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-01**

SCREEN INTERVAL (ft BTOC): *3 - 16.5* START DATE: 9/9/20

WELL DIAMETER (INCHES): *2* FIELD CREW: E. Lettich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/9/20

DTW BEFORE PURGING (ft BTOC): 5.17 DEPTH TO BOTTOM (ft BTOC): 16.38 ___ Soft / ✓ Hard

REFERENCE: 1" well = 0.16 liter/ft or 0.041 gal/ft 2-inch well = 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): ~~5.17~~ 11.21 WELL VOLUME (LITERS): 6.9 3 WELL VOLUMES (LITERS): 20.7

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1055	6.42	400	0.25	21.56	7.36	-279	2.11	1.01	5.37	Initial state.
1103	5.98	300	2.6	19.98	7.10	-302	2.10	0.67	6.76	
1107	6.08	↓	3.8	19.45	7.03	-305	2.11	0.64	5.76	
1111	6.15	↓	5.0	18.87	6.96	-306	2.11	0.60	5.06	
1115	6.18	↓	6.2	18.57	6.89	-304	2.09	0.60	4.53	
1120	6.20	↓	7.4	18.50	6.87	-303	2.10	0.62	3.21	
1135	6.41			--	--	--	--	--		Final state.

NOTES: *May need to have totes moved for access.*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW01-* 090920 PRIMARY SAMPLE DATE & TIME: 09/09/20 1130

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME: NA

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA* None

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 1.27 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-02**	SCREEN INTERVAL (ft BTOC): *3 - 16.5*	START DATE: 9/4/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: D. Holmes / J Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* **(NO TEFLON-LINED TUBING)**

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/4/20

DTW BEFORE PURGING (ft BTOC): 4.08 DEPTH TO BOTTOM (ft BTOC): 16.12 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 12.04 WELL VOLUME (LITERS): 7.4 3 WELL VOLUMES (LITERS): 22.3

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME ~~(liters)~~ gal	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
0935	4.08	300	—	23.44	6.70	-396	~~0.50~~ 18.8	0.58	8.97	Initial state. Clear, black floating particulates,
0939	4.08	300	0.4	22.15	6.82	-447	19.1	0.39	8.69	sulfur like odor
0943	4.08	300	0.8	22.21	6.79	-460	16.5	0.37	7.27	" "
0947	4.08	300	1.2	22.32	6.83	-479	10.7	0.33	6.97	" "
0951	4.09	300	1.6	22.49	6.84	-482	6.91	0.34	6.69	" "
0955	4.09	300	2.0	22.65	6.87	-478	4.79	0.31	5.32	" "
0959	4.08	300	2.4	22.75	6.89	-476	3.94	0.30	4.04	" "
1003	4.08	300	2.8	22.84	6.90	-475	3.67	0.30	4.21	" "
1007	4.09	300	3.2	23.18	6.92	-477	3.53	0.28	4.07	" "
1011	4.09	300	3.6	23.35	6.90	-478	3.47	0.27	4.09	" "
1015	4.09	300	4.0	23.50	6.91	-478	3.44	0.26	4.02	" "
				--	--	--	--	--		Final state.

NOTES: *Requires PFAS and 1,4-dioxane sampling*

Ferrous Iron ~ 0.00 mg/L

~ 5gal purge water generated (grey & odorous)

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW02-090420* PRIMARY SAMPLE DATE & TIME: 9-4-20 / 1025

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *MNA,* ✓ *PFAS,* ✓ *1,4-Dioxane*

QA/QC SAMPLE ID: Dup-GW-090420 QA/QC SAMPLE DATE & TIME: 9-4-20 / ~~1025~~ 1000

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA,* ___ *PFAS,* ___ *1,4-Dioxane*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.00 mg/L SAMPLER'S SIGNATURE: Jenny Spies

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-03**	SCREEN INTERVAL (ft BTOC): *3 - 16.5*	START DATE: 9/3/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SATSBURG / LETTICH

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/3/20

DTW BEFORE PURGING (ft BTOC): 2.78 DEPTH TO BOTTOM (ft BTOC): 16.82 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 14.04 WELL VOLUME (LITERS): 8.66 3 WELL VOLUMES (LITERS): 25.98

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1535	3.49	300	–	23.64	6.57	-462	4.48	0.80	29.9	Initial state CLEAR/GREY
1539	4.13	250	0.8	22.6	6.49	-469	4.81	0.53	15.6	CLEAR/GREY
1543	4.60	200	1.5	22.7	6.51	-466	4.89	0.45	2.6	" "
1547	5.05	–	2.3	22.66	6.50	-467	4.90	0.39	0.1	
1551	–	–	3.1	22.55	6.52	-468	4.92	0.39	0.0	
1554	5.30	–	3.9	22.40	6.53	-469	4.95	0.38	0.0	
									2.34	LAMOTTE
				--	--	--	--	--		Final state.

NOTES: **LEVEL B SAMPLING**

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW03-* 090320 PRIMARY SAMPLE DATE & TIME: 1600 9/3/20

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.20 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-05I**	SCREEN INTERVAL (ft BTOC): *25 - 30*	START DATE: 9/10/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SALSBURG

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/10/20

DTW BEFORE PURGING (ft BTOC): 12.45 DEPTH TO BOTTOM (ft BTOC): 29.80 ___ Soft / ✓ Hard

REFERENCE: 1" well = 0.16 liter/ft or 0.041 gal/ft 2-inch well = 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 17.35 WELL VOLUME (LITERS): 10.7 3 WELL VOLUMES (LITERS): 32.1

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1056	14.85	300	—	18.73	7.34	-59	0.706	5.67	11.4	Initial state. CLEAR
1100	16.10	200	1.4	19.79	7.63	-58	0.690	4.77	3.04	CLEAR/ NO ODOR
1104	17.00	200	2	20.32	7.60	-48	0.688	4.05	3.80	CLEAR/ NO ODOR
1108	17.75	200	2.8	20.71	7.53	-44	0.679	3.79	2.89	
1112	18.04	180	3.6	20.87	7.53	-46	0.677	3.62	3.00	
1116	—	180	4.4	21.08	7.48	-48	0.675	3.15	4.04	
1120	18.90	200	5.2	21.28	7.35	-58	0.670	2.97	5.10	CLEAR
1124	19.32	200	6	21.30	7.30	-64	0.668	2.90	3.05	
1128	19.60	200	6.8	21.45	7.27	-71	0.666	2.75	3.89	
1132	19.92	200	7.6	21.80	7.23	-76	0.660	2.45	3.90	
1136	20.18	200	8.4	22.04	7.20	-82	0.657	2.37	2.21	
1140	20.42	200	9.2	21.50	7.10	-85	0.690	2.32	4.40	
1144	20.68	200	10	21.29	7.08	-89	0.750	2.30	2.92	
1148	20.85	200	10.8	18.20	7.08	-92	0.751	2.50	—	
1152	21.00	200	11.6	16.59	7.07	-98	0.752	2.56	3.60	
1156	21.22	200	12.4	16.62	7.02	-101	0.752	2.31	2.87	
1200	21.38	200	13.2	16.64	7.05	-105	0.752	2.26	2.04	
1204	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: *Bring cones for traffic control*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW05I-* 091020 PRIMARY SAMPLE DATE & TIME: 9/10/20 1204

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ✓ *Tot. & Diss. Metals*, ✓ *SVOCs*, ✓ *PAHs*

QA/QC SAMPLE ID: TW05I-091020MS/MSD QA/QC SAMPLE DATE & TIME: 9/10/20 1204

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ✓ *SVOCs*, ✓ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-06**	SCREEN INTERVAL (ft BTOC): *4 - 14*	START DATE: 9/10/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SALSBURG

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/10/20

DTW BEFORE PURGING (ft BTOC): 4.90 DEPTH TO BOTTOM (ft BTOC): 13.40 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 8.5 WELL VOLUME (LITERS): 5.2 3 WELL VOLUMES (LITERS): 15.7

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1520	5.15	300	—	20.62	6.43	19	0.955	3.60	38.1	Initial state. LT BROWN
1524	5.40	300	1.2	19.71	6.38	23	0.960	3.17	24.6	NO ODOR
1528	5.85	300	2.4	16.80	6.38	24	1.02	3.9	18.2	
1532	6.15	300	3.6	16.89	6.37	25	1.02	3.13	11.0	CLEAR
1536	6.55	300	4.8	16.98	6.37	23	1.02	3.37	5.72	CLEAR
1540	6.70	300	6	17.18	6.40	22	1.03	3.60	6.21	
1544	6.85	300	7.2	17.27	6.41	19	1.04	3.50	4.04	
1548	7.11	300	8.4	17.28	6.40	17	1.06	3.68	3.92	CLEAR
1552	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: DO SENSOR STARTED GIVING WIDE VARIABILITY AROUND 15:36. WILL REPLACE CERTIFICATE AFTER

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW06-* 091020 PRIMARY SAMPLE DATE & TIME: 9/10/20 1552

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *SVOCs,* ✓ *PAHs*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *SVOCs,* ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-07**	SCREEN INTERVAL (ft BTOC): *3 - 13*	START DATE: 9/10/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SALSBURG

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/10/20

DTW BEFORE PURGING (ft BTOC): 5.92 DEPTH TO BOTTOM (ft BTOC): 12.55 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 6.63 WELL VOLUME (LITERS): 4.1 3 WELL VOLUMES (LITERS): 12.3

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1416	6.33	300	—	24.06	6.50	-101	3.12	0.62	58.4	Initial state. LT BROWN
1420	6.60	225	0.9	22.04	6.34	-92	2.37	0.85	39.6	
1424	6.90	225	1.8	21.90	6.19	-69	1.90	0.71	30.6	
1428	7.15	225	2.7	21.81	6.15	-51	1.72	0.64	18.4	CLEAR / NONE
1432	7.40	225	3.6	21.80	6.10	-44	1.79	0.54	16.6	" "
1436	7.63	225	4.5	21.76	6.12	-45	1.88	0.52	15.6	CLEAR
1440	7.44	225	5.4	21.72	6.11	-44	2.09	0.49	12.1	
1444	8.15	200	6.2	21.65	6.13	-45	2.20	0.48	11.0	
1448	8.32	200	7	21.62	6.14	-42	2.31	0.48	10.2	
1452	8.45	200	7.7	21.56	6.15	-45	2.34	0.49	10.7	
1456	SAMPLE									
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW07-* 091020 PRIMARY SAMPLE DATE & TIME: 9/10/20 1456

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *SVOCs,* ✓ *PAHs*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *SVOCs,* ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-09R**	SCREEN INTERVAL (ft BTOC): 6 - 16	START DATE: 9-9-20
	WELL DIAMETER (INCHES): 2	FIELD CREW: Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-9-20

DTW BEFORE PURGING (ft BTOC): 5.75 DEPTH TO BOTTOM (ft BTOC): 15.19 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 9.44 WELL VOLUME (LITERS): 5.82 3 WELL VOLUMES (LITERS): 17.47

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1332	5.95	500	—	23.41	5.81	-159	5.00	3.07	23.9	Initial state.
1336	6.01	350	0.4	23.21	5.90	-172	4.91	2.13	21.7	Clear, very light Brown, H2S odor, Suspended brown & black particles visible
1340	6.20	350	0.8	22.71	6.22	-244	4.06	1.10	8.45	SAA No color
1344	6.33	350	1.0	22.99	6.29	-279	3.97	0.88	3.97	SAA
1348	6.72	350	1.3	23.38	6.28	-297	4.17	0.94	6.81	SAA
1352	7.57	450	2.0	23.35	6.29	-310	4.28	0.96	8.14	SAA
1356	7.75	300	2.2	23.34	6.25	-310	4.29	0.92	8.73	SAA
1400	8.06	350	2.5	23.31	6.27	-312	4.30	0.90	8.42	SAA
			Collect Sample							
				--	--	--	--	--		Final state.

NOTES: Dup for metals Collected

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW09R-GW-090920 PRIMARY SAMPLE DATE & TIME: 09-09-20 / 1405

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ SVOCs, ✓ PAHs

QA/QC SAMPLE ID: Dup-GW-090920-2 QA/QC SAMPLE DATE & TIME: 9-9-20 / 1405

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ✓ Tot. & Diss. Metals, ___ SVOCs, ___ PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-10** | SCREEN INTERVAL (ft BTOC): 4 - 14 | START DATE: 9-10-20

WELL DIAMETER (INCHES): 2 | FIELD CREW: Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* | METER CALIBRATION DATE: 9-10-20

DTW BEFORE PURGING (ft BTOC): 8.03 | DEPTH TO BOTTOM (ft BTOC): 12.96 | ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft | 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft | 1 gallon = 3.785 liters | 1 liter = 0.264 gallons

WATER COLUMN (FT): 4.93 | WELL VOLUME (LITERS): 3.04 | 3 WELL VOLUMES (LITERS): 9.12

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME ~~(Liters)~~	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1104	8.29	300	-	18.21	6.55	-160	1.69	2.92	95.9	Initial state.
1108	8.48	200	0.2	17.65	6.48	-155	1.59	2.31	58.9	Very light Brown, No odor, Fine Suspended Particles
1112	8.91	300	-	17.09	6.47	-131	1.35	3.17	47.6	Clear, No color, No odor, Fine Suspended particles visible
1116	9.37	300	-	16.99	6.56	-114	1.14	1.91	42.1	SAA
1120	9.72	300	-	17.07	6.61	-91	1.08	0.90	12.81	Clear, No color, No odor, Very few Suspended particles
1124	10.37	300	1.4	16.81	6.57	-80	1.23	0.66	8.74	SAA
1128	10.82	300	-	16.68	6.55	-95	1.31	0.64	5.14	Clear, No Color, No odor
1132	11.27	300	-	16.60	6.54	-109	1.40	0.61	4.68	SAA
1136	11.73	300	2.6	16.45	6.52	-131	1.56	0.64	4.27	SAA
1140	12.22	350	-	16.27	6.50	-146	1.65	0.59	3.74	SAA
1144	12.74	350	-	16.05	6.50	-166	1.80	0.63	5.63	SAA
1148	12.90	x	3.7	16.48	6.54	-156	x	x	x	Well went dry
1208	12.44	300		19.02	6.61	-149	1.75	2.64	767	Purged dry
1630	10.65									
				--	--	--	--	--		Final state.

NOTES: Well went dry @ 1148

Purged dry @ 1210, allow to recharge before Sampling

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW10-*091020 | PRIMARY SAMPLE DATE & TIME: 9-10-20 1640

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ___ *Tot. & Diss. Metals*, ✓ *SVOCs*, ___ *PAHs*

QA/QC SAMPLE ID: None | QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *SVOCs*, ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required | SAMPLER'S SIGNATURE: Jay Spies

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-11S**	SCREEN INTERVAL (ft BTOC): *4 - 14*	START DATE: 9/4/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: D. Holmes

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* ***(NO TEFLON-LINED TUBING)***

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: ~~13.70~~ 9/4/20

DTW BEFORE PURGING (ft BTOC): 1.78 DEPTH TO BOTTOM (ft BTOC): 13.70 ✓ Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 11.92 WELL VOLUME (LITERS): 7.35 3 WELL VOLUMES (LITERS): 22

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1153	2.62	300	–	27.58	8.19	-263	3.17	1.18	7.88	Initial state. Clear, no odor
1157	3.60	300	0.4	25.39	8.57	-291	3.19	0.66	5.81	" "
1201	4.32	280	0.8	24.85	8.56	-305	3.06	0.58	4.41	" "
1205	4.62	280	1.2	24.76	8.56	-309	2.96	0.54	4.23	" "
1209	4.98	280	1.6	24.69	8.58	-305	2.83	0.52	3.83	" "
1213	5.20	250	1.9	24.71	8.48	-303	2.78	0.51	1.72	" "
1217	5.38	250	2.2	24.72	8.48	-307	2.76	0.50	2.11	" "
1220	5.50	250	2.5	24.72	8.49	-307	2.75	0.49	1.39	" "
1224	5.63	250	2.8	24.70	8.50	-307	2.74	0.49	1.45	" "
1230	—	Collect Sample								
				--	--	--	--	--		Final state.

NOTES: *Requires PFAS and 1,4-dioxane sampling*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW11S-* 090420 PRIMARY SAMPLE DATE & TIME: 9/4/20 1230

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA,* ✓ *PFAS,* ✓ *1,4-Dioxane*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME: None

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA,* ___ *PFAS,* ___ *1,4-Dioxane*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.12 SAMPLER'S SIGNATURE: [signature]

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-16I**	SCREEN INTERVAL (ft BTOC): *30.5 - 35.5*	START DATE: 9/17/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SAS/BLR

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/17/20

DTW BEFORE PURGING (ft BTOC): 26.23 DEPTH TO BOTTOM (ft BTOC): 36.45 __ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 10.22 WELL VOLUME (LITERS): 6.3 3 WELL VOLUMES (LITERS): 18.9

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1624	26.30	300	–	17.66	6.40	-186	1.08	3.52	26.8	Initial state. LT BROWN
1629	26.34	300	1.0	17.36	6.41	-185	1.06	3.46	18.3	LT BROWN
1632	26.36	250	2	17.38	6.35	-182	1.06	3.44	22.8	CLEAR
1636	26.40	200	2.7	17.11	6.40	-185	1.05	3.02	24.9	CLEAR
1640	26.42	200	3.4	17.16	6.41	-187	1.05	2.62	21.4	
1644	26.44	200	3.9	16.73	6.42	-189	1.04	2.54	23.0	CLEAR
1648	26.49	200	4.4	16.77	6.42	-188	1.05	2.60	24.8	CLEAR
1650	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: *To be sampled with a bladder pump due to depth to water*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW16I-* 091720 PRIMARY SAMPLE DATE & TIME: 1650 9/17/20

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *PAHs*

QA/QC SAMPLE ID: – QA/QC SAMPLE DATE & TIME: –

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-17** | SCREEN INTERVAL (ft BTOC): *15.3 - 25.3* | START DATE: 9/17/20

WELL DIAMETER (INCHES): *2* | FIELD CREW: SALSBURG

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* **(NO TEFLON-LINED TUBING)**

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* | METER CALIBRATION DATE: 9/17/20

DTW BEFORE PURGING (ft BTOC): 22.53 | DEPTH TO BOTTOM (ft BTOC): DID NOT MEASURE Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft | 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft | 1 gallon = 3.785 liters | 1 liter = 0.264 gallons

WATER COLUMN (FT): 3.37 | WELL VOLUME (LITERS): 2.08 | 3 WELL VOLUMES (LITERS): 6.24

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1105	22.73	300	—	18.40	6.16	-211	0.002	1.26	88.2	Initial state. LT BROWN
1109	22.75	300	1.2	14.94	6.37	-223	1.51	0.77	36.4	CLEARING UP
1113	22.76	300	2.4	14.68	6.37	-227	1.51	0.61	12.9	CLEAR
1117	22.77	300	3.6	14.62	6.39	-230	1.51	0.54	14.0	
1121	22.77	300	4.8	14.60	6.38	-231	1.50	0.51	6.42	
1125	22.78	300	6	14.59	6.39	-232	1.50	0.50	2.06	
1129	22.78	300	7.2	14.54	6.40	-233	1.50	0.45	2.11	
1134	—	-	-	-	-	-	-	-	-	
1138	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: *1) Requires PFAS and 1,4-dioxane sampling. 2) Typically produces sufficient water for QA/QC suite. 3) May require ventilation due to history of headspace methane above LEL.* HDPE, COTTON COVERALLS, BACK PEN, METAL CLIPBOARD, CLEAN HANDLES FOR SAMPLING + PURGE + HANDLING TUBING - DIDN'T MEASURE DTB FOR FEAR OF X-CONTAMINATION, EVEN THO DTW METER WAS DECONNED

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW17-* 091720 | PRIMARY SAMPLE DATE & TIME: 9/17/20 11:38

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *PAHs,* ✓ *PFAS,* ✓ *1,4-dioxane*

QA/QC SAMPLE ID: MW17-091720-MS/MSD | QA/QC SAMPLE DATE & TIME: 9/17/20 11:38

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ___ Tot. & Diss. Metals, ___ PAHs, ___ PFAS, ___ 1,4-dioxane

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required | SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-18**	SCREEN INTERVAL (ft BTOC): *6.3 - 12.3*	START DATE: 9/17/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: C. Lattich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/17/20

DTW BEFORE PURGING (ft BTOC): 12.64 DEPTH TO BOTTOM (ft BTOC): 13.70 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 1.06 WELL VOLUME (LITERS): 0.65 3 WELL VOLUMES (LITERS): 1.96

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
0900	12.64	300	0	16.65	5.65	-172	1.78	1.67	OR	Initial state. brown gray, sulfur odor
0904	Well goes dry. Allow to recharge									
1100	Purged sampled volume until dry									
1330	Completed collecting sample volume									
				--	--	--	--	--		Final state.

NOTES: *May require several purge-recharge cycles for sufficient sample volume.*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW18-* 091720 PRIMARY SAMPLE DATE & TIME: 9/17/20 1330

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *PAHs*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-19**	SCREEN INTERVAL (ft BTOC): *8 - 18*	START DATE: 9-10-20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SJ, ES

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-10-20

DTW BEFORE PURGING (ft BTOC): 9.44 DEPTH TO BOTTOM (ft BTOC): 17.2 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 7.76 WELL VOLUME (LITERS): 4.79 3 WELL VOLUMES (LITERS): 14.4

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
910	9.42	250	—	23.74	5.32	-64	1.47	1.57	76	Initial state.
914	9.81	300	.3	22.74	6.07	-131	1.40	0.97	80	Brown white, cloudy, odorless, some suspended particles
918	10.18	300	.6	22.64	6.14	-129	1.40	0.82	608	SAA more turbid
922	10.52	300	.9	19.49	6.17	-138	1.44	0.70	47.0	Clear, odorless, very light grey, suspended particles visible
926	11.06	300	1.2	19.51	6.22	-146	1.42	0.59	16.4	Clear, odorless, no color, suspended particles visible
930	11.42	400	1.6	19.55	6.24	-157	1.42	0.58	9.40	SAA
934	11.81	490	2.0	19.44	6.29	-181	1.45	0.55	8.27	SAA
938	12.50	400	2.5	19.21	6.31	-189	1.45	0.57	7.29	SAA
942	12.92	400	3.0	19.01	6.33	-194	1.45	0.55	4.08	SAA
946	13.51	400	3.5gal	18.82	6.35	-198	1.44	0.54	4.22	SAA
			Collect Sample @ 950							
				--	--	--	--	--		Final state.

NOTES: *History of high methane concentrations in the wellhead. Requires ventilation fan.*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW19-*[illegible]-091020 PRIMARY SAMPLE DATE & TIME: 9-10-20 / 950

PRIMARY SAMPLE PARAMETERS (check): X VOCs, X Tot. & Diss. Metals, X SVOCs, X PAHs

QA/QC SAMPLE ID: Dup-GW-091020 QA/QC SAMPLE DATE & TIME: 9-10-20 / 955

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, X Tot. & Diss. Metals, X SVOCs, X PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE: [signature]

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-20**	SCREEN INTERVAL (ft BTOC): *6 - 16*	START DATE: 9-4-20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: Sykes

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* ***(NO TEFLON-LINED TUBING)***

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-4-20

DTW BEFORE PURGING (ft BTOC): 9.85 DEPTH TO BOTTOM (ft BTOC): — ___ Soft / ___ Hard

REFERENCE: 1" well = 0.16 liter/ft or 0.041 gal/ft 2-inch well = 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): — WELL VOLUME (LITERS): — 3 WELL VOLUMES (LITERS): —

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1211	10.43	300	—	26.47	7.14	-204	0.842	0.58	260	Initial state. Light brown, Turbid, No odor
1215	10.38	300	0.2	22.24	6.95	-155	0.847	2.46	609	SAA, Some suspended particles
1219	10.52	300	0.5	20.38	6.87	-159	0.837	1.24	over	SAA
1223	10.72	200	0.7	18.14	6.81	-144	0.842	1.43	210	SAA
1227	11.25	300	1.0	16.69	6.76	-95	0.826	1.65	47.3	Clear, No odor, Very Lt Brown, Some vis. Partic Susp
1231	11.70	350	1.4	16.55	6.75	-89	0.825	1.41	39.2	SAA
1235	12.05	300	1.7	16.57	6.81	-94	0.824	1.07	16.5	Clear, No odor, No color
1239	12.32	300	2.0	16.61	6.84	-97	0.814	0.62	8.4	SAA
1243	12.74	300	2.3	16.50	6.87	-96	0.809	0.57	5.1	SAA
1247	13.08	300	2.6	16.62	6.86	-95	0.807	0.57	4.8	SAA
				--	--	--	--	--		Final state.

NOTES: *Requires PFAS and 1,4-dioxane sampling*

MS/MSD Collected

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW20-* 090420 PRIMARY SAMPLE DATE & TIME: 9-4-20 / 1255

PRIMARY SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *SVOCs*, ___*PAHs*, ___PFAS, ___1,4-dioxane

QA/QC SAMPLE ID: MW20-090420-MS / MW20-090420-MSD QA/QC SAMPLE DATE & TIME: 9-4-20 / 1255

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, / Tot. & Diss. Metals, ___ SVOCs, ___PAHs, ___PFAS, ___1,4-dioxane

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE: Jay Sykes

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-21**	SCREEN INTERVAL (ft BTOC): *3.8 - 13.8*	START DATE: 9/9/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: C. Lethich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* — METER CALIBRATION DATE: 9/9/20

DTW BEFORE PURGING (ft BTOC): 3.96 — DEPTH TO BOTTOM (ft BTOC): 13.08 — ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft — 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft — 1 gallon = 3.785 liters — 1 liter = 0.264 gallons

WATER COLUMN (FT): 9.84 — WELL VOLUME (LITERS): 6.07 — 3 WELL VOLUMES (LITERS): 18.2

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1440	3.96	200	0	24.64	9.53	-505	17.5	0.48	0.68	Initial state. brown like cola
1448	4.87	500	2	24.55	9.54	-519	17.6	0.39	1.02	
1452	5.06	500	3	24.47	9.56	-545	17.8	0.38	1.96	
1456	5.34	500	4	24.49	9.54	-557	17.4	0.30	2.01	
1504	5.75	550	6	25.15	9.57	-561	16.5	0.25	1.61	
1508	5.96	500	7	25.05	9.55	-558	15.9	0.25	1.40	
1512	6.29	500	8	26.20	9.54	-560	15.6	0.27	1.58	
1516	6.58	500	9	27.21	9.54	-557	15.5	0.25	1.62	
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW21-* 090920 — PRIMARY SAMPLE DATE & TIME: 9/9/20 1515

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: None — QA/QC SAMPLE DATE & TIME: NA

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA* — NA

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.00 — SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: MW-23 | SCREEN INTERVAL (ft BTOC): 2.7-12.7 | START DATE: 9/9/20

WELL DIAMETER (INCHES): 2 | FIELD CREW: CL, HH

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* | METER CALIBRATION DATE: 9/9/20

DTW BEFORE PURGING (ft BTOC): 3.68 | DEPTH TO BOTTOM (ft BTOC): 12.3 | ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft | 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft | 1 gallon = 3.785 liters | 1 liter = 0.264 gallons

WATER COLUMN (FT): 9.02 | WELL VOLUME (LITERS): 5.57 | 3 WELL VOLUMES (LITERS): 16.7

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
0916	3.68	250	0	24.69	8.34	-356	12.2	1.55	13	Initial state. Silty, odor
0920	3.76	300	1.0	24.21	8.89	-384	12.5	0.68	6.66	lt. brown yellow
0924	3.78	↓	2.2	23.03	8.91	-411	12.6	0.46	4.66	
0928	3.79	↓	3.4	21.90	9.10	-450	8.91	0.42	3.59	
0932	3.80	↓	4.6	22.29	8.38	-447	5.97	0.37	3.02	
0936	3.80	↓	5.8	22.50	8.03	-460	5.28	0.37	1.75	
0940	3.80	↓	7.0	22.53	8.01	-464	5.25	0.33	1.65	
0944	3.81	↓	8.2	22.64	7.98	-468	5.14	0.32	0.79	
1020	3.76			--	--	--	--	--		Final state. lt yellow brown

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: ~~MW23-090920~~ MW23-090920 | PRIMARY SAMPLE DATE & TIME: 9/9/20 0940

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ MNA, ___ PAHs, ___ SVOCs, ___ PFAS, ___ 1,4-dioxane

QA/QC SAMPLE ID: MW23-090920 MS/MSD | QA/QC SAMPLE DATE & TIME: 9/9/20 0950

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ___ MNA, ___ PAHs, ___ SVOCs, ___ PFAS, ___ 1,4-dioxane

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.07 | SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-24**	SCREEN INTERVAL (ft BTOC): *4 - 14*	START DATE: 9/9/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SALZBURG

EQUIPMENT: *Peristaltic pump with one time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/9/20

DTW BEFORE PURGING (ft BTOC): 4.71 DEPTH TO BOTTOM (ft BTOC): 13.80 __ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 9.09 WELL VOLUME (LITERS): 5.6 3 WELL VOLUMES (LITERS): 16.8

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1449	5.40	300	–	26.32	6.31	-195	4.40	1.75		Initial state. CLEAR/GREY
1453	5.84	300	1.2	23.44	6.21	-219	4.37	1.06	11.9	CLEAR
1457	7.70	300	2.4	23.58	6.13	-250	2.94	0.87	9.67	CLEAR
1501	8.08	200	3	24.13	6.03	-272	2.57	0.79	10.4	CLEAR
1505	8.95	200	3.8	24.97	6.08	-281	2.77	0.77	7.98	CLEAR
1509	9.90	175	4.2	24.97	6.13	-278	3.11	0.73	9.20	CLEAR
1513	10.62	175	4.6	24.80	6.16	-276	4.26	0.70		
1517	11.50	175	5.2	24.75	6.19	-242	4.12	0.79	11.4	CLEAR
1520	ALLOW TO RECHARGE. DTW = 12.00'									
1620	9.32	175	5.3	–	–	–	–	–	–	
1628	9.75	175	5.6	30.89	6.14	-146	4.16	1.79	8.20	CLEAR
1632	11.25	180	6.3	24.43	6.06	-142	4.13	1.83	7.46	CLEAR
1636	11.80	180	7.0	22.56	6.07	-154	4.02	1.26	–	
				22.23	6.12	-171	4.04	1.15	6.89	
				--	--	--	--	--		Final state.

NOTES: HAD TO ALLOW OVERNIGHT RECHARGE

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW24-* ~~090920~~ 091020 PRIMARY SAMPLE DATE & TIME: 9/10/20 9:30 ~~10:00~~ 9/9/20

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-26**	SCREEN INTERVAL (ft BTOC): *7.5 - 17.5*	START DATE: 9/17/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SAS, BMG

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/17/20

DTW BEFORE PURGING (ft BTOC): 12.23 DEPTH TO BOTTOM (ft BTOC): 18.00 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 5.77 WELL VOLUME (LITERS): 3.56 3 WELL VOLUMES (LITERS): 10.7

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
950	12.32	300	–	19.73	5.59	-108	0.809	1.42	21.2	Initial state. CLEAR
954	12.35	300	1.2	20.47	6.13	-163	0.778	0.81	8.20	CLEAR
958	12.34	300	2.4	20.77	6.25	-179	0.772	0.71	4.45	CLEAR
1002	12.36	300	3.6	20.91	6.34	-189	0.769	0.62	4.04	CLEAR
1006	12.33	300	4.8	20.92	6.35	-192	0.769	0.60	3.21	
1010	12.32	300	6	20.94	6.39	-193	0.768	0.58	2.17	CLEAR
1014	12.31	300	7.2	20.94	6.42	-195	0.767	0.55	1.32	
1018	12.30	300	8.4	20.99	6.43	-198	0.767	0.54	1.30	
1022	12.30	300	9.6	21.01	6.44	-199	0.766	0.53	2.00	
1045	12.28	300		--	--	--	--	--	1.60	Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW26-* 091720 PRIMARY SAMPLE DATE & TIME: 9/17/20 1025

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ PAHs

QA/QC SAMPLE ID: Dup-GW-091720-2 QA/QC SAMPLE DATE & TIME: 9/17/20 1030

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-30**

SCREEN INTERVAL (ft BTOC): *3.6 - 13.6* START DATE: 9/4/20

WELL DIAMETER (INCHES): *2* FIELD CREW: D. Holmes

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* ***(NO TEFLON-LINED TUBING)***

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/4/20

DTW BEFORE PURGING (ft BTOC): 4.62 DEPTH TO BOTTOM (ft BTOC): 13.32 ✓ Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 8.7 WELL VOLUME (LITERS): 5.37 3 WELL VOLUMES (LITERS): 16.1

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	slight yellowish tint
1018	4.69	300	—	23.98	6.90	-171	7.77	8.30	17.3	Initial state. Clear / Very slight sulfur like.
1022	4.70	300	0.4	23.04	7.06	-220	7.87	7.68	7.09	" "
1026	4.70	300	0.8	22.52	7.32	-364	7.43	5.58	5.23	" "
1030	4.70	300	1.2	22.63	7.34	-371	4.48	7.27	3.88	" "
1034	4.70	300	1.6	22.77	7.31	-374	3.84	7.09	4.85	" "
1038	4.70	300	2.0	22.92	7.25	-375	3.59	6.78	4.38	" "
1042	4.70	300	2.4	23.09	7.22	-376	3.48	6.46	4.09	" "
1046	4.70	300	2.8	23.21	7.21	-377	3.43	6.19	3.68	" "
1050	4.70	300	3.2	23.34	7.19	-377	3.39	5.99	3.34	" "
1055	—	—	Collect Sample	—	—	—	—	—	—	—
				--	--	--	--	--		Final state.

NOTES: *Requires PFAS and 1,4-dioxane sampling*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW30-* 090420 PRIMARY SAMPLE DATE & TIME: 9/4/20 1055

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA,* ✓ *PFAS,* ✓ *1,4-Dioxane*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME: None

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA,* ___ *PFAS,* ___ *1,4-Dioxane*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.22 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-31**

SCREEN INTERVAL (ft BTOC): 7 - 17 START DATE: 9-10-20

WELL DIAMETER (INCHES): 2 FIELD CREW: Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-10-20

DTW BEFORE PURGING (ft BTOC): 4.17 DEPTH TO BOTTOM (ft BTOC): 16.08 ✓ Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 11.91 WELL VOLUME (LITERS): 7.34 3 WELL VOLUMES (LITERS): 22.02

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME ~~(liters)~~ gal	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1411	4.54	250	—	24.17	8.54	-318	7.09	3.06	5.80	Initial state.
1415	5.92	300		22.12	8.68	-345	7.42	0.71	5.03	Brown, little color, mild odor, suspended particles w/ silt present
1419	7.91	300		21.40	8.73	-369	7.50	1.02	8.10	SAA
1423	9.24	300		21.51	8.76	-393	7.04	1.34	2.91	SAA
1427	10.87	300		21.62	8.79	-404	5.83	1.68	7.36	SAA
1431	11.53	400		22.16	8.77	-410	3.89	1.91	5.02	SAA
1435	12.05	350		22.29	8.82	-430	4.39	2.00	4.00	SAA
1439	12.68	300		22.47	8.81	-431	5.74	2.10	1.90	SAA
1443	13.41	350		21.70	8.79	-433	6.97	2.21	4.32	SAA
1448	13.95	300		21.26	8.79	-433	7.44	2.28	4.08	SAA
1452	14.79	350		21.03	8.79	-431	7.60	2.29	1.02	SAA
1456	15.68	350	4.0	20.89	8.79	-429	7.65	2.29	0.43	SAA
1457	well	dry								
1623	14.22									
9/11/20 1125	13.03									
				--	--	--	--	--		Final state.

NOTES: *May require mulitple purge-recharge cycles to collect sufficient sample volume*

Purged well dry @ 1457, allow to recharge before Sampling

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW31-* 091120 PRIMARY SAMPLE DATE & TIME: 09-11-20 / 1130

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): SAMPLER'S SIGNATURE: Jay Spies

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-33**	SCREEN INTERVAL (ft BTOC): *3 - 13*	START DATE: 9/2/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: SALSBURG/LETTIERI

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" low-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/2/20

DTW BEFORE PURGING (ft BTOC): 0.55 DEPTH TO BOTTOM (ft BTOC): Not gauged ~~Soft~~ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 12.45 WELL VOLUME (LITERS): 7.68 3 WELL VOLUMES (LITERS): 23

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1724	1.5	—	—	20.81	7.12	-400	10.7	0.96	0.0	Initial state. CLEAN/GREY
1728	2.60	300	—	21.33	7.16	-431	10.7	0.74	0.0	CLEAR/GREY
1732	2.81	300	4	21.50	7.14	-437	11.1	0.70	0.0	" "
1736	3.17	250	6.5	21.87	7.11	-444	11.3	0.64	0.0	GREY
1740	3.40	250	7.5	22.0	7.17	-452	10.6	0.63	31	BLACK TO GREY,
1744	3.55	250	8.5	21.83	7.17	-453	9.70	0.60	26	FREQUENT DARK
1748	3.85	300	10	21.96	7.20	-458	10.1	0.59	14.3	GREY COLOR
1752	4.15	350	12	22.11	7.22	-460	10.0	0.57	14.5	CHANGES. SOMETIMES
1756	4.15	350	14	22.19	7.23	-459	10.3	0.56	15.3	IT'S CLEAR
				--	--	--	--	--		Final state.

NOTES: NOTICE INNER CASING STAINED BLACK WHEN WATER DRAWS DOWN
- FLOW RATE IS APPROXIMATE, VOLUME IN CARBOY BEST ESTIMATE

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW33-* 090220 PRIMARY SAMPLE DATE & TIME: 9/2/20 1800

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals* ✓ *MNA*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-34**

SCREEN INTERVAL (ft BTOC): 5 - 15 START DATE: 9-3-20

WELL DIAMETER (INCHES): 2 FIELD CREW: Salsburg/Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-3-20

DTW BEFORE PURGING (ft BTOC): 2.42 DEPTH TO BOTTOM (ft BTOC): — ___ Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): — WELL VOLUME (LITERS): — 3 WELL VOLUMES (LITERS): —

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
										Initial state.
930	2.90	—	0	22.30	6.75	-381	1.80	9.23	54.9	Clear, no color
934	3.40	150	0.5	22.00	6.93	-399	1.76	8.79	29.5	SAA
938	3.60	150	1.0	21.97	6.91	-412	1.73	7.56	17.4	SAA
942	3.80	300	2.0	21.81	6.82	-419	1.72	6.28	4.8	SAA
946	3.95	300	3.0	21.78	6.79	-417	1.66	5.14	0.2	SAA
950	4.10	300	4.0	21.75	6.78	-414	1.54	4.71	0.0	SAA
954	3.95	300	5.2	21.57	6.99	-432	1.49	0.47	0.0	SAA Switched Carboy + Sample
958	4.05	300	6.0	21.46	6.96	-429	1.45	0.44	0.0	SAA Peri Pump ~ 2 min
1002	4.10	300	7.0	21.46	7.00	-432	1.40	0.43	0.0	SAA
				--	--	--	--	--		Final state.

NOTES: Turbidity before Sampling → 5.60 NTU

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW34-* 090320 PRIMARY SAMPLE DATE & TIME: 9-3-20 / 1010

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ✓ *Tot. & Diss. Metals*, ✓ *MNA*

QA/QC SAMPLE ID: QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.50 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-35**

SCREEN INTERVAL (ft BTOC): *4 - 14* START DATE: 9/11/20

WELL DIAMETER (INCHES): *2* FIELD CREW: SAR SBR

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE:

DTW BEFORE PURGING (ft BTOC): 1.59 DEPTH TO BOTTOM (ft BTOC): 13.10 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 11.4 WELL VOLUME (LITERS): 7 3 WELL VOLUMES (LITERS): 21.1

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1034	2.44	300	–	20.11	5.80	-169	1.85	1.15	22.8	Initial state. CLEAR
1038	2.61	250	1	19.93	6.34	-206	1.83	0.68	8.49	CLEAR / NONE
1042	2.90	250	2	19.89	6.52	-211	1.84	0.59	7.20	CLEAR
1046	3.08	250	3	19.87	6.59	-212	1.84	057	6.05	
1050	3.21	250	4	19.89	6.62	-212	1.83	0.56	6.25	
1054	3.40	250	5	19.89	6.64	-212	1.83	0.55	4.69	CLEAR
1058	3.51	250	6	19.91	6.66	-210	1.82	0.55	4.21	
1102	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: *May need to have totes moved for access.*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW35-* 091120 PRIMARY SAMPLE DATE & TIME: 9/11/20 1102

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 2.37 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **MW-36**

SCREEN INTERVAL (ft BTOC): *4.5 - 14.5* START DATE: 9-11-20

WELL DIAMETER (INCHES): *2* FIELD CREW: Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-11-20

DTW BEFORE PURGING (ft BTOC): 2.30 DEPTH TO BOTTOM (ft BTOC): 13.61 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 11.31 WELL VOLUME (LITERS): 6.98 3 WELL VOLUMES (LITERS): 20.94

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1020	2.91	300	–	20.43	5.65	-104	2.27	1.14	125	Initial state.
1024	3.34	300	1.2	19.63	6.25	-168	2.29	0.78	97	Cloudy, gray, no odor, very fine Suspended particles
1028	4.09	300	2.4	19.64	6.30	-169	2.28	0.53	44.1	very light gray, no odor, very fine Suspended particles
1032	4.38	300	3.6	19.72	6.33	-173	2.25	0.49	36.6	SAA
1036	4.62	300	4.8	19.86	6.39	-168	2.22	0.88	28.0	SAA
1040	4.80	300	6.0	19.93	6.44	-170	2.22	0.64	16.2	SAA w/ less Suspended particles
1044	4.90	300	7.2	19.91	6.47	-178	2.24	0.50	18.3	SAA w/ no color
1048	4.99	300	8.4	19.90	6.48	-182	2.26	0.94	13.0	SAA
1052	5.06	300	9.6	19.88	6.50	-181	2.28	0.46	11.54	SAA
1056	5.11	300	10.8	19.88	6.47	-184	2.29	0.44	9.23	SAA
				Collect	Sample	@	1100			
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW36-*091120 PRIMARY SAMPLE DATE & TIME: 9-11-20 / 1100

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.0 SAMPLER'S SIGNATURE: Jay Spies

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: MW-37	SCREEN INTERVAL (ft BTOC): 4 - 14	START DATE: 9-10-20
	WELL DIAMETER (INCHES): 2	FIELD CREW: Spies

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9-10-20

DTW BEFORE PURGING (ft BTOC): 2.03 DEPTH TO BOTTOM (ft BTOC): 13.78 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 11.75 WELL VOLUME (LITERS): 7.25 3 WELL VOLUMES (LITERS): 21.75

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1526	2.25	400	—	22.70	7.51	-169	4.10	1.91	19.2	Initial state.
1530	3.40	300		21.65	7.14	-156	4.13	0.82	12.9	Grey, odorless, suspended particles (Grey,
1534	4.14	300		21.19	6.78	-146	4.16	0.63	4.12	Clear, Very light gold; suspended (Very few Suspended
1538	4.32	300		21.46	6.87	-137	4.14	0.54	3.68	Clear, No color, no odor, Very few suspended particles
1542	4.71	300		21.60	6.87	-141	4.10	0.54	3.89	SAA
1546	5.00	300		21.60	6.87	-196	3.72	0.53	3.47	SAA
1550	5.29	300		21.61	6.86	-195	3.67	0.58	3.17	SAA
1554	5.62	300		21.71	6.84	-190	3.76	0.57	3.39	SAA
		Collected		Sample @ 1600						
				—	—	—	—	—		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *MW37-*091020 PRIMARY SAMPLE DATE & TIME: 09-10-20 1600

PRIMARY SAMPLE PARAMETERS (check): ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: None QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.00 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **PZ-01**

SCREEN INTERVAL (ft BTOC): *4 - 14* START DATE: 9/3/20

WELL DIAMETER (INCHES): *1* FIELD CREW: SALSBURG / SPIES

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" high-density polyethylene tubing* (NO TEFLON-lined tubing)

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/3/20

DTW BEFORE PURGING (ft BTOC): 2.98 DEPTH TO BOTTOM (ft BTOC): — ___ Soft / ___ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): ~~2.98~~ WELL VOLUME (LITERS): — 3 WELL VOLUMES (LITERS): —

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1206	3.65	250	—	23.40	6.72	-219	1.89	0.57	1580 AU	Initial state. CLEAR/GREY
1210	3.95	250	0.5	22.60	6.70	-232	1.82	0.45	38.5	CLEAR
1214	4.11	250	1.0	22.15	6.72	-247	1.73	0.42	12.1	CLEAR
1218	4.18	250	1.6	22.08	6.71	-254	1.69	0.40	8.01	CLEAR
1222	4.24	250	2.5	21.94	6.71	-259	1.63	0.39	5.07	CLEAR
1226	4.28	250	3.5	21.92	6.75	-263	1.62	0.38	3.40	CLEAR
1230	4.30	250	4.5	21.87	6.74	-265	1.59	0.37	2.81	CLEAR
1234	SAMPLE									
				--	--	--	--	--		Final state.

NOTES: *PFAS and 1,4-dioxane sampling*

DURING 1 OF THE SULFIDE BOTTLES THE PURGE WATER TURNED DARK GREY FOR ABOUT 100 mL.

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *PZ01-* 090320 PRIMARY SAMPLE DATE & TIME: 9/3/20 1234

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *MNA*, ___ *PFAS*, ___ *1,4-Dioxane*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *MNA*, ___ *PFAS*, ___ *1,4-Dioxane*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 1.40 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **PZ-03**

SCREEN INTERVAL (ft BTOC): *4 - 12* START DATE: 9/9/20

WELL DIAMETER (INCHES): *1* FIELD CREW: C. Lotlich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/9/20

DTW BEFORE PURGING (ft BTOC): 3.70 DEPTH TO BOTTOM (ft BTOC): 11.28 ___ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 8.3 WELL VOLUME (LITERS): 1.3 3 WELL VOLUMES (LITERS): 4

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1330	5.50	250	0.5	22.84	6.60	-233	18.1	0.70	15.5	Initial state. clear
1334	5.85	↓	1.5	22.37	6.61	-245	16.7	0.53	15.7	strong sulfur odor
1338	6.32		2.5	21.81	6.65	-266	14.0	0.48	11.2	
1342	6.51		3.5	21.59	6.68	-278	12.0	0.48	3.71	
1346	6.59		4.5	21.49	6.70	-284	10.2	0.46	2.18	
1350	6.73	↓	5.5	21.50	6.73	-290	8.56	0.43	2.10	
1420	6.70			--	--	--	--	--		Final state. clear, sulfur odor

NOTES: *Bring hex/allen wrenches to open well box. May require additional ventilation -- confirm with air monitoring*

Should be 1400 but COC's bottles mislabeled as 1500

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *PZ03-* 090920 PRIMARY SAMPLE DATE & TIME: 9/9/20 1500

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: Dup-GW-090920-1 QA/QC SAMPLE DATE & TIME: 9/9/20 1500

QA/QC SAMPLE PARAMETERS (check): ✓ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 2.06 SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **PZ-04** | SCREEN INTERVAL (ft BTOC): *5.5 - 10.5* | START DATE: 9/8/20 | WELL DIAMETER (INCHES): *1* | FIELD CREW: C. Lettich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* | METER CALIBRATION DATE: 9/8/20

DTW BEFORE PURGING (ft BTOC): 3.48 | DEPTH TO BOTTOM (ft BTOC): 9.65 | ___ Soft / ✓ Hard

REFERENCE: 1" well = 0.16 liter/ft or 0.041 gal/ft | 2-inch well = 0.617 liter/ft or 0.163 gal/ft | 1 gallon = 3.785 liters | 1 liter = 0.264 gallons

WATER COLUMN (FT): 7.02 | WELL VOLUME (LITERS): 1.12 | 3 WELL VOLUMES (LITERS): 3.37

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1445	3.48	200	Ø	28.41	7.09	-430	4.45	2.84	7	Initial state. Cloudy lt grey. Strong sulfur
1449	3.75	↓	1.2	26.53	6.82	-443	3.82	1.87	52.6	
1453	3.77		2.4	26.20	6.70	-453	3.85	1.88	42.4	
1457	3.80		3.6	26.02	6.64	-459	3.90	1.91	25.6	
1501	3.81		4.8	25.93	6.61	-461	3.92	1.94	17.0	
1505	3.84		6.0	25.86	6.58	-462	3.96	1.96	15.7	
1509	3.86		7.2	25.81	6.60	-464	3.98	1.98	10.1	
1513	3.88	↓	8.4	25.39	6.59	-464	3.99	2.00	10.0	
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *PZ04-* 090420 | PRIMARY SAMPLE DATE & TIME: 1520 9/8/20

PRIMARY SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *MNA*

QA/QC SAMPLE ID: None | QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *Tot. & Diss. Metals*, ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.16 NA | SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **PZ-06**	SCREEN INTERVAL (ft BTOC): *5.5 - 10.5*	START DATE: 9/8/20
	WELL DIAMETER (INCHES): *1*	FIELD CREW: C. Lothich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/8/20

DTW BEFORE PURGING (ft BTOC): 3.61 DEPTH TO BOTTOM (ft BTOC): 9.5 ___ Soft / X Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): WELL VOLUME (LITERS): 3 WELL VOLUMES (LITERS):

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1115	3.61	~250	0.25	25.92	7.23	-310	1.45	1.20	29.8	Initial state. lt brown
1117	Well	wint	dry							
1420	Purged	approx	200ml	before	going	dry				
9/9/20	10:35									
	4.78	Purged	~750ml							
				--	--	--	--	--		Final state.

NOTES: *May require mulitple purge-recharge cycles to collect sufficient sample volume*

9/8/20 1430- collected VOC and portion of metals - MINIMUM VOLUME

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *PZ06-* 090820 PRIMARY SAMPLE DATE & TIME: 9/10/20 9:10

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *MNA*

QA/QC SAMPLE ID: — QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *MNA*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **PZ-07R** | SCREEN INTERVAL (ft BTOC): *5.5 - 10.5* | START DATE: 9/8/20

WELL DIAMETER (INCHES): 2 | FIELD CREW: C. Lettich

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* | METER CALIBRATION DATE: 9/8/20

DTW BEFORE PURGING (ft BTOC): 4.18 | DEPTH TO BOTTOM (ft BTOC): 10.6 | __ Soft / ✓ Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft | 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft | 1 gallon = 3.785 liters | 1 liter = 0.264 gallons

WATER COLUMN (FT): 6.42 | WELL VOLUME (LITERS): 3.96 | 3 WELL VOLUMES (LITERS): 11.88

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
1300	4.18	250	Ø	23.89	6.51	-222	14.7	1.98	—	Initial state. Strong H_2S odor
1304	5.17	300	1.0	23.12	6.32	-274	12.7	1.07	6.53	Gray solids
1308	5.31		2.2	22.98	6.33	-311	11.2	0.80	7.69	
1312	5.44		3.4	22.15	6.32	-338	10.5	0.79	7.37	some gray suspended solids
1316	5.45		4.6	23.01	6.31	-345	10.3	0.78	8.12	
1320	5.47		5.8	22.90	6.29	-355	10.0	0.82	6.28	some solids, Overall lt grey color
1324	5.48	V	7.0	22.76	6.29	-365	10.1	0.85	4.16	
				--	--	--	--	--		Final state.

NOTES: *Typically high-yield for QA/QC samples*

Sample not preserved with nitric or sulfuric acid turns almost black in container. Water in purge bucket also turns black

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *PZ07R-* 090820 | PRIMARY SAMPLE DATE & TIME: 9/8/20, 1340

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ MNA

QA/QC SAMPLE ID: PZ07R MS/MSD | QA/QC SAMPLE DATE & TIME: 9/8/20, 1400

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ Tot. & Diss. Metals, ✓ MNA

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): >3.30 (over limit) | SAMPLER'S SIGNATURE:

JACOBS Former Hampshire Chemical Corp. Facility, 228 E. Main St., Waterloo, NY, Project WAT006DW

LOW-FLOW GROUNDWATER SAMPLING LOG, 2020 ANNUAL LTM EVENT

WELL: **TW-01**	SCREEN INTERVAL (ft BTOC): *10.3 - 20.8*	START DATE: 9/17/20
	WELL DIAMETER (INCHES): *2*	FIELD CREW: C. LoHick

EQUIPMENT: *Peristaltic pump with one-time-use 0.25" x 0.170" Teflon-lined high-density polyethylene tubing*

METER MAKE & MODEL: *Horiba U-52 with flow-through cell* METER CALIBRATION DATE: 9/17/20

DTW BEFORE PURGING (ft BTOC): 17.80 DEPTH TO BOTTOM (ft BTOC): 22.57 ___ Soft / X Hard

REFERENCE: 1" well ≈ 0.16 liter/ft or 0.041 gal/ft 2-inch well ≈ 0.617 liter/ft or 0.163 gal/ft 1 gallon = 3.785 liters 1 liter = 0.264 gallons

WATER COLUMN (FT): 4.77 WELL VOLUME (LITERS): 2.94 3 WELL VOLUMES (LITERS): 8.8

FIELD PARAMETERS COLLECTED DURING LOW-FLOW PURGING

TIME 4 minute readings	WATER LEVEL (ft BTOC)	FLOW RATE (ml/min)	TOTAL VOLUME (Liters)	TEMP. (°C)	pH (std. units)	ORP (mV)	CONDUC-TIVITY (mS/cm)	DO (mg/L)	LaMOTTE TURBIDITY (NTU)	REMARKS (color, odor, sheen, sediment, etc.)
Stability:	< 0.3 ft	300 – 500	NA	NA	± 0.1	± 10 mV	± 3 %	± 10 %	± 10 %	
917	17.80	300	0	18.40	6.16	-211	0.002	9.19	23.6	Initial state. Some black suspended solids
0921	17.95	↓	1.2	18.40	6.16	-211	0.002	9.19	10.17	
0925	18.00		2.4	18.40	6.16	-211	0.002	9.19	7.11	
0933	17.99		4.8	18.40	6.16	-211	0.002	9.19	6.08	
0937	17.97	↓	6.0	18.40	6.16	-211	0.002	9.19	8.90	
0954	17.93			--	--	--	--	--	7.21	Final state. minor black suspended solids

NOTES: *May require additional ventilation due to history of headspace methane above LEL.*

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: *TW01-* 091720 PRIMARY SAMPLE DATE & TIME: 0945 9/17/20

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs,* ✓ *Tot. & Diss. Metals,* ✓ *PAHs*

QA/QC SAMPLE ID: Dup-GW-091720-1 QA/QC SAMPLE DATE & TIME: 1000 9/17/20

QA/QC SAMPLE PARAMETERS (check): ✓ *VOCs,* ___ *Tot. & Diss. Metals,* ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): Not Required SAMPLER'S SIGNATURE:

Appendix C
Data Quality Evaluation

JACOBS

Memorandum

Data Quality Evaluation for the 2020 Groundwater Monitoring at the Former Hampshire Chemical Corporation Facility

PREPARED FOR:	Dow Chemical Company
PREPARED BY:	Jacobs
DATE:	November 17, 2020

Introduction

The objective of this data quality evaluation (DQE) report is to assess the data quality of analytical results for groundwater samples collected from the Union Carbide Corporation (UCC) Dow Waterloo site in Waterloo, New York. Jacobs collected samples September 2 through September 17, 2020. Guidance for this DQE report came from the following: *Quality Assurance Project Plan, RCRA Facility Investigation, Former Hampshire Chemical Corporation Facility, Waterloo, New York* (Waterloo QAPP, June 2010); the *U.S. Environmental Protection Agency* (EPA) *National Functional Guidelines (NFG) for Superfund Organic Methods Data Review* (January 2017); the *USEPA Contract Laboratory NFG for Inorganic Superfund Methods Data Review, (*January 2017)*;* and, individual method requirements.

The analytical results were evaluated using the criteria of precision, accuracy, representativeness, comparability and completeness (PARCC) as described in the QAPP. This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers 30 groundwater samples, seven field duplicates (FD), five matrix spike (MS)/matrix spike duplicate (MSD) samples, four field blanks (FB), three equipment blanks (EB), and seven trip blanks (TB). Additional MS/MSD sets were analyzed and reported by the laboratory as part of their quality control program and are included in this DQE. The samples were reported in 15 sample delivery groups identified in Table 1.

TABLE 1. Sample Delivery Groups

2020 Groundwater Monitoring, Dow Waterloo

L2036638	L2037338	L2037713
L2036937	L2037348	L2037896
L2036947	L2037355	L2039067
L2036952	L2037645	L2039070
L2037136	L2037712	L2039387

Samples were collected and delivered to Alpha Analytical in Westborough, Massachusetts. The samples were analyzed by one or more of the methods listed in Table 2.

TABLE 2. Analytical Parameters	
2020 Groundwater Monitoring, Dow Waterloo	
Parameter	**Method**
Volatile Organic Compounds (VOC)	SW8260C
Semivolatile Organic Compounds (SVOC)	SW8270D/SW8270D SIM
Polyaromatic Hydrocarbons (PAH)	SW8270D SIM
1,4-Dioxane	SW8270D SIM Isotope Dilution
Perfluorinated Alkyl Acids	E537 Mod LC/MS/MS
Select Metals (total/dissolved)	SW6020B
Chloride and Sulfate	E300.0
Alkalinity	SM2320B
Nitrate	E353.2
Nitrite	E353.2
Total Phosphorus	SM4500 P-E
Orthophosphate	SM4500 P-E
Total Organic Carbon (TOC)	SM5310 C
Total Dissolved Solids (TDS)	SM2540C
Ammonia	EPA 350.1
Total Kjeldahl Nitrogen (TKN)	EPA 351.3
Sulfide	SM4500-S2 D
Silica	EPA 200.7

The sample delivery groups were assessed by reviewing the following: the chain of custody documentation; holding-time compliance; initial and continuing calibration criteria; method blanks/field blanks; laboratory control spiking sample/laboratory control spiking sample duplicate (LCS/LCSD) recoveries and precision; MS/MSD recoveries and precision, surrogate spike recoveries, internal standard recoveries, FD precision, and the required quality control (QC) samples at the specified frequencies.

Data flags were assigned according to the QAPP. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will only be one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are those listed in the QAPP and are defined below:

- J = The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

- R = The sample result was rejected due to serious deficiencies in the ability to analyze the sample and meet the QC criteria. The presence or absence of the analyte could not be verified.
- U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ = The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Findings

The overall summaries of the data validation are contained in the following sections. Qualified data are presented in Table 3.

Holding Time and Preservation

Holding time and preservation criteria were met with the following exceptions:

- The hold time of 48hrs for orthophosphate was exceeded in samples MW24-091020, PZ06-091020 and MW31-091720. The data were qualified as estimated and flagged “J” in the samples.
- Sample MW21-081519 was received with a pH that exceeded criteria for the ammonia, dissolved/total metals, silica, phosphorus and TKN analyses. The data were qualified as estimated detected results and flagged “J” in the sample.

Calibration

Initial and continuing calibration analyses were performed as required by the methods and acceptance criteria were met with the following exceptions:

- The percent differences (%D) for carbon disulfide and methyl acetate were greater than criteria in one VOC initial calibration verification (ICVS) standard indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of the analytes.
- The %Ds for several analytes were less than criteria in a few VOC continuing calibration verification standards (CCV), indicating a possible low bias. The data were qualified as estimated detected and non-detected results and flagged “J” and “UJ”, respectively, in the associated samples. In addition, the %Ds for chloroethane was greater than criteria in one CCV, indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of chloroethane.
- The relative response factor (RRF) for methyl acetate was less than criteria in a few VOC CCVs, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged “UJ” in the associated samples.
- The %Ds for bis(2-ethylhexyl)phthalate and isophorone were less than criteria in one SVOC CCV, indicating a possible low bias. The data were qualified as estimated non-detects and flagged “UJ” in the associated samples. In addition, the %D for 2,4-dinitrophenol was greater than criteria in one CCV, indicating a possible high bias. The data were not qualified because the associated sample did not contain reportable levels of 2,4-dinitrophenol.
- The %Ds for a few analytes were greater than criteria in one PAH CCV, indicating a possible high bias. The data were not qualified because the associated sample did not contain reportable levels of these analytes.

- Total and/or dissolved iron were detected at concentrations greater and/or less than the reporting limit (RL) in a few initial calibration blanks (ICBs) and continuing calibration blanks (CCBs) associated with the metals analysis. In addition, total and/or dissolved arsenic were detected at concentrations less than the RL in a few CCBs. The data were qualified as not detected at the concentration measured and flagged "U" when the associated sample concentrations were less than five times the blank concentrations.
- Nitrite was detected at a concentration less than the RL in one CCB. The data were not qualified because the associated sample concentrations were greater than five times the blank or the analyte was not detected.

Method Blanks

Method blanks were analyzed at the required frequency and were free of contamination with the following exceptions:

- Several analytes were detected at concentrations less than the RLs in several method blanks associated with the PFAS, SVOC, PAH, metals, ammonia, TKN, nitrite and orthophosphate analyses. The data were qualified as not detected at the concentration measured and flagged "U" when the associated sample concentrations were less than five times the blank concentrations.

Laboratory Control Samples

LCS/LCSDs were analyzed as required and accuracy and precision criteria were met with the following exceptions:

- Benzoic acid did not recover in a few SVOC LCS/LCSDs, indicating a possible significant low bias. The data were rejected for project use and flagged "R" in the associated samples. In addition, dimethyl phthalate recovered less than the lower control limit in one CLS/LCSD, indicating a possible low bias. The analyte was qualified as an estimated non-detect and flagged "UJ" in the associated sample.
- The relative percent differences (RPD) for benzoic acid exceeded criteria in a few SVOC LCS/LCSDs. The data were not qualified because the associated samples did not contain reportable levels of benzoic acid.
- The RPD for 1,2,3-trichlorobenzene exceeded criteria in several VOC LCS/LCSDs. The data were not qualified because the associated samples did not contain reportable levels of 1,2,3-trichlorobenzene.

Internal Standards

Internal standards were added to the samples for methods requiring their use and acceptance criteria were met.

Surrogates

Surrogates were added to the samples for methods requiring their use and acceptance criteria were met with the following exception:

- One base surrogate associated with the PAH analysis was recovered greater than the upper control limit in samples MW07-091020, MW19-091020 and MW05I-091020, indicating a possible high bias. Detected results were qualified as estimated and flagged "J" in the samples. Non-detected results were not qualified.
- One surrogate associated with the PFAS analysis was recovered greater than the upper control limits in samples MW02-090420 and DUP-GW-090420, indicating a possible high bias. The associated analyte was qualified as estimated and flagged "J" in the samples.

Matrix Spikes

MS/MSD samples were analyzed as required and accuracy and precision criteria were met with the following exceptions:

- Bromomethane was recovered less than the lower control limit in the VOC MS/MSD for sample PZ07R-090820, indicating a possible low bias. The analyte was qualified as an estimated non-detected result and flagged “UJ” in the parent sample. In addition, acetone and chloroethane were recovered greater than the upper control limits in the MS/MSD, indicating a possible high bias. Detected results were qualified as estimated and flagged “J” in the sample. Non-detected results were not qualified.
- Sulfate was recovered less than the lower control limit in the MS for sample MW36-091120, indicating a possible low bias. The result was qualified as estimated and flagged “J” in the parent sample.
- TKN was recovered less than the lower control limit in the MS for sample PZ01-090220, indicating a possible low bias. The result was qualified as estimated and flagged “J” in the parent sample

Interference Check Standard

Interference check standards (ICS) were analyzed as required and accuracy criteria were met with the following exception:

- Aluminum was recovered greater than the upper control limit in one ICS standard. Detected results were qualified as estimated and flagged “J” in the associated samples. Non-detected results were not qualified.

Field Duplicates

FDs were collected as required and precision criteria were met.

Laboratory Duplicates

Laboratory duplicates were analyzed as required and precision criteria were met with the following exception:

- The RPD for sulfide exceeded criteria in the laboratory duplicate for sample MW33-090220. The analyte was qualified as estimated and flagged “J” in the sample.

Field Blanks

FBs, EBs and TBs were collected, analyzed and were free of contamination with the following exceptions:

- A few analytes were detected at concentrations less than the RL in one EB and FB associated with the PFAS analysis. The data were qualified as not detected at the concentration measured and flagged “U” when the associated sample concentrations were less than five times the blank concentrations.

Sample Quantitation

The RPD between the dissolved and total concentrations for arsenic exceeded criteria in samples MW02-090420 and DUP-GW-090420, where the dissolved concentration was greater than the total concentration. The data were qualified as estimated and flagged “J” in the samples.

The ion ratio did not meet criteria for a few PFAS analytes in several samples resulting in the data being qualified as estimated and flagged “J”.

Tentatively Identified Compounds

Tentatively identified compounds were reported in the VOC and SVOC analyses to determine the presence/absence of the following analytes in the samples: epichlorohydrin, thioglycolic acid, dithiodiglycolic acid, mercaptopropionic acid, thiodipropionic acid, and dithiodipropionic acid. The library search did not identify these analytes in the samples.

Chain of Custody

Required procedures were followed and COCs were free of errors.

Overall Assessment

The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected, and the resulting analytical data can be used to support the decision-making process. The following summary highlights the PARCC findings for the above-defined events:

Precision of the data was verified through the review of the field and laboratory data quality indicators that include: FD, LCS/LCSD, MS/MSD, and laboratory duplicates RPDs. Precision was generally acceptable; however, sulfide was qualified as estimated in one sample due to laboratory duplicate RPD issues. Data users should consider the impact to any result that is qualified as estimated as it may contain a bias which could affect the decision-making process.

Accuracy of the data was verified through the review of the calibration data, LCS/LCSD, internal standard, surrogate, MS/MSD recoveries and additional method QC requirements, as well as the evaluation of method/calibration/field blank data. Accuracy was generally acceptable; however, a few analytes were qualified as estimated due to calibration, LCS, surrogate, MS/MSD and/or method QC requirement issues. In addition, benzoic acid was rejected for project use in several SVOC samples due to LCS/LCSD issues. Multiple analytes were qualified as not detected in the samples due to calibration/method and/or equipment blank contamination.

Representativeness of the data was verified through the sample's collection, storage and preservation procedures and the verification of holding-time compliance. The sample containers associated with the metals, ammonia, TKN and phosphorus analyses were received with a pH greater than criteria for sample MW21-090920, resulting in the data being qualified as estimated. Orthophosphate was analyzed outside of hold time criteria in a few samples, resulting in the data being qualified as estimated. The remaining data were reported from analyses within the EPA recommended holding time.

Comparability of the data was verified through the use of standard EPA analytical procedures and standard units for reporting. Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.

Completeness is a measure of the number of valid measurements obtained in relation to the total number of measurements planned. Completeness is expressed as the percentage of valid or usable measurements compared to planned measurements. Valid data are defined as all data that are not rejected for project use. All data were considered valid with the exception of benzoic acid which was rejected for project use in multiple SVOC samples. The completeness goal of 95 percent was met for all method/analytes combinations except for benzoic acid which was 13 percent complete.

The data can be used for project decisions taking into consideration the validation flags applied to the samples.

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
DUP-GW-09020-1	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
DUP-GW-09020-1	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
DUP-GW-09020-1	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
DUP-GW-09020-1	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
DUP-GW-09020-1	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
DUP-GW-090420	E537	1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	2.8	J	EMPC
DUP-GW-090420	E537	1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	2.8	J	Sur>UCL
DUP-GW-090420	E537	Perfluorooctanesulfonic Acid (PFOS)	ng/l	5.22	J	EMPC
DUP-GW-090420	E537	Perfluorobutanesulfonic Acid (PFBS)	ng/l	1.77	J	EMPC
DUP-GW-090420	SW6020B	Arsenic, Total	mg/l	0.00059	J	D_MET>T_MET
DUP-GW-090420	SW6020BF	Iron, Dissolved	mg/l	0.106	U	CCB<RL
DUP-GW-090420	SW6020BF	Arsenic, Dissolved	mg/l	0.00083	J	D_MET>T_MET
DUP-GW-090920-2	SW6020B	Aluminum, Total	mg/l	0.0292	J	ICS>UCL
DUP-GW-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
DUP-GW-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
DUP-GW-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
DUP-GW-091720-1	SW8260C	Acetone	µg/l	8.8	J	CCV<LCL
DUP-GW-091720-1	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
DUP-GW-091720-1	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
DUP-GW-091720-2	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
DUP-GW-091720-2	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
DUP-GW-091720-2	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
DUP-GW-091720-2	SW8270DSIM	Benzo(a)anthracene	µg/l	0.03	U	LB<RL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
DUP-GW-091720-2	SW8270DSIM	Benzo(a)pyrene	µg/l	0.04	U	LB<RL
DUP-GW-091720-2	SW8270DSIM	Benzo(b)fluoranthene	µg/l	0.06	U	LB<RL
DUP-GW-091720-2	SW8270DSIM	Benzo(ghi)perylene	µg/l	0.03	U	LB<RL
DUP-GW-091720-2	SW8270DSIM	Benzo(k)fluoranthene	µg/l	0.02	U	LB<RL
DUP-GW-091720-2	SW8270DSIM	Chrysene	µg/l	0.05	U	LB<RL
DUP-GW-091720-2	SW8270DSIM	Indeno(1,2,3-cd)pyrene	µg/l	0.03	U	LB<RL
DUP-GW-091720-3	SW8260C	Carbon disulfide	µg/l	1	UJ	CCV<LCL
DUP-GW-091720-3	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL
MW01-09020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW01-09020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW01-09020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW01-09020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW01-09020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW02-090420	E537	1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ng/l	2.92	J	EMPC, Sur>UCL
MW02-090420	E537	Perfluorooctanesulfonic Acid (PFOS)	ng/l	4.58	J	EMPC
MW02-090420	SW6020B	Arsenic, Total	mg/l	0.0005	J	D_MET>T_MET
MW02-090420	SW6020BF	Arsenic, Dissolved	mg/l	0.00062	J	D_MET>T_MET
MW02-090420	SW8260C	2-Butanone	µg/l	1.9	UJ	CCV<LCL
MW02-090420	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW02-090420	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW02-090420	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
MW02-090420	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.17	UJ	CCV<LCL
MW02-090420	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL
MW02-090420	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	0.7	UJ	CCV<LCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW02-090420	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL
MW02-090420	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW03-090320	SW8260C	2-Butanone	µg/l	33	J	CCV<LCL
MW03-090320	SW8260C	2-Hexanone	µg/l	11	J	CCV<LCL
MW03-090320	SW8260C	4-Methyl-2-pentanone	µg/l	320	J	CCV<LCL
MW03-090320	SW8260C	1,2,3-Trichlorobenzene	µg/l	1.8	UJ	CCV<LCL
MW03-090320	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	1.8	UJ	CCV<LCL
MW03-090320	SW8260C	Acetone	µg/l	3.6	UJ	CCV<LCL
MW03-090320	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.42	UJ	CCV<LCL
MW03-090320	SW8260C	Methyl Acetate	µg/l	0.58	UJ	CCV<LCL
MW03-090320	SW8260C	Methyl Acetate	µg/l	0.58	UJ	CCVRRF
MW05I-091020	SW6020B	Iron, Total	mg/l	0.0639	U	ICB<RL, CCB<RL
MW05I-091020	SW6020BF	Iron, Dissolved	mg/l	0.051	U	ICB<RL, CCB<RL
MW05I-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW05I-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW05I-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW05I-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW05I-091020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW05I-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW05I-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
MW05I-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
MW05I-091020	SW8270DSIM	Fluoranthene	µg/l	0.04	J	Sur>UCL
MW05I-091020	SW8270DSIM	Phenanthrene	µg/l	0.04	J	Sur>UCL
MW05I-091020	SW8270DSIM	Pyrene	µg/l	0.03	J	Sur>UCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW06-091020	SW6020B	Iron, Total	mg/l	0.0746	U	ICB<RL, CCB<RL
MW06-091020	SW6020BF	Iron, Dissolved	mg/l	0.0406	U	ICB<RL, CCB<RL
MW06-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW06-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW06-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW06-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW06-091020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW06-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW06-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
MW06-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
MW07-091020	SW6020B	Iron, Total	mg/l	0.16	U	ICB<RL, CCB<RL
MW07-091020	SW6020BF	Iron, Dissolved	mg/l	0.157	U	ICB<RL, CCB<RL
MW07-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW07-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW07-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW07-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW07-091020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW07-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW07-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
MW07-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
MW07-091020	SW8270D	Di-n-butylphthalate	µg/l	0.66	U	LB<RL
MW07-091020	SW8270DSIM	Benzo(b)fluoranthene	µg/l	0.02	J	Sur>UCL
MW07-091020	SW8270DSIM	Benzo(ghi)perylene	µg/l	0.02	J	Sur>UCL
MW07-091020	SW8270DSIM	Fluoranthene	µg/l	0.02	J	Sur>UCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW07-091020	SW8270DSIM	Indeno(1,2,3-cd)pyrene	µg/l	0.02	J	Sur>UCL
MW07-091020	SW8270DSIM	Phenanthrene	µg/l	0.03	J	Sur>UCL
MW07-091020	SW8270DSIM	Pyrene	µg/l	0.02	J	Sur>UCL
MW09R-090920	SW6020B	Aluminum, Total	mg/l	0.0266	J	ICS>UCL
MW09R-090920	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW09R-090920	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW09R-090920	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW09R-090920	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW09R-090920	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW09R-090920	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW09R-090920	SW8270D	Benzoic Acid	µg/l	2.6	R	LCSD<LCL
MW09R-090920	SW8270D	Dimethyl phthalate	µg/l	1.8	UJ	LCS<LCL
MW09R-090920	SW8270D	Dimethyl phthalate	µg/l	1.8	UJ	LCSD<LCL
MW10-091020	SW6020BF	Iron, Dissolved	mg/l	0.043	U	ICB<RL, CCB<RL
MW10-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW10-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW10-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW10-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW10-091020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW10-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW10-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
MW10-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
MW11S-090420	E537	1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	14.5	J	EMPC
MW16I-091720	SW6020B	Iron, Total	mg/l	11.8	U	CCB<RL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW16I-091720	SW8260C	Carbon disulfide	µg/l	1	UJ	CCV<LCL
MW16I-091720	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL
MW17-091720	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW18-091720	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
MW18-091720	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW18-091720	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW18-091720	SW8270DSIM	Benzo(a)pyrene	µg/l	0.02	U	LB<RL
MW18-091720	SW8270DSIM	Benzo(b)fluoranthene	µg/l	0.04	U	LB<RL
MW18-091720	SW8270DSIM	Benzo(ghi)perylene	µg/l	0.07	U	LB<RL
MW18-091720	SW8270DSIM	Benzo(k)fluoranthene	µg/l	0.04	U	LB<RL
MW18-091720	SW8270DSIM	Chrysene	µg/l	0.02	U	LB<RL
MW18-091720	SW8270DSIM	Indeno(1,2,3-cd)pyrene	µg/l	0.07	U	LB<RL
MW19-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW19-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW19-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW19-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
MW19-091020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW19-091020	SW8270D	Benzoic Acid	µg/l	2.6	R	LCS<LCL
MW19-091020	SW8270D	Bis(2-ethylhexyl)phthalate	µg/l	1.5	UJ	CCV<LCL
MW19-091020	SW8270D	Isophorone	µg/l	1.2	UJ	CCV<LCL
MW19-091020	SW8270DSIM	Acenaphthene	µg/l	0.04	J	Sur>UCL
MW19-091020	SW8270DSIM	Anthracene	µg/l	0.02	J	Sur>UCL
MW19-091020	SW8270DSIM	Fluoranthene	µg/l	0.23	J	Sur>UCL
MW19-091020	SW8270DSIM	Fluorene	µg/l	0.02	J	Sur>UCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW19-091020	SW8270DSIM	Phenanthrene	µg/l	0.03	J	Sur>UCL
MW19-091020	SW8270DSIM	Pyrene	µg/l	0.17	J	Sur>UCL
MW20-090420	SW6020B	Arsenic, Total	mg/l	0.00061	U	CCB<RL
MW20-090420	SW6020BF	Arsenic, Dissolved	mg/l	0.00041	U	CCB<RL
MW20-090420	SW8260C	2-Butanone	µg/l	1.9	UJ	CCV<LCL
MW20-090420	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW20-090420	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW20-090420	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
MW20-090420	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.17	UJ	CCV<LCL
MW20-090420	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL
MW20-090420	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	0.7	UJ	CCV<LCL
MW20-090420	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL
MW20-090420	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW20-090420	SW8270DSIM	Phenanthrene	µg/l	0.03	U	LB<RL
MW21-090920	E200.7	Silica, Total	mg/l	18.7	J	pH
MW21-090920	E350.1	Nitrogen, Ammonia	mg/l	14.1	J	pH
MW21-090920	E351.3	Nitrogen, Total Kjeldahl	mg/l	49.7	J	pH
MW21-090920	SM4500-P E	Phosphorus, Total	mg/l	15.5	J	pH
MW21-090920	SW6020B	Sodium, Total	mg/l	5640	J	pH
MW21-090920	SW6020B	Aluminum, Total	mg/l	1.2	J	pH
MW21-090920	SW6020B	Calcium, Total	mg/l	1.88	J	pH
MW21-090920	SW6020B	Magnesium, Total	mg/l	1.86	J	pH
MW21-090920	SW6020B	Potassium, Total	mg/l	2.82	J	pH
MW21-090920	SW6020B	Arsenic, Total	mg/l	2.178	J	pH

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW21-090920	SW6020B	Iron, Total	mg/l	0.362	J	pH
MW21-090920	SW6020B	Manganese, Total	mg/l	0.00621	J	pH
MW21-090920	SW6020BF	Aluminum, Dissolved	mg/l	1.22	J	pH
MW21-090920	SW6020BF	Arsenic, Dissolved	mg/l	1.892	J	pH
MW21-090920	SW6020BF	Iron, Dissolved	mg/l	0.335	J	pH
MW21-090920	SW6020BF	Manganese, Dissolved	mg/l	0.00631	J	pH
MW24-091020	SM4500-P E	Phosphorus, Orthophosphate	mg/l	0.001	U	LB<RL, HT>UCL (J)
MW26-091720	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
MW26-091720	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
MW26-091720	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
MW30-090420	E537	1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ng/l	15.8	J	EMPC
MW30-090420	E537	Perfluorooctanesulfonic Acid (PFOS)	ng/l	8.82	J	EMPC
MW30-090420	E537	Perfluorohexanesulfonic Acid (PFHxS)	ng/l	0.9	J	EMPC
MW31-091720	E350.1	Nitrogen, Ammonia	mg/l	6.68	U	LB<RL
MW31-091720	SM4500-P E	Phosphorus, Orthophosphate	mg/l	6.13	J	HT>UCL
MW31-091720	SW6020B	Iron, Total	mg/l	6.54	U	CCB>RL
MW31-091720	SW6020BF	Iron, Dissolved	mg/l	5	U	CCB<RL
MW33-090220	SM4500-S2 D	Sulfide	mg/l	44	J	Lab Dup RPD
MW33-090220	SW8260C	2-Butanone	µg/l	1.9	UJ	CCV<LCL
MW33-090220	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW33-090220	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW33-090220	SW8260C	Acetone	µg/l	3.6	J	CCV<LCL
MW33-090220	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.17	UJ	CCV<LCL
MW33-090220	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
MW33-090220	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	0.7	UJ	CCV<LCL
MW33-090220	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL, CCVRRF
MW34-090220	SW8260C	2-Butanone	µg/l	1.9	UJ	CCV<LCL
MW34-090220	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
MW34-090220	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
MW34-090220	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
MW34-090220	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.17	UJ	CCV<LCL
MW34-090220	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL
MW34-090220	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	0.7	UJ	CCV<LCL
MW34-090220	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL, CCVRRF
MW35-091120	E351.3	Nitrogen, Total Kjeldahl	mg/l	0.395	U	LB<RL
MW35-091120	SM4500-P E	Phosphorus, Orthophosphate	mg/l	0.002	U	LB<RL
MW35-091120	SW6020B	Iron, Total	mg/l	4.04	U	CCB<RL
MW35-091120	SW6020BF	Iron, Dissolved	mg/l	3.49	U	CCB>RL
MW36-091120	E300	Sulfate	mg/l	238	J	MS<LCL
MW36-091120	E351.3	Nitrogen, Total Kjeldahl	mg/l	0.247	U	LB<RL
MW36-091120	SM4500-P E	Phosphorus, Orthophosphate	mg/l	0.002	U	LB<RL
MW36-091120	SW6020B	Iron, Total	mg/l	1.47	U	CCB<RL
MW36-091120	SW6020BF	Iron, Dissolved	mg/l	1.05	U	CCB>RL
MW37-091020	SM4500-P E	Phosphorus, Orthophosphate	mg/l	0.001	U	LB<RL
PZ01-090220	E351.3	Nitrogen, Total Kjeldahl	mg/l	1.12	J	MS<LCL
PZ01-090220	E537	Perfluorohexanoic Acid (PFHxA)	ng/l	0.464	U	EB<RL, LB<RL
PZ01-090220	SW8260C	2-Butanone	µg/l	1.9	UJ	CCV<LCL
PZ01-090220	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
PZ01-090220	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
PZ01-090220	SW8260C	Acetone	µg/l	1.5	UJ	CCV<LCL
PZ01-090220	SW8260C	1,1,2,2-Tetrachloroethane	µg/l	0.17	UJ	CCV<LCL
PZ01-090220	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL
PZ01-090220	SW8260C	1,2-Dibromo-3-chloropropane	µg/l	0.7	UJ	CCV<LCL
PZ01-090220	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCV<LCL, CCVRRF
PZ03-09020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
PZ03-09020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
PZ03-09020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
PZ03-09020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
PZ03-09020	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
PZ04-090820	SW6020B	Aluminum, Total	mg/l	0.0802	U	LB<RL
PZ04-090820	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
PZ04-090820	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
PZ04-090820	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
PZ04-090820	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
PZ04-090820	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
PZ06-091020	SM4500-P E	Phosphorus, Orthophosphate	mg/l	0.18	J	HT>UCL
PZ06-091020	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
PZ06-091020	SW8260C	4-Methyl-2-pentanone	µg/l	1	UJ	CCV<LCL
PZ06-091020	SW8260C	1,2,3-Trichlorobenzene	µg/l	0.7	UJ	CCV<LCL
PZ06-091020	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
PZ06-091020	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
PZ07R-090820	E353.2	Nitrogen, Nitrite	mg/l	0.033	U	LB<RL

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
PZ07R-090820	SW6020B	Aluminum, Total	mg/l	0.0691	U	LB<RL
PZ07R-090820	SW8260C	2-Hexanone	µg/l	1	UJ	CCV<LCL
PZ07R-090820	SW8260C	4-Methyl-2-pentanone	µg/l	1.2	J	CCV<LCL
PZ07R-090820	SW8260C	Acetone	µg/l	2.9	J	SD>UCL
PZ07R-090820	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL, MS<LCL, SD<LCL
PZ07R-090820	SW8260C	Chloromethane	µg/l	0.7	UJ	CCV<LCL
PZ07R-090820	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
TW01-091720	SW8260C	Acetone	µg/l	8.6	J	CCV<LCL
TW01-091720	SW8260C	Bromomethane	µg/l	0.7	UJ	CCV<LCL
TW01-091720	SW8260C	Methyl Acetate	µg/l	0.23	UJ	CCVRRF
TW01-091720	SW8270DSIM	Benzo(a)pyrene	µg/l	0.02	U	LB<RL
TW01-091720	SW8270DSIM	Benzo(b)fluoranthene	µg/l	0.03	U	LB<RL
TW01-091720	SW8270DSIM	Benzo(ghi)perylene	µg/l	0.03	U	LB<RL
TW01-091720	SW8270DSIM	Benzo(k)fluoranthene	µg/l	0.01	U	LB<RL
TW01-091720	SW8270DSIM	Indeno(1,2,3-cd)pyrene	µg/l	0.03	U	LB<RL

Validation Reasons:

CCB<RL	The analyte was detected in the continuing calibration blank at a concentration less than the reporting limit
CCB>RL	The analyte was detected in the continuing calibration blank at a concentration greater than the reporting limit
CCV<LCL	The continuing calibration verification standard recovery was less than criteria
CCVRRF	The continuing calibration verification relative response factor was less than criteria
D_M>T_M	The dissolved concentration was greater than the total concentration
EB<RL	The analyte was detected in the equipment blank at a concentration greater than the reporting limit
EMPC	Estimated Maximum Potential Concentration--The ion ratio exceeded criteria
HT>UCL	The hold time exceeded criteria

TABLE 3. Data Qualification Summary

2020 Groundwater Monitoring, Dow Waterloo

Field ID	Method	Analyte	Units	Final Result	Validation Flag	Validation Reason
ICB<RL	The analyte was detected in the initial calibration blank at a concentration less than the reporting limit					
ICS>UCL	The interference check standard was recovered greater than criteria					
LabDupRPD	The relative percent difference exceeded criteria between the laboratory duplicate and native sample					
LB<RL	The analyte was detected in the method blank at a concentration less than the reporting limit					
LCS<LCL	The laboratory control sample recovery was less than the lower control limit					
LCSD<LCL	The laboratory control sample duplicate recovery was less than the lower control limit					
MS<LCL	The matrix spike sample recovery was less than the lower control limit					
pH	The pH of the analyte was greater than criteria					
SD<LCL	The matrix spike duplicate sample recovery was less than the lower control limit					
SD>UCL	The matrix spike duplicate sample recovery was greater than the upper control limit					
Sur>UCL	The surrogate recovery was greater than the upper control limit					

Note:

µg/L = micrograms per liter
mg/L = milligrams per liter