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June 5, 2018

Ms. Gail Dieter
New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau E, Section B
625 Broadway, 12th Floor

Subject: 2016 and 2017 Groundwater Monitoring Results and MNA Performance Evaluation 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 2016 and 2017 Groundwater Monitoring Results and MNA Performance Evaluation Report Former Hampshire Chemical Corp. Facility Waterloo, New York Site No. 850001A.

The Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) and 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.

Please contact me at 304-747-7788 or Brian Carling at 610-384-0747 should you have any questions or require any additional information.

Sincerely,

Jerome E. Cibrik, P.G.
Remediation Leader

Copies: Mr. Matthew Gillette, NYSDEC Region 8 (CD)
Mr. Scott Foti, NYSDEC Region 8 (CD)
Mr. Mark Sergott – NYSDOH (CD)
Mr. Steve Brusso, Evans Chemetics (Hard copy and CD)
CH2M Project File (Hard copy and CD)

F I N A L

2016 and 2017 Groundwater Monitoring Results and MNA Performance Evaluation Report

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

Prepared for

Hampshire Chemical Corp.

June 2018

CH2M HILL Engineers, Inc.
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Syracuse, New York 13202

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Acronyms and Abbreviations

µg/L	micrograms per liter
AOC	area of concern
As III	trivalent arsenite
As V	pentavalent arsenate
AWQS	Ambient Water Quality Standard
bgs	below ground surface
canal	Cayuga-Seneca Canal
CH2M	CH2M HILL Engineers, Inc.
COC	constituent of concern
$Cr(OH)_3$	chromium(III) hydroxide
Cr III	trivalent chromium
Cr VI	hexavalent chromium
DER	Division of Environmental Remediation
DO	dissolved oxygen
Eh	redox potential
ELAP	Environmental Laboratory Accreditation Program
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.
HFO	hydrous ferric oxide
ID	identification
IDW	investigation-derived waste
LTMWP	Long-term Monitoring Work Plan
MDL	method detection limit
mg/L	milligrams per liter
MIBK	methyl isobutyl ketone (4-methyl-2-pentanone)
Microbac	Microbac Laboratories, Inc.
MNA	monitored natural attenuation
MS	matrix spike
MSD	matrix spike duplicate

MW	monitoring well
NaHS	sodium hydrosulfide
NaOH	sodium hydroxide
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OBWZ	overburden water-bearing zone
ORP	oxidation-reduction potential
OSWER	Office of Solid Waste Emergency Response
PAH	polycyclic aromatic hydrocarbon
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

SECTION 1

Introduction

This report presents the results of the sitewide groundwater monitoring activities conducted during December 2016 and August 2017 (reporting period) at the former Hampshire Chemical Corp. (HCC) facility in Waterloo, New York (site). Additionally, this report summarizes the findings from the second and third years (Years Two and Three) of a monitored natural attenuation (MNA) study for 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 reduces concentrations for constituents of concern (COCs), and attenuating 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], 2008a), 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, 2013d, 2014a) 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).

Development of this report and applying MNA at the site follow the procedures outlined in the U.S. Environmental Protection Agency's (EPA) Office of Solid Waste Emergency Response (OSWER) Directive 9200.4-17P and several supporting reports (EPA 2006, 2007). Field data were collected following NYSDEC Division of Environmental Remediation (DER)-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 is a map of 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, to the west by East Water Street, and to the south by the Cayuga-Seneca Canal (canal). 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. The site also includes outside drum storage areas and several tank farms. The RFI Report (CH2M, 2006) and RFI Report Addendum (CH2M, 2008b) present additional information regarding site setting, history, and manufacturing processes. The site plan is presented on Figure 1-2.

The site lies on an alluvial plain, which consists of 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 (bgs). The bedrock surface generally increases with depth from west to east. Overburden groundwater flow follows the topography of the land from north to south toward the canal.

Thirty-one groundwater monitoring wells are included as part of 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, 2015a). 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, 2017b).

1.2 Site Activities Performed

The following activities were completed during this reporting period:

- Collected depth-to-water measurements from 27 site groundwater monitoring wells on December 12, 2016.
- Conducted groundwater sampling of 28 site groundwater monitoring wells for laboratory analysis from December 6 to 13, 2016.
- Construction of an engineered landfill cap at Solid Waste Management Unit (SWMU) 1, completed in March 2017. The results of these activities have been reported separately (CH2M, 2017a).
- Performed subslab soil vapor port installation and soil gas sampling. The results of these activities have been reported separately (CH2M, 2017b).
- Collected depth–to-water measurements from 26 site groundwater monitoring wells on August 21, 2017.
- Conducted groundwater sampling of 21 site groundwater monitoring wells for laboratory analysis from August 22 to 25, 2017.

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 Years Two and Three
- Section 6, Conclusions
- Section 7, References

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

SECTION 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 December 12, 2016, and August 21, 2017, depth-to-water measurements were collected from safely accessible site groundwater monitoring wells to evaluate groundwater flow direction and hydraulic gradients near the site. Measurements were collected in accordance with the LTMWP (CH2M, 2014a) using an electronic water level meter with 0.01-foot graduations, which was decontaminated between wells. Depth-to-water measurements were not collected at monitoring wells with high concentrations of hydrogen sulfide and/or methane in and near Building 4 (December 2016: MW-03, MW-33, MW-34, and PZ-01; and August 2017: MW-03, MW-33, MW-34, PZ-01, and PZ-03). 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 with respect to MNA is presented in Section 5.1.

2.2 Groundwater Sampling

During December 2016 and August 2017, groundwater samples were collected from 27 and 21 monitoring wells, respectively, associated with the site in accordance with 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, 2009a). The groundwater sampling locations for both monitoring events are shown on Figure 1-2. A detailed summary of information for each groundwater sample is presented in Table 2-1. 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 dedicated Teflon-lined polyethylene tubing was used to purge groundwater from the monitoring wells. Water quality parameters were measured during purging using a Horiba U-52 water quality meter with an inline flow-through cell; the water quality parameters recorded were pH (as standard units), 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 measurements were collected 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. There was insufficient recharge at MW-18 (December 2016 and August 2017), MW-19 (August 2017), and PZ-06 (December 2016 and August 2017) to allow water quality parameters to stabilize. 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. Additional sample volume was collected at each monitoring well to measure ferrous iron concentrations using a Hach 8290 field measurement kit and Accuvac ferrous iron reagent ampules. 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).

Groundwater samples were not collected at monitoring wells with high concentrations of hydrogen sulfide and/or methane in and near Building 4 (December 2016: MW-03, MW-33, MW-34, and PZ-01; and August 2017: MW-03, MW-33, MW-34, PZ-01, and PZ-03).

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

- 4 field duplicates, 3 matrix spike (MS)/matrix spike duplicates (MSDs), 2 field blanks, and 3 trip blanks during the December 2016 sampling event
- 4 field duplicates, 4 matrix spike (MS)/matrix spike duplicates (MSDs), 3 field blanks, and 3 trip blanks during the August 2017 sampling event

The field duplicate and MS/MSD samples were collected from monitoring well sampling locations using methodologies described previously and analyzed for parameters listed in Table 2-1. Field blanks were collected in separate AOCs. Field blanks were collected by pouring laboratory-provided deionized water into laboratory-provided sampling containers at a sampling location in that AOC. Field blanks were submitted to the laboratory for the same parameters sampled at the AOC. A trip blank for VOC analysis was included in the sample cooler that accompanied the empty (pre-sample) and filled (post-sample) VOC bottleware to confirm that the samples had not been 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 Microbac Laboratories, Inc. of Marietta, Ohio (Microbac) (New York State Laboratory Identification [ID] No. 10861). Microbac is an approved laboratory under the New York State Environmental Laboratory Accreditation Program (ELAP). A copy of the New York State Department of Health (NYSDOH) ELAP certification for Microbac is included in Appendix C.

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

- VOCs via EPA SW-846 via Method 8260C
- PAHs via EPA Method SW-8270D SIM
- SVOCs by EPA Method 8270C
- Target analyte list (TAL) metals via EPA Methods SW6010C/SW6020A/SW7470A

Groundwater samples were analyzed for total metals and dissolved metals. Dissolved metals samples were collected after the other sample bottles were filled using a 0.45-micron filter. In addition, samples from AOCs B and D were collected to assess groundwater for potential MNA via the following analyses performed by Microbac:

- Alkalinity via EPA Method E310.2
- Nitrate by EPA Method E353.2
- Total phosphorus via EPA Method E365.4
- Chloride and sulfate via EPA Method E300.0
- Total organic carbon via EPA Method SM5310C
- Orthophosphate via EPA Method SM4500P-E
- Total dissolved solids via EPA Method SM2540C
- Total sulfide via EPA Method SM4500
- Total Kjeldahl nitrogen via EPA Method 351.2

2.3 Waste Management

Investigation-derived waste (IDW) from the 2016 and 2017 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 containerized in USDOT-approved 55-gallon drums. The IDW was removed for offsite disposal by Veolia on October 10, 2017.

2.4 Data Quality Review

Microbac performed laboratory analysis of the water samples and provided electronic reports of the results to CH2M. A CH2M 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 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 D and discussed in detail in Section 3.4.

SECTION 3

Groundwater Sampling Results

This section 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 events during the reporting period. Figures 3-1 and 3-2 present the potentiometric surface map (contour map) for overburden groundwater for the December 2016 and August 2017 monitoring events, respectively. As inferred from the contour maps, groundwater flow was generally south toward the canal, which is consistent with historical conditions observed at the site. The horizontal hydraulic gradients calculated for selected well pairs were approximately as follows:

- 0.03 feet per foot (ft/ft) for the MW-10/09R well pair in December 2016
- 0.02 ft/ft for the MW-10/09R well pair in August 2017
- 0.05 ft/ft for the MW-06/18 well pair in December 2016
- 0.05 ft/ft for the MW-06/18 well pair in August 2017

In previous reports, vertical hydraulic gradients were calculated for the MW-05S/05I and MW-11S/11I well pairs. However, MW-05S and MW-11I were abandoned during November 2015.

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

3.2 Groundwater Sampling Results

Table 3-2 presents the monitoring wells, sampling frequency, and categories included in the LTMWP (CH2M, 2014a). Tables 3-3 through 3-11 provide VOCs, SVOCs, metals, and MNA parameters results for the reporting period. 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 the table.

The following sections present a summary of the groundwater sampling results for each well grouping onsite. The analytical data obtained during this reporting period are discussed in conjunction with historical results from the following reports:

- *RCRA Facility Investigation Report, Former Hampshire Chemical Corp., Waterloo, New York* (CH2M, 2006)
- *RCRA Facility Investigation Report Addendum, Former Hampshire Chemical Corp., Waterloo, New York* (CH2M, 2008b; revised February 2010)
- *Groundwater Monitoring Results Report – October 2008, April 2009 and October 2009 Sampling Events, Former Hampshire Chemical Corp Facility, Waterloo, New York* (CH2M, 2009b)
- *Groundwater Monitoring Results Report, April 2010 and November 2010 Monitoring Events. Former Hampshire Chemical Corp. Facility, Waterloo, New York* (CH2M, 2011)
- *Additional Investigation Results Report, Former Hampshire Chemical Corp. Facility, Waterloo, NY* (CH2M, 2012a) based on the *Additional Groundwater Investigation Work Plan, Former Hampshire Chemical Corp. Facility, Waterloo, New York* (CH2M, 2010)

- *Groundwater Monitoring Results Report, April 2011 and November 2011 Monitoring Events. Former Hampshire Chemical Corp. Facility, Waterloo, New York* (CH2M, 2012b)
- *Groundwater Monitoring Results Report, April and October 2012 Monitoring Events, Former Hampshire Chemical Corp. Facility, Waterloo, New York* (CH2M, 2013c)
- *Groundwater Monitoring Results Report, April and October 2013 Monitoring Events. Former Hampshire Chemical Corp. Facility, Waterloo, New York* (CH2M, 2014b)
- *Groundwater Monitoring Results, November 2014 Monitoring Event, Former Hampshire Chemical Corp. Facility, Waterloo, New York, Site No. 850001A* (CH2M, 2015b)
- *Monitored Natural Attenuation Performance Evaluation Report, Year One, Former Hampshire Chemical Corp. Facility, Waterloo, New York, Site No. 850001A* (CH2M, 2017b)
- *Evaluation of Subslab Hydrogen Sulfide and Methane Concentrations* (CH2M, 2017c)

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). There is no TOGS Class GA Standard for MIBK. Per NYSDEC (2005), the 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 3-3 through 3-6 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. Tables 3-3 and 3-7 summarize the analytical results for groundwater samples collected from SWMU 1 during December 2016 and August 2017, respectively. Figure 3-3 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:

- Three SVOCs (benzo[a]anthracene, benzo[b]fluoranthene, and chrysene) at MW-18 in December 2016
- Total iron, total magnesium, total manganese, total potassium, total sodium, dissolved iron and/or dissolved manganese at one or more wells

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-07/PZ-07R) are associated with AOC B. Tables 3-4 and 3-8 summarize the analytical results for groundwater samples collected from AOC B during December 2016 and August 2017, respectively. Figure 3-4 summarizes concentrations of constituents exceeding the TOGS Class GA standards. Section 4.1 evaluates the AOC B groundwater results with respect to MNA performance.

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 PZ-03 (1,2-dichloroethane) and PZ-04 (chloroform) in December 2016
- Total arsenic, total iron, total magnesium, total manganese, total sodium, and/or dissolved iron at one or more wells

- General chemistry parameters (chloride, sulfate, and/or sulfide) at all wells, except PZ-06 in December 2016

3.2.3 Groundwater Results – AOC D

Nine monitoring wells (MW-11S, MW-21, MW-24, MW-29, MW-30, MW-31, MW-35, MW-36, and MW-37) are associated with AOC D. Tables 3-5 and 3-9 summarize the analytical results for groundwater samples collected from AOC D during December 2016 and August 2017, respectively. Figure 3-5 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, total iron, total magnesium, total manganese, total sodium, dissolved arsenic, dissolved iron, and/or dissolved manganese at one or more wells
- General chemistry parameters (chloride, sulfate, and/or sulfide) at all wells, except MW-36 in December 2016 and August 2017

3.2.4 Groundwater Results – Supplemental Monitoring Wells

Seven monitoring wells (MW-05I, MW-06, MW-07, MW-09R, MW-19, and MW-20) are located outside the boundaries for site AOCs, and are classified as supplemental wells in the LTMWP. Tables 3-6 and 3-10 summarize the analytical results for groundwater samples collected from the supplemental wells during December 2016 and August 2017. Figure 3-6 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:

- Two VOCs (cis-1,2-dicholorethene and trans-1,2-dicholorethene) at MW-19 in December 2016 and August 2017
- Total iron, total magnesium, total manganese, total sodium, dissolved iron, and/or dissolved manganese at one or more wells, except MW-20 in December 2016 and August 2017

3.3 Quality Assurance/Quality Control Samples

Table 2-1 presents the sample IDs and sample delivery groups for the QA/QC samples. Table 3-11 presents the analytical results of the equipment blanks and trip blanks for the reporting period. Acetone and chloroform were detected above the laboratory detection limits in some trip and field blanks; the results for these analytes were qualified as described in Appendix D.

3.4 Data Quality Review Summary

Appendix D contains a detailed data quality evaluation for groundwater samples collected during the December 2016 and August 2017 sampling events. The following conclusions are presented in the data quality evaluation:

- Precision was generally acceptable with the exception of a few analytes which were qualified as estimated detected results in several samples.
- Accuracy was generally acceptable with a few compounds being qualified as estimated detected and non-detected results. During 2016, bromomethane, chloromethane, and carbon disulfide were rejected for project use in a few samples due to calibration issues.

- Representativeness of the data was generally acceptable and verified through the sample's collection, storage, and preservation procedures and the verification of holding-time compliance. During 2016, several samples were received with a pH above criteria for multiple analyses, resulting in the data being qualified as estimated. In 2017, the samples received with a pH above the criteria were adjusted by the laboratory and data were not qualified. In 2017, few SVOC samples were re-extracted out of hold time, resulting in the data being qualified as estimated non-detected results.
- Results obtained are comparable to industry standards in that the collection and analytical techniques followed approved, documented procedures.
- The data can be used for decision making, with the exception of the rejected data, taking into consideration the validation flags applied.

SECTION 4

Monitored Natural Attenuation at the Site

In this report, MNA refers to the reliance on natural attenuation processes to achieve site-specific remediation objectives within a reasonable timeframe as compared with active remedial methods. Natural attenuation includes 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.

Performance monitoring to evaluate the effectiveness of a remedy and protect human health and the environment forms a critical element of most response actions. For the first year of monitoring, sampling was conducted quarterly at AOCs B and D and involved sampling six monitoring wells during each event. Year One sampling at AOC B extended from November 2014 to November 2015. Similarly, sampling was conducted at AOC D in November 2014, followed by a gap of one year, and then sampling at a quarterly frequency starting in November 2015, extending to September 2016. The Year One results are described in the *Monitored Natural Attenuation Performance Evaluation Report, Year One, Former Hampshire Chemical Corp. Facility, Waterloo, New York, Site No. 850001A* (CH2M, 2017b). Sampling for Years Two and Three at both AOCs was conducted in December 2016 and August 2017. Although the sampling was conducted on a less regular frequency at AOC D than AOC B, going forward, HCC will collect groundwater samples annually at AOCs B and D, at the same time.

For the remainder of the performance period, HCC will sample the monitoring wells according to Table 3-2. In addition to annual sampling, four other monitoring wells at AOC B are scheduled for sampling every 5 years.

The following sections describe monitoring wells, sampling frequency, and analytes specific to AOCs B and D.

4.1 AOC B MNA Sampling Summary

Sampling during Years Two and Three at AOC B was conducted as follows:

- Annual groundwater samples were collected at MW-01, MW-02, PZ-03, PZ-04, PZ-06, and PZ-07R in December 2016.
- Annual samples were not collected at MW-03 and MW-33 in December 2016 due to high concentrations of methane and/or hydrogen sulfide in the monitoring well headspaces (CH2M, 2017c).
- Annual groundwater samples were collected at MW-02, PZ-04, and PZ-06 in August 2017.
- Annual samples were not collected at MW-02, MW-03, MW-33, and PZ-03 in August 2017 due to high concentration of methane and/or hydrogen sulfide in the monitoring well headspaces (CH2M, 2017c).

During each event, samples were analyzed for TAL metals, VOCs, cations, anions, nutrients, and general water quality constituents (Table 2-1). 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. Together, the field and laboratory analyses were used to evaluate MNA effectiveness at AOC B.

The main COCs in groundwater at AOC B are MIBK, acetone, and chromium. Elevated concentrations of the three COCs appear in the same monitoring wells, forming groundwater plumes extending from beneath Building 4 to wells adjacent to the canal, which forms the southern edge of the site. Total

arsenic was detected at a concertation above the NYSDEC AWQS at PZ-03 in December 2016. However, arsenic is not considered a COC at AOC B because it displays limited distribution, and no continuity between adjoining monitoring wells in comparison to the other COCs.

4.2 AOC D MNA Sampling Summary

Sampling during Years Two and Three at AOC D was conducted as follows:

- In December 2016, groundwater samples were collected at MW-11S, MW-21, MW-23, MW-30, MW-31, MW-35, MW-36, and MW-37.
- Annual groundwater samples were collected at MW-11S, MW-21, MW-30, MW-31, MW-35, and MW-36 in August 2016.

During each event, samples were analyzed for TAL metals, cations, anions, nutrients, and general water quality constituents (Table 1-1). Field parameters also were measured while purging the monitoring wells, including temperature, pH, DO, specific conductance, ORP, ferrous iron, sulfide, and/or sulfate. Samples collected during December 2016 overlap with end of the first year of sampling at AOC D, which extended between November 2015 and September 2016. Together, the field and laboratory analyses were used to evaluate MNA effectiveness at AOC D.

At AOC D, arsenic in groundwater is the only COC. Spills of caustic sodium hydroxide (NaOH) and sodium hydrosulfide (NaHS) in Building 3 have infiltrated to groundwater and increased pH from approximately 6.5 standard units (SU) to 12 SU. The alkaline groundwater 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.

SECTION 5

Monitored Natural Attenuation Results for Years Two and Three

This section describes the results of synoptic surveys and groundwater sampling from Years Two and Three of the MNA performance monitoring at AOCs B and D. The sampling events from the Year One studies differed between the AOCs. Quarterly groundwater samples were collected between November 2014 and November 2015 at AOC B. By comparison, at AOC D, a round of samples was collected, in November 2014 followed by a gap spanning a year, with sampling resuming in November 2015 and ending in September 2016. For Years Two and Three, sampling events were conducted at AOCs B and D in December 2016 and August 2017. These data were incorporated into the MNA study and compared to the Year One baseline for synoptic elevations, COC concentrations, and geochemical conditions (CH2M, 2017b). To standardize sampling frequency moving forward, HCC will conduct annual sampling events at roughly the same time at AOCs B and D.

5.1 AOC B Monitoring Results

Data from the annual synoptic surveys and groundwater sampling were evaluated as part of the Years Two and Three of the MNA study. The synoptic surveys were conducted to characterize groundwater flow directions, gradients, and velocities across AOC B in December 2016 and August 2017. The surveys also documented the range in seasonal groundwater elevations in the overburden water-bearing zone (OBWZ) observed at AOC B over the period.

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 also were examined to characterize 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

From December 2016 to August 2017, groundwater flowed toward the canal (Figures 5-1 and 5-2) at gradients ranging from 0.02 to 0.03 ft/ft. During previous water level surveys, the flowable cement mass used in abandoning BLDG4-PIT-SSP has influenced the potentiometric surface by backing groundwater up behind the structure, elevating the gradient downgradient of BLDG4-PIT-SSP and deflecting flowlines around the mass. However, this geometry could not be verified during the study period because several wells in AOC B were not gauged due to the presence of hydrogen sulfide and methane; therefore, limited groundwater elevation data were available for potentiometric contouring. 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 for silty sands (Walton, 1989), groundwater velocities across the area during 2016 and 2017 varied from 0.17 to 0.27 ft/day.

5.1.2 AOC B Groundwater Analytical Results

5.1.2.1 MIBK

Data from the Year One study (November 2014 to November 2015) showed measurable declines in MIBK concentrations, particularly in downgradient monitoring wells like MW-02 and PZ-04. The absence of groundwater samples collected from MW-03, MW-33, or MW-34 during the Years Two and Three studies made evaluating temporal trends at these locations, and the spatial dimensions and geometry of the MIBK plume difficult. However, samples collected at MW-02, PZ-04, PZ-06 and PZ-07 (December 2016, only) facilitated characterizing the downgradient edge of the MIBK plume along the canal.

MIBK at monitoring wells situated along a transect extending from PZ-07 to PZ-04 displayed a continued, progressive decline in concentrations (Figure 5-3). Although a sample was not collected at PZ-07 in August 2017, MIBK concentrations at the remaining three wells fell below laboratory method detection limits (MDLs) for the first time since initiating the MNA study. These Years Two and Three data extend the trend observed during the Year One study where MIBK concentrations declined, while the leading edge of the plume appeared to recede upgradient, away from the canal. A time series graph at MW-02 (Figure 5-4), shows MIBK concentrations declining from 500 µg/L to less than MDL over the MNA study. Acetone, a degradation product of MIBK, exceeded MIBK concentrations in MW-02 in December 2016, but fell below MDLs in August 2017.

5.1.2.2 Chromium

The absence of groundwater samples from MW-03, MW-33, and MW-34 negated assessing the concentrations near the source area, or dimensions of the chromium plume over Years Two and Three. Chromium in monitoring wells located along the Canal was detected in MW-02, PZ-04, PZ-06, and PZ-07 (December 2016), but concentrations stayed below 10 µg/L (Figure 5-5). Except for chromium at PZ-06, concentrations have progressively declined since November 2014. Chromium concentrations at MW-02 have declined to less than 200 µg/L since June 2015 (Figure 5-6).

5.1.2.3 Geochemical Conditions

Geochemical conditions remained stable over Years Two and Three, resembling conditions described during Year One and sampling events preceding the MNA study. Groundwater displayed a circum-neutral to mildly alkaline pH ranging from 6.91 SU to 8.01 SU (PZ-06), respectively. Similar to the ionic chemistry from Year One, groundwater samples displayed a sodium to mixed cation–mixed anion bicarbonate chemistry. The anionic chemistry varied more than cations. PZ-03, MW-01 and PZ-07R exhibited a chloride anionic chemistry, while MW-02 displayed a sulfate chemistry (Figure 5-7).

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 et al., 1994), transitioning 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. Speciation analysis of a sample from MW-03 in 2012 showed that chromium concentrations were entirely composed of Cr VI.

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-sulfide-iron system (Figure 5-8). The chemistry (pH, cations, anions, iron, silica, nutrients) from MW-02 was used as input to PHREEPLOT. In addition to considering the phases of chromium, sulfide, 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, and depending on pH can adsorb large amounts (Dzomback and Morel,

1990) of cationic (cadmium, manganese, cobalt, nickel, lead, and zinc) and anionic metals (chromium, arsenic, uranium, molybdenum, and selenium).

The pH and ORP measurements collected during the MNA study were plotted on phase diagrams of the chromium and iron system (Figure 5-8). ORP was converted to the standard hydrogen electrode (Eh) by adding 0.2 volts to the field measurement (Hem, 1986). On the chromium diagram, points plotted in the $Cr(OH_2)^{1+}$ and $Cr(OH)_3$ fields, suggesting equilibrium with trivalent chromium. None of the points plotted in the Cr VI chromium fields (CrO_4^{1-} or CrO_4^{2-}). HFO surfaces occurred in equilibrium with only the small CrO_4^{1-} field, an oxyanion of Cr VI.

Chromium's lack of equilibrium with HFO minimizes the potential its adsorption and favors elevated chromium concentrations in groundwater. Yet, elevated concentrations of 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 speed the Cr VI to Cr III reduction reaction. But, dissolved iron concentrations rarely exceeded 1 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) characterizes the primary redox category and process (Table 5-1) 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 December 2016 and August 2017 sampling events. The program offers an alternative to ORP measured in the field. ORP measurements often are affected by the disequilibrium of the system, reducing their usefulness as an indicator of redox.

Running the program produced a mixed oxic-anoxic chemistry with ferric iron, and sulfate reduction constituting the primary redox processes (Table 5-3). The screens of monitoring wells and piezometers measuring 10 feet or longer, spanning shallow systems can often span 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.

In addition to serving as an indicator of redox conditions (nitrate and ammonia), nutrients like orthophosphate can influence the mobility of chromium in groundwater. Orthophosphate effectively competes with oxyanions like chromium and arsenic as they adsorb on HFO and HAO surfaces (competitive adsorption) common in groundwater environments. Orthophosphate can strip other oxyanions from adsorptive surfaces (Manning and Goldberg, 1996), increasing their concentration in groundwater.

Orthophosphate concentrations in groundwater samples from AOC B mostly fell below laboratory MDLs. Samples from MW-02 and PZ-06 exhibited concentrations exceeding the MDL, yet at low concentrations around 0.1 mg/L. Thus, orthophosphate should not inhibit the adsorption of chromium at AOC B.

5.1.2.4 Summary of MNA Effectiveness at AOC B

In summary, geochemical conditions in groundwater showed mixed implications for attenuating the migration of MIBK and chromium. Oxic concentrations of DO, where present support biodegrading MIBK and acetone by aerobic bacteria. Yet, the consumption of DO creates reducing conditions that can slow MIBK attenuation.

Redox conditions, including mixed oxic to anoxic conditions with DO, iron-, and sulfate- reduction as important processes, favor a system that reduces Cr VI to Cr III. Yet, the low concentrations of reductants like ferrous iron and manganous manganese slow the kinetics of the reaction. Under equilibrium conditions, adsorption by HFO should not influence chromium migration.

Despite mixed geochemical conditions, MIBK and chromium concentrations have declined over the relatively short time period covered by the Year One, Year Two, and Year Three MNA studies. Concentrations of MIBK and chromium have declined below method detection limits in monitoring wells located adjacent to the canal.

5.2 AOC D MNA Evaluation

Monitoring results for Years Two and Three of the MNA study focused on evaluating data from the synoptic survey and groundwater sampling. The synoptic surveys were conducted to determine the groundwater flow direction, gradients, and velocities across AOC D in December 2016 and August 2017.

5.2.1 AOC D Hydraulic Monitoring Results

From November 2014 to September 2016, groundwater flowed toward the canal (Figures 5-1 and 5-2) at gradients ranging from 0.03 to 0.05 ft/ft. Unlike the mounding at AOC B, equipotentials appeared 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 surveys, and a porosity of 0.35 for silty sands (Walton, 1989), groundwater velocities across the area during 2016 and 2017 varied from 0.17 to 0.27 ft/day.

5.2.2 AOC D Groundwater Results

5.2.2.1 Arsenic

Arsenic displayed fluctuating concentrations during the Years Two and Three MNA sampling (December 2016 and August 2017). At MW-21, the monitoring well historically exhibiting the greatest amounts of arsenic, concentrations declined to less than 4,000 µg/L (Figure 5-9). Similarly, at MW-11S, the second most affected monitoring well, arsenic concentrations fell below 1,000 µg/L. Plotted on a transect trending parallel to the canal, arsenic concentrations varied by location (Figure 5-10). MW-21 exhibited the lowest concentrations for the study period in August 2017 but, the pattern at MW-21 was not duplicated at the MW-11S and MW-31 where, with arsenic fell between minimum and maximum concentrations for the MNA Year One, and Years Two and Three study period. Arsenic concentrations at monitoring wells other than MW-11S and MW-21 remained roughly the same for the Years Two and Three periods, compared to Year One.

Spills of caustic products including NaOH and NaHS increased the pH of groundwater from circum-neutral pH (6.5 to 7.5 SU) to over 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 Years Two and Three sampling events, pH measurements from December 2016 revealed values near their historic minima, but rebounded slightly in August 2017 (Figure 5-11). Moreover, over the MNA study, the lowest pH appeared during the first sampling event of the study conducted in November 2014. However, in evaluating data prior to Year One, pH values have not exceeded 11 at MW-21 since June 2016, and 10 at MW-11S since 2009. Thus, data from Years Two and Three 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 evaluated during the Year One study. Groundwater displayed a strongly sodium to mixed cation (MW-35 and MW-36) – bicarbonate-mixed anion-chloride and even sulfate (MW-23 only) chemistry (Figure 5-12). The chemistry of groundwater samples remained roughly equivalent between December 2016 and August 2017, 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 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 (As III-arsenite and As V-arsenate) remain soluble under normal (pH 6 to8 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 natural groundwater environment, like those prevalent in a zero valent-iron environment. The redox program developed by USGS (Jurgens et al., 2009) produced mostly mixed oxic-anoxic redox conditions (Table 5-4) with nitrate, ferric iron, and sulfate reduction describe the prevailing redox processes.

In addition to the redox program, PHREEPLOT was employed to assess arsenic equilibria. The chemistry (pH, cations, anions, iron, silica, and nutrients) from MW-21 was used as input to PHREEPLOT. In addition to arsenic, iron 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 $NaAsO_4^{-2}$ appear in equilibrium with HFO surfaces. The diagram conveys the mechanism for arsenic mobilization at AOC D with elevated arsenic concentrations in groundwater appearing at pH greater than 8.5 SU. The phase diagram suggests As V is not in equilibrium with HFO at a pH greater than 8.5 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. oints from MW-11S, MW-21, and single samples from other monitoring wells (MW-30, MW-31, and MW-35) plot in the $NaAsO_4^{2-}$ field, suggesting arsenic in these samples is dominated by As V, and that $NaAsO4^{2-}$ may comprise the dominating arsenic oxyanion.

5.2.2.3 MNA and Arsenic at AOC D

The results of the MNA Year Two study, including equilibrium plots of arsenic and iron, correspond with the findings from an arsenic adsorption study conducted in 2012 (CH2M, 2013d). 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 (correlation coefficient – 0.78) iron content, replicating the relationship between oxyanions of As and HFO seen on the phase diagrams.

Findings during the MNA Year Two study regarding arsenic concentrations, pH and arsenic plume strength and size showed stable conditions. Yet, since 2005, arsenic concentrations and pH have shown measurable declines. In the absence of further NaOH and NaHS spills that elevate groundwater pH, ambient groundwater flow through the area should return the pH to less than 7.0 SU, improving the adsorption capacity of soils, while attenuating arsenic concentrations in groundwater.

SECTION 6

Conclusions

The following conclusions were developed from the MNA Years Two and Three studies at AOCs B and D.

6.1 AOC B

- Although personnel could not collect groundwater samples in monitoring wells situated in Building 4, MIBK exhibited declines in concentrations over the Year Two and Three MNA study periods in monitoring wells located adjacent to the canal.
- *Dow will employ the measures necessary to collect groundwater samples from monitoring wells situated around Building 4 (MW-2, MW-3, MW-33, MW-34, PZ-01, and PZ-03) during the Year Four MNA study period.*
- The reducing redox conditions favor the reduction of Cr VI to Cr III, a relatively insoluble precipitate.
- Chromium concentrations declined below 10 µg/L in monitoring wells situated adjacent to the canal for the December 2016 and August 2017 sampling events. The declining trend in wells located adjacent to the canal suggest the chromium plume is receding upgradient, behaving like a shrinking plume.

6.2 AOC D

- Arsenic displayed fluctuating concentrations during the Years Two and Three MNA study.
- Despite recent fluctuations, arsenic concentrations have decreased nearly an order of magnitude at MW-11S since 2005.
- The pH in groundwater at AOC D fluctuated over the study period; however, the pH at MW-21 and MW-11S appeared to have permanently settled below 11 and 10, respectively, compared to historical maxima approaching 12.0.
- 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 the most contaminated monitoring wells.
- Managing the groundwater pH by preventing spills of NaOH and NaHS will allow its return to ambient levels, improving the adsorption capacity of saturated soils.
- The oxic redox conditions in groundwater favors the stability of HFO surfaces for re-adsorbing arsenic as pH declines.
- The results of the MNA Years Two and Three study correspond with the findings from an arsenic adsorption study conducted in 2012 (CH2M, 2013d) that indicated soils beneath AOC D possess sufficient capacity to adsorb arsenic, and reduce concentrations in groundwater to less than the NYS TOGS Class GA standard.

SECTION 7

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Tables

Table 1-1. List of Analytes Analyzed during November 2014, April 2015, June 2015, September 2015, November 2015, April 2016, June 2016, and September 2016 Sampling Events for AOCs B and D

AOC B	AOC D
Metals	
Total Chromium Dissolved Chromium	Total Arsenic Dissolved Arsenic
Volatile Organic Compounds	
1,1,1-Dichloroethane 1,2-Dichloropopane Carbon Tetrachloride Chloroform cis-1,2-Dichloroethene Methylene Chloride MIBK Vinyl Chloride	None
MNA Parameters [a]	
Calcium Magnesium Potassium Sodium Iron (total and dissolved) Manganese (total and dissolved) Aluminum (total and dissolved) Chloride Sulfate Nitrate Nitrite as N	Alkalinity Total Phosphorous Total Organic Carbon Ammonia Total Kjedahl Nitrogen Ortho-Phosphate Total Dissolved Solids Total Sulfide Silica Sulfide
Field Chemistry [a]	
pH Specific conductivity Dissolved oxygen Temperature ORP Turbidity Ferrous iron	

Notes:

[a] MNA and Field Chemistry parameters are the same for AOCs B and D.

AOC = area of concern

MIBK = methyl isobutyl ketone

MNA = monitored natural attenuation

ORP = oxidation-reduction potential

Table 2-1
Summary of Groundwater Samples Collected
2016 and 2017 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-01	MW01-120616	VOCs, Metals[1], MNA	L16120352	N	Peristaltic	9.5	12/06/2016	14:38
MW-02	MW02-120616	VOCs, Metals[1], MNA	L16120352	N	Peristaltic	9.5	12/06/2016	11:10
MW-02	MW02-120616-MS	VOCs, Metals[1]	L16120352	MS	Peristaltic	9.5	12/06/2016	11:10
MW-02	MW02-120616-MSD	VOCs, Metals[1]	L16120352	SD	Peristaltic	9.5	12/06/2016	11:10
MW-02	MW02-082217	VOCs, Metals[1], MNA	L17081212	N	Peristaltic	9.5	08/22/2017	12:23
MW-02	MW02-082217-MS	VOCs, Metals[1]	L17081212	MS	Peristaltic	9.5	08/22/2017	12:23
MW-02	MW02-082217-MSD	VOCs, Metals[1]	L17081212	SD	Peristaltic	9.5	08/22/2017	12:23
MW-05I	MW05I-120716	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	27.5	12/07/2016	09:30
MW-05I	DUP-GW-120716-1	VOCs, Metals[1], SVOCs	L16120425	FD	Peristaltic	27.5	12/07/2016	12:30
MW-05I	MW05I-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	27.5	08/24/2017	15:40
MW-06	MW06-120716	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	9	12/07/2016	13:55
MW-06	MW06-082517	VOCs, Metals[1], SVOCs	L17081498	N	Peristaltic	9	08/25/2017	13:54
MW-06	MW06-082517-MS	SVOCs	L17081498	MS	Peristaltic	9	08/25/2017	13:54
MW-06	MW06-082517-MSD	SVOCs	L17081498	SD	Peristaltic	9	08/25/2017	13:54
MW-07	MW07-120716	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	8.5	12/07/2016	09:45
MW-07	MW07-120716MS	SVOCs	L16120425	MS	Peristaltic	8.5	12/07/2016	09:45
MW-07	MW07-120716SD	SVOCs	L16120425	SD	Peristaltic	8.5	12/07/2016	09:45
MW-07	MW07-082517	VOCs, Metals[1], SVOCs	L17081498	N	Peristaltic	8.5	08/25/2017	10:34
MW-09R	MW09R-120616	VOCs, Metals[1], SVOCs	L16120352	N	Peristaltic	12	12/06/2016	14:00
MW-09R	MW09R-082317	VOCs, Metals[1], SVOCs	L17081305	N	Peristaltic	12	08/23/2017	14:40
MW-09R	DUP-GW-082317-2	VOCs, Metals[1], SVOCs	L17081305	FD	Peristaltic	12	08/23/2017	09:30
MW-10	MW10-120716	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	12	12/07/2016	11:20
MW-10	MW10-082517	VOCs, Metals[1], SVOCs	L17081498	N	Peristaltic	12	08/25/2017	10:20
MW-11S	MW11S-120716	Metals[1], MNA	L16120425	N	Peristaltic	10	12/07/2016	10:18
MW-11S	DUP-GW-120716-2	Metals[1]	L16120425	FD	Peristaltic	10	12/07/2016	12:31
MW-11S	MW11S-082317	Metals[1], MNA	L17081305	N	Peristaltic	10	08/23/2017	13:55
MW-16I	MW16I-120616	VOCs, Metals[1], SVOCs	L16120352	N	Peristaltic	29	12/06/2016	13:15
MW-16I	MW16I-120616-MS	VOCs, SVOCs	L16120352	MS	Peristaltic	29	12/06/2016	13:15
MW-16I	MW16I-120616-MSD	VOCs, SVOCs	L16120352	SD	Peristaltic	29	12/06/2016	13:15
MW-16I	MW16I-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	29	08/24/2017	13:30
MW-17	MW17-120616	VOCs, Metals[1], SVOCs	L16120352	N	Peristaltic	13.5	12/06/2016	11:10
MW-17	DUP-GW-120616	VOCs, Metals[1], SVOCs	L16120352	FD	Peristaltic	13.5	12/06/2016	12:30
MW-17	MW17-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	13.5	08/24/2017	10:22
MW-17	DUP-GW-082417	VOCs, Metals[1], SVOCs	L17081366	FD	Peristaltic	13.5	08/24/2017	09:00
MW-18	MW18-120616	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	12	12/07/2016	15:40
MW-18	MW18-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	12	08/24/2017	11:50
MW-19	MW19-121316	VOCs, Metals[1], SVOCs	L16120782	N	Peristaltic	15.5	12/13/2016	10:25
MW-19	MW19-082317	VOCs, Metals[1], SVOCs	L17081305	N	Peristaltic	15.5	08/23/2017	15:35
MW-20	MW20-120716	VOCs, Metals[1], SVOCs	L16120425	N	Peristaltic	13.5	12/07/2016	11:25
MW-20	MW20-082517	VOCs, Metals[1], SVOCs	L17081498	N	Peristaltic	13.5	08/25/2017	14:10
MW-21	MW21-120816	Metals[1], MNA	L16120521	N	Peristaltic	10	12/08/2016	14:50
MW-21	MW21-082217	Metals[1], MNA	L17081212	N	Peristaltic	10	08/22/2017	12:35
MW-23	MW23-120616	Metals[1], MNA	L16120352	N	Peristaltic	8	12/06/2016	10:57
MW-23	MW23-120616-MS	Metals[1]	L16120352	MS	Peristaltic	8	12/06/2016	10:57
MW-23	MW23-120616-MSD	Metals[1]	L16120352	SD	Peristaltic	8	12/06/2016	10:57
MW-24	MW24-120816	Metals[1], MNA	L16120521	N	Peristaltic	12.5	12/08/2016	10:25
MW-26	MW26-120616	VOCs, Metals[1], SVOCs	L16120352	N	Peristaltic	14.5	12/06/2016	14:45
MW-26	MW26-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	14.5	08/24/2017	10:55
MW-26	MW26-082417MS	VOCs, SVOCs	L17081366	MS	Peristaltic	14.5	08/24/2017	10:55
MW-26	MW26-082417MSD	VOCs, SVOCs	L17081366	SD	Peristaltic	14.5	08/24/2017	10:55
MW-30	MW30-120716	Metals[1], MNA	L16120425	N	Peristaltic	10	12/07/2016	14:06
MW-30	MW30-082317	Metals[1], MNA	L17081305	N	Peristaltic	10	08/23/2017	12:40
MW-31	MW31-120816	Metals[1], MNA	L16120521	N	Peristaltic	12	12/08/2016	11:45
MW-31	MW31-082317	Metals[1], MNA	L17081305	N	Peristaltic	12	08/23/2017	10:35
MW-35	MW35-120816	Metals[1], MNA	L16120521	N	Peristaltic	9	12/08/2016	14:45
MW-35	MW35-082217	Metals[1], MNA	L17081212	N	Peristaltic	9	08/22/2017	15:28

MW-35	MW35-082217-MS	Metals[1]	L17081212	MS	Peristaltic	9	08/22/2017	15:28
MW-35	MW35-082217-MSD	Metals[1]	L17081212	SD	Peristaltic	9	08/22/2017	15:28
MW-36	MW36-120816	Metals[1], MNA	L16120521	N	Peristaltic	9	12/08/2016	11:20
MW-36	MW36-082217	Metals[1], MNA	L17081212	N	Peristaltic	9	08/22/2017	15:50
MW-36	DUP-GW-082217	Metals[1]	L17081212	FD	Peristaltic	9	08/22/2017	09:00
MW-37	MW37-120816	Metals[1], MNA	L16120521	N	Peristaltic	9	12/08/2016	09:55
PZ-03	PZ03-120716	VOCs, Metals[1], MNA	L16120425	N	Peristaltic	8	12/07/2016	15:10
PZ-04	PZ04-121316	VOCs, Metals[1], MNA	L16120782	N	Peristaltic	8	12/13/2016	13:55
PZ-04	DUP-GW-121316	VOCs, Metals[1]	L16120782	FD	Peristaltic	8	12/13/2016	12:30
PZ-04	PZ04-082317	VOCs, Metals[1], MNA	L17081305	N	Peristaltic	8	08/23/2017	10:58
PZ-04	DUP-GW-082317-1	VOCs, Metals[1]	L17081305	FD	Peristaltic	8	08/23/2017	09:00
PZ-06	PZ06-120616	VOCs, Metals[1], MNA	L16120425	N	Peristaltic	8	12/07/2016	15:00
PZ-06	PZ06-082317	VOCs, Metals[1], MNA	L17081305	N	Peristaltic	8	08/23/2017	09:42
PZ-07R	PZ07R-121316	VOCs, Metals[1], MNA	L16120782	N	Peristaltic	8.5	12/13/2016	15:25
TW-01	TW01-121316	VOCs, Metals[1], SVOCs	L16120782	N	Peristaltic	18	12/13/2016	12:05
TW-01	TW01-082417	VOCs, Metals[1], SVOCs	L17081366	N	Peristaltic	18	08/24/2017	14:12
FB	FB-120716	VOCs	L16120425	FB	N/A	N/A	12/07/2016	15:01
FB	FB-121316-1	VOCs	L16120782	FB	N/A	N/A	12/13/2016	14:45
FB	FB-121316-2	VOCs	L16120782	FB	N/A	N/A	12/13/2016	14:50
FB	FB-082217	VOCs	L17081212	FB	N/A	N/A	08/22/2017	12:40
FB	FB-082317	VOCs	L17081305	FB	N/A	N/A	08/23/2017	15:00
FB	FB-082417	VOCs	L17081366	FB	N/A	N/A	08/24/2017	14:00
FB	FB-082517	VOCs	L17081498	FB	N/A	N/A	08/25/2017	12:40
TB	TB-120616	VOCs	L16120352	TB	N/A	N/A	12/06/2016	08:00
TB	TB-120716	VOCs	L16120425	TB	N/A	N/A	12/07/2016	08:00
TB	TB-121316	VOCs	L16120782	TB	N/A	N/A	12/13/2016	08:00
TB	TB-082217	VOCs	L17081212	TB	N/A	N/A	08/22/2017	08:00
TB	TB-082317	VOCs	L17081305	TB	N/A	N/A	08/23/2017	08:00
TB	TB-082417	VOCs	L17081366	TB	N/A	N/A	08/24/2017	08:00
TB	TB-082517	VOCs	L17081498	TB	N/A	N/A	08/25/2017	08:00

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

VOC - Volatile Organic Compounds
SVOC - Semivolatile Organic Compounds
TOC - Total Organic Carbon
TDS - Total Dissolved Solids
TIC - Top of Inner Casing
TB - Trip Blank

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
Groundwater Monitoring Results, December 2016 and August 2017 Monitoring Events
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	12/12/16	434.03	433.80	4.25	429.55
MW-01	8/21/17	434.03	433.80	4.55	429.25
MW-02	12/12/16	433.33	432.93	3.36	429.57
MW-02	8/21/17	433.33	432.93	3.80	429.13
MW-03[a]	12/12/16	434.44	434.02	NM	NA
MW-03[a]	8/21/17	434.44	434.02	NM	NA
MW-05I	12/12/16	445.24	444.79	12.95	431.84
MW-05I	8/21/17	445.24	444.79	11.15	433.64
MW-06	12/12/16	446.57	446.21	3.60	442.61
MW-06	8/21/17	446.57	446.21	3.35	442.86
MW-07	12/12/16	437.88	437.37	4.75	432.62
MW-07	8/21/17	437.88	437.37	5.12	432.25
MW-09R	12/12/16	434.84	434.40	5.37	429.03
MW-09R	8/21/17	434.84	434.40	5.33	429.07
MW-10	12/12/16	445.34	445.06	3.28	441.78
MW-10	8/21/17	445.34	445.06	6.35	438.71
MW-11S	12/12/16	433.52	432.95	1.25	431.70
MW-11S	8/21/17	433.52	432.95	1.20	431.75
MW-16I	12/12/16	454.27	455.99	27.04	428.95
MW-16I	8/21/17	454.27	455.99	24.69	431.30
MW-17	12/12/16	449.92	452.13	23.00	429.13
MW-17	8/21/17	449.92	452.13	21.38	430.75
MW-18	12/12/16	440.04	442.07	12.50	429.57
MW-18	8/21/17	440.04	442.07	12.23	429.84
MW-19	12/12/16	445.64	445.25	10.38	434.87
MW-19	8/21/17	445.64	445.25	14.33	430.92
MW-20	12/12/16	448.76	448.53	3.93	444.60
MW-20	8/21/17	448.76	448.53	8.40	440.13
MW-21	12/12/16	433.46	433.10	4.05	429.05
MW-21	8/21/17	433.46	433.10	3.82	429.28
MW-23	12/12/16	432.67	432.35	3.02	429.33
MW-23	8/21/17	432.67	432.35	3.14	429.21
MW-24	12/12/16	433.98	433.75	4.41	429.34
MW-24	8/21/17	433.98	433.75	4.65	429.10
MW-25[b]	12/12/16	441.47	441.14	NM	NA
MW-25[b]	8/21/17	441.47	441.14	NM	NA
MW-26	12/12/16	439.29	441.76	12.90	428.86
MW-26	8/21/17	439.29	441.76	10.71	431.05
MW-30	12/12/16	433.38	433.02	4.45	428.57
MW-30	8/21/17	433.38	433.02	4.54	428.48
MW-31	12/12/16	433.13	432.65	5.30	427.35
MW-31	8/21/17	433.13	432.65	3.62	429.03
MW-33[a]	12/12/16	434.29	433.87	NM	NA
MW-33[a]	8/21/17	434.29	433.87	NM	NA
MW-34[a]	12/12/16	434.36	433.79	NM	NA
MW-34[a]	8/21/17	434.36	433.79	NM	NA
MW-35	12/12/16	433.60	433.43	1.50	431.93
MW-35	8/21/17	433.60	433.43	1.55	431.88

TABLE 3-1

Groundwater Elevation Measurements

Groundwater Monitoring Results, December 2016 and August 2017 Monitoring Events

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-36	12/12/16	433.26	432.80	1.00	431.80
MW-36	8/21/17	433.26	432.80	0.81	431.99
MW-37	12/12/16	433.32	433.02	1.43	431.59
MW-37	8/21/17	433.32	433.02	0.98	432.04
PZ-01[a]	12/12/16	434.49	434.25	NM	NA
PZ-01[a]	8/21/17	434.49	434.25	NM	NA
PZ-03	12/12/16	434.41	434.06	2.95	431.11
PZ-03[a]	8/21/17	434.41	434.06	NM	NA
PZ-04	12/12/16	432.73	432.14	2.81	429.33
PZ-04	8/21/17	432.73	432.14	3.09	429.05
PZ-06	12/12/16	433.06	432.77	3.35	429.42
PZ-06	8/21/17	433.06	432.77	3.31	429.46
PZ-07R	12/12/16	433.07	432.57	4.01	428.56
PZ-07R	8/21/17	433.07	432.57	3.93	428.64
TW-01	12/12/16	447.33	449.01	18.18	430.83
TW-01	8/21/17	447.33	449.01	17.10	431.91

Notes:

[a] Water level measurements were not collected due to wellhead hydrogen sulfide and/or methane.

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

1. Water level measurements were collected on November 16, 2014, with the exception of MW-03 and MW-33 which were collected on November 17, 2015.
2. Water level measurements were not collected from MW-15, MW-25, and MW-28 because these locations were not accessible.
3. 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
NA - not available
NM - not measured
TIC - top of inner casing

Table 3-2

LTMWP Groundwater Sampling Locations, Sampling Frequency, and Corresponding Analytical Results Tables

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

<table>
<tr><th colspan="2">**SWMU 1**
Monitoring Wells</th><th colspan="2">**AOC B**
Monitoring Wells</th><th colspan="2">**AOC D**
Monitoring Wells</th><th colspan="2">**Supplemental**
Monitoring Wells</th></tr>
<tr><td rowspan="2">Annual Sampling</td><td rowspan="2">MW-16I
MW-17
MW-18
MW-26
TW-01</td><td>Annual Sampling</td><td>MW-02
MW-03
MW-33
PZ-03
PZ-04
PZ-06</td><td>Annual Sampling</td><td>MW-11S
MW-21
MW-30
MW-31
MW-35
MW-36</td><td rowspan="2">Annual Sampling</td><td rowspan="2">MW-05I
MW-06
MW-07
MW-09R
MW-10
MW-19
MW-20</td></tr>
<tr><td>Sampling Every 5 Years</td><td>MW-01
MW-34
PZ-01
PZ-07R</td><td>Sampling Every 5 Years</td><td>MW-23
MW-24
MW-37</td></tr>
<tr><td colspan="2">Results in Tables 3-3 and 3-7</td><td colspan="2">Results in Tables 3-4 and 3-8</td><td colspan="2">Tables 3-5 and 3-9</td><td colspan="2">Tables 3-6 and 3-10</td></tr>
</table>

Table 3-3a

Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, December 2016

2016 and 2017 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-120616	MW17-120616	DUP-GW-120616	MW18-120616	MW26-120616	TW01-121316
Sample Date			12/6/2016	12/6/2016	12/6/2016	12/7/2016	12/6/2016	12/13/2016
Analyte	CAS#	TOGS 1.1.1 GA*						
VOA (ug/l)								
1,1,1-Trichloroethane	71-55-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2 U	2 U	2 U	2 U	2 U	2 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
1,1-Dichloroethane	75-34-3	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	120-82-1	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	96-12-8	--	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	107-06-2	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	156-59-2	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	156-60-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	78-87-5	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	541-73-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	78-93-3	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Hexanone	591-78-6	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50 **	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	67-64-1	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Benzene	71-43-2	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	74-97-5	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	75-27-4	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	75-25-2	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	74-83-9	5	0.5 R	0.5 R	0.5 U	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	75-15-0	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R
Carbon Tetrachloride	56-23-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	108-90-7	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	75-00-3	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	67-66-3	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	74-87-3	5	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ	0.5 UJ	0.5 R
Cyclohexane	110-82-7	--	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U
Dibromochloromethane	124-48-1	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	75-71-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100-41-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	98-82-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 3-3a

Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, December 2016

2016 and 2017 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-120616	MW17-120616	DUP-GW-120616	MW18-120616	MW26-120616	TW01-121316
Sample Date			12/6/2016	12/6/2016	12/6/2016	12/7/2016	12/6/2016	12/13/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
Methyl Acetate	79-20-9	--	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	108-87-2	--	1 UJ	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	75-09-2	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Styrene	100-42-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butyl Methyl Ether	1634-04-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	108-88-3	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	79-01-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	75-69-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	75-01-4	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ
Xylene, m,p-	108-38-3/1	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, o-	95-47-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 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; modified April 2000; modified 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

-- = Not available

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

SWMU = solid waste management unit

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 3-3b

Groundwater Sampling Results for SWMU 1 — Semivolatile Organic Compounds, December 2016

2016 and 2017 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-120616	MW17-120616	DUP-GW-120616	MW18-120616	MW26-120616	TW01-121316
Sample Date			12/6/2016	12/6/2016	12/6/2016	12/7/2016	12/6/2016	12/13/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
SVOA (ug/l)								
2-Methylnaphthalene	91-57-6	--	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Acenaphthene	83-32-9	20	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Acenaphthylene	208-96-8	--	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Anthracene	120-12-7	50	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Benzo(a)anthracene	56-55-3	0.002	0.0272 U	0.0255 U	0.0255 U	**0.0358 J**	0.026 U	0.025 U
Benzo(a)pyrene	50-32-8	0.002	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Benzo(b)fluoranthene	205-99-2	0.002	0.0272 U	0.0255 U	0.0255 U	**0.0575 J**	0.026 U	0.025 U
Benzo(g,h,i)perylene	191-24-2	--	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Benzo(k)fluoranthene	207-08-9	0.002	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Chrysene	218-01-9	0.002	0.0272 U	0.0255 U	0.0255 U	**0.0369 J**	0.026 U	0.025 U
Dibenzo (a,h) Anthracene	53-70-3	--	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Fluoranthene	206-44-0	50	0.0272 U	0.0255 U	0.0255 U	**0.074 J**	0.026 U	0.025 U
Fluorene	86-73-7	50	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Indeno (1,2,3-c,d) Pyrene	193-39-5	0.002	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Naphthalene	91-20-3	10	0.0272 U	0.0255 U	0.0255 U	0.0301 UJ	0.026 U	0.025 U
Phenanthrene	85-01-8	50	0.0272 U	0.0255 U	0.0255 U	**0.075 J**	0.026 U	0.025 U
Pyrene	129-00-0	50	0.0272 U	0.0255 U	0.0255 U	**0.0801 J**	0.026 U	0.025 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; modified April 2000; modified June 2004.

Bold indicates the analyte was detected

Shading indicates the result exceeded screening criteria

-- = Not available

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

SWMU = solid waste management unit

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, December 2016

2016 and 2017 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-120616	MW17-120616	DUP-GW-120616	MW18-120616	MW26-120616	TW01-121316
Sample Date			12/6/2016	12/6/2016	12/6/2016	12/7/2016	12/6/2016	12/13/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
Metals (ug/l)								
Aluminum	7429-90-5	--	100 U	100 U	100 U	**5,040**	100 U	100 U
Arsenic	7440-38-2	25	**1.4**	**4.03**	**3.57**	**5.87**	**1.45**	**2.9**
Calcium	7440-70-2	--	**118,000**	**177,000**	**179,000 J**	**151,000**	**81,400**	**175,000**
Iron	7439-89-6	300	**6,860**	**2,560**	**2,120**	**21,900**	**1,490**	**27,200**
Magnesium	7439-95-4	35,000	**22,300**	**34,000**	**34,500**	**25,100**	**16,100**	**39,100**
Manganese	7439-96-5	300	**227**	**548**	**556**	**1,140**	**152**	**210**
Potassium	7440-09-7	--	**6,010**	**8,560**	**8,560**	**11,000**	**4,310**	**11,400**
Sodium	7440-23-5	20,000	**75,700**	**73,500**	**74,000**	**172,000**	**68,800**	**102,000**
**Metals, Dissolved (ug/l) ** **								
Aluminum, Dissolved	7429-90-5_D	--	100 U	100 U	**219**	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2_D	25	**1.5**	**5.2**	**3.85**	**0.724 J**	**1.81**	**2.74**
Iron, Dissolved	7439-89-6_D	300	**6,260**	**2,330**	**2,750**	**5,030**	**1,500**	**25,700**
Manganese, Dissolved	7439-96-5_D	300	**219**	**566**	**551**	**1,240**	**143**	**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.

** - 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 available

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

SWMU = solid waste management unit

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, December 2016
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-01	MW-02	PZ-03	PZ-04		PZ-06	PZ-07R
Sample ID			MW01-120616	MW02-120616	PZ03-120716	PZ04-121316	DUP-GW-121316	PZ06-120616	PZ07R-121316
Sample Date			12/6/2016	12/6/2016	12/7/2016	12/13/2016	12/13/2016	12/7/2016	12/13/2016
Analyte	CAS#	TOGS 1.1.1 GA*							
VOA (ug/l)									
1,1,1-Trichloroethane	71-55-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2 U	2 UJ	2 U	2 U	2 U	2 U	2 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	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	5	0.5 U	0.5 UJ	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,3-Trichlorobenzene	87-61-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	120-82-1	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromo-3-chloropropane	96-12-8	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	107-06-2	0.6	0.5 U	0.5 U	**0.94 J**	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	156-59-2	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, trans-	156-60-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloropropane	78-87-5	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichlorobenzene	541-73-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Butanone	78-93-3	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Hexanone	591-78-6	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50 **	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	67-64-1	50	**2.58 J**	**2.97 J**	2.5 U	2.5 U	2.5 U	6.31 U	2.5 U
Benzene	71-43-2	1	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromochloromethane	74-97-5	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	75-27-4	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	75-25-2	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	74-83-9	5	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	75-15-0	60	0.5 U	**1.99**	0.5 U	**21 J**	**7.45 J**	0.5 U	0.5 R
Carbon Tetrachloride	56-23-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	108-90-7	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroethane	75-00-3	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloroform	67-66-3	7	**1.32**	0.5 U	0.5 U	**9.8**	**9.71**	0.5 U	0.5 U
Chloromethane	74-87-3	5	0.5 UJ	0.5 UJ	0.5 UJ	0.5 R	0.5 R	0.5 UJ	0.5 R
Cyclohexane	110-82-7	--	1 UJ	1 UJ	1 UJ	1 U	1 U	1 UJ	1 U
Dibromochloromethane	124-48-1	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	75-71-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Ethylbenzene	100-41-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Isopropylbenzene	98-82-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Acetate	79-20-9	--	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	108-87-2	--	1 U	1 UJ	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	75-09-2	5	0.5 U	0.5 U	0.5 U	**2.39 J**	**2.14 J**	0.5 U	0.5 U
Styrene	100-42-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
tert-Butyl Methyl Ether	1634-04-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Toluene	108-88-3	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichloroethene	79-01-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane	75-69-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	75-01-4	2	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 UJ	0.5 U	0.5 UJ
Xylene, m,p-	108-38-3/1	--	0.5 U	0.5 U	0.5 U	**0.93 J**	**0.871 J**	0.5 U	0.5 U
Xylene, o-	95-47-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 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; modified April 2000; modified 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
J = The analyte was positively identified; the associated numerical value is the approximate concentration.
R = The analyte result was rejected due to quality control issues.
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 3-4b
Groundwater Sampling Results for AOC B — Metals, December 2016
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-01	MW-02	PZ-03	PZ-04		PZ-06	PZ-07R
Sample ID			MW01-120616	MW02-120616	PZ03-120716	PZ04-121316	DUP-GW-121316	PZ06-120616	PZ07R-121316
Sample Date			12/6/2016	12/6/2016	12/7/2016	12/13/2016	12/13/2016	12/7/2016	12/13/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***							
Metals (ug/l)									
Aluminum	7429-90-5	--	100 U	100 U	100 U	100 U	**113 J**	**326**	100 U
Arsenic	7440-38-2	25	**7.11**	**0.736 J**	**28.9**	**1.76**	**2.07**	**7.06**	**7.58**
Calcium	7440-70-2	--	**98,600**	**117,000**	**185,000**	**83,800**	**84,800**	**18,000**	**179,000**
Chromium	7440-47-3	50	**2.35**	**2.52**	**1.82 J**	**7.02**	**7.08**	**4.7**	**1.76 J**
Iron	7439-89-6	300	**2,550**	**781**	**1,350**	**167**	**269**	**520**	**16,000**
Magnesium	7439-95-4	35,000	**12,000**	**13,100**	**87,200**	**16,400**	**16,700**	**5,030**	**50,200**
Manganese	7439-96-5	300	**155**	**91.9**	**304**	**14**	**18.3**	**14.2**	**270**
Potassium	7440-09-7	--	**4,790**	**4,610**	**8,820**	**18,800**	**19,000**	**5,540**	**13,800**
Silica	7631-86-9	--	**10,900**	**14,900**	**23,400**	**66,900**	- -	**13,100**	**15,100**
Silicon	7440-21-3	--	**5,070**	**6,950**	**10,900**	**31,300**	- -	**6,140**	**7,070**
Sodium	7440-23-5	20,000	**244,000**	**153,000**	**3,100,000**	**1,360,000**	**1,340,000**	**428,000**	**445,000**
**Metals, Dissolved (ug/l) ** **									
Aluminum, Dissolved	7429-90-5_D	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2_D	25	**5.94**	**0.597 J**	**24.4**	**1.58**	**1.61**	**3.51**	**6.18**
Chromium, Dissolved	7440-47-3_D	50	**2.34**	**2.46**	**1.82 J**	**5.76**	**5.15**	**2.32**	**1.38 J**
Iron, Dissolved	7439-89-6_D	300	**2,270**	**701**	**3,430**	50 U	50 U	50 U	**12,800**
Manganese, Dissolved	7439-96-5_D	300	**156**	**91.9**	**260**	**13.9**	**10.5**	5 U	**216**

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.
ug/l = micrograms per liter

Table 3-4c
Groundwater Sampling Results for AOC B — General Chemistry, December 2016
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-01	MW-02	PZ-03	PZ-04		PZ-06	PZ-07R
Sample ID			MW01-120616	MW02-120616	PZ03-120716	PZ04-121316	DUP-GW-121316	PZ06-120616	PZ07R-121316
Sample Date			12/6/2016	12/6/2016	12/7/2016	12/13/2016	12/13/2016	12/7/2016	12/13/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***							
Wet Chemistry (ug/l)									
Alkalinity	ALK	--	**186,000**	**214,000**	**405,000**	**1,740,000**	- -	**563,000**	**427,000 J**
Ammonia	7664-41-7	--	**595**	**1,030**	**821**	**7,370**	- -	**208**	**5,780**
Chloride	16887-00-6	250,000	**427,000**	**110,000**	**1,310,000**	**425,000**	- -	**66,200**	**653,000**
Nitrate	14797-55-8	--	**908**	**6,100**	**2,220**	**2,100**	- -	**720**	**325**
Nitrate-Nitrite	NO2NO3	--	**908**	**6,100**	**2,220**	**2,100**	- -	**735**	**325**
Nitrogen, Total Kjeldahl	7727-37-9	--	**585**	**1,140**	**696**	**5,600**	- -	**405**	**4,880**
Orthophosphate	14265-44-2	--	25 U	**98.9**	25 U	10,000 U	- -	**135**	25 U
Phosphorus, Total	7723-14-0	--	**127 J**	100 U	**157 J**	**542 J**	- -	100 U	**301 J**
Sulfate	14808-79-8	250,000	**82,300**	**313,000**	**352,000**	**955,000**	- -	**47,800**	**367,000**
Sulfide	18496-25-8	50	**571 J**	**3,440**	**941 J**	500 U	- -	500 U	**1,250**
Total Dissolved Solids	TDS	--	**1,010,000**	**872,000**	**3,060,000**	**1,700,000**	- -	**1,110,000**	**960,000**
Total Organic Carbon	TOC	--	**8,210**	**6,020**	**7,590**	**22,000**	- -	**2,930**	**8,240**

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
- - = 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 3-5a
Groundwater Sampling Results for AOC D — Metals, December 2016
2016 and 2017 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-120716	DUP-GW-120716-2	MW21-120816	MW23-120616	MW24-120816	MW30-120716	MW31-120816	MW35-120816	MW36-120816	MW37-120816
Sample Date			12/7/2016	12/7/2016	12/8/2016	12/6/2016	12/8/2016	12/7/2016	12/8/2016	12/8/2016	12/8/2016	12/8/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***										
Metals (ug/l)												
Aluminum	7429-90-5	--	100 U	100 U	**1,050 J**	100 U	**307**	**252**	1,000 U	100 U	100 U	100 U
Arsenic	7440-38-2	25	**1,130**	**1,120**	**4,100**	**37.3**	**9.48**	**31.4**	**32.9**	**8.96**	**169**	**2.19**
Calcium	7440-70-2	--	**3,400**	**3,240**	**2,710 J**	**169,000**	**164,000**	**49,500**	**3,470 J**	**155,000**	**97,200**	**216,000**
Iron	7439-89-6	300	**68.7 J**	**73.6 J**	**663 J**	**200**	**11,100**	**475**	**1,950**	**1,030**	**4,110**	**141**
Magnesium	7439-95-4	35,000	**3,730**	**3,810**	2,500 U	**22,900**	**96,500**	**20,500**	**3,060 J**	**94,000**	**74,000**	**88,800**
Manganese	7439-96-5	300	**10.1**	**8 J**	50 U	**78.1**	**302**	**26 J**	50 U	**174**	**36.4**	**362**
Potassium	7440-09-7	--	**2,030**	**1,950**	5,000 U	**11,400**	**7,020**	**7,360**	**11,800**	**4,310**	**5,340**	**3,900**
Silica	7631-86-9	--	**10,200**	- -	**16,700 J**	**41,600**	**24,300**	**21,900**	**24,300**	**18,400**	**20,400**	**16,300**
Silicon	7440-21-3	--	**4,750**	- -	**7,790 J**	**19,500**	**11,300**	**10,200**	**11,400**	**8,580**	**9,540**	**7,610**
Sodium	7440-23-5	20,000	**683,000**	**748,000**	**6,900,000**	**909,000**	**514,000**	**860,000**	**2,410,000**	**164,000**	**174,000**	**714,000**
**Metals, Dissolved (ug/l) ** **												
Aluminum, Dissolved	7429-90-5_D	--	100 U	100 U	**1,070 J**	100 U	100 U	100 U	1,000 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2_D	25	**1,110**	**1,110**	**3,940**	**35.1**	**8.94**	**2.84**	**29.8**	**8.39**	**162**	**1.98**
Iron, Dissolved	7439-89-6_D	300	50 U	50 U	**541 J**	**75.4 J**	**8,420**	**343**	**1,800**	**846**	**3,810**	**133**
Manganese, Dissolved	7439-96-5_D	300	**10.5**	5 U	50 U	**80.5**	**185**	**44.8 J**	50 U	**172**	**35.7**	**365**

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.
ug/l = micrograms per liter

Table 3-5b
Groundwater Sampling Results for AOC D — General Chemistry, December 2016
2016 and 2017 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-120716	DUP-GW-120716-2	MW21-120816	MW23-120616	MW24-120816	MW30-120716	MW31-120816	MW35-120816	MW36-120816	MW37-120816
Sample Date			12/7/2016	12/7/2016	12/8/2016	12/6/2016	12/8/2016	12/7/2016	12/8/2016	12/8/2016	12/8/2016	12/8/2016
Analyte	CAS#	TOGS 1.1.1 GA*										
Wet Chemistry (ug/l)												
Alkalinity	ALK	--	**431,000**	- -	**13,300,000**	**738,000**	**809,000**	**563,000**	**4,510,000**	**322,000**	**398,000**	**266,000**
Ammonia	7664-41-7	--	**323**	- -	**11,900**	**3,320**	**759**	**473**	**4,100**	**82.2 J**	**216**	50 U
Chloride	16887-00-6	250,000	**676,000**	- -	**308,000**	**289,000**	**281,000**	**176,000**	**608,000**	**453,000**	**215,000**	**1,220,000**
Nitrate	14797-55-8	--	**732**	- -	**13,900**	**3,080**	**2,220**	**16,800**	**16,200**	**804**	**844**	**696**
Nitrate-Nitrite	NO2NO3	--	**732**	- -	**14,300**	**3,080**	**2,220**	**16,800**	**16,800**	**804**	**844**	**696**
Nitrogen, Total Kjeldahl	7727-37-9	--	**230**	- -	**23,000**	**3,680**	**922**	**448**	**7,770**	100 U	**222**	100 U
Orthophosphate	14265-44-2	--	**400**	- -	**23,000**	**638**	25 U	**279**	**9,070 J**	**45.4 J**	**27.9 J**	**51.7**
Phosphorus, Total	7723-14-0	--	**215**	- -	**14,500**	**701**	**101 J**	**185 J**	**4,910**	100 U	100 U	100 U
Sulfate	14808-79-8	250,000	**261,000**	- -	**1,040,000**	**1,240,000**	**975,000**	**232,000**	**380,000**	**166,000**	**233,000**	**836,000**
Sulfide	18496-25-8	50	**681 J**	- -	**37,200**	**8,860**	500 U	**1,740**	**35,100**	500 U	500 U	500 U
Total Dissolved Solids	TDS	--	**1,870,000**	- -	**16,000,000**	**3,110,000**	**2,470,000**	**1,670,000**	**3,550,000**	**1,330,000**	**1,040,000**	**3,300,000**
Total Organic Carbon	TOC	--	**3,420**	- -	**729,000**	**132,000**	**10,000**	**7,410**	**255,000**	**1,530**	**2,970**	**2,020**

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
- - = 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 3-6a
Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, December 2016
2016 and 2017 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-120716	DUP-GW-120716-1	MW06-120716	MW07-120716	MW09R-120616	MW10-120716	MW19-121316	MW20-120716
Sample Date			12/7/2016	12/7/2016	12/7/2016	12/7/2016	12/6/2016	12/7/2016	12/13/2016	12/7/2016
Analyte	CAS#	TOGS 1.1.1 GA*								
VOA (ug/l)										
1,1,1-Trichloroethane	71-55-6	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
1,1,2,2-Tetrachloroethane	79-34-5	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
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 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	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethene	75-35-4	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
1,2,3-Trichlorobenzene	87-61-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2,4-Trichlorobenzene	120-82-1	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
1,2-Dibromo-3-chloropropane	96-12-8	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	106-93-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichlorobenzene	95-50-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethane	107-06-2	0.6	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dichloroethene, cis-	156-59-2	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**6.71**	0.5 U
1,2-Dichloroethene, trans-	156-60-5	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**9.41**	0.5 U
1,2-Dichloropropane	78-87-5	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
1,3-Dichlorobenzene	541-73-1	3	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,4-Dichlorobenzene	106-46-7	3	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-Butanone	78-93-3	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
2-Hexanone	591-78-6	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50 **	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Acetone	67-64-1	50	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U
Benzene	71-43-2	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
Bromochloromethane	74-97-5	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromodichloromethane	75-27-4	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	75-25-2	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromomethane	74-83-9	5	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ
Carbon Disulfide	75-15-0	60	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 R	0.5 U
Carbon Tetrachloride	56-23-5	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
Chlorobenzene	108-90-7	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
Chloroethane	75-00-3	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
Chloroform	67-66-3	7	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chloromethane	74-87-3	5	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 UJ	0.5 R	0.5 UJ
Cyclohexane	110-82-7	--	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 UJ	1 U	1 UJ
Dibromochloromethane	124-48-1	50	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dichlorodifluoromethane	75-71-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**30.5**	0.5 U
Ethylbenzene	100-41-4	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
Isopropylbenzene	98-82-8	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Methyl Acetate	79-20-9	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane	108-87-2	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	75-09-2	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
Styrene	100-42-5	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
tert-Butyl Methyl Ether	1634-04-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Tetrachloroethene	127-18-4	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
Toluene	108-88-3	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
Trichloroethene	79-01-6	5	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	**0.629 J**	0.5 U
Trichlorofluoromethane	75-69-4	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl Chloride	75-01-4	2	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 UJ	0.5 U
Xylene, m,p-	108-38-3/1	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Xylene, o-	95-47-6	--	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U

Table 3-6a
Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, December 2016
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

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.
** - 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
J = The analyte was positively identified; the associated numerical value is the approximate concentration.
R = The analyte result was rejected due to quality control issues.
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 3-6b
Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, December 2016
2016 and 2017 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-120716	DUP-GW-120716-1	MW06-120716	MW07-120716	MW09R-120616	MW10-120716	MW19-121316	MW20-120716
Sample Date			12/7/2016	12/7/2016	12/7/2016	12/7/2016	12/6/2016	12/7/2016	12/13/2016	12/7/2016
Analyte	CAS#	TOGS 1.1.1 GA*								
SVOA (ug/l)										
1,1'-Biphenyl	92-52-4	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
1,3,5-Trinitrobenzene	99-35-4	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
1,3-Dinitrobenzene	99-65-0	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
1,4-Dioxane	123-91-1	--	6.85 UJ	5.38 UJ	5.32 UJ	5 UJ	5.56 U	5.49 UJ	5.62 UJ	5.62 UJ
2,4,5-Trichlorophenol	95-95-4	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2,4,6-Trichlorophenol	88-06-2	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2,4-Dichlorophenol	120-83-2	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2,4-Dimethylphenol	105-67-9	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2,4-Dinitrophenol	51-28-5	1	17.1 U	13.4 U	13.3 U	12.5 U	13.9 U	13.7 U	14 U	14 U
2,4-Dinitrotoluene	121-14-2	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2,6-Dinitrotoluene	606-20-2	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2-Chloronaphthalene	91-58-7	10	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2-Chlorophenol	95-57-8	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2-Methylnaphthalene	91-57-6	--	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
2-Methylphenol	95-48-7	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
2-Nitroaniline	88-74-4	5	17.1 U	13.4 U	13.3 U	12.5 U	13.9 U	13.7 U	14 U	14 U
2-Nitrophenol	88-75-5	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
3,3'-Dichlorobenzidine	91-94-1	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
3-,4-Methylphenol	1319-77-3	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
3-Nitroaniline	99-09-2	5	17.1 U	13.4 U	13.3 U	12.5 U	13.9 U	13.7 U	14 U	14 U
4-Bromophenyl Phenyl Ether	101-55-3	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
4-Chloroaniline	106-47-8	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
4-Nitrophenol	100-02-7	--	17.1 U	13.4 U	13.3 U	12.5 U	13.9 U	13.7 U	14 U	14 U
Acenaphthene	83-32-9	20	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	**0.0362 J**	0.0272 U
Acenaphthylene	208-96-8	--	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Anthracene	120-12-7	50	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzo(a)anthracene	56-55-3	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzo(a)pyrene	50-32-8	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzo(b)fluoranthene	205-99-2	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzo(g,h,i)perylene	191-24-2	--	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzo(k)fluoranthene	207-08-9	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Benzoic Acid	65-85-0	--	13.7 U	10.8 U	10.6 U	10 U	11.1 U	11 U	11.2 UJ	11.2 U
Benzyl Alcohol	100-51-6	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Bis (2-chloroethoxy) Methane	111-91-1	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Bis (2-chloroethyl) Ether	111-44-4	1	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Bis (2-ethylhexyl) Phthalate	117-81-7	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Butyl Benzyl Phthalate	85-68-7	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Carbazole	86-74-8	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Chrysene	218-01-9	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Dibenzo (a,h) Anthracene	53-70-3	--	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Dibenzofuran	132-64-9	--	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Diethylphthalate	84-66-2	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Dimethylphthalate	131-11-3	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Di-n-butylphthalate	84-74-2	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Di-n-octylphthalate	117-84-0	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Fluoranthene	206-44-0	50	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	**0.283**	0.0272 U
Fluorene	86-73-7	50	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Hexachlorobenzene	118-74-1	0.04	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Hexachlorobutadiene	87-68-3	0.5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Hexachlorocyclopentadiene	77-47-4	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Hexachloroethane	67-72-1	5	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Indeno (1,2,3-c,d) Pyrene	193-39-5	0.002	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Isophorone	78-59-1	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Naphthalene	91-20-3	10	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Nitrobenzene	98-95-3	0.4	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U

Table 3-6b
Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, December 2016
2016 and 2017 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-120716	DUP-GW-120716-1	MW06-120716	MW07-120716	MW09R-120616	MW10-120716	MW19-121316	MW20-120716
Sample Date			12/7/2016	12/7/2016	12/7/2016	12/7/2016	12/6/2016	12/7/2016	12/13/2016	12/7/2016
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
n-Nitrosodiphenylamine	86-30-6	50	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Pentachlorophenol	87-86-5	1	17.1 U	13.4 U	13.3 U	12.5 U	13.9 U	13.7 U	14 U	14 U
Phenanthrene	85-01-8	50	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	0.0258 U	0.0272 U
Phenol	108-95-2	1	3.42 U	2.69 U	2.66 U	2.5 U	2.78 U	2.75 U	2.81 U	2.81 U
Pyrene	129-00-0	50	0.0272 U	0.0258 U	0.0272 U	0.0269 U	0.269 U	0.0255 U	**0.211**	0.0272 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; modified April 2000; modified June 2004.
Bold indicates the analyte was detected
-- = Not available
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.
ug/l = micrograms per liter

Table 3-6c
Groundwater Sampling Results for Supplemental Wells — Metals, December 2016
2016 and 2017 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-120716	DUP-GW-120716-1	MW06-120716	MW07-120716	MW09R-120616	MW10-120716	MW19-121316	MW20-120716
Sample Date			12/7/2016	12/7/2016	12/7/2016	12/7/2016	12/6/2016	12/7/2016	12/13/2016	12/7/2016
Analyte	CAS#	TOGS 1.1.1 GA*								
Metals (ug/l)										
Aluminum	7429-90-5	--	100 U	100 U	100 U	**308**	100 U	**252**	100 U	100 U
Arsenic	7440-38-2	25	**1.08**	**0.936 J**	**0.694 J**	**4.54 J**	**6.88 J**	**14.1**	**7.36**	0.5 U
Calcium	7440-70-2	--	**77,500**	**77,500**	**124,000**	**61,600**	**319,000**	**45,100**	**141,000**	**109,000**
Iron	7439-89-6	300	**208**	**176**	50 U	**236**	**7,020**	**245**	**2,540**	50 U
Magnesium	7439-95-4	35,000	**19,200**	**20,100**	**19,100**	**8,460**	**96,400**	**4,550**	**42,900**	**17,200**
Manganese	7439-96-5	300	**85.1**	**82.4**	**7.5 J**	**5.45 J**	**735**	5 U	**872**	5 U
Potassium	7440-09-7	--	**4,110**	**4,080**	**1,720**	**3,080**	**10,900**	**1,020**	**1,020**	**5,690**
Sodium	7440-23-5	20,000	**71,700**	**72,100**	**31,200**	**260,000**	**732,000**	**110,000**	**108,000**	**16,800**
Metals, Dissolved (ug/l) **										
Aluminum, Dissolved	7429-90-5_D	--	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2_D	25	**0.991 J**	**1.2**	**0.752 J**	**5.84 J**	**5.36**	**11.4**	**7.89**	**0.513 J**
Iron, Dissolved	7439-89-6_D	300	**177**	**170**	50 U	50 U	**6,640**	50 U	**2,470**	50 U
Manganese, Dissolved	7439-96-5_D	300	**84.1**	**82.6**	5 U	5 U	**700**	5 U	**820**	**6.25 J**

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 available
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 3-7a

Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, August 2017

2016 and 2017 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-082417	MW17-082417	DUP-GW-082417	MW18-082417	MW26-082417	TW01-082417
Sample Date			08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017
Analyte	CAS#	TOGS 1.1.1 GA*						
VOA (ug/l)								
1,1,1-Trichloroethane	71-55-6	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
1,1,2-Trichloroethane	79-00-5	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	75-34-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene	75-35-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	87-61-6	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	120-82-1	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane	96-12-8	--	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ	1.00 U	1.00 UJ
1,2-Dibromoethane	106-93-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	95-50-1	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	107-06-2	0.6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, cis-	156-59-2	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, trans-	156-60-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloropropane	78-87-5	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichlorobenzene	541-73-1	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	106-46-7	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2-Butanone	78-93-3	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
2-Hexanone	591-78-6	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
Acetone	67-64-1	50	3.23 U	2.50 U	2.50 U	3.16 U	2.50 U	3.89 U
Benzene	71-43-2	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	74-97-5	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	75-27-4	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromoform	75-25-2	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromomethane	74-83-9	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 UJ	0.500 U
Carbon Disulfide	75-15-0	60	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Carbon Tetrachloride	56-23-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	108-90-7	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroethane	75-00-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform	67-66-3	7	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloromethane	74-87-3	5	0.500 U	**0.573 J**	0.500 U	0.500 U	0.500 U	0.500 U
Cyclohexane	110-82-7	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Dibromochloromethane	124-48-1	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U

Table 3-7a

Groundwater Sampling Results for SWMU 1 — Volatile Organic Compounds, August 2017

2016 and 2017 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-082417	MW17-082417	DUP-GW-082417	MW18-082417	MW26-082417	TW01-082417
Sample Date			08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
Dichlorodifluoromethane	75-71-8	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Epichlorohydrin	106-89-8	5	0 UN	0 UN	0 UN	0 UN	0 UN	0 UN
Ethylbenzene	100-41-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Isopropylbenzene	98-82-8	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Methyl Acetate	79-20-9	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylcyclohexane	108-87-2	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylene Chloride	75-09-2	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Styrene	100-42-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
tert-Butyl Methyl Ether	1634-04-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Tetrachloroethene	127-18-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Toluene	108-88-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichloroethene	79-01-6	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	75-69-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Vinyl Chloride	75-01-4	2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, m,p-	179601-23-1	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, o-	95-47-6	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 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; modified April 2000; modified 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

-- = Not available

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

SWMU = solid waste management unit

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 3-7b

Groundwater Sampling Results for SWMU 1 — Semivolatile Organic Compounds, August 2017

2016 and 2017 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-082417	MW17-082417	DUP-GW-082417	MW18-082417	MW26-082417	TW01-082417
Sample Date			08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
VOA (ug/l)								
2-Methylnaphthalene	91-57-6	--	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Acenaphthene	83-32-9	20	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Acenaphthylene	208-96-8	--	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Anthracene	120-12-7	50	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Benzo(a)anthracene	56-55-3	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Benzo(a)pyrene	50-32-8	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Benzo(b)fluoranthene	205-99-2	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Benzo(g,h,i)perylene	191-24-2	--	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Benzo(k)fluoranthene	207-08-9	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Chrysene	218-01-9	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Dibenzo (a,h) Anthracene	53-70-3	--	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Fluoranthene	206-44-0	50	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Fluorene	86-73-7	50	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Indeno (1,2,3-c,d) Pyrene	193-39-5	0.002	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Naphthalene	91-20-3	10	0.0250 U	0.0287 U	0.0269 U	**0.0335 J**	**0.0269 J**	0.0272 UJ
Phenanthrene	85-01-8	50	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ
Pyrene	129-00-0	50	0.0250 U	0.0287 U	0.0269 U	0.0260 U	0.0250 U	0.0272 UJ

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

-- = Not available

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

SWMU = solid waste management unit

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 3-7c

Groundwater Sampling Results for SWMU 1 — Metals, August 2017

2016 and 2017 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-082417	MW17-082417	DUP-GW-082417	MW18-082417	MW26-082417	TW01-082417
Sample Date			08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017	08/24/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***						
Metals (ug/l)								
Aluminum	7429-90-5	--	100 U	100 U	100 U	**182 J**	100 U	100 U
Arsenic	7440-38-2	25	**1.39**	**9.50**	**9.00**	**3.96**	**0.938 J**	**3.33**
Calcium	7440-70-2	--	**106,000**	**146,000**	**147,000**	**141,000**	**67,100**	**168,000**
Iron	7439-89-6	300	**8,150**	**3,330**	**3,300**	**22,000**	**509**	**48,900**
Magnesium	7439-95-4	35,000	**18,700**	**28,300**	**28,300**	**21,100**	**13,200**	**38,600**
Manganese	7439-96-5	300	**338**	**624**	**630**	**911**	**381**	**374**
Potassium	7440-09-7	--	**4,820**	**7,940**	**7,970**	**9,020**	**3,540**	**10,800**
Sodium	7440-23-5	20,000	**71,300**	**91,000**	**91,000**	**145,000**	**69,900**	**92,200**
**Metals, Dissolved (ug/l) ** **								
Aluminum, Dissolved	7429-90-5	--	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2	25	**1.54**	**9.07**	**8.67**	**4.03**	**1.01**	**3.07**
Iron, Dissolved	7439-89-6	300	**9,110**	**3,260**	**3,280**	**21,500**	**465**	**48,600**
Manganese, Dissolved	7439-96-5	300	**356**	**620**	**629**	**920**	**376**	**376**

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 available

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

SWMU = solid waste management unit

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

ug/l = micrograms per liter

Table 3-8a

Groundwater Sampling Results for AOC B — Volatile Organic Compounds, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-02	PZ-04		PZ-06
Sample ID			MW02-082217	PZ04-082317	DUP-GW-082317-1	PZ06-082317
Sample Date			08/22/2017	08/23/2017	08/23/2017	08/23/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***				
VOA (ug/l)						
1,1,1-Trichloroethane	71-55-6	5	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2.00 U	2.00 U	2.00 U	2.00 U
1,1,2-Trichloroethane	79-00-5	1	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	75-34-3	5	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene	75-35-4	5	0.500 U	0.500 U	0.500 UJ	0.500 U
1,2,3-Trichlorobenzene	87-61-6	--	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	120-82-1	5	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane	96-12-8	--	1.00 UJ	1.00 UJ	1.00 UJ	1.00 UJ
1,2-Dibromoethane	106-93-4	--	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	95-50-1	3	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	107-06-2	0.6	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, cis-	156-59-2	5	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, trans-	156-60-5	5	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloropropane	78-87-5	1	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichlorobenzene	541-73-1	3	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	106-46-7	3	0.500 U	0.500 U	0.500 U	0.500 U
2-Butanone	78-93-3	50	2.50 U	2.50 U	2.50 U	2.50 U
2-Hexanone	591-78-6	50	2.50 U	2.50 U	2.50 UJ	2.50 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50 **	2.50 U	2.50 U	2.50 U	2.50 U
Acetone	67-64-1	50	3.23 U	2.73 U	3.72 U	14.1 U
Benzene	71-43-2	1	0.500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	74-97-5	--	0.500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	75-27-4	50	0.500 U	0.500 U	0.500 U	0.500 U
Bromoform	75-25-2	50	0.500 U	0.500 U	0.500 U	0.500 U
Bromomethane	74-83-9	5	0.500 U	0.500 U	0.500 UJ	0.500 U
Carbon Disulfide	75-15-0	60	**18.9 J**	**7.07 J**	**14.3 J**	0.500 U
Carbon Tetrachloride	56-23-5	5	0.500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	108-90-7	5	0.500 U	0.500 U	0.500 UJ	0.500 U
Chloroethane	75-00-3	5	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform	67-66-3	7	1.07 U	1.16 U	1.31 U	0.500 U
Chloromethane	74-87-3	5	0.500 U	0.500 U	0.500 U	**0.613 J**
Cyclohexane	110-82-7	--	1.00 U	1.00 U	1.00 U	1.00 U
Dibromochloromethane	124-48-1	50	0.500 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane	75-71-8	--	0.500 U	0.500 U	0.500 U	0.500 U
Epichlorohydrin	106-89-8	5	0 UN	0 UN	0 UN	0 UN
Ethylbenzene	100-41-4	5	0.500 U	0.500 U	**1.03**	0.500 U
Isopropylbenzene	98-82-8	--	0.500 U	0.500 U	0.500 U	0.500 U
Methyl Acetate	79-20-9	--	1.00 U	1.00 U	1.00 U	1.00 U
Methylcyclohexane	108-87-2	--	1.00 U	1.00 U	1.00 U	1.00 U
Methylene Chloride	75-09-2	5	**0.896 J**	0.500 U	0.500 U	0.500 U
Styrene	100-42-5	5	0.500 U	0.500 U	0.500 U	0.500 U
tert-Butyl Methyl Ether	1634-04-4	--	0.500 U	0.500 U	0.500 U	0.500 U
Tetrachloroethene	127-18-4	5	0.500 U	0.500 U	0.500 U	0.500 U
Toluene	108-88-3	5	0.500 U	0.500 U	0.500 U	0.500 U
Trichloroethene	79-01-6	5	0.500 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	75-69-4	--	0.500 U	0.500 U	0.500 U	0.500 U
Vinyl Chloride	75-01-4	2	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, m,p-	179601-23-1	--	0.500 U	**0.965 J**	**0.869 J**	0.500 U
Xylene, o-	95-47-6	--	0.500 U	0.500 U	0.500 U	0.500 U

Table 3-8a

Groundwater Sampling Results for AOC B — Volatile Organic Compounds, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

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.

** - 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

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.

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

ug/l = micrograms per liter

Table 3-8b

Groundwater Sampling Results for AOC B — Metals, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-02	PZ-04		PZ-06
Sample ID			MW02-082217	PZ04-082317	DUP-GW-082317-1	PZ06-082317
Sample Date			08/22/2017	08/23/2017	08/23/2017	08/23/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***				
Metals (ug/l)						
Aluminum	7429-90-5	--	100 U	**120 J**	100 U	**1,890**
Arsenic	7440-38-2	25	**1.17**	**1.02**	**0.972 J**	**8.20**
Calcium	7440-70-2	--	**198,000**	**73,800**	**68,700**	**35,600**
Chromium	7440-47-3	50	**4.32**	**7.94**	**8.72**	**4.86**
Iron	7439-89-6	300	**423**	92.9 U	71.3 U	**2,210**
Magnesium	7439-95-4	35,000	**22,500**	**14,800**	**14,700**	**6,710**
Manganese	7439-96-5	300	**58.8**	**16.0**	**10.2**	**81.1**
Potassium	7440-09-7	--	**7,960**	**15,100**	**15,700**	**4,820**
Silica	7631-86-9	--	**31,200**	**69,200**	- -	**18,200**
Silicon	7440-21-3	--	**14,600**	**32,300**	- -	**8,480**
Sodium	7440-23-5	20,000	**422,000**	**1,110,000**	**1,130,000**	**172,000**
**Metals, Dissolved (ug/l) ** **						
Aluminum, Dissolved	7429-90-5	--	100 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2	25	**1.09**	**0.718 J**	**0.730 J**	**3.87**
Chromium, Dissolved	7440-47-3	50	**3.85**	**6.68**	**6.49**	**1.14 J**
Iron, Dissolved	7439-89-6	300	**70.0 J**	50.0 U	50.0 U	50.0 U
Manganese, Dissolved	7439-96-5	300	**63.8**	**8.86 J**	**9.15 J**	**20.5**

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 3-8c

Groundwater Sampling Results for AOC B — General Chemistry, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-02	PZ-04		PZ-06
Sample ID			MW02-082217	PZ04-082317	DUP-GW-082317-1	PZ06-082317
Sample Date			08/22/2017	08/23/2017	08/23/2017	08/23/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***				
Wet Chemistry (ug/l)						
Alkalinity	--	--	**482,000**	**1,270,000**	- -	**362,000**
Ammonia	7664-41-7	--	**2,810**	**5,870**	- -	**978**
Chloride	16887-00-6	250,000	**144,000**	**364,000**	- -	**91,900**
Nitrate	14797-55-8	--	1,250 U	625 U	- -	**270**
Nitrate-Nitrite	--	--	1,250 U	625 U	- -	**300**
Nitrogen, Total Kjeldahl	7727-37-9	--	**2,410**	**2,850**	- -	**390**
Orthophosphate	14265-44-2	--	**310**	1,250 U	- -	**43.9 J**
Phosphorus, Total	7723-14-0	--	**182 J**	**296**	- -	**195 J**
Sulfate	14808-79-8	250,000	**651,000**	**983,000**	- -	**65,900**
Sulfide	18496-25-8	50	**7,540**	**169,000**	- -	**7,430**
Total Dissolved Solids	--	--	**1,780,000**	**3,400,000**	- -	**792,000**
Total Organic Carbon	--	--	**13,800 J**	**22,900**	- -	**8,520**

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

- - = 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 3-9a

Groundwater Sampling Results for AOC D — Metals, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-11S	MW-21	MW-30	MW-31	MW-35	MW-36	
Sample ID			MW11S-082317	MW21-082217	MW30-082317	MW31-082317	MW35-082217	MW36-082217	DUP-GW-082217
Sample Date			08/23/2017	08/22/2017	08/23/2017	08/23/2017	08/22/2017	08/22/2017	08/22/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***							
Metals (ug/l)									
Aluminum	7429-90-5	--	100 U	**1,250**	100 U	**854**	**118 J**	100 U	100 U
Arsenic	7440-38-2	25	**974**	**3,710**	**2.96**	**21.2 J**	**8.42**	**245**	**244**
Calcium	7440-70-2	--	**6,350**	**16,800**	**72,900**	**3,630**	**165,000**	**111,000**	**107,000**
Iron	7439-89-6	300	115 U	**394**	**581**	**1,340**	**1,440**	**4,710**	**4,490**
Magnesium	7439-95-4	35,000	**9,210**	**2,700**	**16,100**	**4,340**	**83,300**	**78,800**	**75,700**
Manganese	7439-96-5	300	**21.0**	**36.5**	**58.5**	**14.8 J**	**178**	**24.0**	**22.0**
Potassium	7440-09-7	--	**2,640**	**7,990**	**10,500**	**11,700**	**4,840**	**4,880**	**4,540**
Silica	7631-86-9	--	**12,800**	**16,700**	**20,500**	**20,100**	**18,700**	**23,800**	- -
Silicon	7440-21-3	--	**5,990**	**7,820**	**9,600**	**9,400**	**8,750**	**11,100**	- -
Sodium	7440-23-5	20,000	**675,000**	**6,490,000**	**495,000**	**2,260,000**	**163,000**	**118,000**	**114,000**
**Metals, Dissolved (ug/l) ** **									
Aluminum, Dissolved	7429-90-5	--	100 U	**1,200**	100 U	**845**	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2	25	**935**	**3,560**	**2.03**	**24.4 J**	**6.74**	**234**	**226**
Iron, Dissolved	7439-89-6	300	50.0 U	**332**	**484**	**1,270**	**946**	**4,340**	**4,530**
Manganese, Dissolved	7439-96-5	300	**19.9**	10.0 U	**60.5**	10.0 U	**174**	**24.1**	**22.5**

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 3-9b

Groundwater Sampling Results for AOC D — General Chemistry, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Location			MW-11S	MW-21	MW-30	MW-31	MW-35	MW-36	
Sample ID			MW11S-082317	MW21-082217	MW30-082317	MW31-082317	MW35-082217	MW36-082217	DUP-GW-082217
Sample Date			08/23/2017	08/22/2017	08/23/2017	08/23/2017	08/22/2017	08/22/2017	08/22/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***							
Wet Chemistry (ug/l)									
Alkalinity	--	--	**367,000**	**14,400,000**	**617,000**	**4,630,000**	**343,000**	**376,000**	- -
Ammonia	7664-41-7	--	**478**	**16,100**	**797**	**7,450**	**308**	**369**	- -
Chloride	16887-00-6	250,000	**724,000**	**380,000**	**343,000**	**780,000**	**452,000**	**249,000**	- -
Nitrate	14797-55-8	--	100 U	2,500 U	2,500 U	2,500 U	**260**	**164 J**	- -
Nitrate-Nitrite	--	--	100 U	2,500 U	2,500 U	2,500 U	**260**	**164 J**	- -
Nitrogen, Total Kjeldahl	7727-37-9	--	100 U	**34,100**	100 U	**11,700**	**198 J**	**434**	- -
Orthophosphate	14265-44-2	--	**249**	**18,700**	**185**	**6,840**	25.0 U	25.0 U	- -
Phosphorus, Total	7723-14-0	--	100 U	**18,300**	**139 J**	**6,780**	100 U	100 U	- -
Sulfate	14808-79-8	250,000	**201,000**	**813,000**	**340,000**	**362,000**	**168,000**	**171,000**	- -
Sulfide	18496-25-8	50	**755 J**	**28,400**	**1,550**	**14,600**	500 U	500 U	- -
Total Dissolved Solids	--	--	**1,780,000**	**1,690,000**	**1,650,000**	**6,300,000**	**1,280,000**	**1,050,000**	- -
Total Organic Carbon	--	--	**3,030**	**653,000 J**	**7,510**	**277,000**	**4,030 J**	**4,470 J**	- -

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

- - = 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 3-10a

Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, August 2017

2016 and 2017 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-082417	MW06-082517	MW07-082517	MW09R-082317	DUP-GW-082317-2	MW10-082517	MW19-082317	MW20-082517
Sample Date			08/24/2017	08/25/2017	08/25/2017	08/23/2017	08/23/2017	08/25/2017	08/23/2017	08/25/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
VOA (ug/l)										
1,1,1-Trichloroethane	71-55-6	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	79-34-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	--	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
1,1,2-Trichloroethane	79-00-5	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	75-34-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene	75-35-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	87-61-6	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	120-82-1	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane	96-12-8	--	1.00 U	1.00 U	1.00 U	1.00 UJ	1.00 UJ	1.00 U	1.00 UJ	1.00 U
1,2-Dibromoethane	106-93-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	95-50-1	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	107-06-2	0.6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, cis-	156-59-2	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	**5.94**	0.500 U
1,2-Dichloroethene, trans-	156-60-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	**7.70**	0.500 U
1,2-Dichloropropane	78-87-5	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichlorobenzene	541-73-1	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, cis-	10061-01-5	0.4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, trans-	10061-02-6	0.4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	106-46-7	3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2-Butanone	78-93-3	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
2-Hexanone	591-78-6	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
4-Methyl-2-pentanone (MIBK)	108-10-1	50	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
Acetone	67-64-1	50	2.85 U	2.52 U	3.20 U	2.58 U	2.50 U	3.66 U	2.80 U	7.78 U
Benzene	71-43-2	1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	74-97-5	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	75-27-4	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromoform	75-25-2	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromomethane	74-83-9	5	0.500 UJ	0.500 UJ	0.500 UJ	0.500 U	0.500 U	0.500 UJ	0.500 U	0.500 UJ
Carbon Disulfide	75-15-0	60	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Carbon Tetrachloride	56-23-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	108-90-7	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroethane	75-00-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform	67-66-3	7	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloromethane	74-87-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Cyclohexane	110-82-7	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Dibromochloromethane	124-48-1	50	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane	75-71-8	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	**21.4**	0.500 U
Epichlorohydrin	106-89-8	5	0 UN	0 UN	0 UN	0 UN	0 UN	0 UN	0 UN	0 UN
Ethylbenzene	100-41-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Isopropylbenzene	98-82-8	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Methyl Acetate	79-20-9	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylcyclohexane	108-87-2	--	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylene Chloride	75-09-2	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Styrene	100-42-5	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
tert-Butyl Methyl Ether	1634-04-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Tetrachloroethene	127-18-4	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Toluene	108-88-3	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichloroethene	79-01-6	5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	75-69-4	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Vinyl Chloride	75-01-4	2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, m,p-	179601-23-1	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, o-	95-47-6	--	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U

Table 3-10a
Groundwater Sampling Results for Supplemental Wells — Volatile Organic Compounds, August 2017
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

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.
** - 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
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.
UN = The analyte is a Tentatively Identified Compound, and was not detected above the reported sample quantitation limit.
ug/l = micrograms per liter

Table 3-10b
Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, August 2017
2016 and 2017 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-082417	MW06-082517	MW07-082517	MW09R-082317	DUP-GW-082317-1	MW10-082517	MW19-082317	MW20-082517
Sample Date			08/24/2017	08/25/2017	08/25/2017	08/23/2017	08/23/2017	08/25/2017	08/23/2017	08/25/2017
Analyte	CAS#	TOGS 1.1.1 GA*								
SVOA (ug/l)										
1,1'-Biphenyl	92-52-4	--	2.50 U	2.66 UJ	2.84 UJ	2.75 U	2.78 U	2.50 UJ	2.50 U	2.63 UJ
1,3,5-Trinitrobenzene	99-35-4	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
1,3-Dinitrobenzene	99-65-0	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
1,4-Dioxane	123-91-1	--	5.00 UJ	5.26 UJ	5.32 UJ	5.49 UJ	5.56 UJ	5.00 UJ	5.00 UJ	5.05 UJ
2,4,5-Trichlorophenol	95-95-4	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2,4,6-Trichlorophenol	88-06-2	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2,4-Dichlorophenol	120-83-2	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2,4-Dimethylphenol	105-67-9	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2,4-Dinitrophenol	51-28-5	1	12.5 U	13.2 U	13.3 U	13.7 U	13.9 U	12.5 U	12.5 U	12.6 U
2,4-Dinitrotoluene	121-14-2	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2,6-Dinitrotoluene	606-20-2	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2-Chloronaphthalene	91-58-7	10	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2-Chlorophenol	95-57-8	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2-Methylnaphthalene	91-57-6	--	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
2-Methylphenol	95-48-7	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
2-Nitroaniline	88-74-4	5	12.5 U	13.2 U	13.3 U	13.7 U	13.9 U	12.5 U	12.5 U	12.6 U
2-Nitrophenol	88-75-5	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
3,3'-Dichlorobenzidine	91-94-1	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
3-,4-Methylphenol	65794-96-9	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
3-Nitroaniline	99-09-2	5	12.5 U	13.2 U	13.3 U	13.7 U	13.9 U	12.5 U	12.5 U	12.6 U
4-Bromophenyl Phenyl Ether	101-55-3	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
4-Chloroaniline	106-47-8	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
4-Nitrophenol	100-02-7	--	12.5 U	13.2 U	13.3 U	13.7 U	13.9 U	12.5 U	12.5 U	12.6 U
Acenaphthene	83-32-9	20	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Acenaphthylene	208-96-8	--	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Anthracene	120-12-7	50	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzo(a)anthracene	56-55-3	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzo(a)pyrene	50-32-8	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzo(b)fluoranthene	205-99-2	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzo(g,h,i)perylene	191-24-2	--	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzo(k)fluoranthene	207-08-9	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Benzoic Acid	65-85-0	--	10.0 UJ	10.5 UJ	10.6 UJ	11.0 UJ	11.1 UJ	10.0 UJ	10.0 UJ	10.1 UJ
Benzyl Alcohol	100-51-6	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Bis (2-chloroethoxy) Methane	111-91-1	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Bis (2-chloroethyl) Ether	111-44-4	1	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Bis (2-ethylhexyl) Phthalate	117-81-7	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Butyl Benzyl Phthalate	85-68-7	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Carbazole	86-74-8	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Chrysene	218-01-9	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Dibenzo (a,h) Anthracene	53-70-3	--	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Dibenzofuran	132-64-9	--	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Diethylphthalate	84-66-2	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Dimethylphthalate	131-11-3	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Di-n-butylphthalate	84-74-2	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Di-n-octylphthalate	117-84-0	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Fluoranthene	206-44-0	50	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	**0.118**	0.0250 U
Fluorene	86-73-7	50	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Hexachlorobenzene	118-74-1	0.04	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Hexachlorobutadiene	87-68-3	0.5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Hexachlorocyclopentadiene	77-47-4	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Hexachloroethane	67-72-1	5	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Indeno (1,2,3-c,d) Pyrene	193-39-5	0.002	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U

Table 3-10b

Groundwater Sampling Results for Supplemental Wells — Semivolatile Organic Compounds, August 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Isophorone	78-59-1	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Naphthalene	91-20-3	10	**0.0256 J**	0.0260 U	**0.0414 J**	**0.0406 J**	**0.0317 J**	0.0266 U	**0.0381 J**	**0.0342 J**
Nitrobenzene	98-95-3	0.4	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
n-Nitrosodiphenylamine	86-30-6	50	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Pentachlorophenol	87-86-5	1	12.5 U	13.2 U	13.3 U	13.7 U	13.9 U	12.5 U	12.5 U	12.6 U
Phenanthrene	85-01-8	50	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	0.0250 U	0.0250 U
Phenol	108-95-2	1	2.50 U	2.63 U	2.66 U	2.75 U	2.78 U	2.50 U	2.50 U	2.53 U
Pyrene	129-00-0	50	0.0250 U	0.0260 U	0.0255 U	0.0287 U	0.0263 U	0.0266 U	**0.0866**	0.0250 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; modified April 2000; modified June 2004.

Bold indicates the analyte was detected

-- = Not available

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.

ug/l = micrograms per liter

Table 3-10c
Groundwater Sampling Results for Supplemental Wells — Metals, August 2017
2016 and 2017 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-082417	MW06-082517	MW07-082517	MW09R-082317	DUP-GW-082317-2	MW10-082517	MW19-082317	MW20-082517
Sample Date			08/24/2017	08/25/2017	08/25/2017	08/23/2017	08/23/2017	08/25/2017	08/23/2017	08/25/2017
Analyte	**CAS#**	**TOGS 1.1.1 GA***								
Metals (ug/l)										
Aluminum	7429-90-5	--	100 U	100 U	**145 J**	100 U	100 U	100 U	100 U	100 U
Arsenic	7440-38-2	25	**0.657 J**	**0.929 J**	**2.38**	**6.89**	**6.70**	**4.68**	**4.45 J**	**0.821 J**
Calcium	7440-70-2	--	**69,100**	**114,000**	**96,700**	**270,000**	**280,000**	**82,400**	**128,000**	**111,000**
Iron	7439-89-6	300	**63.5 J**	50.0 U	**152**	**4,100**	**4,320**	**276 J**	**2,400**	**78.9 J**
Magnesium	7439-95-4	35,000	**19,400**	**25,800**	**14,700**	**94,200**	**97,300**	**20,100**	**42,100**	**30,100**
Manganese	7439-96-5	300	**54.3**	**65.8**	**254 J**	**577**	**598**	**221**	**631**	**32.8 J**
Potassium	7440-09-7	--	**3,390**	**1,770**	**4,280**	**9,220**	**9,550**	**2,410**	**1,480**	**3,690**
Sodium	7440-23-5	20,000	**70,900**	**43,600**	**262,000**	**624,000**	**647,000**	**172,000**	**102,000**	**22,900**
**Metals, Dissolved (ug/l) ** **										
Aluminum, Dissolved	7429-90-5	--	100 U	**217**	100 U	100 U	100 U	100 U	100 U	100 U
Arsenic, Dissolved	7440-38-2	25	**0.658 J**	**0.985 J**	**1.91**	**3.65**	**3.95**	**4.55**	**11.0 J**	**0.672 J**
Iron, Dissolved	7439-89-6	300	**56.7 J**	50.0 U	50.0 U	**3,410**	**3,590**	**1,850 J**	**696**	**75.0 J**
Manganese, Dissolved	7439-96-5	300	**55.9**	**25.8**	**296 J**	**489**	**502**	**129**	**433**	**125 J**

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 available
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 3-11
Summary of QA/QC Water Sample Results
2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sample ID		FB-120716	FB-121316-1	FB-121316-2	FB-082217	FB-082317	FB-082417	FB-082517	TB-120616	TB-120716	TB-121316	TB-082217	TB-082317	TB-082417	TB-082517
Sample Date		12/7/2016	12/13/2016	12/13/2016	08/22/2017	08/23/2017	08/24/2017	08/25/2017	12/6/2016	12/7/2016	12/13/2016	08/22/2017	08/23/2017	08/24/2017	08/25/2017
Analyte	**CAS#**														
VOA (ug/l)															
1,1,1-Trichloroethane	71-55-6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2,2-Tetrachloroethane	79-34-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U	2.00 U
1,1,2-Trichloroethane	79-00-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethane	75-34-3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,1-Dichloroethene	75-35-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,3-Trichlorobenzene	87-61-6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2,4-Trichlorobenzene	120-82-1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dibromo-3-chloropropane	96-12-8	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
1,2-Dibromoethane	106-93-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichlorobenzene	95-50-1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethane	107-06-2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, cis-	156-59-2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloroethene, trans-	156-60-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,2-Dichloropropane	78-87-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichlorobenzene	541-73-1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, cis-	10061-01-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,3-Dichloropropene, trans-	10061-02-6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
1,4-Dichlorobenzene	106-46-7	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
2-Butanone	78-93-3	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
2-Hexanone	591-78-6	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
4-Methyl-2-pentanone (MIBK)	108-10-1	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U	2.50 U
Acetone	67-64-1	**3.58 J**	2.50 U	2.50 U	2.50 U	**2.87 J**	**4.40 J**	**2.81 J**	2.50 U	2.50 U	2.50 U	**4.91 J**	**3.65 J**	**5.69 J**	**4.91 J**
Benzene	71-43-2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromochloromethane	74-97-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromodichloromethane	75-27-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromoform	75-25-2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Bromomethane	74-83-9	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Carbon Disulfide	75-15-0	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Carbon Tetrachloride	56-23-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chlorobenzene	108-90-7	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroethane	75-00-3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloroform	67-66-3	**1.21**	**1.10**	**1.04**	**4.82**	**4.39**	**3.60**	**2.58**	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Chloromethane	74-87-3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Cyclohexane	110-82-7	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Dibromochloromethane	124-48-1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Dichlorodifluoromethane	75-71-8	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Epichlorohydrin	106-89-8				0.000 UN	0.000 UN	0.000 UN	0.000 UN				0.000 UN	0.000 UN	0.000 UN	0.000 UN
Ethylbenzene	100-41-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Isopropylbenzene	98-82-8	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Methyl Acetate	79-20-9	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylcyclohexane	108-87-2	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U	1.00 U
Methylene Chloride	75-09-2	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Styrene	100-42-5	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
tert-Butyl Methyl Ether	1634-04-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Tetrachloroethene	127-18-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Toluene	108-88-3	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichloroethene	79-01-6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Trichlorofluoromethane	75-69-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Vinyl Chloride	75-01-4	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, m,p-	108-38-3/1	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U
Xylene, o-	95-47-6	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U

Notes:
Bold indicates the analyte was detected
-- = Not available
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.
UN = The analyte is a Tentatively Identified Compound, and was not detected above the reported sample quantitation limit.
ug/l = micrograms per liter

Table 5-1
Criteria and Threshold Concentrations for Identifying Redox Processes in Groundwater.
2016 and 2017 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- → N2(g) + 6 H2O; NO_3- + 10H+ + 8e- → NH4+ + 3H2O	<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- → HS- + 4H2O	<0.5	<0.5	—	≥0.1	≥0.5	<0.3
Anoxic	CH_4gen	$CO_2(g) + 8H+ + 8e- \rightarrow CH_4(g) + 2H2O$	<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
Summary of Groundwater Quality Parameters
2016 and 2017 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)	**Remarks**
MW-01	12/6/2016	7.06	1.80	6.21	3.4	12.62	-168	1.71	
MW-02	12/6/2016	6.91	1.32	0.65	7.1	13.54	-322	0.00	
MW-23	12/6/2016	8.14	4.51	0.52	7.5	14.67	-330	0.36	
PZ-06	12/6/2016	8.01	2.28	42.7	6.6	13.10	-248	--	well went dry
MW-11S	12/7/2016	8.83	3.67	2.32	2.2	16.65	-196	0.00	
MW-30	12/7/2016	6.97	1.81	3.78	3.6	16.37	-302	0.49	
PZ-03	12/7/2016	6.95	5.50	0.2	4.8	18.21	-240	1.24	
MW-21	12/8/2016	9.78	20.00	0.01	7.2	16.70	-442	0.10	
MW-24	12/8/2016	6.22	3.00	12.9	3.2	16.00	-114	0.21	
MW-31	12/8/2016	9.33	9.27	0.32	10.9	16.23	-405	0.40	
MW-35	12/8/2016	6.97	2.32	5.21	3.9	18.59	-48	0.85	
MW-36	12/8/2016	7.12	1.83	3.4	4.3	18.05	-119	>3.30	
MW-37	12/8/2016	6.99	5.42	0.58	4.6	18.82	-47	0.08	
PZ-04	12/13/2016	7.26	5.91	1.91	4.3	12.59	-371	0.00	
PZ-07R	12/13/2016	6.77	3.64	1.71	4.5	9.98	-288	3.30	
MW-21	8/22/2017	10.42	23.00	--	0.0	21.33	-535	0.08	
MW-22	8/22/2017	7.54	2.58	6.21	0.7	23.10	-401	0.14	
MW-35	8/22/2017	7.1	2.41	6.29	1.0	19.69	-100	0.38	
MW-36	8/22/2017	7.53	1.71	1.76	0.0	20.13	-241	>3.30	
PZ-06	8/22/2017	6.99	1.29	21.2	6.5	22.55	-136	1.18	well went dry
MW-11S	8/23/2017	9.18	3.30	1.32	0.0	20.18	-309	0.00	
MW-30	8/23/2017	7.35	2.78	0.27	0.0	18.56	-395	0.49	
MW-31	8/23/2017	9.68	9.29	--	0.0	19.66	-492	0.01	
PZ-04	8/23/2017	7.15	5.32	3.92	0.8	19.74	-427	0.00	

Notes:

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

mg/L - milligrams per liter

mS/cm - millisiemens per centimeter

mV - millivolts

NTU - nephelometric turbidity unit

std units - standard units

Table 5-3

Summary of Redox Results at AOC B for 2016 and 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sample ID	Variable:	Dissolved Oxygen	Nitrate	Manganese	Ferrous Iron	Sulfate	Sulfide	**Redox Assignment**			
	Units:	(mg/L)	(mg/L)	(µg/L)	(µg/L)	(mg/L)	(mg/L)				
	Threshold:	0.5	0.5	50	100	0.5	none	Number of Params	General Redox Category	Redox Process	Fe^{+2}/S Ratio
MW-01 12-06-2016		3.4	0.91	155	2550	82.3	0.06	6	Mixed(oxic-anoxic)	O_2-Fe(III)	42.50
MW-02 12-06-2016		7.1	6.1	92	781	313	0.05	6	Mixed(oxic-anoxic)	O_2-Fe(III)	15.62
PZ-04 12-13-2016		7.3	2.1	14	269	955	0.03	6	Mixed(oxic-anoxic)	O_2-Fe(III)-SO_4	8.97
PZ-06 12-07-2016		6.6	0.72	14.2	520	47.8	0.01	6	Mixed(oxic-anoxic)	O_2-Fe(III)	52.00
PZ-07 12-13-2016		4.5	0.33	270	16000	367	0.005	6	Mixed(oxic-anoxic)	O_2-Fe(III)	3200.00
MW-02 08-22-2017		0.17	0.6	58.8	423	651	7.5	6	Mixed(anoxic)	NO_3-SO_4	0.06
PZ-04 08-23-2017		0.76	6.3	16	46	983	169	6	Oxic	O_2	
PZ-06 08-23-2017		6.5	0.27	81.1	2210	65.9	7.4	6	Mixed(oxic-anoxic)	O_2-SO_4	0.30

Abbreviations

mg/L, milligram per liter

µg/L, miocrograms per liter

Redox process

O_2, oxygen reduction

NO_3, nitrate reduction

Mn(IV), manganese reduction

Fe(III), iron reduction

SO_4, sulfate reduction

Table 5-4

Summary of Redox Results at AOC D for 2016 and 2017

2016 and 2017 Groundwater Monitoring Results and Monitored Natural Attenuation Performance Evaluation Report

Former Hampshire Chemical Corp. Facility, Waterloo, New York

Sample ID	Variable:	Dissolved Oxygen	Nitrate	Manganese	Ferrous Iron	Sulfate	Sulfide	Redox Assignment			
	Units:	(mg/L)	(mg/L)	(µg/L)	(µg/L)	(mg/L)	(mg/L)				
	Threshold:	0.5	0.5	50	100	0.5	none	Number of Params	General Redox Category	Redox Process	Fe^{+2}/S Ratio
MW-11S 12-07-2016		2.2	0.73	10.1	68.7	261	0.68	6	Oxic	O_2	
MW-21 12-08-2016		7.2	13.9	0.21	663	1020	37.2	6	Mixed(oxic-anoxic)	O_2-SO_4	0.02
MW-23 12-06-2016		7.5	3.08	78.1	200	1240	8.86	6	Mixed(oxic-anoxic)	O_2-SO_4	0.02
MW-24 12-08-2016		3.1	2.22	302	11100	975	0.25	6	Mixed(oxic-anoxic)	O_2-Fe(III)	44.40
MW-30 12-07-2016		10.2	16.8	26	475	232	1.7	6	Mixed(oxic-anoxic)	O_2-SO_4	0.28
MW-31 12-08-2016		3.9	16.2	0.25	0.25	195	35.1	6	Oxic	O_2	
MW-35 12-08-2016		4.3	0.8	174	1030	166	0.25	6	Mixed(oxic-anoxic)	O_2-Fe(III)-SO_4	4.12
MW-36 12-08-2016		4.5	0.84	36	4110	233	0.25	6	Mixed(oxic-anoxic)	O_2-Fe(III)	16.44
MW-37 12-08-2016		0.01	0.69	362	141	836	0.25	6	Mixed(oxic-anoxic)	O_2-Fe(III)-SO_4	0.56
MW-11S 08-23-2017		0.01	0.5	21	55	201	0.8	6	Anoxic	NO_3	
MW-21 08-22-2017		0.01	1.25	36.5	394	813	28.4	6	Mixed(anoxic)	NO3-SO4	0.01
MW-30 08-23-2017		0.01	1.25	58	581	340	1.5	6	Mixed(anoxic)	NO_3-Fe(III)-SO_4	0.39
MW-31 08-23-2017		0.01	1.25	14.8	1340	362	14.6	6	Mixed(anoxic)	NO_3-SO_4	0.09
MW-35 08-22-2017		0.99	0.26	178	1440	165	0.25	6	Mixed(oxic-anoxic)	O_2-Fe(III)-SO_4	5.76
MW-36 08-22-2017		0.01	0.16	24	4710	171	0.25	6	Anoxic	Fe(III)	18.84

Abbreviations

mg/L, milligram per liter

µg/L, miocrograms per liter

Redox process

O_2, oxygen reduction

NO_3, nitrate reduction

Mn(IV), manganese reduction

Fe(III), iron reduction

SO_4, sulfate reduction

Figures

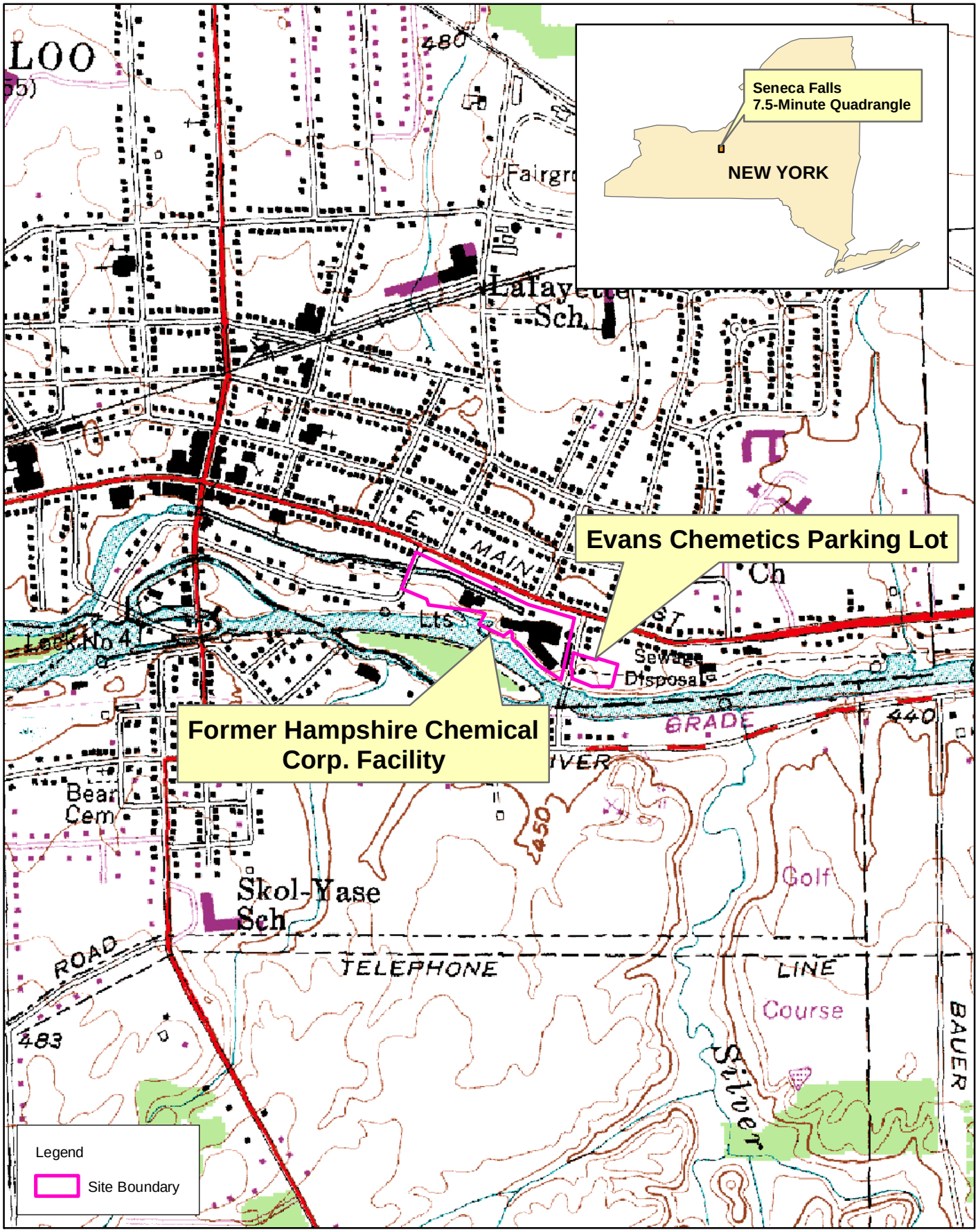


Figure 1-1
Facility Location Map
2016 and 2017 Groundwater Monitoring Results and
Year Two Monitored Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

\\LAKEFRONT\PROJ\GIS\DOW\WATERLOO\REPORTS\2017\MNA_REPORT_YEAR2\FIGURE 1-1 - FACILITY LOCATION MAP.MXD JQUAN 12/13/2017 2:07:57 PM

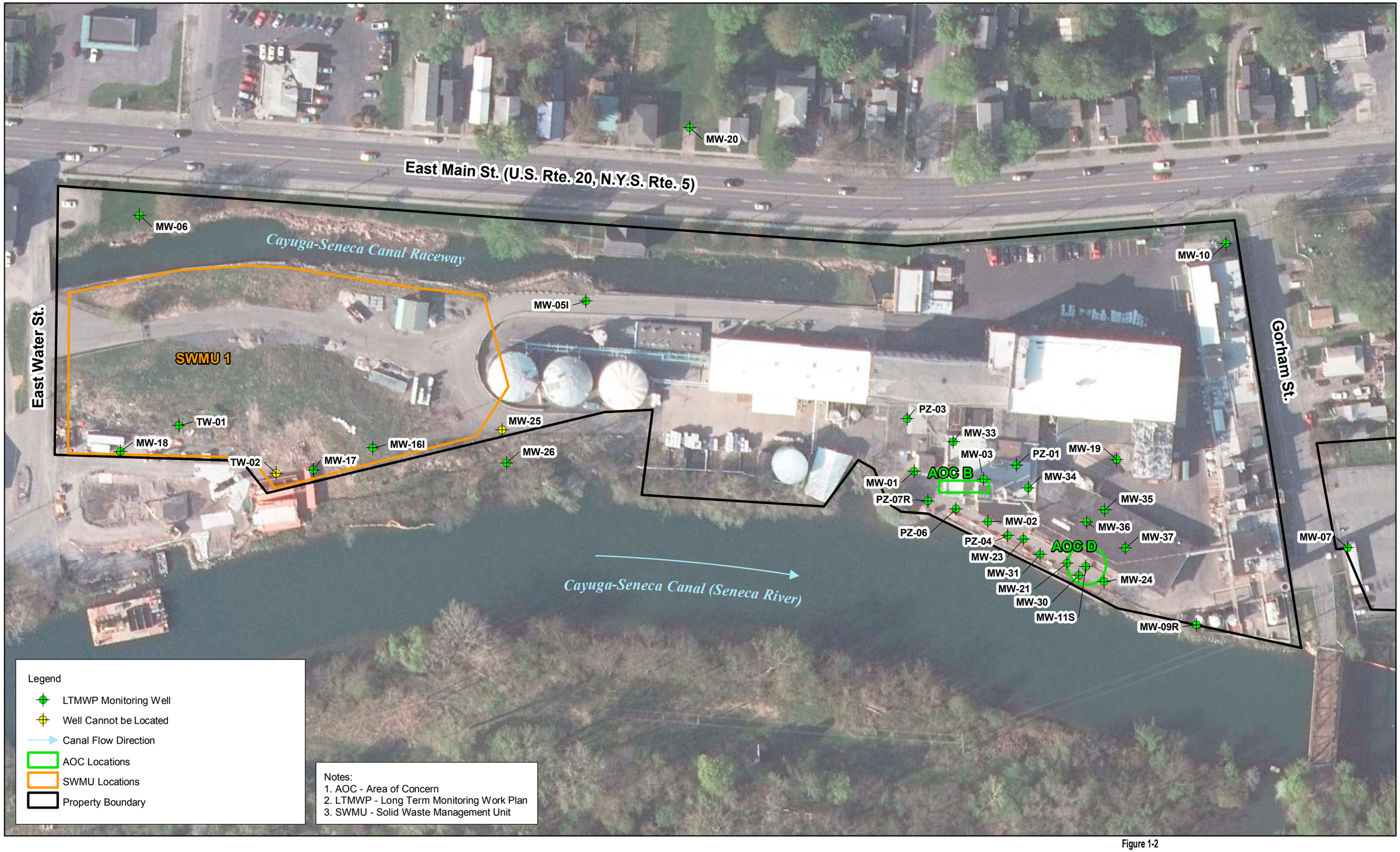


Figure 1-2
Site Layout Map
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

MKE \\LAKEFRONT\PROJ\GIS\DOW\WATERLOO\REPORTS\2017\MNA_REPORT_YEAR2\FIGURE 1-2 - SITE LAYOUT MAP.MXD JQUAN 12/13/2017 3:58:28 PM

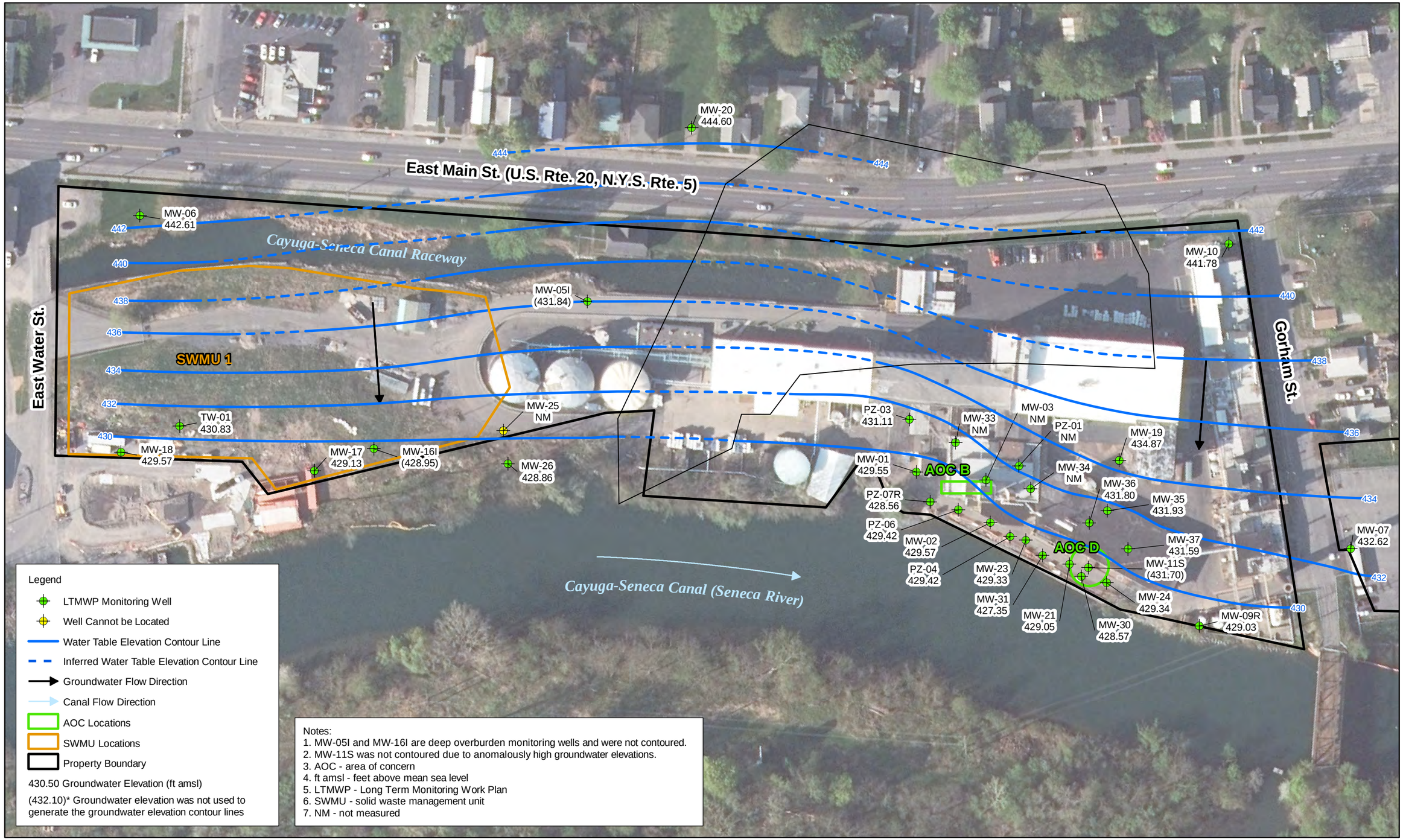


Figure 3-1
Groundwater Elevation Contour Map, December 2016
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m

MKE \\LAKEFRONT\PROJ\GIS\DOW\WATERLOO\REPORTS\2017\MNA_REPORT_YEAR2\FIGURE 3-1 - GW ELEVATION CONTOUR MAP DEC 2016.MXD JQUAN 12/15/2017 3:08:22 PM

East Main St. (U.S. Rte. 20, N.Y.S. Rte. 5)

Cayuga-Seneca Canal Raceway

Cayuga-Seneca Canal (Seneca River)

East Water St.

Gorham St.

SWMU 1

AOC B

AOC D

MW-20 440.13

MW-06 442.86

MW-05I (433.64)

MW-10 438.71

TW-01 431.90

MW-18 429.84

MW-17 430.75

MW-16I (431.90)

MW-25 NM

MW-26 431.05

PZ-03 NM

MW-33 NM

MW-03 NM

PZ-01 NM

MW-19 430.92

MW-01 429.25

PZ-07R 428.64

PZ-06 429.46

MW-02 429.13

PZ-04 429.05

MW-23 429.10

MW-31 429.03

MW-21 429.28

MW-30 428.48

MW-34 NM

MW-36 431.99

MW-35 431.88

MW-37 432.04

MW-11S (431.75)

MW-24 429.10

MW-09R 429.07

MW-07 432.25

442 440 438 436 434 432 430

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

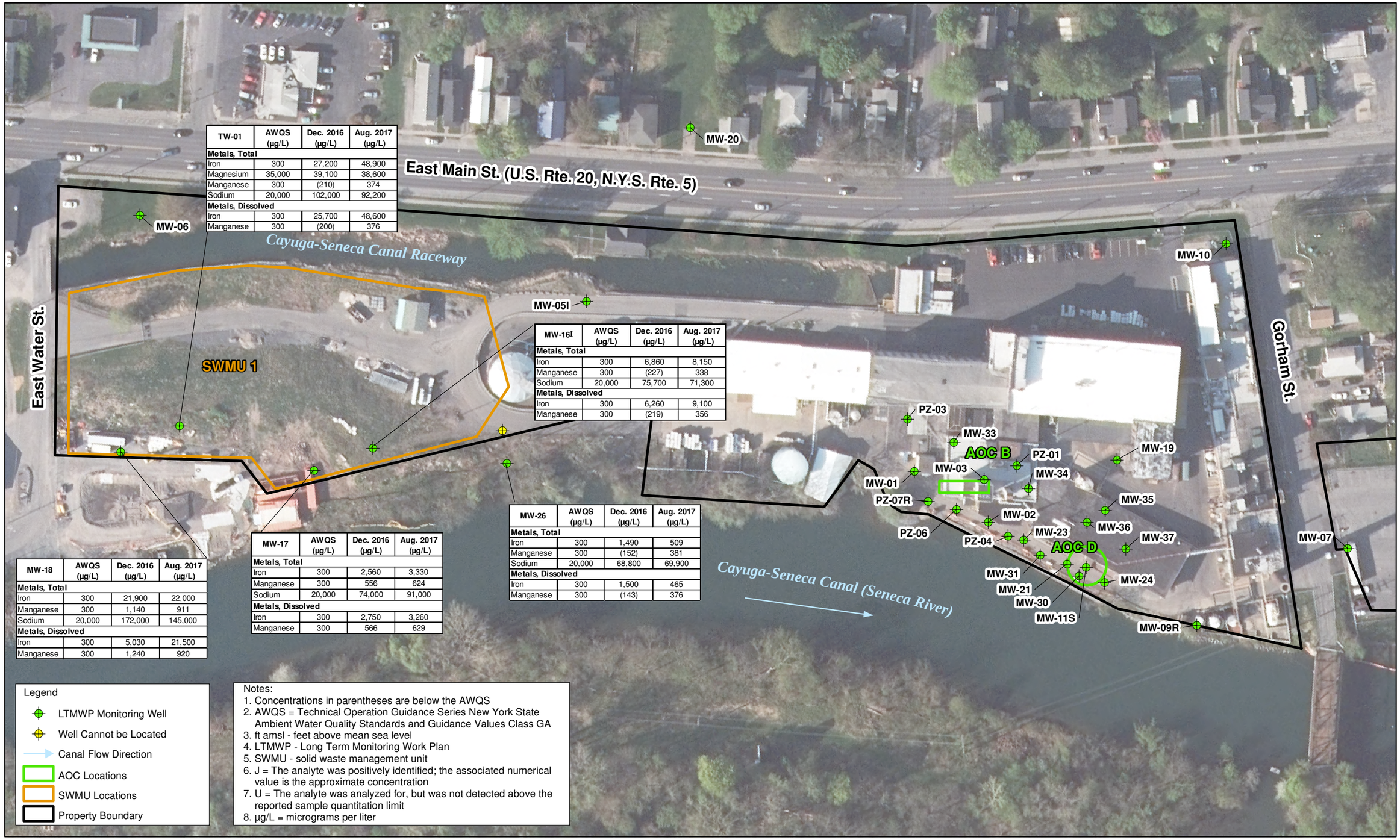
0 100 200

Feet

Figure 3-2
Groundwater Elevation Contour Map, August 2017
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m

MKE \\LAKEFRONT\PROJ\GIS\DOW\WATERLOO\REPORTS\2017\MNA_REPORT_YEAR2\FIGURE 3-2 - GW ELEVATION CONTOUR MAP AUG 2017.MXD JQUAN 12/15/2017 4:42:25 PM



TW-01	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	27,200	48,900
Magnesium	35,000	39,100	38,600
Manganese	300	(210)	374
Sodium	20,000	102,000	92,200
Metals, Dissolved			
Iron	300	25,700	48,600
Manganese	300	(200)	376

MW-16I	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	6,860	8,150
Manganese	300	(227)	338
Sodium	20,000	75,700	71,300
Metals, Dissolved			
Iron	300	6,260	9,100
Manganese	300	(219)	356

MW-26	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	1,490	509
Manganese	300	(152)	381
Sodium	20,000	68,800	69,900
Metals, Dissolved			
Iron	300	1,500	465
Manganese	300	(143)	376

MW-17	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	2,560	3,330
Manganese	300	556	624
Sodium	20,000	74,000	91,000
Metals, Dissolved			
Iron	300	2,750	3,260
Manganese	300	566	629

MW-18	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	21,900	22,000
Manganese	300	1,140	911
Sodium	20,000	172,000	145,000
Metals, Dissolved			
Iron	300	5,030	21,500
Manganese	300	1,240	920

Legend

- LTMWP Monitoring Well
- Well Cannot be Located
- Canal Flow Direction
- AOC Locations
- SWMU Locations
- Property Boundary

Notes:

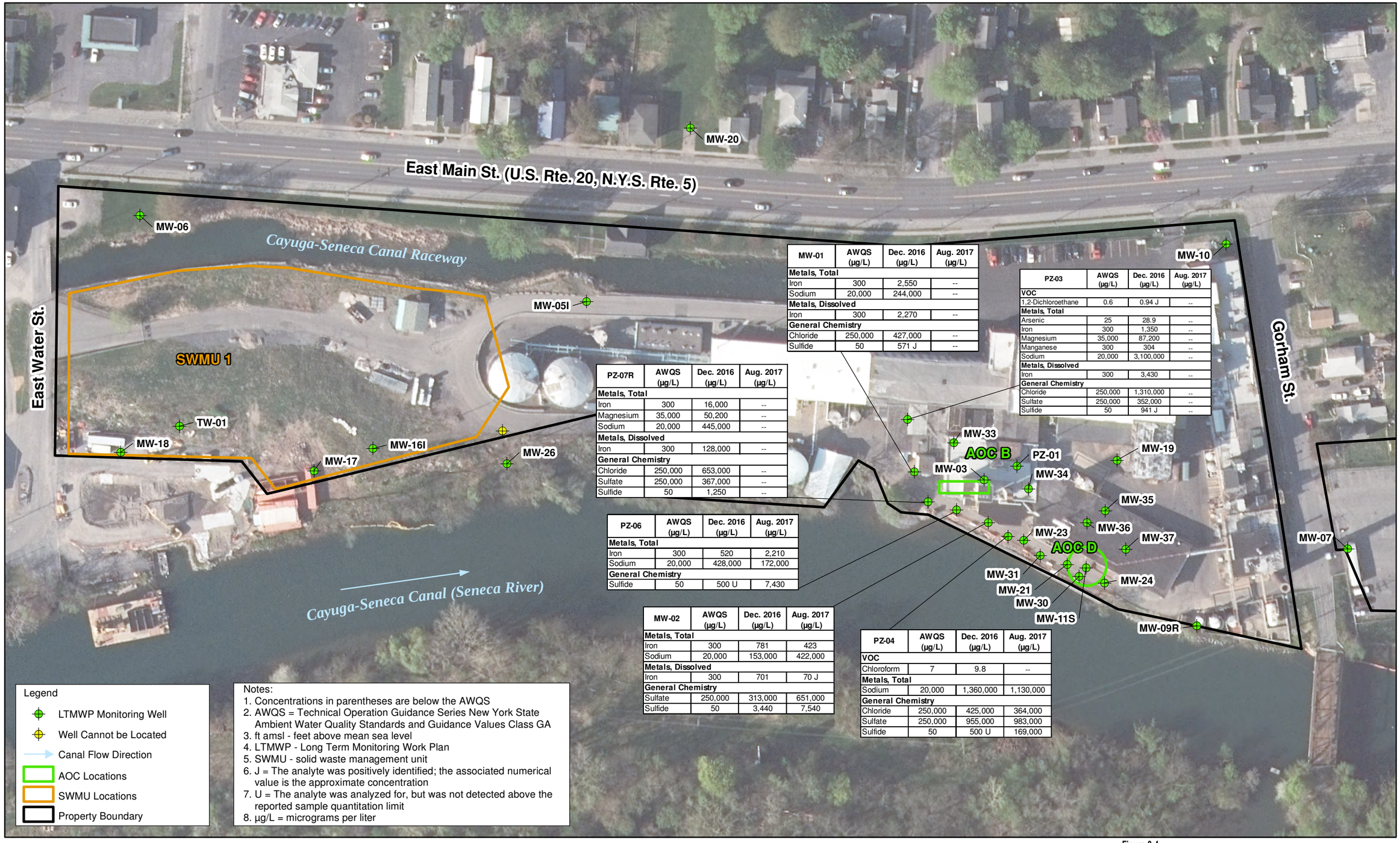
1. Concentrations in parentheses are below the AWQS
2. AWQS = Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values Class GA
3. ft amsl - feet above mean sea level
4. LTMWP - Long Term Monitoring Work Plan
5. SWMU - solid waste management unit
6. J = The analyte was positively identified; the associated numerical value is the approximate concentration
7. U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
8. µg/L = micrograms per liter

0 100 200

Feet

Figure 3-3
Groundwater Analytical Exceedances at SWMU 1
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m:



MW-01	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	2,550	--
Sodium	20,000	244,000	--
Metals, Dissolved			
Iron	300	2,270	--
General Chemistry			
Chloride	250,000	427,000	--
Sulfide	50	571 J	--

PZ-03	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
VOC			
1,2-Dichloroethane	0.6	0.94 J	--
Metals, Total			
Arsenic	25	28.9	--
Iron	300	1,350	--
Magnesium	35,000	87,200	--
Manganese	300	304	--
Sodium	20,000	3,100,000	--
Metals, Dissolved			
Iron	300	3,430	--
General Chemistry			
Chloride	250,000	1,310,000	--
Sulfate	250,000	352,000	--
Sulfide	50	941 J	--

PZ-07R	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	16,000	--
Magnesium	35,000	50,200	--
Sodium	20,000	445,000	--
Metals, Dissolved			
Iron	300	128,000	--
General Chemistry			
Chloride	250,000	653,000	--
Sulfate	250,000	367,000	--
Sulfide	50	1,250	--

PZ-06	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	520	2,210
Sodium	20,000	428,000	172,000
General Chemistry			
Sulfide	50	500 U	7,430

MW-02	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	781	423
Sodium	20,000	153,000	422,000
Metals, Dissolved			
Iron	300	701	70 J
General Chemistry			
Sulfate	250,000	313,000	651,000
Sulfide	50	3,440	7,540

PZ-04	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
VOC			
Chloroform	7	9.8	--
Metals, Total			
Sodium	20,000	1,360,000	1,130,000
General Chemistry			
Chloride	250,000	425,000	364,000
Sulfate	250,000	955,000	983,000
Sulfide	50	500 U	169,000

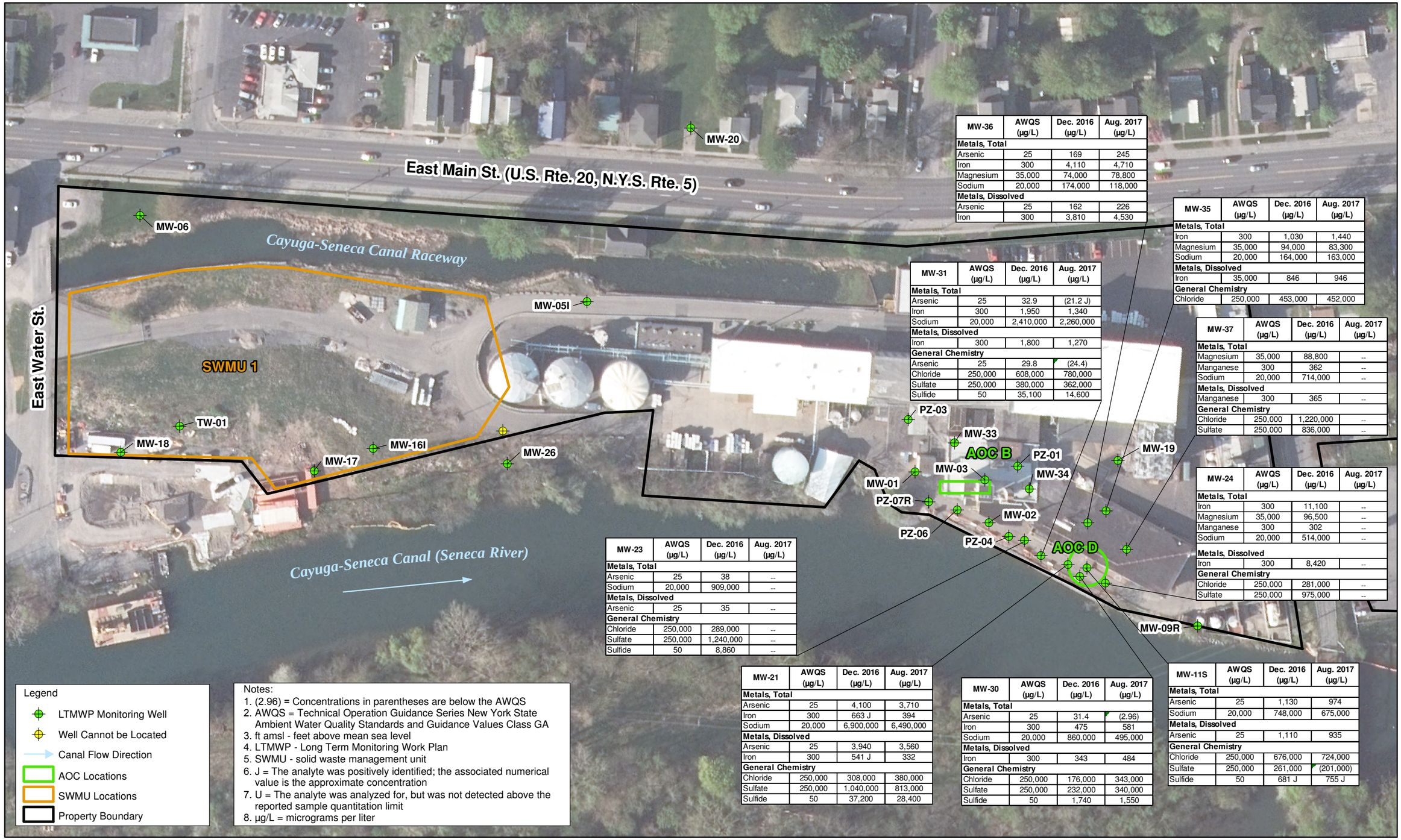
Legend

- LTMWP Monitoring Well
- Well Cannot be Located
- Canal Flow Direction
- AOC Locations
- SWMU Locations
- Property Boundary

Notes:
1. Concentrations in parentheses are below the AWQS
2. AWQS = Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values Class GA
3. ft amsl - feet above mean sea level
4. LTMWP - Long Term Monitoring Work Plan
5. SWMU - solid waste management unit
6. J = The analyte was positively identified; the associated numerical value is the approximate concentration
7. U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
8. µg/L = micrograms per liter

0 100 200
Feet

Figure 3-4
Groundwater Analytical Exceedances at AOC B
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York



MW-36	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	169	245
Iron	300	4,110	4,710
Magnesium	35,000	74,000	78,800
Sodium	20,000	174,000	118,000
Metals, Dissolved			
Arsenic	25	162	226
Iron	300	3,810	4,530

MW-35	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	1,030	1,440
Magnesium	35,000	94,000	83,300
Sodium	20,000	164,000	163,000
Metals, Dissolved			
Iron	35,000	846	946
General Chemistry			
Chloride	250,000	453,000	452,000

MW-31	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	32.9	(21.2 J)
Iron	300	1,950	1,340
Sodium	20,000	2,410,000	2,260,000
Metals, Dissolved			
Iron	300	1,800	1,270
General Chemistry			
Arsenic	25	29.8	(24.4)
Chloride	250,000	608,000	780,000
Sulfate	250,000	380,000	362,000
Sulfide	50	35,100	14,600

MW-37	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Magnesium	35,000	88,800	--
Manganese	300	362	--
Sodium	20,000	714,000	--
Metals, Dissolved			
Manganese	300	365	--
General Chemistry			
Chloride	250,000	1,220,000	--
Sulfate	250,000	836,000	--

MW-24	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	11,100	--
Magnesium	35,000	96,500	--
Manganese	300	302	--
Sodium	20,000	514,000	--
Metals, Dissolved			
Iron	300	8,420	--
General Chemistry			
Chloride	250,000	281,000	--
Sulfate	250,000	975,000	--

MW-23	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	38	--
Sodium	20,000	909,000	--
Metals, Dissolved			
Arsenic	25	35	--
General Chemistry			
Chloride	250,000	289,000	--
Sulfate	250,000	1,240,000	--
Sulfide	50	8,860	--

MW-21	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	4,100	3,710
Iron	300	663 J	394
Sodium	20,000	6,900,000	6,490,000
Metals, Dissolved			
Arsenic	25	3,940	3,560
Iron	300	541 J	332
General Chemistry			
Chloride	250,000	308,000	380,000
Sulfate	250,000	1,040,000	813,000
Sulfide	50	37,200	28,400

MW-30	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	31.4	(2.96)
Iron	300	475	581
Sodium	20,000	860,000	495,000
Metals, Dissolved			
Iron	300	343	484
General Chemistry			
Chloride	250,000	176,000	343,000
Sulfate	250,000	232,000	340,000
Sulfide	50	1,740	1,550

MW-11S	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Arsenic	25	1,130	974
Sodium	20,000	748,000	675,000
Metals, Dissolved			
Arsenic	25	1,110	935
General Chemistry			
Chloride	250,000	676,000	724,000
Sulfate	250,000	261,000	(201,000)
Sulfide	50	681 J	755 J

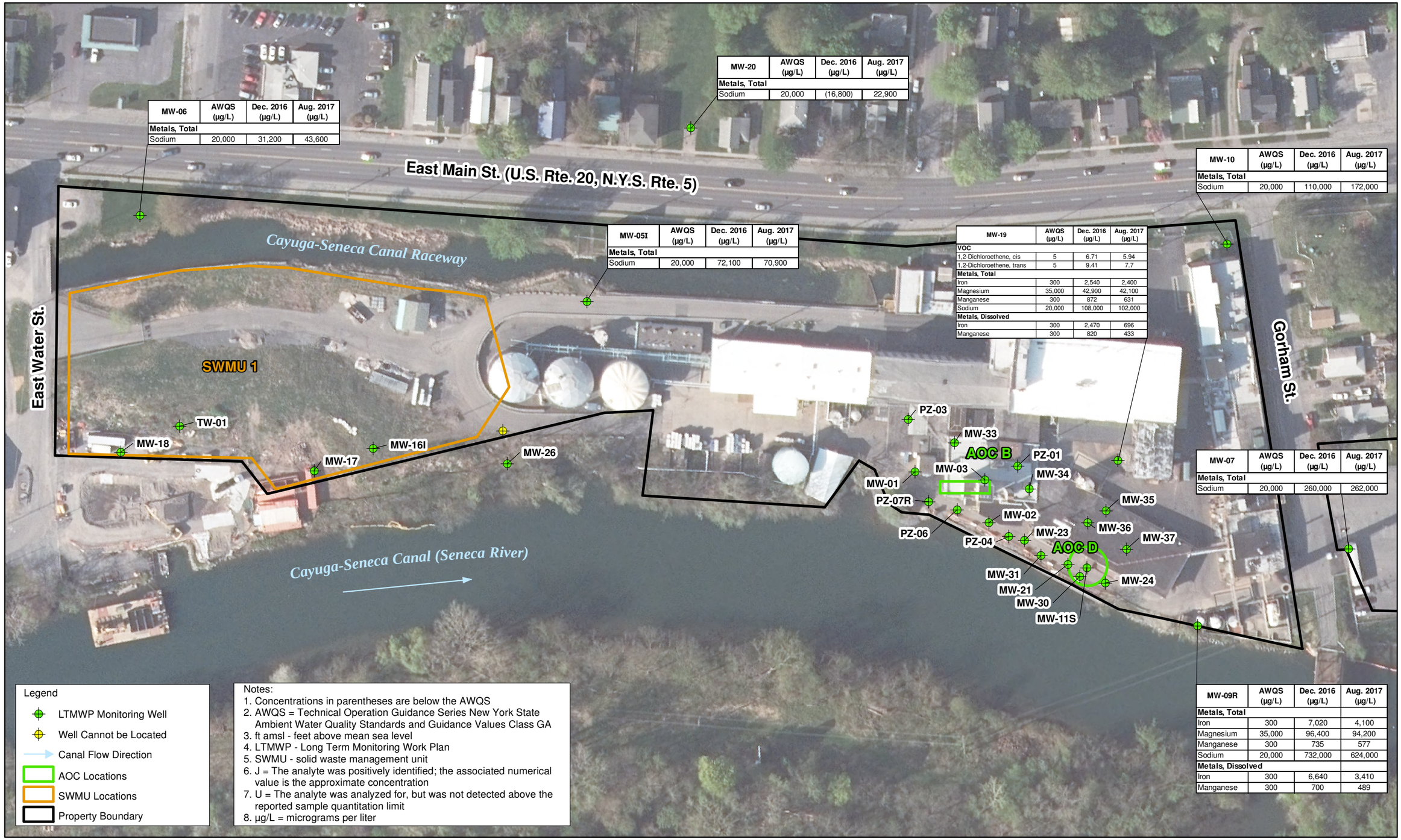
Legend

- LTMWP Monitoring Well
- Well Cannot be Located
- Canal Flow Direction
- AOC Locations
- SWMU Locations
- Property Boundary

Notes:
1. (2.96) = Concentrations in parentheses are below the AWQS
2. AWQS = Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values Class GA
3. ft amsl - feet above mean sea level
4. LTMWP - Long Term Monitoring Work Plan
5. SWMU - solid waste management unit
6. J = The analyte was positively identified; the associated numerical value is the approximate concentration
7. U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
8. µg/L = micrograms per liter

0 100 200
Feet

Figure 3-5
Groundwater Analytical Exceedances at AOC D
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York



MW-06	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Sodium	20,000	31,200	43,600

MW-20	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Sodium	20,000	(16,800)	22,900

MW-05I	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Sodium	20,000	72,100	70,900

MW-19	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
VOC			
1,2-Dichloroethene, cis	5	6.71	5.94
1,2-Dichloroethene, trans	5	9.41	7.7
Metals, Total			
Iron	300	2,540	2,400
Magnesium	35,000	42,900	42,100
Manganese	300	872	631
Sodium	20,000	108,000	102,000
Metals, Dissolved			
Iron	300	2,470	696
Manganese	300	820	433

MW-10	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Sodium	20,000	110,000	172,000

MW-07	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Sodium	20,000	260,000	262,000

MW-09R	AWQS (µg/L)	Dec. 2016 (µg/L)	Aug. 2017 (µg/L)
Metals, Total			
Iron	300	7,020	4,100
Magnesium	35,000	96,400	94,200
Manganese	300	735	577
Sodium	20,000	732,000	624,000
Metals, Dissolved			
Iron	300	6,640	3,410
Manganese	300	700	489

Legend

- LTMWP Monitoring Well
- Well Cannot be Located
- Canal Flow Direction
- AOC Locations
- SWMU Locations
- Property Boundary

Notes:
1. Concentrations in parentheses are below the AWQS
2. AWQS = Technical Operation Guidance Series New York State Ambient Water Quality Standards and Guidance Values Class GA
3. ft amsl - feet above mean sea level
4. LTMWP - Long Term Monitoring Work Plan
5. SWMU - solid waste management unit
6. J = The analyte was positively identified; the associated numerical value is the approximate concentration
7. U = The analyte was analyzed for, but was not detected above the reported sample quantitation limit
8. µg/L = micrograms per liter

0 100 200
Feet

Figure 3-6
Groundwater Analytical Exceedances at Supplemental Wells
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m.

MKE \\LAKEFRONT\PROJ\GIS\DOW\WATERLOO\REPORTS\2017\MNA_REPORT_YEAR2\FIGURE 3-6 - GW ANALYTICAL EXCEEDANCES SUPPLEMENTAL.MXD TSALSBUR 1/9/2018 5:32:32 PM

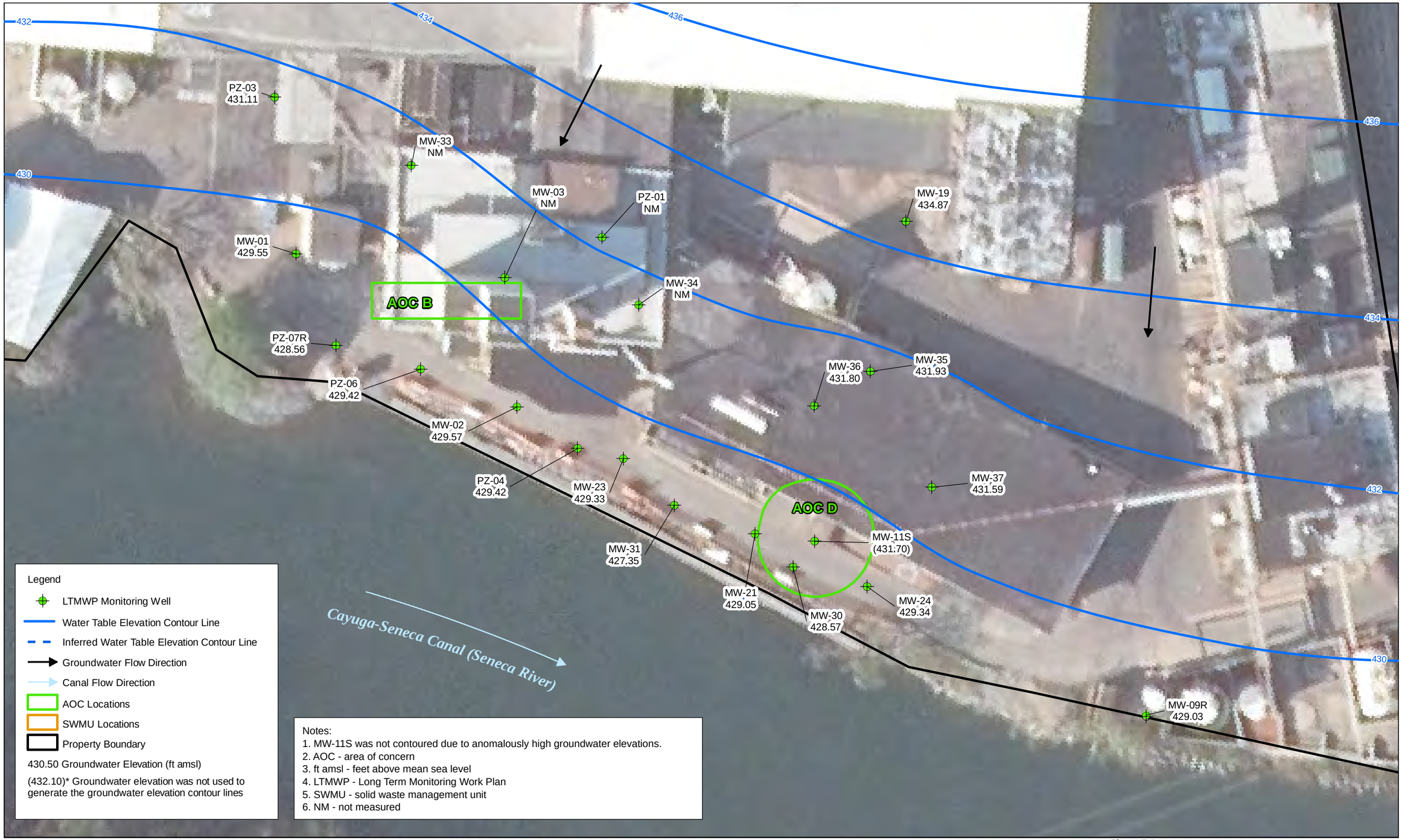


Figure 5-1
AOCs B and D Groundwater Elevation Contour Map, December 2016
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m

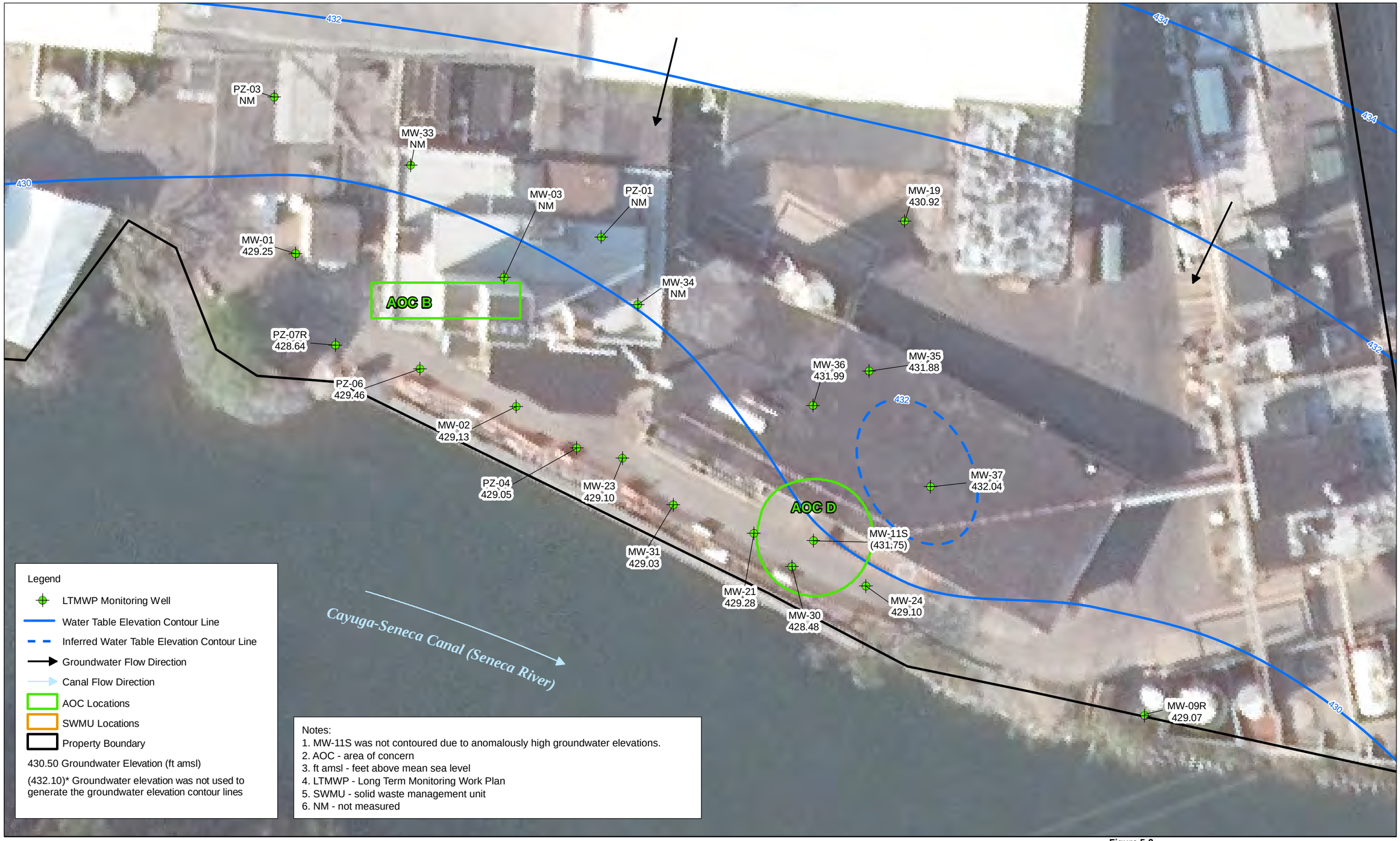
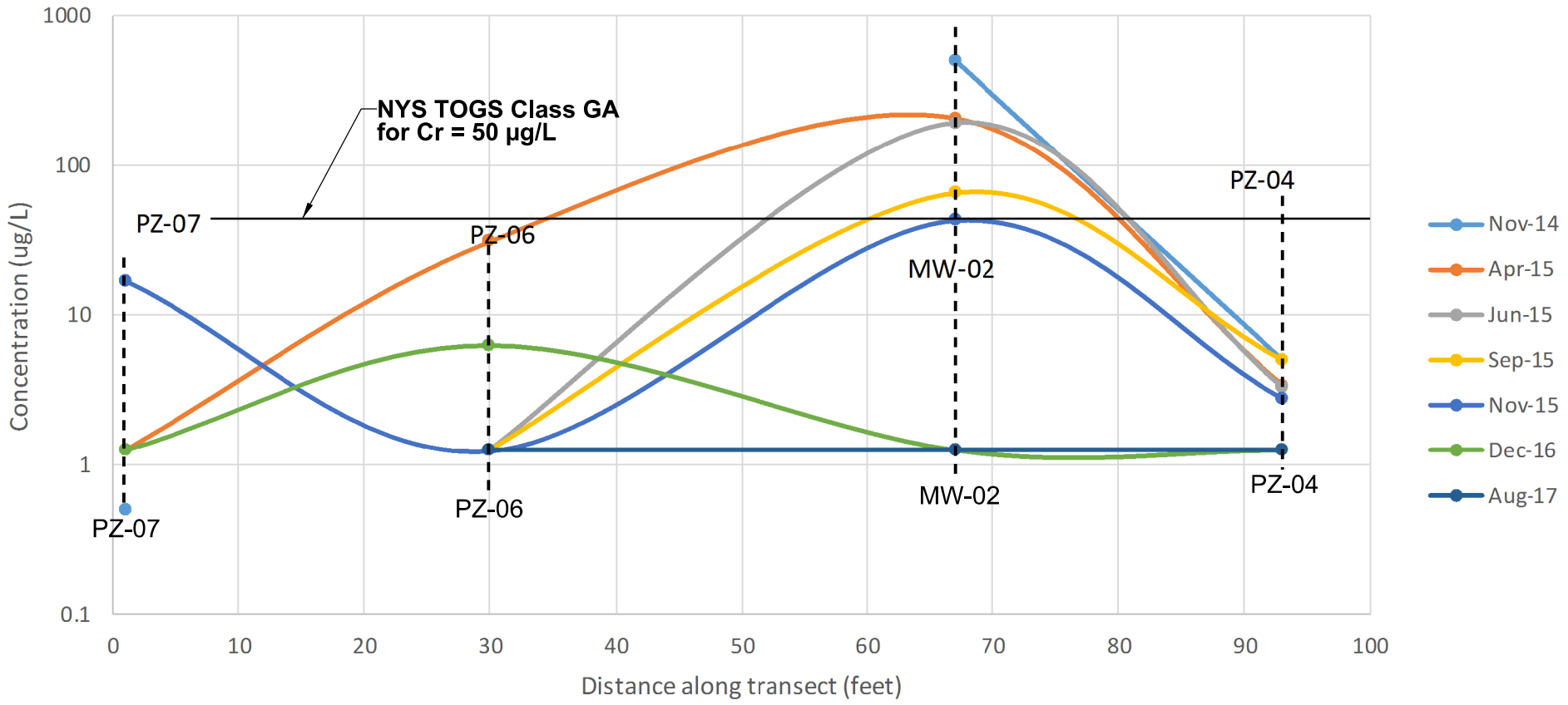


Figure 5-2
AOCs B and D Groundwater Elevation Contour Map, August 2017
2016 and 2017 Groundwater Monitoring Results and
Year 2 Monitoring Natural Attenuation Performance Evaluation Report
Former Hampshire Chemical Corp. Facility
Waterloo, New York

ch2m



Legend

MW-02 — Distance of Monitoring Well Along Transect

Figure 5-3
MIBK Concentrations Along Transect Parallel to Canal: November 2014 to August 2017
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

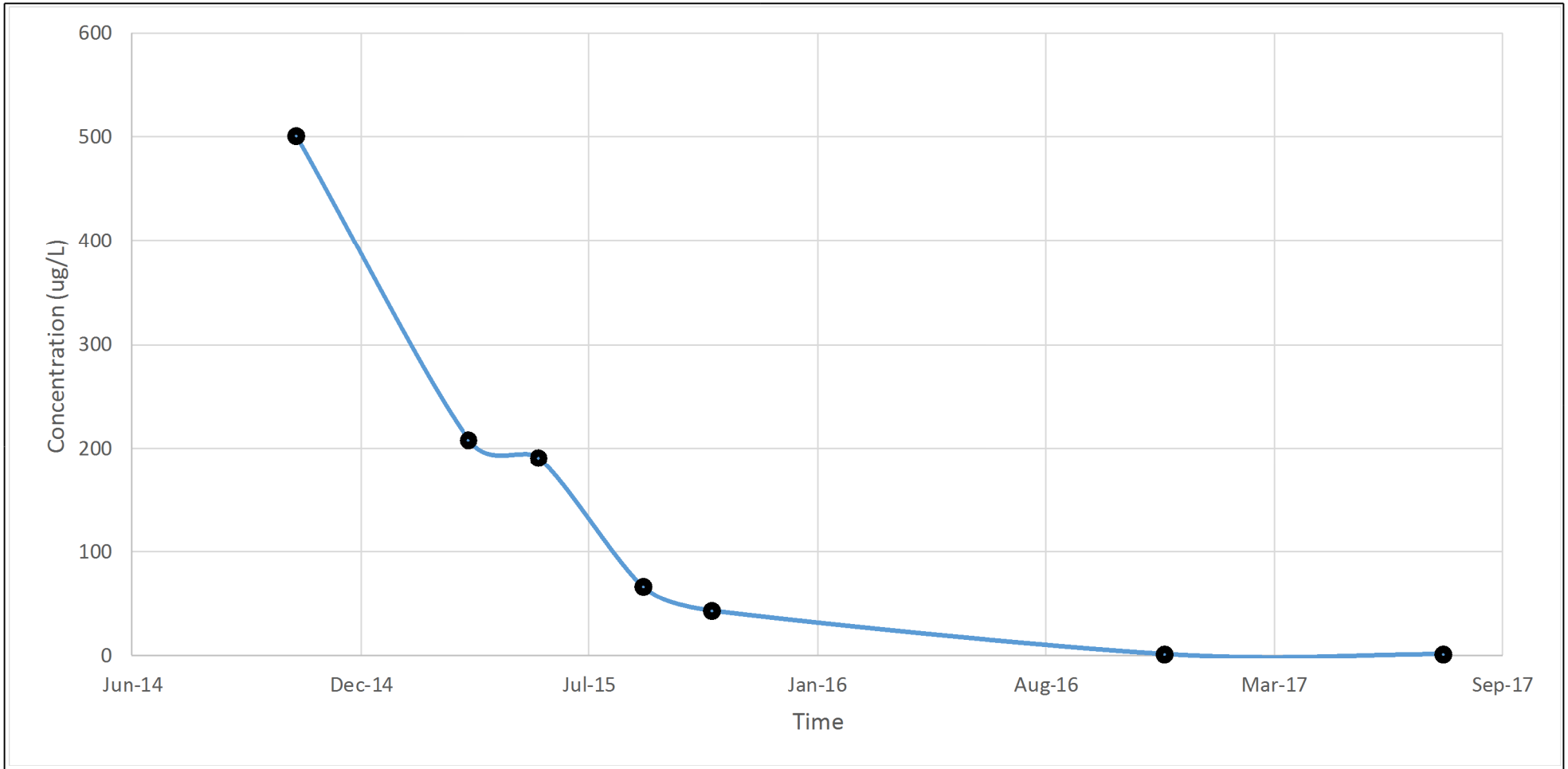


Figure 5-4
Time Series Graph Showing MIBK Concentrations at MW-02
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

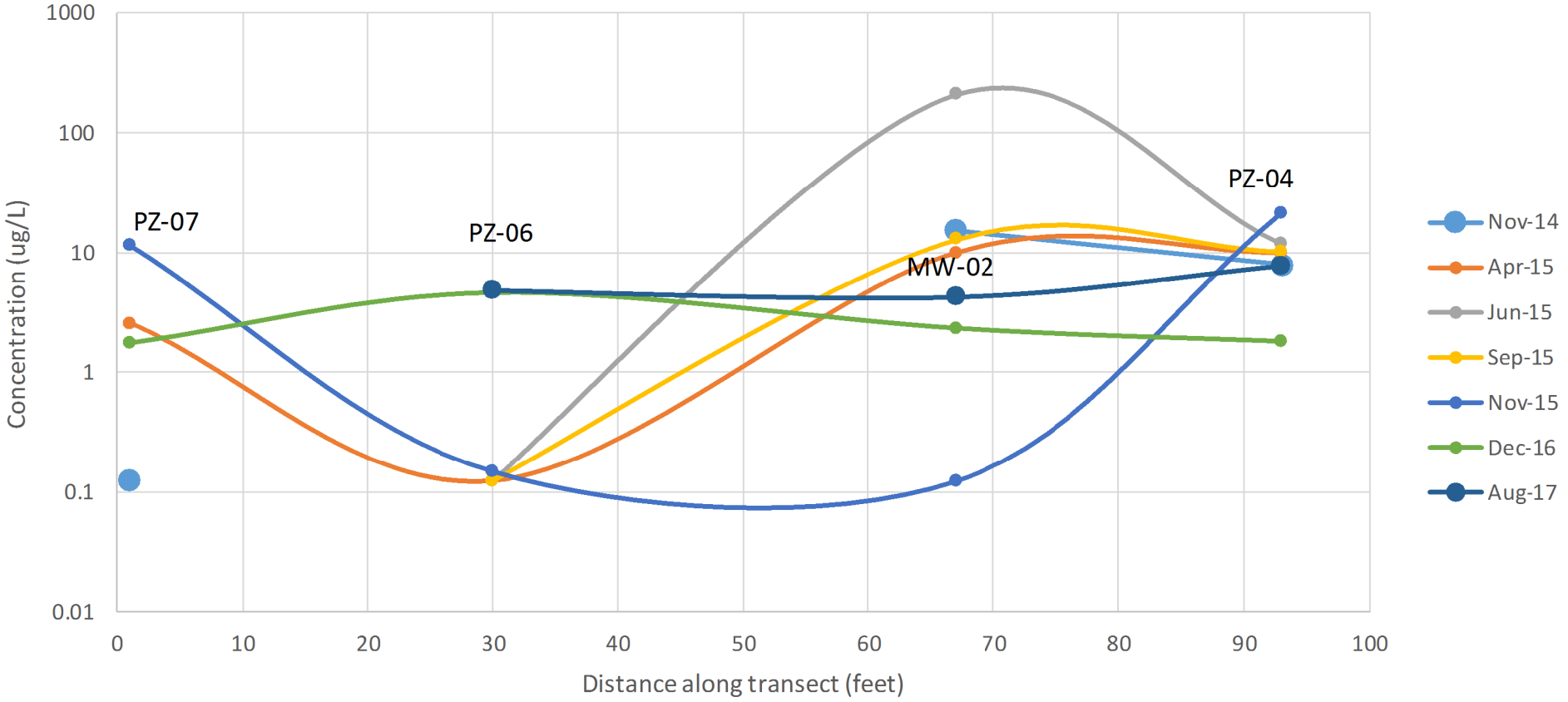


Figure 5-5
Chromium Concentrations Along Transect Parallel to Canal: November 2014 to August 2017
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

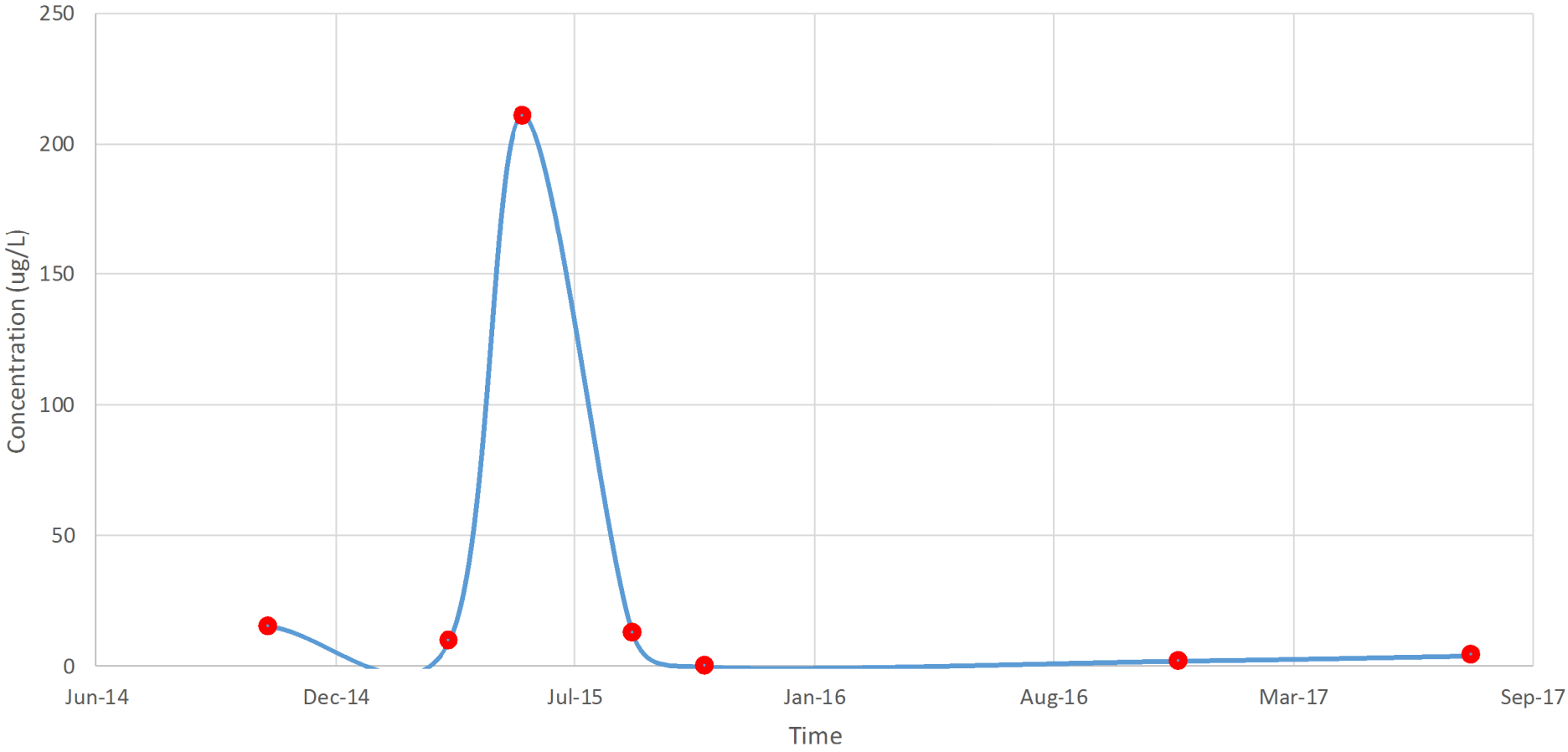
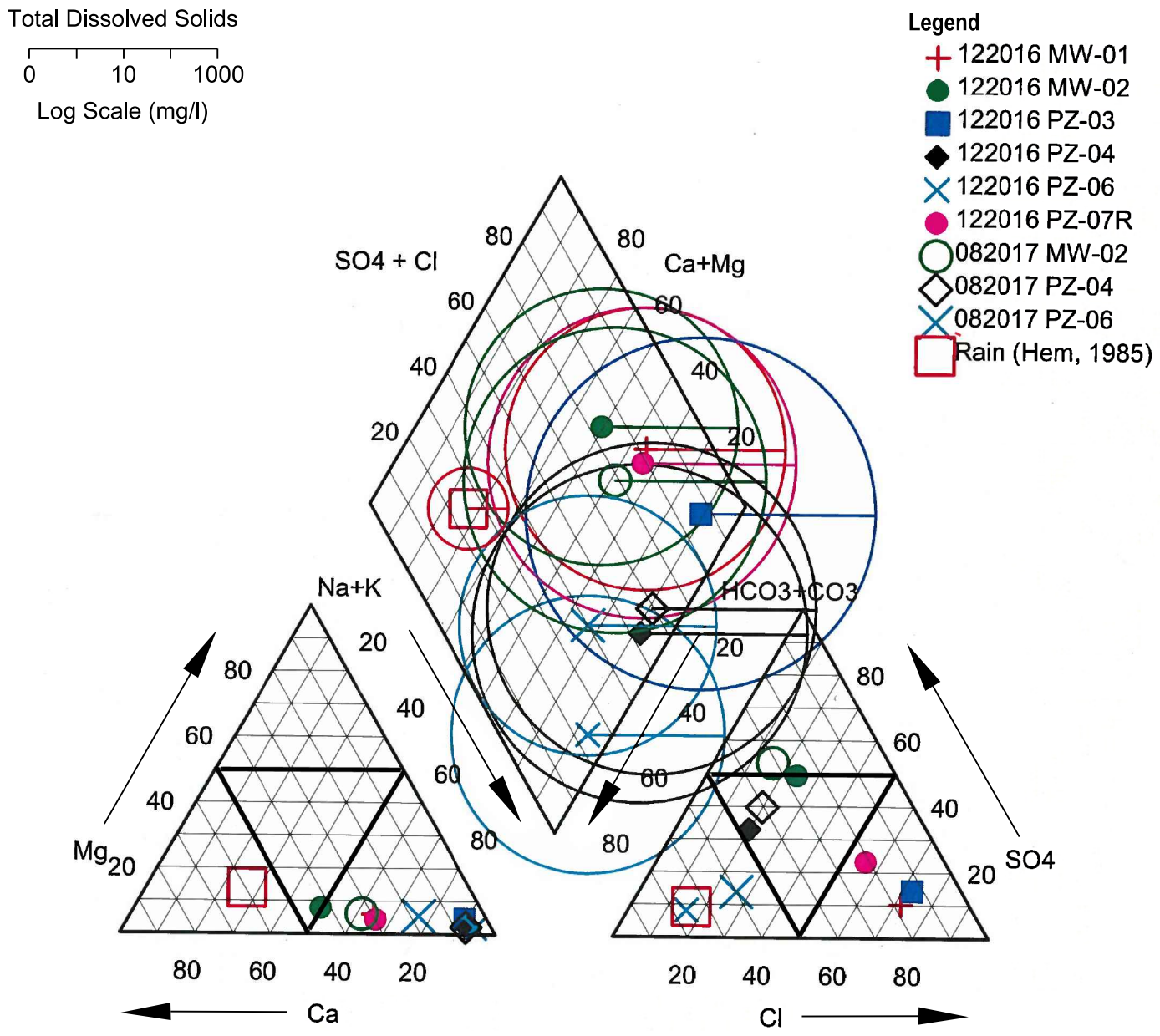


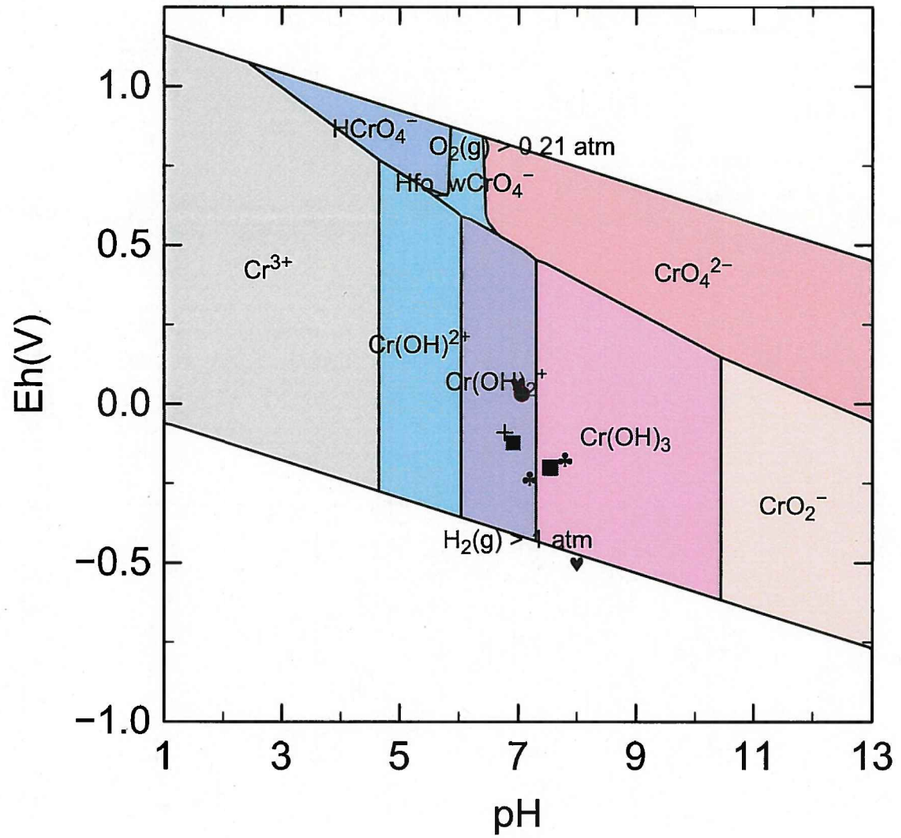
Figure 5-6
Time Series Graph Showing Chromium Concentrations at MW-02
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York



Notes:

1. Circles shown in center field represent total dissolved solids concentrations as indexed by log scale provided above.
2. The chemistry for rain appears as reference for groundwater in a surficial water bearing zone.
3. MW-01 was not sampled in August 2017.

Figure 5-7
Major Ions in Groundwater at AOC B for
December 2016 and August 2017 Sampling Events
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York



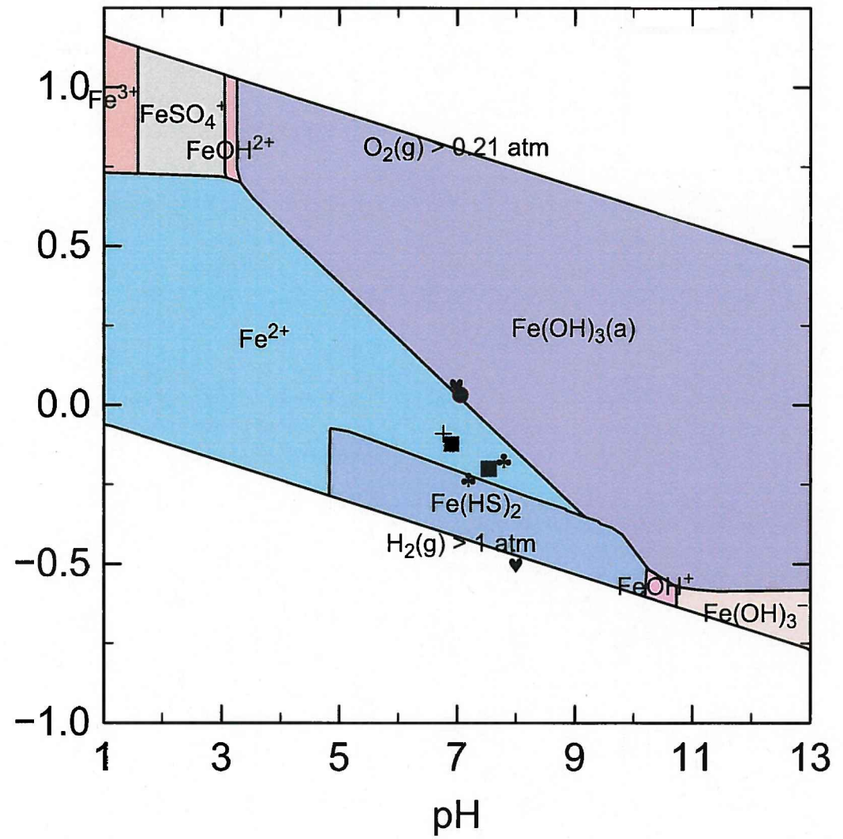


Figure 5-8
Eh - pH Diagram for Chromium - Iron - Sulfide - Oxygen System at AOC B
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

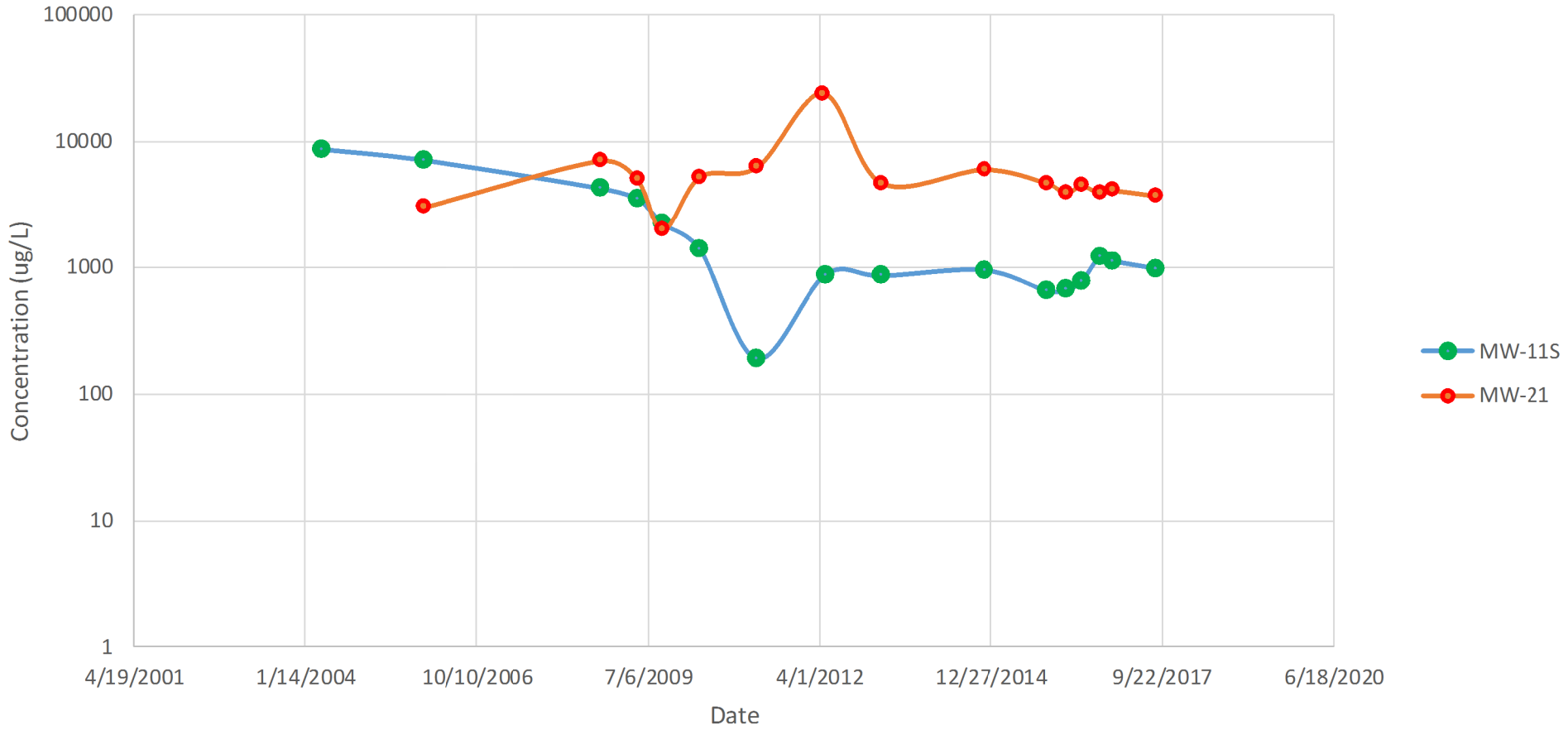


Figure 5-9
Arsenic Concentrations with Time at MW-11S and MW-21, AOC D
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

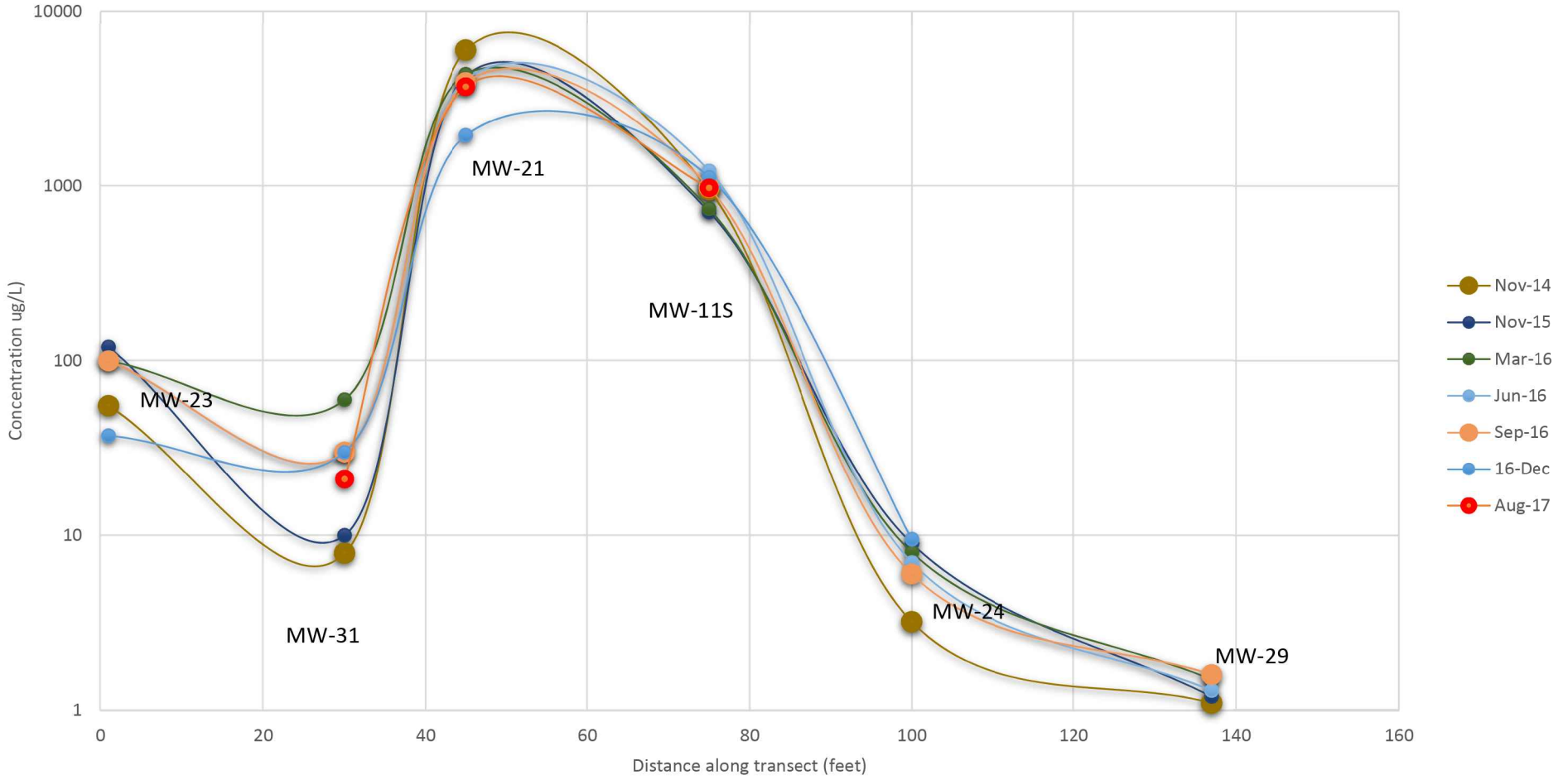


Figure 5-10
Arsenic Concentrations Along Transect Parallel to Canal
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

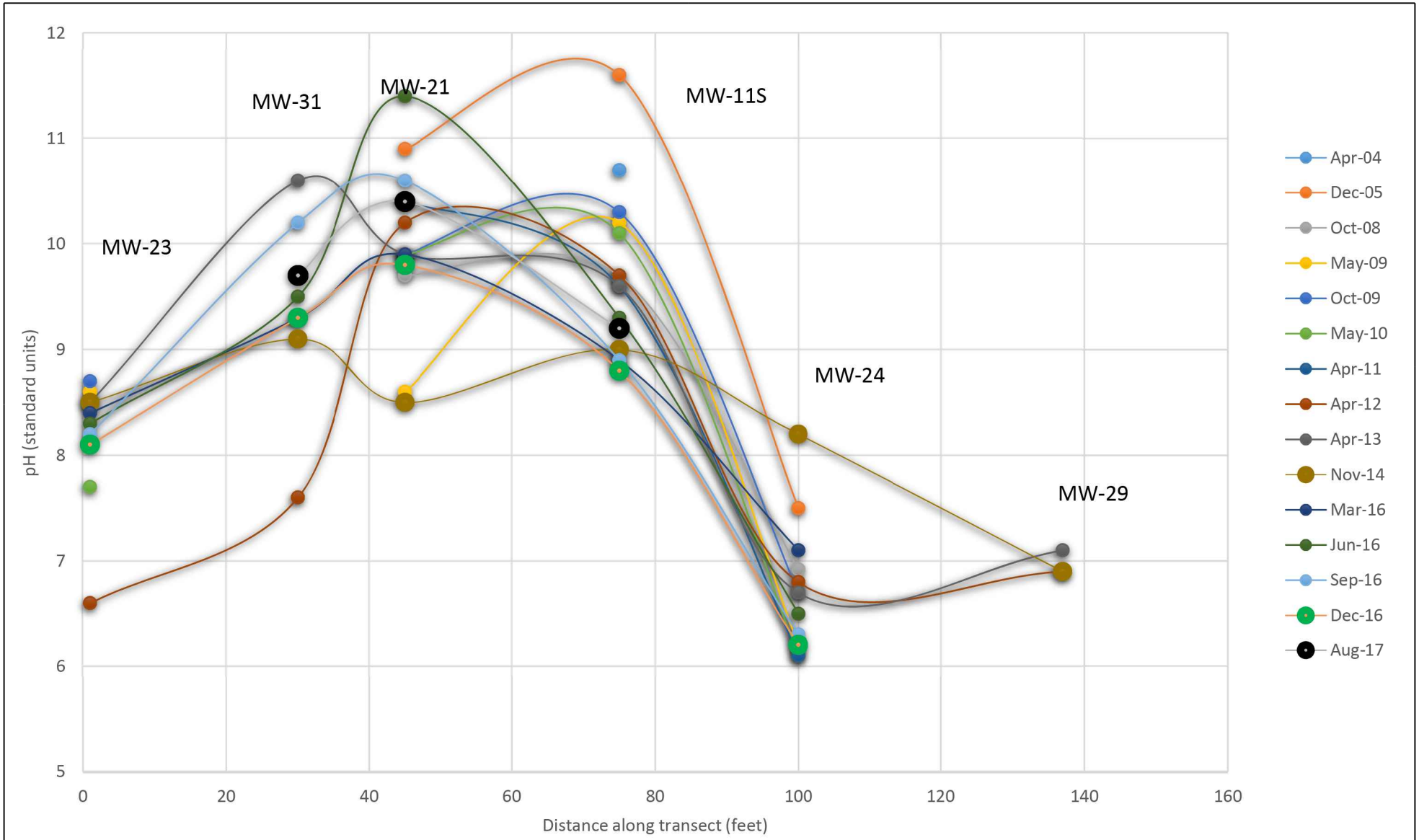
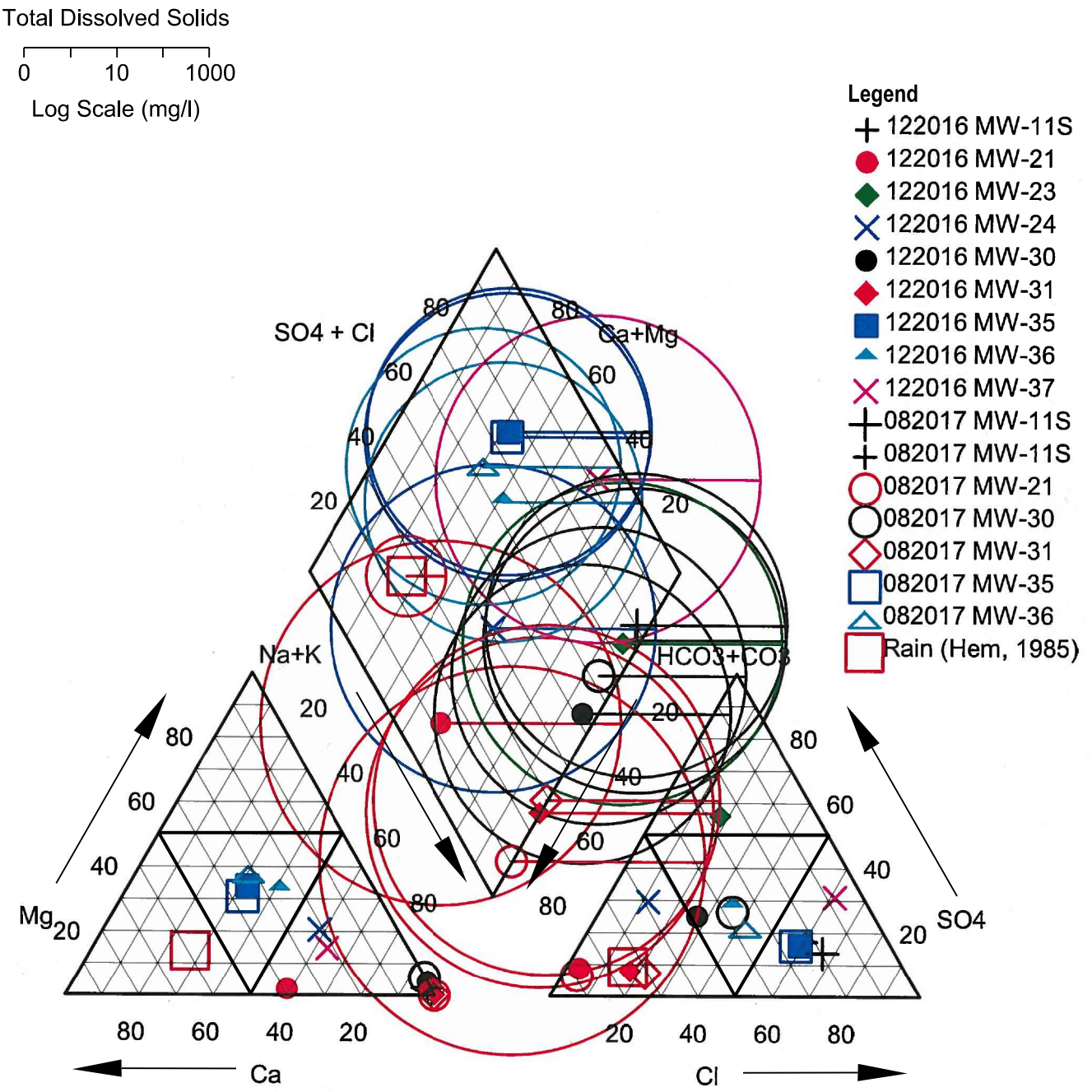


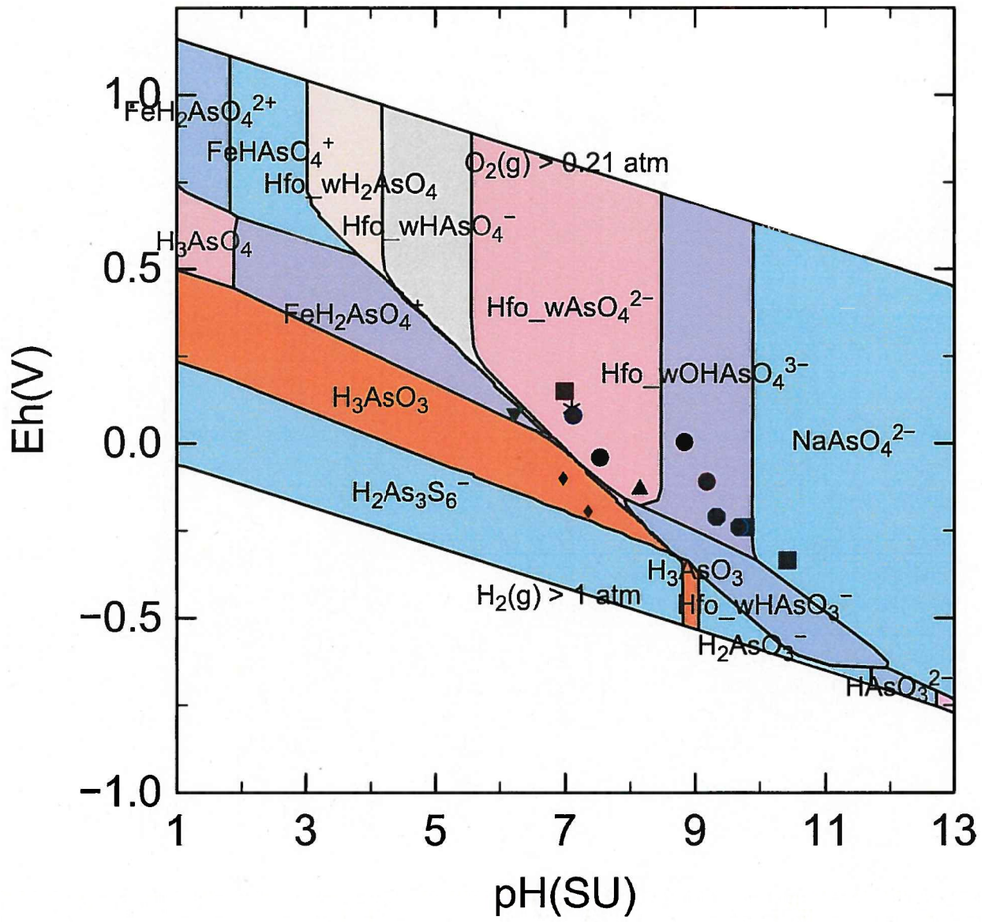
Figure 5-11
pH Along Transect Parallel to Canal
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

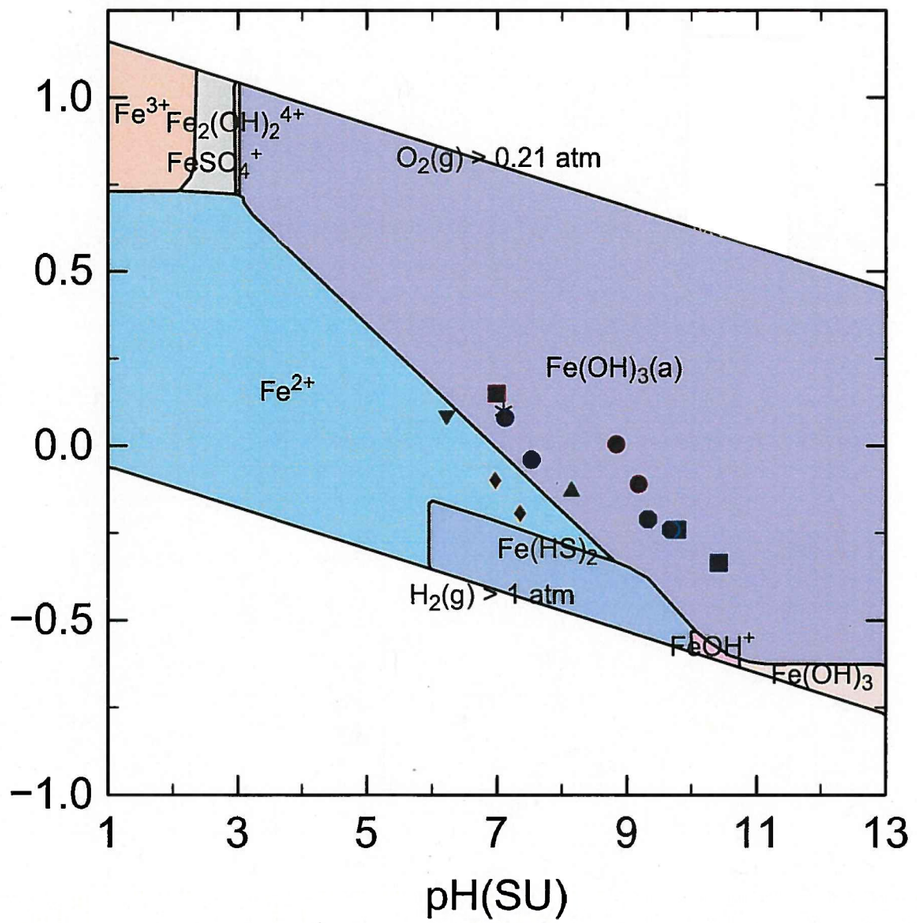


Notes:

1. Circles in center field represent relative total dissolved solids concentrations as indexed by log scale above.
2. The chemistry for Rain (Hem, 1985) appears as reference for groundwater in a surficial water bearing zone.

Figure 5-12
Major Ions at AOC D from December 2016 and August 2017 Sampling Events
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York





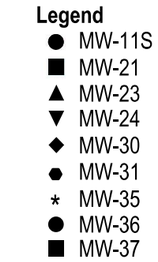


Figure 5-13
Eh - pH Diagram of Arsenic - Iron - Sulfide - Oxygen System at AOC D
Monitored Natural Attenuation Performance Evaluation Report, Years Two and Three
Former Hampshire Chemical Corp. Facility
Waterloo, New York

Appendix A
Analytical Data Packages and EQuIS Reports (on CD)

Appendix B
Groundwater Sampling Field Data Sheets

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-30	SCREEN INTERVAL (ft BTOC): 4-14	START DATE: 12/7/16	
	WELL DIAMETER (INCHES): 2	FIELD CREW: TB	

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: 12/7/16

DTW BEFORE PURGING (ft BTOC): 4.37 — DEPTH TO BOTTOM (ft BTOC): 14 — ___ 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 %	
1334	4.45	300	—	12.03	7.83	-280	6.33	6.93	39.6	Initial state. LT BROWN
1338	4.48	250	1.0	14.46	7.60	-317	6.27	5.75	20.7	CLEARING UP
1342	4.50	250	2.0	15.24	7.49	-314	3.01	6.45	17.4	
1346	4.52	250	3.0	15.80	7.38	-311	2.76	6.21	11.3	LT BROWN
1350	4.51	250	4.0	16.08	7.05	-300	1.89	4.44	3.97	
1354	4.51	250	5.0	16.19	6.99	-300	1.84	4.05	3.09	
1358	4.51	250	6.0	16.28	6.97	-301	1.82	4.02	3.60	
1402	4.51	250	7.0	16.37	6.97	-302	1.81	3.57	3.78	
1406		CORRECT	SAMPLE							
				--	--	--	--	--		Final state.

NOTES:

ACCUMULATED PURGE BUCKET DARK BROWN COLOR

$Fe^{+} \rightarrow 0.49$ mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW30-120716 — PRIMARY SAMPLE DATE & TIME: 12/7/16 1406

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-11S	SCREEN INTERVAL (ft BTOC): 4 - 14	START DATE:	12/7/16
	WELL DIAMETER (INCHES): 2	FIELD CREW:	TS

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: 12/7/16

DTW BEFORE PURGING (ft BTOC): 1.30 — DEPTH TO BOTTOM (ft BTOC): 14 — ___ 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 %	
942	1.95	300	—	18.04	8.83	-180	3.70	4.04	13.2	Initial state. CLEAR
946	2.60	300	0.75	17.51	8.81	-172	3.65	3.72	8.30	
950	3.45	250	1.5	17.25	8.80	-167	3.62	2.64	3.81	CLEAR
954	4.10	200	1.75	16.93	8.78	-156	3.56	2.36	2.63	
958	4.40	150	2.0	16.78	8.77	-163	3.65	2.30	2.50	
1002	4.60	150	2.5	16.64	8.77	-171	3.74	2.24	3.04	
1006	4.70	150	3.0	16.59	8.78	-186	3.79	2.21	2.68	
1010	4.78	150	3.5	16.61	8.81	-191	3.72	2.19	2.51	
1014	4.82	150	4.0	16.65	8.83	-196	3.67	2.16	2.32	
1018	Collect	SAMPLE								
				--	--	--	--	--		Final state.

NOTES:

$Fe^{+} \rightarrow 0$ mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW11S-120716 — PRIMARY SAMPLE DATE & TIME: 12/7/16 10:18

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

QA/QC SAMPLE ID: DUP-GW-120716-2 — QA/QC SAMPLE DATE & TIME: 12/7/16 12:31

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-17	SCREEN INTERVAL (ft BTOC): Well raised	START DATE: 12/6/16	
	WELL DIAMETER (INCHES): 2"	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:

DTW BEFORE PURGING (ft BTOC): 22.86 — DEPTH TO BOTTOM (ft BTOC): ~25.80 * — 7 Soft / 7 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): 2.94 — WELL VOLUME (LITERS): 1.81 — 3 WELL VOLUMES (LITERS): 5.4

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 %	
1044	23.20	300 (A)	–	12.19	6.55	65	1.44	6.99	109	Initial state. opaque brown
1050	23.35	↓	1.8	11.97	6.63	37	1.47	6.91	OR	
1055	23.54		3.3	12.46	6.00	24	1.42	5.96	37	
1058	23.66		4.2	12.56	6.59	1	1.41	5.84	60.3	
1101	23.78		5.1	12.61	6.59	-13	1.41	5.78	20.1	
1105	23.80		6.3	12.54	6.58	-21	1.41	5.73	8.99	
1108	23.81		7.2	12.54	6.58	-22	1.41	5.74	8.51	
See 1108			–	–	–	–	–			Final state.

(A) 12/6/16

NOTES: * Difficult to gauge DTB because tape sticking to inner PVC casing. Tubing hangs inside casing when inserting at ~5', 15', 20'

(A) Between 1044–1050 lost flow. Worked tubing closer to well bottom

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW17-120616 — PRIMARY SAMPLE DATE & TIME: 12/6/16 1110

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA ✓ PAH

QA/QC SAMPLE ID: Dup-GW-120616-1 — QA/QC SAMPLE DATE & TIME: 12/6/16 1110

QA/QC SAMPLE PARAMETERS (check): ✓ Volatiles, ___ TAL metals, ___ MNA PAH — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-26	SCREEN INTERVAL (ft BTOC):	START DATE:	12/6/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. Lethlich

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: 12/6/16

DTW BEFORE PURGING (ft BTOC): 12.75 — DEPTH TO BOTTOM (ft BTOC): 17.62 — ___ 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): 4.87 — WELL VOLUME (LITERS): 3.15 — 3 WELL VOLUMES (LITERS): 9.5

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 %	
1415	12.78	300	0.5	13.04	6.85	-63	0.882	6.95	23.3	Initial state. light brown
1418	12.79	↓	1.4	14.79	6.90	-72	0.856	5.81	10.24	
1421	12.79	↓	2.3	15.13	6.92	-76	0.856	5.48	4.88	
1423	↓	↓	3.2	15.37	6.93	-102	0.858	5.49	2.57	clear
1426	↓	↓	4.1	15.47	6.93	-113	0.858	5.42	1.11	
1429	↓	↓	5.0	15.44	6.93	-122	0.860	5.40	0.93	
1432	↓	↓	5.9	15.38	6.93	-129	0.857	5.34	0.37	
1435	↓	↓	6.4	15.42	6.91	-138	0.858	5.29	0.36	
1438	↓	↓	7.3	15.61	6.93	-142	0.856	5.26	0.37	
1441	↓	↓	8.2	15.59	6.93	-148	0.857	5.20	0.37	
						12/6/16				
					(1)					
	See	1441		--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW26-120616 — PRIMARY SAMPLE DATE & TIME: 12/6/16 1445

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA ✓ PAH

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

QA/QC SAMPLE PARAMETERS (check): ___ Volatiles, ___ TAL metals, ___ MNA — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-16I	SCREEN INTERVAL (ft BTOC):	START DATE:	12/6/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. Laffick

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: 12/6/16

DTW BEFORE PURGING (ft BTOC): 26.87 — DEPTH TO BOTTOM (ft BTOC): 36.55 — ___ 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): — 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 %	
1246	26.95	300	.500	8.31	6.91	-58	1.55	11.54	30	Initial state. light brown
1249	↓	↓	1.4	9.26	6.94	-96	1.47	7.99	19.6	
1252			2.3	9.71	6.94	-107	1.39	7.43	10.63	clear
1255			3.2	10.31	6.93	-120	1.32	7.03	4.68	
1258			4.1	10.31	6.92	-125	1.30	6.84	3.17	
1301			5.0	10.52	6.92	-134	1.26	6.61	3.07	
1305			6.5	10.62	6.91	-139	1.25	6.51	0.42	
1308	↓	↓	7.4	10.67	6.91	-144	1.23	6.36	0.45	
See 1308 reading	–	–	–	–	–	–	–	–		Final state.

(2) 12/6/16

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW16I-120616 — PRIMARY SAMPLE DATE & TIME: 12/6/16 1315

PRIMARY SAMPLE PARAMETERS (check): ✓ *Volatiles*, ✓ *TAL metals*, ___ *MNA* ✓ PAH

QA/QC SAMPLE ID: MW16I-120616-MS/MSD — QA/QC SAMPLE DATE & TIME: 12/6/16 1315

QA/QC SAMPLE PARAMETERS (check): ✓ *Volatiles*, ___ *TAL metals*, ___ *MNA* ✓ PAH — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-23	SCREEN INTERVAL (ft BTOC):	START DATE:	12-6-16
	WELL DIAMETER (INCHES):	FIELD CREW:	K. D

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: 12-6-16

DTW BEFORE PURGING (ft BTOC): 2.94 — 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.
1000	3	300	0	16.69	8.65	-143	14.9	9.57	2.53	brownish color
1012	3.03		1	16.67	9.27	-138	15.9	8.71	2.71	
1016	3.03	350	2	16.01	9.16	-229	9.82	2.39	3.10	
1020	3.05		3.5	14.75	8.50	-216	5.11	3.49	2.24	
1024	3.05	350	5.5	14.67	8.30	-231	4.82	4.04	1.56	
1028	3.06		7	14.66	8.23	-253	4.69	4.64	1.56	
1032	3.06	350	8.5	14.66	8.20	-271	4.66	5.16	1.07	
1036	3.06		10	14.61	8.20	-291	4.66	5.84	0.92	
1040	3.06	350	11.5	14.62	8.19	-306	4.64	6.46	1.61	
1044	3.07		13	14.61	8.17	-314	4.61	6.97	0.65	
1048	3.08	350	14.5	14.67	8.16	-322	4.58	7.39	0.52	
1052	3.09		16	14.67	8.14	-330	4.51	7.48		
				--	--	--	--	--		Final state.

(1119)
1123
1127

NOTES: Vapor → No VOCs
No VRAE Readings

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.36 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW23-120616 — PRIMARY SAMPLE DATE & TIME: 1057 12-6-06

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, X *TAL metals*, X *MNA*

QA/QC SAMPLE ID: MW23-120616MS, MW23-120616MSD — QA/QC SAMPLE DATE & TIME: 1057 12-6-16

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, X *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

MS/MSD

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-09R	SCREEN INTERVAL (ft BTOC):	START DATE:	12-6-16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	KD

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: 12-6-16

DTW BEFORE PURGING (ft BTOC): 5.39 — 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 %	
1318	5.82	450	Ø	14.38	7.57	-164	6.03	5.32	3.37	Initial state.
1322	6.05	300	2	16.00	6.85	-157	6.10	3.45	1.52	clear
1326	6.08	300	4	16.30	6.75	-159	6.08	3.04	3.10	
1330	6.20	300	4.5	16.38	6.72	-160	6.06	2.87	2.41	
1334	6.36	300	5.5	16.38	6.69	-163	6.20	2.46	2.31	
1338	7.05	300	7	16.36	~~6.41~~	-166	4.40	2.13	1.25	pH = 6.6 °C
1342	7.45	160	8	16.33	6.69	-170	6.54	2.04	1.08	
1346	7.62	160	9	15.95	6.69	-172	6.61	2.09	1.03	
1350	7.85	160	9.5	15.87	~~6.59~~	-173	6.58	2.22	0.73	pH = 6.79
1354	8.00	160	10.5	15.81	6.69	-175	6.59	2.12	1.43	
1400	Sample									
1430	8.67	160	13						1.54	
~~1400~~ ~~8.70~~				--	--	--	--	--		Final state.

NOTES: Headspace readings VOC = Ø H_2S = Ø

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 3.30 * flushing limit — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW09R-120616 — PRIMARY SAMPLE DATE & TIME: 12-6-16 1400

PRIMARY SAMPLE PARAMETERS (check): X *Volatiles*, X *TAL metals*, ~~X~~ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: PZ-06	SCREEN INTERVAL (ft BTOC): 3.5-8.5	START DATE: 12/6/16	
	WELL DIAMETER (INCHES): 1	FIELD CREW: TB	

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): 3.49 — 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 %	
1345	5.80	100	✓	11.90	7.94	-225	2.23	7.62	53.4	Initial state. CLEAR
1349	7.31	100	1	13.10	8.01	-248	2.28	6.58	42.7	CLEAR
1353		DRY								
				--	--	--	--	--		Final state.

NOTES: UNABLE TO TAKE 3RD READING → WENT DRY AT 1352 AFTER 7 MINS OF PURGE. 2 LITERS PURGED

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: PZ06-120616 — PRIMARY SAMPLE DATE & TIME: 12/6/16 1500

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-02	SCREEN INTERVAL (ft BTOC): 3-16	START DATE: 12/6/16	
	WELL DIAMETER (INCHES): 2	FIELD CREW: TS	

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: 12/6/16

DTW BEFORE PURGING (ft BTOC): 3.40 — 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 %	
1030	3.45	300	—	15.00	6.30	-125	1.23	5.96	2.16	Initial state.
1034	3.50	300	~~3.0~~	14.17	6.81	-223	1.15	19.10	2.02	SPIKE IN DO
1038	3.50	300	3.5	13.61	6.88	-263	1.21	18.18	1.91	
1042	3.50	300	4.5	13.57	6.92	-279	1.24	17.50	1.03	GRAYISH COLOR
1046	3.50	300	6.0	13.60	6.92	-292	1.26	15.89	0.91	GRAY/BLACK
1050	3.50	300	7.0	13.58	6.92	-298	1.27	15.27	0.94	SLIGHT H_2S SMELL
1054	3.50	300	~~8~~ 8.5	13.53	6.92	-305	1.28	14.55	0.80	
1058	3.50	300	10.0	13.56	6.91	-310	1.29	7.25	0.82	
1102	3.50	300	11.0	13.55	6.91	-316	1.31	7.14	0.74	
1106	3.50	300	12.5	13.54	6.91	-322	1.32	7.11	0.65	
1110	COLLECT		SAMPLE							
				--	--	--	--	--		Final state.

NOTES:

$Fe^{+} \rightarrow 0.0$ mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW02-120616 — PRIMARY SAMPLE DATE & TIME: 12/6/16 11:10

PRIMARY SAMPLE PARAMETERS (check): ✓ *Volatiles*, ✓ *TAL metals*, ✓ *MNA*

QA/QC SAMPLE ID: MW02-120616-MS/MSD — QA/QC SAMPLE DATE & TIME: 12/6/16 11:10

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-01 | SCREEN INTERVAL (ft BTOC): 3-16 | START DATE: 12/6/16

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

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: 12/6/16

DTW BEFORE PURGING (ft BTOC): 4.35 | DEPTH TO BOTTOM (ft BTOC): 16 | ___ 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 %	
1409	4.71	300	—	11.76	8.10	-159	1.86	4.99	89.2	Initial state. BROWN
1413	4.95	300	2.0	12.84	7.26	-160	1.82	3.65	31.4	
1417	5.01	275	3.0	12.89	7.13	-163	1.81	3.50	18.9	LT BROWN
1421	5.07	275	4.0	12.80	7.10	-164	1.80	3.48	12.3	
1425	5.13	275	5.0	12.69	7.08	-165	1.79	3.43	10.1	
1429	5.18	275	6.0	12.62	7.06	-167	1.79	3.38	6.89	CLEAR
1433	5.20	275	7.0	12.62	7.06	-168	1.80	3.35	6.21	
1438	COLLECT SAMPLE									
~~1440~~										
				--	--	--	--	--		Final state.

NOTES:

$Fe^{+} \rightarrow 1.71$ mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): | SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW01-120616 | PRIMARY SAMPLE DATE & TIME: 1438 12/6/16

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* | SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: PZ-04	SCREEN INTERVAL (ft BTOC):	START DATE:	12-6-16
	WELL DIAMETER (INCHES): 1"	FIELD CREW:	K.D

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: 12-6-16

DTW BEFORE PURGING (ft BTOC): 2.83 — 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 %	
1134				15.53	7.79	-338	6.91	8.41		Initial state.
										Slight brown color
				--	--	--	--	--		Final state.

NOTES: No H_2S or VOCs in head space

H_2S in purge bucket ~12ppm → sampling halted

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L):	SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A
PRIMARY SAMPLE ID:	PRIMARY SAMPLE DATE & TIME:
PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	
QA/QC SAMPLE ID:	QA/QC SAMPLE DATE & TIME:
QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-10	SCREEN INTERVAL (ft BTOC):	START DATE:	12/7/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. Lithich

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: 12/7/16

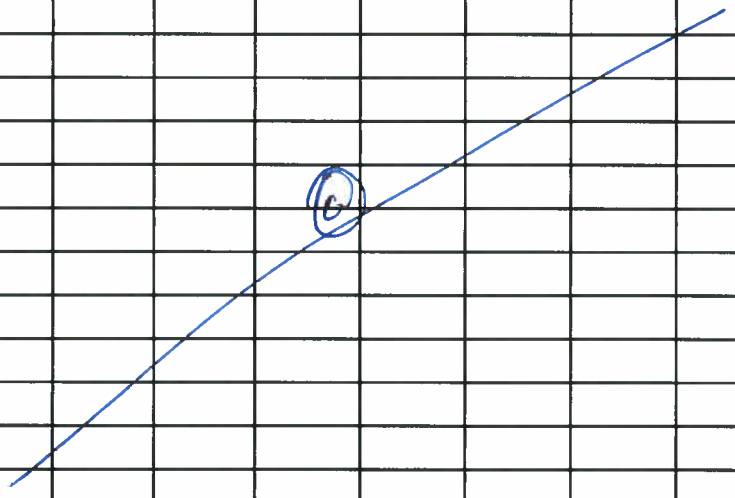
DTW BEFORE PURGING (ft BTOC): 1.50 — DEPTH TO BOTTOM (ft BTOC): 12.65 — ___ Soft / ✓ Hard

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): — 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 %	
1058	1.99	300	0.5	10.71	7.34	74	0.826	14.26	11.9	Initial state.
1101	2.13		1.4	10.15	7.30	76	0.818	14.24	8.90	
1104	–		2.3	9.87	7.28	68	0.817	14.39	7.35	
1107	2.34		3.2	9.70	7.29	76	0.809	14.49	6.54	
1110	2.39		4.1	9.19	7.34	72	0.818	14.57	8.81	
1113	2.42		5.0	9.05	7.35	74	0.810	14.43	7.14	
1116	2.49		5.9	8.90	7.34	77	0.805	14.36	6.37	
See	1116			--	--	--	--	--		Final state.



NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): NA — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW10-120716 — PRIMARY SAMPLE DATE & TIME: 12/7/16 1120

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ___ TAL metals, ___ MNA ✓ PAH ✓ SVOC

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

QA/QC SAMPLE PARAMETERS (check): ___ Volatiles, ___ TAL metals, ___ MNA — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: PZ-03	SCREEN INTERVAL (ft BTOC):	START DATE:	12/7/16
	WELL DIAMETER (INCHES): 1"	FIELD CREW:	C. Lotich

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: 12/7/16

DTW BEFORE PURGING (ft BTOC): 3.04 — DEPTH TO BOTTOM (ft BTOC): 10.95 — ___ 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): 7.91 — WELL VOLUME (LITERS): 4.9 — 3 WELL VOLUMES (LITERS): 14.6

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 %	
1430	3.19	300	0.5	14.61	6.61	-177	24.8	7.03	2.83	Initial state. Cream sulfur odor
1433	3.39	↓	1.4	17.11	6.73	-242	18.5	5.32	2.35	
1436	3.44	↓	2.3	17.40	6.78	-247	14.3	5.14	2.17	
1439	3.47	↓	3.2	17.48	6.80	-249	12.8	5.13	1.37	
1445	3.49		5.0	17.69	6.87	-247	8.53	5.00	0.71	
1448	3.49	400	5.9	17.78	6.89	-246	7.49	4.94	0.57	
~~1454~~			6.8							
1456	3.37	300	10*	17.91	6.92	-244	6.32	4.86	0.39	
1459	–	↓	10.9	18.11	6.94	-240	5.74	4.83	0.94	
1502	3.51	↓	11.8	18.15	6.94	-240	5.70	4.80	0.19	
1505	3.50	↓		18.21	6.95	-240	5.50	4.75	0.20	
				--	--	--	--	--		Final state.

✓ 12/7/16

NOTES: * Flow rate increased between

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 1.24 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: PZ03-120716 — PRIMARY SAMPLE DATE & TIME: 12/7/16 1510

PRIMARY SAMPLE PARAMETERS (check): ✓ *Volatiles*, ✓ *TAL metals*, ✓ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-18	SCREEN INTERVAL (ft BTOC):	START DATE:	12/6/16
	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: 12/6/16

DTW BEFORE PURGING (ft BTOC): 12.45 — DEPTH TO BOTTOM (ft BTOC): 13.35 — ___ 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): 0.9 — WELL VOLUME (LITERS): 0.56 — 3 WELL VOLUMES (LITERS): 1.67

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 %	
1009	12.45	~400	300	16.42	6.15	39	1.53	5.67	OL	Initial state. milky brown. no odor
1010	Well	went dry	after	~500 ml						
1540	12.43	Purged	~750	ml for	VOC &	metals	sample			
				--	--	--	--	--		Final state.

NOTES: GEM2000 + headspace, CH_4 1%, LEL 20%.
12/6/16 – collected VOC, total & dissolved metals
12/7/16 – collected additional sample for PAH (~1.2 L) @ 1200

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L):	SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A
PRIMARY SAMPLE ID:	PRIMARY SAMPLE DATE & TIME: 12/6/16 1540
PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	
QA/QC SAMPLE ID:	QA/QC SAMPLE DATE & TIME:
QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-05I	SCREEN INTERVAL (ft BTOC):	START DATE:	12/7/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. LeHich

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: 12/7/16

DTW BEFORE PURGING (ft BTOC): 12.39 — DEPTH TO BOTTOM (ft BTOC): 29.50 — ___ 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 %	
0905	12.39	300	.500	17.09	6.36	66	0.864	8.33	12.6	Initial state. clear
0908	12.53	↓	1.4	14.77	6.88	-2	0.879	7.79	4.35	
0911	12.54	↓	2.3	14.32	6.96	-12	0.881	6.68	3.41	
0914	↓	↓	3.2	14.03	6.98	-15	0.885	6.25	1.04	
0917	↓	↓	4.1	13.87	6.97	-18	0.888	6.43	0.73	
0920	↓	↓	5.0	13.74	6.97	-21	0.892	6.26	0.38	
0925	↓	↓	6.5	13.56	6.94	-25	0.897	6.18	0.30	
0928	↓	↓	7.4	13.42	6.93	-28	0.894	6.12	0.10	
					(a)					
500	9.28			--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): NA	SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A
PRIMARY SAMPLE ID: MW05I-120716	PRIMARY SAMPLE DATE & TIME: 12/7/16 0930
PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA ✓ PAH ✓ SVOC	
QA/QC SAMPLE ID: ~~None~~ DUP-GW-120716-1	QA/QC SAMPLE DATE & TIME: 12/7/16 1230
QA/QC SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA PAH, SVOC	SAMPLER'S SIGNATURE:

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-06	SCREEN INTERVAL (ft BTOC): 4-14'	START DATE: 12-7-16	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: K. Doup	

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: 12-7-16

DTW BEFORE PURGING (ft BTOC): 3.05 — DEPTH TO BOTTOM (ft BTOC): 12.25 — __ 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)	CONDUCTIVITY (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 %	
1316	3.32	200	0	11.85	7.03	198	0.904	9.11	1.02	Initial state.
1320	3.53	200	0.5	12.31	6.95	205	0.847	8.77	0.91	
1324	3.77	200	1	12.33	6.94	207	0.835	8.69	0.88	
1328	3.97	200	1.5	12.24	6.93	209	0.835	8.47	1.21	
1332	4.16	200	2.5	12.18	6.93	210	0.831	8.51	1.22	
1336	4.40	200	3.5	12.17	6.93	210	0.826	8.49	1.46	
1340	4.56	200	4.5	12.10	6.93	211	0.826	8.26	1.88	
1344	4.68	200	6	12.08	6.93	213	0.829	8.15	2.37	
1348	4.83	200	6.5	12.12	6.91	214	0.830	8.13	2.37	
1355	Sample									
1										
1415	6.05	200		--	--	--	--	--	2.47	Final state.

NOTES: Well covered in ant hill, dug out

No headspace reading

Checked for air bubbles ✓

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW06-120716 — PRIMARY SAMPLE DATE & TIME: 12-7-16 13:55

PRIMARY SAMPLE PARAMETERS (check): X *Volatiles*, X *TAL metals*, __ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): __ *Volatiles*, __ *TAL metals*, __ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-07	SCREEN INTERVAL (ft BTOC): 3 - 13	START DATE: 12-7-16	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: K. Doup	

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: 12-7-16

DTW BEFORE PURGING (ft BTOC): ~~4.00~~ 4.00 — DEPTH TO BOTTOM (ft BTOC): 13.00 ___ 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): — 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 %	
0914	4.40		Ø	15.86	5.56	217	1.42	9.99	4.25	Initial state.
0918	4.67	250	2	14.58	6.03	191	1.41	8.09	3.87	Clear
0922	4.70	250	2	14.01	6.15	205	1.41	7.54	6.96	
0926	4.80	250	3	13.71	6.18	214	1.43	7.42	8.09	
0930	4.90	250	4	13.48	6.20	221	1.44	7.20	9.24	
0934	4.94		4.8	13.47	6.21	224	1.43	7.13	9.98	
0938	5.00	250	6	13.51	6.24	225	1.39	6.70	8.93	
0942	5.05	250	7	13.52	6.28	224	1.39	6.49	8.60	
0945	Sample									
		250								
1023	5.25	~~250~~ 8	8	--	--	--	--	--	8.21	Final state.

NOTES: Well casing is broken → top part

No headspace readings

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW07-120716 — PRIMARY SAMPLE DATE & TIME: 0945 12/7/16

PRIMARY SAMPLE PARAMETERS (check): X *Volatiles*, X *TAL metals*, ___ *MNA*

QA/QC SAMPLE ID: MW07-120716-MS/MSD — QA/QC SAMPLE DATE & TIME: 0945 12/7/16

QA/QC SAMPLE PARAMETERS (check): X *Volatiles*, X *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-20	SCREEN INTERVAL (ft BTOC): 6-16'	START DATE: 12-7-16	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: K. Doup	

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: 12-7-16

DTW BEFORE PURGING (ft BTOC): ~~5.44~~ 4.79 — DEPTH TO BOTTOM (ft BTOC): 16' — ___ 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 %	
1047	5.45	250	Ø	11.04	6.86	209	0.754	11.22	7.69	Initial state.
1051	5.50	150	1	12.14	6.73	201	0.713	8.88	5.04	
1054	5.64	150	1.8	12.17	6.74	205	0.709	8.64	4.81	
1058	5.82	150	2.5	12.11	6.75	208	0.707	8.24	3.46	
1102	6.03	150	3	12.06	6.77	211	0.707	8.24	2.81	
1106	6.25		4	11.99	6.78	214	0.707	8.29	2.67	
1110	6.51	150	4.5	12.00	6.78	216	0.707	8.02	2.01	
1114	6.80	150	5.3	12.04	6.78	218	0.707	7.82	3.72	
1118	7.09	150	6	12.01	6.74	219	0.709	7.81	2.78	
1125	sample									
1146	8.01	150	7	--	--	--	--	--	2.59	Final state.

NOTES: No headspace readings

* Checked for air bubble on DO → really that high

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW20-120716 — PRIMARY SAMPLE DATE & TIME: 12/7/16 1125

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

QA/QC SAMPLE ID: N/A — QA/QC SAMPLE DATE & TIME: ~~12/7/16~~

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-24	SCREEN INTERVAL (ft BTOC): 4-14	START DATE: 12/8/16	
	WELL DIAMETER (INCHES): 2	FIELD CREW: TS + CL	

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: 12/8/16

DTW BEFORE PURGING (ft BTOC): ~~4.17~~ 4.40 — 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)	CONDUCTIVITY (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 %	
939	4.57	250	—	16.91	6.34	-63	4.63	3.55	6.43	Initial state. CLEAR
943	6.00	300	1.5	17.25	6.45	-93	4.65	2.91	2.95	CLEAR
947	6.25	225	2	16.51	6.51	-100	2.98	2.67	2.38	
951	6.42	240	3.0	15.99	6.40	-103	1.89	2.60	2.11	
955	6.60	240	4.0	15.48	6.20	-105	1.30	2.55	1.92	
959	6.70	230	4.75	15.39	6.20	-109	1.45	2.86	8.32	
1003	6.80	225	5.5	15.31	6.18	-124	1.62	2.77	9.04	
1007	6.95	225	6.25	15.61	6.19	-123	1.75	2.90	11.3	
1011	7.05	225	7.0	15.65	6.20	-128	2.03	2.89	12.9	
1015	7.20	225	8.0	15.79	6.24	-126	2.63	3.05	15.7	
1019	7.40	220	9.0	15.40	6.24	-120	2.80	3.09	12.9	
1023	7.65	220	10.0	16.00	6.22	-114	3.00	3.20		
1025		COLLECT		SAMPLE						
				--	--	--	--	--		Final state.

NOTES:

LEL IN HEADSPACE

Fe → 0.21 mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW24-120816 — PRIMARY SAMPLE DATE & TIME: 12/8/16 1025

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-37	SCREEN INTERVAL (ft BTOC): 4 - 14	START DATE:	12-8-16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	K. Doup

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: 12-8-16

DTW BEFORE PURGING (ft BTOC): 1.45 — DEPTH TO BOTTOM (ft BTOC): 14.00 — ___ 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): 12.55 — 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 %	
0914	2.05	150	Ø	17.87	6.21	47	5.47	7.80	17	Initial state.
0918	2.38	150	0.5	18.05	~~6.87~~	-54	5.48	5.63	6.93	Cloudy
0922	2.31	150	1.0	18.22	6.95	-61	5.48	5.07	2.09	clear
0926	2.39	150	2	18.31	6.97	-62	5.48	4.92	1.14	
0930	2.58	150	2.8	18.39	6.98	-63	5.48	4.74	0.79	
0934	2.75	150	~~4~~ 3.5	18.47	6.98	-63	5.48	4.62	0.63	
0938	3.10	100	4	18.52	6.99	-61	5.48	4.54	0.67	
0942	3.34	100	5	18.61	6.99	-59	5.47	4.43	0.89	
0946	3.46	100	5.5	18.75	6.99	-51	5.44	~~4.38~~	0.77	4.39 → DO
0950	3.68	100	6	18.82	6.99	-47	5.42	4.57	0.58	
Sample		0955								
1012	4.22	100	8	–	–	–	–	–	0.74	Final state.

NOTES: Ø headspace reading

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.08 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW37-120816 — PRIMARY SAMPLE DATE & TIME: 0955 12-8-16

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, X *TAL metals*, X *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-36	SCREEN INTERVAL (ft BTOC): ~~0~~ 4.5-14.5	START DATE: 12-8-16	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: K. Doup	

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: 12-8-16

DTW BEFORE PURGING (ft BTOC): 2.14 — DEPTH TO BOTTOM (ft BTOC): 14.5 — ___ 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): 12.36 — 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 %	
1038	~~0~~	275	Ø	18.57	7.21	-112	2.16	7.59	17.1	Initial state. WL ~~2.07~~ 2.1
1042	2.21	200	1.5	18.08	7.18	-167	2.02	4.85	4.62	clear
1046	2.40	200	1.8	18.06	7.15	-163	1.97	4.60	2.27	
1050	2.45	200	3	18.06	7.13	-157	1.94	4.46	1.97	
1054	2.51	200	4	18.05	7.11	-147	1.89	4.32	1.75	
1058	2.58	200	5	18.04	7.11	-145	1.86	4.27	2.22	
1102	2.61	200	6	18.04	7.11	-137	1.84	4.24	3.46	
1106	2.73	200	7	18.05	7.12	-125	1.84	4.28	3.71	
1110	2.82	200	8	18.05	7.12	-120	1.83	4.27	3.11	
1114	2.89	200	9	18.05	7.12	-119	1.83	4.28	3.4	
1120	Sample									
1132	2.51	200	9.5	--	--	--	--	--	1.99	Final state.

NOTES: Ø headspace reading

WL hard to read, requires flashlight

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 3.30 (flashing limit) — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW36-120816 — PRIMARY SAMPLE DATE & TIME: 1120 12-08-16

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, X *TAL metals*, X *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-35	SCREEN INTERVAL (ft BTOC): 4 - 14	START DATE:	12-8-16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	K Doup

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: 12-8-16

DTW BEFORE PURGING (ft BTOC): 1.66 — DEPTH TO BOTTOM (ft BTOC): 14 — ___ 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 %	
1400	2.30	200	0	19.32	6.92	-48	2.20	9.04	34	Initial state.
1404	2.71	200	1	18.81	6.96	-102	2.26	5.36	114	brownish color
1408	2.95	200	2	18.76	6.97	-110	2.28	4.80	36.4	cloudy
1412	3.19	200	3	18.76	6.96	-110	2.29	4.52	20.0	
1416	3.35	200	4	18.68	6.95	-95	2.30	4.39	22.1	
1420	3.47	200	5	18.66	6.95	-81	2.30	4.20	10.87	Clear
1424	3.60	200	6	18.67	6.96	-64	2.28	4.11	7.93	
1428	3.70	200	7	18.65	6.97	-53	2.28	4.05	6.64	
1432	3.79	200	8	18.65	6.97	-48	2.29	3.99	6.66	
1436	3.89	200	9	18.54	6.98	-47	2.30	3.96	5.73	
1440	3.92	200	10	18.59	6.97	-48	2.32	3.91	5.21	
1445	Sample									
1455	3.60	200	11	-	-	-	-	-	5.07	Final state.

NOTES: Clay coming up in water

No head space reading

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.85	SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A
PRIMARY SAMPLE ID: MW35 - 120816	PRIMARY SAMPLE DATE & TIME: 1445 12-8-16
PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, X *TAL metals*, X *MNA*	
QA/QC SAMPLE ID: N/A	QA/QC SAMPLE DATE & TIME: N/A
QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	SAMPLER'S SIGNATURE:

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-21	SCREEN INTERVAL (ft BTOC): 4-14	START DATE: 12/8/16	
	WELL DIAMETER (INCHES): 2	FIELD CREW: TS + CL	

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: 12/8/16

DTW BEFORE PURGING (ft BTOC): 3.90 — 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 %	
1417		300	—	12.50	9.96	-373	24.4	7.18	0.06	Initial state. BROWN
1421	5.10	300	1.25	14.57	9.95	-417	23.8	9.45	0.01	LOOKS LIKE COCA COLA
1425	5.29	300	3.0	16.86	9.86	-430	21.6	8.38	—	
1429	5.50	280	4.5	16.70	9.80	-432	21.0	8.01	—	
1433	5.69	280	4.75	16.41	9.75	-434	20.2	7.83	—	
1437	6.08	280	6.0	16.49	9.75	-437	20.1	7.52	—	
1441	6.35	280	7.0	16.53	9.76	-439	20.0	7.40	—	
1445	6.75	280	8.0	16.67	9.79	-440	20.0	7.50	—	
1449	7.05	280	9.0	16.70	9.78	-442	20.0	7.24		
1450	SAMPLE									
				--	--	--	--	--		Final state.

NOTES:

Fe → 0.1 mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.1 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW21-120816 — PRIMARY SAMPLE DATE & TIME: 12/8/16 1450

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-31	SCREEN INTERVAL (ft BTOC): 7-17	START DATE: 12/8/16	
	WELL DIAMETER (INCHES): 2	FIELD CREW: TB + CL	

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: 12/8/16

DTW BEFORE PURGING (ft BTOC): 5.75 — 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 %	
1115	6.50	300	—	10.09	9.14	-326	10.5	14.89	0.27	Initial state.
1119	7.30	200	1.0	11.91	9.27	-361	9.89	12.70	0.21	BROWN
1123	8.63	200	1.5	14.00	9.28	-372	9.62	10.97	0.32	LOOKS LIKE COCA COLA
1127	8.57	200	2.5	14.62	9.29	-379	9.53	12.35	BELOW 1	
1131	9.50	200	3.0	14.82	9.30	-384	9.45	13.70	—	
1136	9.42	200	4.0	16.12	9.31	-398	9.31	11.22	—	
1140	10.38	200	5.0	16.17	9.33	-403	9.34	11.30	—	
1144	10.80	200	6.0	16.23	9.33	-405	9.27	10.84	—	
1145		SAMPLE								
				--	--	--	--	--		Final state.

NOTES: HIP BUBBLE IN HORIBA 1132

Fe → 0.4 mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW 31- 120816 — PRIMARY SAMPLE DATE & TIME: 12/8/16 1145

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: TW-01	SCREEN INTERVAL (ft BTOC): 7.25-17.25	START DATE: 12/13/16	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: C. Lothrich, T. Sidsburg	

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: 12/13/16

DTW BEFORE PURGING (ft BTOC): 18.23 — DEPTH TO BOTTOM (ft BTOC): 22.40 — ___ 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): — 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 %	
1140	18.30	300	—	8.67	6.85	-90	1.89	6.73	26.4	Initial state. clear
1144	18.33	300	1	10.60	6.93	-121	1.78	4.82	13.3	
1147	18.33	300	1.9	10.86	7.01	-135	1.76	4.64	9.85	
1150	18.36	↓	2.8	11.18	7.04	-143	1.75	4.50	6.25	
1153	↓	↓	3.7	11.31	7.07	-149	1.74	4.40	3.16	
1156	↓	↓	4.6	11.35	7.07	-151	1.74	4.34	2.17	
1159	↓	↓	5.5	11.34	7.09	-155	1.74	4.30	2.48	
See	1159			--	--	--	--	--		Final state.

NOTES: Using forced ventilation

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): TW01-121316 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: — PRIMARY SAMPLE DATE & TIME: 12/13/16 1205

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA ✓ PAH

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

QA/QC SAMPLE PARAMETERS (check): ___ Volatiles, ___ TAL metals, ___ MNA — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: PZ-07R	SCREEN INTERVAL (ft BTOC):	START DATE:	12/13/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. Lettich, T. 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: 12/13/16

DTW BEFORE PURGING (ft BTOC): 4.06 — DEPTH TO BOTTOM (ft BTOC): 10.5 — ___ 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): 6.44 — WELL VOLUME (LITERS): 4 — 3 WELL VOLUMES (LITERS): 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 %	
1452	5.41	300	0.5	7.95	6.95	-185	4.45	8.53	OR	Initial state. dk grey w/ suspended solids
1455	5.41		1.4	9.77	6.80	-203	4.31	5.51	13.2	lt. grey less suspended
1458	5.40		2.3	9.87	6.78	-213	4.25	5.17	12.3	sulfur odor
1501			3.2	9.95	6.77	-223	4.23	4.91	9.28	
1504			4.1	10.04	6.75	-237	4.16	4.79	7.99	
1507			5.0	10.06	6.76	-252	4.01	4.67	6.38	v. lt. grey, minor suspended
1510			5.9	10.03	6.76	-260	3.95	4.64	5.04	
1513			6.8	10.01	6.76	-276	3.73	4.58	3.66	
1516			7.7	9.95	6.76	-281	3.69	4.57	2.92	
1519	↓	↓	8.6	9.98	6.77	-288	3.64	4.51	1.71	
				--	--	--	--	--		Final state.

NOTES: using forced ventilation

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 3.30 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: P207R-121316 — PRIMARY SAMPLE DATE & TIME: 12/13/16 1525

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA

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

QA/QC SAMPLE PARAMETERS (check): ___ Volatiles, ___ TAL metals, ___ MNA — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: PZ-04	SCREEN INTERVAL (ft BTOC):	START DATE: 12/13/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW: C. Loffredi, T. 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: 12/13/16

DTW BEFORE PURGING (ft BTOC): 2.60 — DEPTH TO BOTTOM (ft BTOC): 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): — 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 %	
1333	2.85	300	0.5	10.59	7.30	-361	6.53	5.22	21.0	Initial state. yellowish, strong sulfur odo.
1336	3.00	↓	1.4	11.80	7.26	-370	6.21	4.74	7.27	
1339	3.05		2.3	12.14	7.26	-371	6.05	4.52	3.92	
1342	3.08		3.2	12.39	7.26	-373	5.96	4.42	2.46	
1345	3.09		4.1	12.46	7.26	-372	5.93	4.33	2.14	
1348	3.09	↓	5.0	12.59	7.26	-371	5.91	4.25	1.91	
				--	--	--	--	--		Final state.

NOTES: using forced ventilation

Fe → 0.0 mg/L

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.0 — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: PZ04-121316 — PRIMARY SAMPLE DATE & TIME: 12/13/16 1355

PRIMARY SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ✓ MNA

QA/QC SAMPLE ID: DUP-GW-121316 — QA/QC SAMPLE DATE & TIME: 1230 12/13/16

QA/QC SAMPLE PARAMETERS (check): ✓ Volatiles, ✓ TAL metals, ___ MNA — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-19	SCREEN INTERVAL (ft BTOC):	START DATE:	12/13/16
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	C. Lettich, T. Sedsberg

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: 12/13/16

DTW BEFORE PURGING (ft BTOC): 8.95 — DEPTH TO BOTTOM (ft BTOC): 18 — ___ 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 — WELL VOLUME (LITERS): 5.6 — 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 %	
0942		200	500mL	12.75	5.36	103	1.68	6.13	OR	Initial state. Stopped to change valve
0953	9.15	300	–	12.51	6.65	-52	1.61	5.23	OR	cloudy grey brown
0956	9.24	↓	–	12.59	6.69	-53	1.61	4.84	976	sulfur odor
1003	9.45		1.5	13.74	6.70	-54	1.61	4.30	168	stopped due to no flow
1007	9.70		2.0	14.45	6.70	-72	1.60	3.90	70.2	
1010	10.03		2.9	14.67	6.71	-80	1.59	3.70	35.1	
1013	10.33		3.8	14.80	6.72	-86	1.59	3.62	6.82	
1016	10.53		4.7	14.86	6.72	-90	1.58	3.60	6.61	
1019	10.85		5.6	14.91	6.73	-100	1.59	3.54	9.31	
1022	–		6.5	14.96	6.73	-120	1.59	3.53	8.29	
1025	11.30		7.4	15.01	6.74	-126	1.60	3.72	5.14	
1028	11.60	↓	8.3	15.02	6.74	-130	1.60	3.64	5.62	
seq. 1028				--	--	--	--	--		Final state.

NOTES: Using forced ventilation

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): NA — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: MW19-121316 — PRIMARY SAMPLE DATE & TIME: 12/13/16 1025

PRIMARY SAMPLE PARAMETERS (check): ✓ *Volatiles*, ✓ *TAL metals*, ___ *MNA* ✓ PAH ✓ SVOC

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: P2-01	SCREEN INTERVAL (ft BTOC):	START DATE: 12/12/16
	WELL DIAMETER (INCHES):	FIELD CREW: C. LeHich, T. Salsbury

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): — 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.
		DID NOT SAMPLE								
				--	--	--	--	--		Final state.

NOTES: When checking vapor headspace found CH_4 % vol 65.9%, H_2S 58 ppm and climbing. Water entered lower FEM intake while headspace readings climbing. Did not get max vapor readings. Did not continue per DN.

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L):	SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A
PRIMARY SAMPLE ID:	PRIMARY SAMPLE DATE & TIME:
PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	
QA/QC SAMPLE ID:	QA/QC SAMPLE DATE & TIME:
QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*	SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-03	SCREEN INTERVAL (ft BTOC):	START DATE: 12/12/16
	WELL DIAMETER (INCHES):	FIELD CREW: C. Lethich, T. 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:

DTW BEFORE PURGING (ft BTOC): — 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.
			Did not sample							
				--	--	--	--	--		Final state.

NOTES:

Did not sample because of high CH_4, LEL, H_2S at MW-33, MW-34, and PZ-01 per DN

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: — PRIMARY SAMPLE DATE & TIME:

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles,* ___ *TAL metals,* ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles,* ___ *TAL metals,* ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-34	SCREEN INTERVAL (ft BTOC):	START DATE: 12/12/16
	WELL DIAMETER (INCHES):	FIELD CREW: C. Wellich, T. 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:

DTW BEFORE PURGING (ft BTOC): — 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.
		Did not sample								
				--	--	--	--	--		Final state.

NOTES: When checked headspace vapor found CH_4 58% vol, H_2S 370ppm and both still climbing. Did not sample per DN

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: — PRIMARY SAMPLE DATE & TIME:

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles*, ___ *TAL metals*, ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #671207

LOW-FLOW GROUNDWATER SAMPLING LOG, FOURTH QUARTER 2016

WELL: MW-33	SCREEN INTERVAL (ft BTOC):	START DATE: 12/12/16
	WELL DIAMETER (INCHES):	FIELD CREW: C. LeHirh, T. Saldberg

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): — 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.
	DID NOT SAMPLE									
				--	--	--	--	--		Final state.

NOTES: Found CH_4 73% vol and H_2S > 475ppm in well headspace. H_2S was continuing to climb as was CH_4. H_2S maxed sensor. Disconnected vapor plug, plugged well, ventilated area. Contacted DN and told not to continue.

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): — SULFIDE FIELD KIT CONCENTRATION (mg/L): N/A

PRIMARY SAMPLE ID: — PRIMARY SAMPLE DATE & TIME:

PRIMARY SAMPLE PARAMETERS (check): ___ *Volatiles,* ___ *TAL metals,* ___ *MNA*

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

QA/QC SAMPLE PARAMETERS (check): ___ *Volatiles,* ___ *TAL metals,* ___ *MNA* — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-31	SCREEN INTERVAL (ft BTOC): 7-17	START DATE:	8/23/17
	WELL DIAMETER (INCHES): 2"	FIELD CREW:	A. Stapleton

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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 3.59' — DEPTH TO BOTTOM (ft BTOC): 15.80' — ___ 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): 12.21' — WELL VOLUME (LITERS): 7.53 L — 3 WELL VOLUMES (LITERS): 22.60 L

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 %	
1000	5.08	250	—	19.43	9.38	-427	8.80	3.36	-0.35	Initial state. Dark Brown
1004	6.19	200	0.5	19.33	9.05	-460	9.07	0.00	-0.36	Very Dark Brown
1008	6.84	200	0.7	19.56	9.59	-477	9.19	0.00	-0.23	very dark Brown
1012	7.95	200	0.9	19.73	9.61	-483	9.23	0.00	NW	Very dark Brown
1016	9.05	200	1.0	19.82	9.64	-489	9.20	0.00	NW	very dark brown
1020	9.55	200	1.2	19.82	9.66	-492	9.35	0.00	NW	very dark brown
1024	10.39	200	1.5	19.66	9.68	-492	9.29	0.00	NW	Very dark brown
1035	Collect		Sample							
				--	--	--	--	--		Final state.

NOTES:

* Turbidity meter does not seem to work properly when water is very dark brown. *

NW = not working

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW31-082317 — PRIMARY SAMPLE DATE & TIME: 8/23/17 1035

PRIMARY SAMPLE PARAMETERS (check): ___ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs — N/A

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.01 mg/L — SAMPLER'S SIGNATURE: [signature]

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-11S	SCREEN INTERVAL (ft BTOC): 4-14	START DATE: 8/23/17	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: A STAPLETON	

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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 1.75' — DEPTH TO BOTTOM (ft BTOC): 13.40' — ___ 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): 12.15' — WELL VOLUME (LITERS): 7.50 L — 3 WELL VOLUMES (LITERS): 22.49 L

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 %	
1322	2.71	—	—	21.88	9.42	-309	3.74	2.01	—	Initial state.
1326	3.54	250	0.5	20.47	9.47	-323	3.69	0.00	1.22	Clear, none
1330	4.05	250	0.7	20.47	9.47	-323	3.69	0.00	1.85	clear, none
1334	4.55	250	1.0	20.47	9.47	-323	3.69	0.00	1.06	" "
1338	4.94	250	1.4	20.41	9.10	-310	3.29	0.00	0.79	" "
1342	5.09	250	1.5	20.34	9.12	-308	3.28	0.00	1.19	" "
1346	5.44	250	1.8	20.33	9.17	-309	3.29	0.00	1.88	" "
1350	5.70	250	2.1	20.18	9.18	-309	3.30	0.00	1.32	" "
1355	Collect	Sample								
				--	--	--	--	--		Final state.

NOTES: INTAKE DEPTH 10'
WELL SCREEN 4-14

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW11S-082317 — PRIMARY SAMPLE DATE & TIME: 8/23/17 1355

PRIMARY SAMPLE PARAMETERS (check): ___ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs N/A

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

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-30 | SCREEN INTERVAL (ft BTOC): 4-14 | START DATE: 8/23/17

WELL DIAMETER (INCHES): 2" | FIELD CREW: A. Stapleton

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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 4.38' | DEPTH TO BOTTOM (ft BTOC): 13.00' | __ 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~~ 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 %	
1143	4.53	350	—	22.11	7.87	-357	5.81	11.49	0.65	Initial state. Yellow/amber
1147	4.50	300	0.5	20.23	7.78	-391	3.95	5.11	0.55	Amber tint
1151	4.51	300	0.8	20.24	7.60	-380	3.04	4.40	0.63	Amber tint, odor
1155	4.51	250	1.1	20.19	7.51	-377	2.83	3.70	0.34	Amber tint, odor
1159	4.51	250	1.4	20.09	7.47	-378	2.82	3.26	0.31	Clear, odor
1203	4.51	300	1.6	20.09	7.44	-378	2.77	2.93	0.30	Clear, odor
1207	4.51	300	2.0	20.17	7.42	-379	2.76	2.49	0.47	" "
1211	4.51	300	2.3	20.04	7.40	-381	2.73	2.08	0.58	" "
1216	4.51	300	2.6	20.12	7.37	-384	2.73	1.83	0.40	" "
1220	4.52	300	2.9	20.04	7.37	-386	2.73	1.50	0.36	" "
1224	4.52	300	3.2	20.05	7.36	-388	2.74	1.07	0.50	" "
1228	4.52	300	3.5	18.59	7.37	-393	2.86	0.00	0.22	" "
1232	4.52	300	3.6	18.56	7.35	-394	2.78	0.00	0.33	" "
1236	4.52	300	3.9	18.56	7.36	-395	2.78	0.00	0.27	" "
1240		SAMPLE								
				--	--	--	--	--		Final state.

NOTES: Pump intake @ 10' bgs

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW30-082317 | PRIMARY SAMPLE DATE & TIME: 8/23/17 1240

PRIMARY SAMPLE PARAMETERS (check): __ VOCs, ✓ TAL metals, ✓ MNA, __ SVOCs, __ PAHs

QA/QC SAMPLE ID: N/A | QA/QC SAMPLE DATE & TIME: N/A

QA/QC SAMPLE PARAMETERS (check): __ VOCs, __ TAL metals, __ MNA, __ SVOCs, __ PAHs N/A

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.49 mg/L | SAMPLER'S SIGNATURE: Cindy

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-36 | SCREEN INTERVAL (ft BTOC): 6-16 | START DATE: 8/22/17

WELL DIAMETER (INCHES): 2" | FIELD CREW: A. Stapleton

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: 8/22/17

DTW BEFORE PURGING (ft BTOC): 0.99' | DEPTH TO BOTTOM (ft BTOC): 12.70 | ___ 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): 11.71 | WELL VOLUME (LITERS): 7.22 L | 3 WELL VOLUMES (LITERS): 21.68 L

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 %	
1512	1.99	250	—	21.31	8.96	-345	1.97	3.03	—	Initial state. Clear
1516	2.42	250	0.3	20.24	7.98	-275	1.77	0.00	3.27	Clear
1520	2.74	250	0.6	20.21	7.76	-259	1.70	0.00	2.09	Clear
1524	2.95	250	1.0	20.24	7.70	-254	1.69	0.00	1.94	Clear
1528	3.10	250	1.3	20.26	7.65	-251	1.69	0.00	2.01	Clear
1532	3.25	250	1.6	20.22	7.62	-248	1.69	0.00	2.16	Clear
1536	3.35	250	2.0	20.19	7.59	-246	1.70	0.00	1.65	Clear
1540	3.43	250	2.3	20.17	7.55	-243	1.70	0.00	1.89	Clear
1544	3.50	250	2.6	20.13	7.53	-241	1.71	0.00	1.76	Clear
1550	Collect Sample									
				--	--	--	--	--		Final state.

NOTES: Pump placement @ 11' bgs

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW36-082217 | PRIMARY SAMPLE DATE & TIME: 8/22/17 1550

PRIMARY SAMPLE PARAMETERS (check): ___ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

QA/QC SAMPLE ID: Dup-GW-082217 | QA/QC SAMPLE DATE & TIME: 8/22/17 0900

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 3.30 mg/L | SAMPLER'S SIGNATURE: [signature]

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-35	SCREEN INTERVAL (ft BTOC): 4-14	START DATE: 8/22/17	
	WELL DIAMETER (INCHES): 2	FIELD CREW: T SARSBURG	

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: 8/22/17

DTW BEFORE PURGING (ft BTOC): 1.51 — DEPTH TO BOTTOM (ft BTOC): 14 — ___ 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 %	
1500	2.12	200	—	24.27	8.75	-126	2.34	7.60	22.1	Initial state. CLEAR
1504	2.68	250	1	21.54	7.26	-104	2.36	1.50	5.34	CLEAR
1508	3.01	225	1.75	20.82	7.15	-104	2.38	1.27	4.92	CLEAR
1512	3.40	250	3.0	20.17	7.08	-103	2.42	1.08	5.22	
1516	3.51	225	3.75	19.69	7.07	-102	2.44	1.04	3.89	
1520	3.60	225	4.75	19.69	7.08	-100	2.42	1.02	4.91	
1524	3.70	225	5.75	19.69	7.10	-100	2.41	0.99	6.29	
1528		COLLECT		SAMPLE						
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW35-082217 — PRIMARY SAMPLE DATE & TIME: 8/22/17 15:28

PRIMARY SAMPLE PARAMETERS (check): ___ *VOCs*, ✓ *TAL metals*, ✓ *MNA*, ___ *SVOCs*, ___ *PAHs*

QA/QC SAMPLE ID: MW35-082217-TS/TSD — QA/QC SAMPLE DATE & TIME: 8/22/17 1528

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ✓ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ___ *PAHs*

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.38 — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-21 | SCREEN INTERVAL (ft BTOC): 4 - 14 | START DATE: 8/22/17 | WELL DIAMETER (INCHES): 2" | FIELD CREW: A. STAPLETON

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: 8/22/17

DTW BEFORE PURGING (ft BTOC): 3.90 | DEPTH TO BOTTOM (ft BTOC): 13.45' | ___ 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): 9.55 | WELL VOLUME (LITERS): 5.89 L | 3 WELL VOLUMES (LITERS): 17.67 L

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 %	
1147	4.65	—	—	21.84	10.22	-438	24.1	0.46	—	Initial state. Brown / yellow
1154	4.69	100	0.5	21.50	10.36	-508	25.2	0.00	-0.50	Dark BRN
1159	4.91	175	0.6	21.27	10.37	-519	25.4	0.00	-0.58	very dark brown, odor
1204	5.30	250	0.9	20.81	10.37	-526	24.4	0.00	-0.52	" "
1208	5.61	250	1.1	20.72	10.37	-528	23.4	0.00	-0.55	" "
1212	5.90	200	1.4	21.25	10.37	-529	23.0	0.00	NW	" "
1216	6.14	200	1.7	21.66	10.39	-531	23.0	0.00	NW	" "
1220	6.39	200	1.9	21.56	10.40	-532	23.0	0.00	NW	" "
1224	6.64	200	2.1	21.48	10.42	-534	23.0	0.00	NW	" "
1228	6.85	200	2.3	21.33	10.42	-535	23.0	0.00	NW	" "
1235	Collect Sample									
				--	--	--	--	--		Final state.

NOTES: INTAKE 10
WELL SCREEN 4-14

Turbidity meter not working properly

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW21-082217 | PRIMARY SAMPLE DATE & TIME: 8/22/17 1235

PRIMARY SAMPLE PARAMETERS (check): ___ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

QA/QC SAMPLE ID: N/A | QA/QC SAMPLE DATE & TIME: —

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs N/A

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): ~~N/A~~ 0.08 mg/L | SAMPLER'S SIGNATURE: Cody

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-02 | SCREEN INTERVAL (ft BTOC): 3-16 | START DATE: 8/22/17

WELL DIAMETER (INCHES): 2 | FIELD CREW: T 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: 8/22/17

DTW BEFORE PURGING (ft BTOC): 3.75 | DEPTH TO BOTTOM (ft BTOC): 15.90 | ___ 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 %	
1147	3.78	—	—	23.80	7.67	-261	9.74	1.49	30.7	Initial state.
1151	3.79	250	1	21.58	6.36	-310	10.1	0.90	23.6	SLIGHT H_2S ODOR
1155	3.80	300	2	21.56	7.12	-373	6.54	0.79	10.5	CLEAR
1159	3.80	300	3	21.92	7.56	-398	4.20	0.77	9.24	
1203	3.80	300	4	22.37	7.64	-402	3.00	0.75	8.78	CLEAR
1207	3.80	300	5	22.69	7.50	-396	2.68	0.74	6.46	
1211	3.80	300	6	22.78	7.53	-398	2.62	0.72	5.88	
1215	3.80	300	7	23.10	7.54	-401	2.58	0.71	6.21	CLEAR
1219	3.80	300	8							
1223		SAMPLE								
				--	--	--	--	--		Final state.

NOTES: INTAKE 9.5
SCREEN 3-16
- PURGE LINE IS CLEAR BUT TURNS GREY WHEN EXPOSED TO ATMOSPHERE. PIC TAKEN

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW02-082217 | PRIMARY SAMPLE DATE & TIME: 8/22/17 1223

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

QA/QC SAMPLE ID: MW02-082217-MS/MSD | QA/QC SAMPLE DATE & TIME:

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs | 8/22/17 1223

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 0.14 | SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: PZ-06	SCREEN INTERVAL (ft BTOC): 3.5 - 8.5	START DATE:	8/22/17
	WELL DIAMETER (INCHES): 1	FIELD CREW:	T 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: 8/22/17

DTW BEFORE PURGING (ft BTOC): 3.45 — DEPTH TO BOTTOM (ft BTOC): 9.15 — ___ 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 %	
	1128	5.69	300	–	22.66	6.73	-160	2.10	2.49	21.2	Initial state. CLEAR
8/22	1130	6.05	200	~~0~~ 2	22.55	6.99	-136	1.29	6.50		PURGE BUCKET
	1132		DRY								GREY PARTICLES
											W/ H_2S ODOR
8/23	942	3.50	CONTINUE →		SAMPLE COLLECT						
	1000	DRY	~~0~~								
	1600	RESUME									
	1600	3.50									
					--	--	--	--	--		Final state.

NOTES: INTAKE @ SCREEN 3.5-8.5

- ALLOW RECHARGE OVERNIGHT

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: PZ06-082317 — PRIMARY SAMPLE DATE & TIME: 8/23/17 9:42

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): 1.18 — SAMPLER'S SIGNATURE:

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: PZ-04 | SCREEN INTERVAL (ft BTOC): 3.5-8.5 | START DATE: 8/23/17

WELL DIAMETER (INCHES): 1 | FIELD CREW: T 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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 2.90 | DEPTH TO BOTTOM (ft BTOC): 8.5 | ___ 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): 5.6 | 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 %	
1018	3.00	250	-	20.21	4.01	-202	4.61	8.32	21.6	Initial state. CLEAR
1022	3.11	250	1	19.84	3.22	-225	5.57	6.13	8.92	CLEAR
1026	3.17	250	2	19.84	5.06	-318	5.38	4.90	6.31	
1030	3.20	250	3	19.78	5.85	-359	5.36	0.99	4.27	CLEAR, H_2S ODOR
1034	3.21	250	4	19.77	6.46	-399	5.30	0.91	5.80	
1038	3.21	250	5	19.74	6.85	-410	5.30	0.84	5.20	
1042	3.22	250	6	19.74	7.05	-421	5.31	0.81	5.06	
1046	3.23	250	7	19.74	7.17	-427	5.31	0.78	4.61	CLEAR
1050	3.23	250	8	19.74	7.13	-426	5.31	0.76	4.69	
1054	3.23	250	9	19.74	7.15	-427	5.32	0.76	3.92	
1058	Collect									
				--	--	--	--	--		Final state.

NOTES: INTAKE 8
SCREEN 5.5-10.5

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: PZ04-082317 | PRIMARY SAMPLE DATE & TIME: 8/23/17 1058

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ✓ MNA, ___ SVOCs, ___ PAHs

QA/QC SAMPLE ID: DUP-GW-082317 | QA/QC SAMPLE DATE & TIME: 8/23/17 0900

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW09R	SCREEN INTERVAL (ft BTOC): 6 - 16	START DATE: 8/23/17	
	WELL DIAMETER (INCHES): 2	FIELD CREW: T SALSBURY	

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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 5.10 DEPTH TO BOTTOM (ft BTOC): 16 ___ 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): 10.90 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 %	
1347	5.44	300	—	23.74	6.95	-127	4.82	8.62	5.92	Initial state. CLEAR
1351	5.52	300	1	16.05	7.11	-153	5.72	1.88	3.21	
1355	5.58	300	2	16.01	7.02	-165	5.30	1.34	3.90	
1359	5.65	300	3	15.93	6.96	-178	5.10	1.16	2.90	
1403	5.75	300	4	15.98	6.97	-191	5.02	1.08	3.33	
1407	5.85	300	5	16.21	6.96	-201	4.94	1.03	3.04	CLEAR
1411	5.97	300	6	16.37	6.97	-209	4.97	0.99	2.84	" "
1415	6.10	300	7	16.49	6.99	-220	5.02	0.94	2.60	" "
1419	6.20	300	8	16.71	7.01	-237	5.08	0.89	3.71	" "
1423	6.42	250	9	16.62	7.05	-245	5.10	0.87	3.60	" "
1428	6.62	250	10	16.59	7.11	-256	5.13	0.85	3.04	" "
1432	6.79	250	11	16.50	7.20	-261	5.12	0.84	2.74	" "
1436	6.95	250	12	16.41	7.23	-266	5.10	0.83	2.90	" "
1440		SAMPLE								
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW09R-082317 PRIMARY SAMPLE DATE & TIME: 8/23/17 1440

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

QA/QC SAMPLE ID: DUP-GW-082317-2 QA/QC SAMPLE DATE & TIME: 8/23/17 930

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-19	SCREEN INTERVAL (ft BTOC): 8-18	START DATE: 8/23/17	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: A. Stapleton	

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: 8/23/17

DTW BEFORE PURGING (ft BTOC): 14.25' DEPTH TO BOTTOM (ft BTOC): 17.00' ___ 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): 2.75' WELL VOLUME (LITERS): 1.70 L 3 WELL VOLUMES (LITERS): 5.10 L

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 %	
1508	14.70	150	—	23.10	7.26	-191	1.23	0.00	2.22	Initial state. Clear
1512	14.95	250	0.4	21.37	7.09	-191	1.26	0.00	2.03	Clear, no odor
1516	15.25	250	0.6	20.51	7.07	-196	1.27	0.00	1.81	" "
1520	15.55	250	0.8	20.16	7.05	-201	1.29	0.00	1.80	" "
1524	15.60	250	1.0	20.00	7.04	-205	1.29	0.00	1.61	" "
1528	15.91	250	1.3	19.72	7.03	-207	1.30	0.00	1.59	" "
1535	Collect sample									
	Purged dry after metals + 1 amber, let									
	recharge for 1 hour.									
1635	Collected remaining volume (3 ambers, 1 dissolved metals)									
				--	--	--	--	--		Final state.

NOTES:

* High methane readings in well headspace, let air out.

pump intake depth @ 15.5' bgs

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW19-082317 PRIMARY SAMPLE DATE & TIME: 8/23/17 1535

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ___ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs N/A

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A SAMPLER'S SIGNATURE: Cindy Stapleton

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-18	SCREEN INTERVAL (ft BTOC): 2'	START DATE:	8/24/17
	WELL DIAMETER (INCHES): 4.7-12.7	FIELD CREW:	T SALSBURY

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 12.20 — DEPTH TO BOTTOM (ft BTOC): 13.35 — ___ 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): 1.15 — 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 %	
1114	12.60	200	–	17.00	7.02	-237	6.39	5.27	OVER	Initial state. BROWN
1118	13.12	200	0.5	16.26	6.87	-235	1.30	0.00	187	LT BROWN
1122	13.30	200	1.25	15.93	6.83	-235	1.37	0.00	80.4	
1124	DRY									
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW18-082417 — PRIMARY SAMPLE DATE & TIME: 8/24/17 1150

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ✓ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ✓ *PAHs*

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

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ___ *PAHs*

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

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-17	SCREEN INTERVAL (ft BTOC):	START DATE:	8/24/17
	WELL DIAMETER (INCHES): 2	FIELD CREW:	T SATTERLEE

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 22.10 — DEPTH TO BOTTOM (ft BTOC): 25.50 — ___ 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): 3.40 — 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 %	
958	22.3	240	~	14.89	6.49	-156	1.31	0.00	OVER	Initial state. BROWN
1002	22.4	250	1	14.53	6.62	-177	1.30	0.00	15.1	CLEAR
1006	22.5	250	2	14.36	6.66	-182	1.30	0.00	12.4	CLEAR
1010	22.55	250	3	14.22	6.69	-185	1.29	0.00	10.4	" "
1014	22.58	250	4	14.15	6.71	-189	1.29	0.00	9.86	" "
1018	22.59	250	5	14.09	6.74	-191	1.29	0.00	8.90	LT BROWN
1022	SAMPLE									
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW17-082417 — PRIMARY SAMPLE DATE & TIME: 8/24/17 1022

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ✓ PAHs

QA/QC SAMPLE ID: DUP-GW-082417 — QA/QC SAMPLE DATE & TIME: 8/24/17 0900

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ✓ PAHs

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: TW-01	SCREEN INTERVAL (ft BTOC): 7-17	START DATE: 8/24/17	
	WELL DIAMETER (INCHES): 2	FIELD CREW: T SR SB MG	

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 17.40 — DEPTH TO BOTTOM (ft BTOC): 23.5 — ___ 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 %	
1336	17.75	300	—	21.67	7.79	-73	0.758	0.07	620	Initial state. LT BROWN
1340	17.80	300	1	21.34	7.44	-95	0.747	0.00	43.8	
1344	17.82	300	2	20.73	7.00	-95	0.764	0.00	23.2	CLEAR
1348	17.83	300	3	20.60	6.92	-96	0.770	0.00	20.4	
1352	17.84	300	4	20.20	6.88	-98	0.778	0.00	18.24	
1356	17.85	300	5	19.62	6.85	-99	0.789	0.00	16.90	CLEAR
1400	17.86	300	6	19.37	6.78	-108	0.816	0.00	14.02	
1404	17.86	300	7	19.21	6.82	-101	0.816	0.00	12.54	CLEAR
1408	17.86	300	8	19.05	6.75	-105	0.824	0.00	10.40	
1412		SAMPLE								
				—	—	—	—	—		Final state.

NOTES: OCCASIONAL ORP SPIKE TO -140 THEN RETURNS TO ~-105

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: TW01-082417 — PRIMARY SAMPLE DATE & TIME: 8/24/17 1412

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ✓ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ✓ *PAHs*

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

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ___ *PAHs*

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

ch2m·

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-16I | SCREEN INTERVAL (ft BTOC): 26-31 | START DATE: 8/24/17 | WELL DIAMETER (INCHES): 2" | FIELD CREW: A. Stapleton

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 25.83' | DEPTH TO BOTTOM (ft BTOC): 36.20' | ___ 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 %	
1228	26.05	300	—	17.59	3.40	18	1.16	3.38	0.77	Initial state. Clear, none
1232	26.05	300	0.4	16.62	4.15	-31	1.16	1.62	0.39	" "
1236	26.05	300	0.7	16.45	4.96	-77	1.15	1.25	0.10	" "
1244	26.05	300	1.4	16.42	5.82	-124	1.14	1.00	0.31	" "
1248	26.05	300	1.7	16.29	6.01	-133	1.13	0.94	0.69	" "
1252	25.01	300	2.0	16.33	6.16	-142	1.13	0.86	0.13	" "
1256	25.01	300	2.3	16.32	8.68	-139	1.12	0.89	0.26	" "
1300	25.00	300	2.6	16.34	8.24	-242	1.12	0.79	0.33	" "
1304	25.00	300	2.8	16.38	7.73	-219	1.11	0.78	0.22	" "
1308	25.00	300	3.1	16.36	7.38	-203	1.11	0.77	0.60	" "
1312	25.00	300	3.5	16.42	7.23	-196	1.10	0.77	0.49	" "
1316	25.00	300	3.7	16.41	7.09	-190	1.10	0.74	0.09	" "
1320	25.01	300	3.9	16.46	7.05	-190	1.10	0.70	0.31	" "
1324	25.01	300	4.3	16.51	7.09	-193	1.10	0.68	0.33	" "
1330	Collect Sample									
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW16I-082417 | PRIMARY SAMPLE DATE & TIME: 8/24/17 1330

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ___ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ✓ *PAHs*

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

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ___ *PAHs* N/A

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-26	SCREEN INTERVAL (ft BTOC): 6-16	START DATE: 8/24/17	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: A. Stapleton	

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 11.80' — DEPTH TO BOTTOM (ft BTOC): 17.75' — ___ 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): 5.95' — WELL VOLUME (LITERS): 3.67 L — 3 WELL VOLUMES (LITERS): 11.01 L

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 %	
1000	11.80	350	—	21.55	4.44	33	0.903	2.16	0.61	Initial state. Clear, none
1004	11.80	250	0.5	21.65	4.68	12	0.861	1.26	0.15	Clear, none
1008	11.80	250	0.9	21.65	5.04	-8	0.853	1.18	0.08	" "
1012	11.80	250	1.1	21.68	5.45	-30	0.849	1.00	0.25	" "
1016	11.80	250	1.4	21.60	5.63	-42	0.849	0.84	0.11	" "
1020	11.81	250	1.7	21.62	5.76	-52	0.847	0.84	0.21	" "
1024	11.81	250	2.0	21.64	5.91	-59	0.846	0.86	0.16	" "
1030	11.81	250	2.4	21.64	6.52	-92	0.845	0.92	0.06	" "
1034	11.82	250	2.6	21.62	6.38	-87	0.846	0.81	0.12	" "
1038	11.80	250	2.8	21.61	6.27	-83	0.845	0.76	0.01	" "
1042	11.80	250	3.1	21.61	6.26	-84	0.845	0.71	0.12	" "
1046	11.80	250	3.3	21.65	6.31	-88	0.845	0.74	0.02	" "
1055	Collect Sample									
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW26-082417 — PRIMARY SAMPLE DATE & TIME: 8/24/17 1055

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ___ SVOCs, ✓ PAHs

QA/QC SAMPLE ID: MW26-082417-MS/MSD — QA/QC SAMPLE DATE & TIME: 8/24/17 1055

QA/QC SAMPLE PARAMETERS (check): ✓ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ✓ PAHs

FERROUS IRON FIELD KIT CONCENTRATION (mg/L): N/A — SAMPLER'S SIGNATURE: Cody Stapleton

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-05I [redacted]

SCREEN INTERVAL (ft BTOC): 25-30 START DATE: 8/24/17

WELL DIAMETER (INCHES): 2" FIELD CREW: A. Stapleton

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: 8/24/17

DTW BEFORE PURGING (ft BTOC): 11.59' DEPTH TO BOTTOM (ft BTOC): 29.52' __ 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): 17.93' WELL VOLUME (LITERS): 11.06 L 3 WELL VOLUMES (LITERS): 33.19 L

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 %	
1442	11.85	300	—	16.62	6.91	78	0.762	12.39	1.82	Initial state. Clear, none
1446	11.85	300	0.5	14.77	7.47	43	1.05	5.88	2.02	" "
1450	11.85	300	0.8	14.38	7.79	-46	1.05	2.23	0.71	" "
1454	11.85	300	1.1	14.28	7.99	-88	0.974	1.66	0.52	" "
1500	11.85	300	1.7	13.11	7.97	-112	0.945	1.24	0.17	" "
1504	11.85	300	2.0	13.02	7.86	-111	0.932	1.16	0.33	" "
1508	11.85	300	2.4	13.01	7.70	-107	0.926	1.08	0.11	" "
1512	11.85	300	2.7	13.01	6.54	-51	0.919	1.16	0.06	" "
1516	11.85	300	3.0	13.00	6.50	-57	0.917	1.01	0.02	" "
1520	11.85	300	3.3	12.98	7.02	-82	0.915	0.93	0.13	" "
1524	11.85	300	3.6	12.97	7.35	-98	0.913	0.89	0.02	" "
1528	11.85	300	4.0	12.96	7.53	-107	0.911	0.85	0.06	" "
1532	11.85	300	4.4	12.95	7.56	-109	0.912	0.84	0.05	" "
1536	11.85	300	4.6	12.93	7.58	-111	0.910	0.81	0.07	" "
1540	Collect Sample									
				--	--	--	--	--		Final state.

NOTES: Pump Intake 27.5'

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW05I-082417 PRIMARY SAMPLE DATE & TIME: 8/24/17 1540

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, __ TAL metals, __ MNA, ✓ SVOCs, ✓ PAHs

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

QA/QC SAMPLE PARAMETERS (check): __ VOCs, __ TAL metals, __ MNA, __ SVOCs, __ PAHs N/A

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-20	SCREEN INTERVAL (ft BTOC): 6-16	START DATE: 8/25/17	
	WELL DIAMETER (INCHES): 2"	FIELD CREW: A. Stepleton	

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: 8/25/17

DTW BEFORE PURGING (ft BTOC): 8.69' — DEPTH TO BOTTOM (ft BTOC): 15.55' — ___ 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): 6.86' — WELL VOLUME (LITERS): 4.23 L — 3 WELL VOLUMES (LITERS): 12.70 L

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 %	
1259	9.20	250	—	16.72	7.20	-142	0.853	2.60	20.8	Initial state. Clear, some particles, no odor
1303	9.50	250	0.4	14.83	7.01	-165	0.841	0.00	15.6	very slight brown tint
1307	9.89	250	0.6	15.22	6.97	-201	0.847	0.00	13.2	very slight brown tint, some particles, no odor
1311	10.17	250	1.0	15.36	6.97	-229	0.878	0.00	4.95	Clear, no odor
1315	10.45	250	1.2	15.08	6.98	-241	0.886	0.00	4.84	" "
1319	10.75	250	1.5	15.01	6.99	-243	0.884	0.00	4.41	" "
1323	11.10	250	1.7	14.81	6.99	-220	0.848	0.00	3.73	" "
1327	11.42	250	2.0	14.75	6.98	-188	0.823	0.00	5.14	" "
1331	11.77	250	2.3	14.68	6.96	-165	0.814	0.00	4.62	" "
1335	12.10	250	2.5	14.33	6.97	-148	0.789	0.00	13.66	" "
1339	12.32	250	2.7	14.21	6.98	-137	0.770	0.00	11.10	" "
1343	12.65	250	3.0	14.13	7.00	-128	0.748	0.00	9.89	" "
1347	13.00	250	3.3	14.04	7.03	-126	0.748	0.00	6.57	" "
1351	13.20	250	3.5	14.16	7.01	-134	0.756	0.00	7.49	" "
	Just about	Purged	well dry, let	recharge	for 20 min	prior to	sampling			
1410	Collect	Sample								
	Turned pump off again to let recharge (moved pump down 2 1/2')									
				--	--	--	--	--		Final state.

NOTES: Pump Intake 13.5' bgs

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW20-082517 — PRIMARY SAMPLE DATE & TIME: 8/25/17 1410

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ___ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs N/A

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-10 | SCREEN INTERVAL (ft BTOC): 4 - 14 | START DATE: 8/25/17 | WELL DIAMETER (INCHES): 2" | FIELD CREW: A. Stapleton

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: 8/25/17

DTW BEFORE PURGING (ft BTOC): 6.68' | DEPTH TO BOTTOM (ft BTOC): 12.60' | ___ 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): 5.92' | WELL VOLUME (LITERS): 3.65 L | 3 WELL VOLUMES (LITERS): 11.00 L

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 %	
933	7.05	300	—	16.33	6.20	-155	2.00	0.00	6.42	Initial state. Clear, Slight odor
937	7.48	250	0.5	15.73	6.70	-156	1.36	0.00	4.76	" "
941	7.78	250	0.7	16.08	6.76	-78	1.01	2.45	3.90	" "
945	8.05	250	1.0	16.31	6.81	-53	0.982	4.23	3.22	" "
949	8.30	250	1.3	15.98	6.86	-49	0.996	4.09	2.30	" "
953	8.69	250	1.6	15.90	6.91	-32	1.00	4.69	2.91	" "
957	8.97	250	1.9	15.91	6.94	-30	1.00	4.32	2.94	" "
1001	9.20	250	2.1	15.87	6.94	-25	1.00	4.24	4.44	" "
1005	9.60	250	2.4	15.71	6.94	-20	0.986	3.67	5.26	" "
1009	9.98	250	2.6	15.59	6.93	-15	0.977	3.83	5.00	" "
1013	10.25	250	2.9	15.46	6.92	-17	0.977	4.02	3.56	" "
(AS) ~~1017~~				~~15.35~~	~~6.91~~	~~-34~~	~~1.01~~	~~3.90~~		
1020	Collect Sample									
				--	--	--	--	--		Final state.

NOTES: Pump Intake depth 12' bgs

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW10-082517 | PRIMARY SAMPLE DATE & TIME: 08/25/17 1020

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ___ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

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

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ___ SVOCs, ___ PAHs N/A

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-06 | SCREEN INTERVAL (ft BTOC): ~~4.5~~ | START DATE: 8/25/17

WELL DIAMETER (INCHES): 2 | FIELD CREW: T 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: 8/25/17

DTW BEFORE PURGING (ft BTOC): [redacted] 4.5 | DEPTH TO BOTTOM (ft BTOC): [redacted] 13.1 ___ 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): ~~4.5~~ | 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 %	
1306	4.96	350	–	22.41	6.97	77	0.964	8.49	23.9	Initial state. LT BROWN
1310	5.25	300	1	19.81	7.18	74	1.02	7.03	12.4	CLEAR
1314	5.41	250	1.5	18.18	7.33	71	1.05	4.70	4.60	CLEAR
1318	5.72	250	2.25	18.12	7.32	74	1.05	7.71	5.80	
1322	5.90	250	3	18.07	7.29	78	1.06	4.77	8.24	
1326	6.15	200	3.5	18.25	7.33	78	1.06	4.76	6.89	
1330	6.40	200	4	18.42	7.34	79	1.05	3.98	7.04	
1334	6.55	200	4.5	18.13	7.30	84	1.04	3.06	7.46	CLEAR
1338	6.70	200	5	17.81	7.17	89	1.03	2.83	6.91	
1342	6.89	200	5.5	17.57	7.24	83	1.03	2.04	6.54	
1346	7.05	200	6	17.90	7.25	85	1.02	1.91	7.04	CLEAR
1350	7.21	200	6.5	17.83	7.26	80	1.02	1.80	4.82	
1354		SAMPLE								
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW06-082517 | PRIMARY SAMPLE DATE & TIME: 8/25/17 1354

PRIMARY SAMPLE PARAMETERS (check): ✓ VOCs, ✓ TAL metals, ___ MNA, ✓ SVOCs, ✓ PAHs

QA/QC SAMPLE ID: MW06-082517-MS/MSD | QA/QC SAMPLE DATE & TIME: 8/25/17 1354

QA/QC SAMPLE PARAMETERS (check): ___ VOCs, ___ TAL metals, ___ MNA, ✓ SVOCs, ___ PAHs

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

ch2m

Former Hampshire Chemical Corp., 228 E. Main St., Waterloo, NY, Project #691615.01.SA

LOW-FLOW GROUNDWATER SAMPLING LOG, 2017 ANNUAL LTM EVENT

WELL: MW-07 | SCREEN INTERVAL (ft BTOC): 3 - 13 | START DATE: 8/25/17 | WELL DIAMETER (INCHES): 2 | FIELD CREW: T STARBUCK

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: 8/25/17

DTW BEFORE PURGING (ft BTOC): 5.10 | DEPTH TO BOTTOM (ft BTOC): 12.5 | ___ 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 %	
934	5.40	300	–	18.73	7.22	-22	3.41	8.48	OVER	Initial state. LT BROWN
938	6.01	350	1.5	18.05	6.78	23	2.31	6.80	39.7	CLEAR
942	6.20	300	2.5	17.64	6.74	38	1.61	1.24	32.4	CLEAR
946	6.45	300	3.5	18.88	5.88	110	0.754	0.98	33.9	
950	6.60	300	4.5	18.68	5.59	122	0.740	~~10.5~~	30.2	
954	6.75	300	5.5	18.87	5.85	112	0.752	0.99	26.4	
958	6.80	300	6.5	18.97	6.12	100	0.810	0.89	20.4	
1002	7.10	325	7.5	18.95	6.30	92	0.924	0.81	21.7	
1006	7.45	250	9	18.92	6.39	80	1.10	0.77	16.62	CLEAR
1010	7.65	250	9.5	18.90	6.84	71	1.31	0.78	—	
1014	7.80	250	10.5	18.89	7.41	38	1.40	0.76		
1018	8.1	250	11.5	18.85	7.08	55	1.64	0.75	13.20	
1022	8.40	225	12	18.89	7.01	59	1.76	0.71		
1026	8.60	225	12.5	18.86	6.97	62	1.89	0.72		
1030	8.85	225	13	18.81	6.96	62	1.90	0.70		
1034		SAMPLE								
				--	--	--	--	--		Final state.

NOTES:

FIELD ANALYSES AND LABORATORY SAMPLING INFORMATION

PRIMARY SAMPLE ID: MW07-082517 | PRIMARY SAMPLE DATE & TIME: 8/25/17 1034

PRIMARY SAMPLE PARAMETERS (check): ✓ *VOCs*, ✓ *TAL metals*, ___ *MNA*, ✓ *SVOCs*, ✓ *PAHs*

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

QA/QC SAMPLE PARAMETERS (check): ___ *VOCs*, ___ *TAL metals*, ___ *MNA*, ___ *SVOCs*, ___ *PAHs*

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

Appendix C
Laboratory NYSDOH ELAP Certifications (on CD)

Appendix D
Data Quality Evaluation

Data Quality Evaluation for 2016 Groundwater Investigation, Dow Waterloo

PREPARED BY: CH2M

DATE: February 2017

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. CH2M collected samples March 15-17; June 15-16; September 27, and December 6-13, 2016. Guidance for this DQE report came from the *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) Contract Laboratory National Functional Guidelines (NFG) for Organic Data Review, August 2014;* the *USEPA Contract Laboratory NFG for Inorganic Data Review, October 2013;* and individual method requirements.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers 46 water samples, 7 field duplicates (FD), 3 ambient blanks (AB) and 3 trip blanks (TB). The samples were reported in 10 sample delivery groups identified in Table 1.

TABLE 1
Sample Delivery Groups
2016 Groundwater Investigation, Dow Waterloo

L16030899	L16091192
L16030969	L16120352
L16031040	L16120425
L16060907	L16120521
L16060991	L16120782

Samples were collected and delivered to Microbac Laboratory (MBLM) in Marietta, Ohio. The samples were analyzed by one or more of the methods listed in Table 2.

Table 2	
Analytical Parameters	
2016 Groundwater Investigation, Dow Waterloo	
Parameter	**Method**
Volatile Organic Compounds (VOC)	SW8260C
Semivolatile Organic Compounds (SVOC)	SW8270D
Polyaromatic Hydrocarbons (PAH)	SW8270D SIM
Select Metals (total/dissolved)	SW6010C/SW6020A
Chloride and Sulfate	E300.0
Alkalinity	E310.2
Nitrate	E353.2
Total Phosphorus	E365.4
Orthophosphate	SM4500 P-E
Total Organic Carbon (TOC)	SM5310 C
Total Dissolved Solids (TDS)	SM2540C
Ammonia	EPA 350.1
Total Kjeldahl Nitrogen (TKN)	EPA 351.2
Silica	EPA 200.7
Sulfide	SM4500 F

The sample delivery groups were assessed by reviewing the following: (1) the chain-of- custody documentation; (2) holding-time compliance; (3) initial and continuing calibration criteria; (4) method blanks and field blanks; (5) laboratory control sample/laboratory control sample duplicate (LCS/LCSD) precision and recoveries; (6) matrix spike/matrix spike duplicate (MS/MSD) precision and recoveries; (7) surrogate spike recoveries; (8) internal standard recoveries; (9) FD precision; and (10) the required quality control (QC) samples at the specified frequencies.

Data flags were assigned according to the Waterloo 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 Waterloo 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

Multiple samples were received with a pH that exceeded the criteria of pH<2 for ammonia, dissolved/total metals, nitrate, nitrate + nitrite, silica, phosphorus, TKN and/or TOC. Additional preservative was added by the laboratory; however, the pH for samples DUP-GW-031616, DUP-GW-092716, MW21-031616, MW21-061516, MW21-092716, MW31-061516 and MW31-092716 still exceeded criteria for one or more of the methods, indicating possible matrix interference. The data were qualified as estimated detected and non-detected results and flagged "J" and "UJ", respectively, in the samples.

Calibration

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

The percent differences (%D) for benzoic acid and/or 2,4-dinitrophenol were greater than criteria in a few SVOC initial calibration verifications (ICVS), indicating a possible high sample bias. The data were not qualified because the associated samples did not contain reportable levels of these analytes.

The %Ds for several analytes were less than criteria in a few VOC continuing calibration verification (CCV) standards, 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. The %Ds for bromomethane, carbon disulfide and/or chloromethane were significantly less than criteria (>2x) in one CCV. The non-detected results were rejected for project use and flagged "R" in the associated samples.

The %D for benzoic acid was significantly greater than criteria (>50%) in one SVOC CCV, indicating a possible high bias. The analyte was qualified as an estimated non-detected result and flagged "UJ" in the associated sample.

The %D for phosphorus was greater than criteria in one CCV, indicating a possible high bias. The data were qualified as estimated detected results and flagged "J" in the associated samples.

The %D for alkalinity was greater and/or less than criteria in a few CCVs, indicating a possible high or low bias. The data were qualified as estimated detected results and flagged "J" in the associated samples.

Method Blanks

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

Naphthalene was detected at concentrations less than and/or greater than the reporting limit (RL) in a few SVOC method blanks. The data were not qualified because the associated samples did not contain reportable levels of naphthalene.

Ammonia was detected at a concentration less than the RL in one method blank. 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 concentrations detected in the blank.

Field Blanks

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

Acetone and chloroform were detected at concentrations less than and/or greater than the RL in a few ABs associated with the VOC analysis. The data were qualified as not detected at the concentration measured and flagged "U" when the sample concentrations were less than five times (10 times for acetone) the concentrations detected in the blanks.

Laboratory Control Samples

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

Cyclohexane was recovered less than the lower control limits in a few VOC LCS/LCSDs, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged "UJ" in the associated samples.

The recovery for 1,4-dioxane was less than the lower control limits in a few SVOC LCS/LCSDs, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged "UJ" in the associated samples. In addition, benzoic acid and/or benzo(g,h,i)perylene were recovered greater than the upper control limits in a few LCS/LCSDs, indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of these analytes.

Naphthalene was recovered greater than the upper control limit in a few PAH LCS/LCSDs, indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of naphthalene.

Phosphorus was recovered less than the lower control limit in one LCS, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged "UJ" in the associated samples.

The relative percent differences (RPD) for benzoic acid was greater than criteria in one SVOC LCS/LCSD. The data were not qualified because the associated sample did not contain a reportable level of the benzoic acid.

Matrix Spike

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

Several analytes were recovered less than the lower control limits in the VOC MS/MSDs for samples MW02-120616 and MW16I-120616, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged "UJ" in the respective parent sample.

The recovery of 1,4-dioxane was less than criteria in the SVOC MS/MSD for sample MW07-120716, indicating a possible low bias. The analyte was qualified as an estimated non-detected result and flagged "UJ" in the parent sample.

Total magnesium was recovered less than the lower control limit in the MS/MSD for sample MW30-031516, indicating a possible low bias. The analyte was qualified as an estimated detected result and flagged "J" in the parent sample. In addition, total calcium was recovered greater than the upper control limit in the MS for sample MW30-092716, indicating a possible high bias. The analyte was qualified as an estimated detected result and flagged "J" in the parent sample.

The RPD for bromomethane exceeded criteria in the VOC MS/MSD for sample MW02-120616. The analyte was not qualified because the parent sample did not contain a reportable level of bromomethane.

Post Digestion Spikes

Post digestion spikes (PS) were analyzed as required and accuracy criteria were met with the following exceptions:

Calcium was recovered greater than the upper control limit in the PS for sample DUP-GW-120616, indicating a possible high bias. The analyte was qualified as an estimated detected result and flagged "J" in the sample.

Arsenic was recovered greater than the upper control limit in the PS for sample MW09R-120616, indicating a possible high bias. The analyte was qualified as an estimated detected result and flagged "J" in the sample.

Serial Dilutions

Serial dilutions were analyzed as required and acceptance criteria were met.

Internal Standards

Acceptance criteria were met.

Surrogates

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

One surrogate was recovered less than the lower control limit in the PAH analysis for sample MW18-120616, indicating a possible low bias. The data were qualified as estimated detected and non-detected results and flagged "J" and "UJ", respectively, in the sample.

Field Duplicates

FDs were collected and analyzed at the required frequency and precision acceptance criteria were met with the following exceptions:

The RPDs for total/dissolved arsenic exceeded criteria in FD pair MW11S-061516/ DUP-GW-061516. The data were qualified as estimated and flagged "J" in the FD pair.

The RPD for carbon disulfide exceeded criteria in FD pair PZ04-121316/ DUP-GW-121316. The data were qualified as estimated and flagged "J" in the FD pair.

Laboratory Duplicates

Laboratory duplicates were analyzed as required and precision criteria were met.

Interference Check Standards

Interference check standards were analyzed as required and all accuracy criteria were met.

Sample Quantitation

There were several instances where the RPD between the total/dissolved metals concentration exceeded criteria where the dissolved concentrations were greater than the total concentrations. The data were qualified as estimated and flagged "J" in the samples.

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 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, laboratory duplicate and serial dilution RPDs. Precision was generally acceptable with the exception of a few analytes which were qualified as estimated detected results in several samples due to FD 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, MS/MSD, post digestion spike, interference check standard, internal standard and surrogate recoveries, as well as the evaluation of method/field blank data. Accuracy was generally acceptable with a few compounds being qualified as estimated detected and non-detected results due to calibration, LCS/LCSD, MS/MSD, post digestion spike and/or surrogate issues. A few metals were qualified as

estimated due to the dissolved concentration being greater than the total concentration. In addition, bromomethane, chloromethane and carbon disulfide were rejected for project use in a few samples due to calibration issues. Acetone and chloroform were detected in several ambient blanks; however, acetone was qualified as not detected in only one sample. Ammonia was qualified as not detected due to method blank contamination in one sample.

Representativeness of the data was verified through the sample's collection, storage and preservation procedures and the verification of holding-time compliance. Several samples were received with a pH above criteria for multiple analyses, resulting in the data being qualified as estimated. All data were reported from analyses within the USEPA-recommended holding time.

Comparability of the data was ensured through the use of standard USEPA 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 bromomethane, chloromethane and carbon disulfide which were rejected in a few VOC samples. The completeness goal of 95 percent was met for all analyte/method combinations with the exception of the following:

- bromomethane (90 percent complete)
- carbon disulfide (86 percent complete)
- chloromethane (76 percent complete)

The data can be used for decision making with the exception of the rejected data, taking into consideration the validation flags applied.

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
DUP-GW-031616	SW6010C	Aluminum	mg/L	1.38	J	SI
DUP-GW-031616	SW6010C	Aluminum, dissolved	mg/L	1.33	J	SI
DUP-GW-031616	SW6020	Arsenic	mg/L	4.46	J	SI
DUP-GW-031616	SW6020	Arsenic, dissolved	mg/L	4.54	J	SI
DUP-GW-031616	SW6010C	Calcium	mg/L	2.94	J	SI
DUP-GW-031616	SW6010C	Iron	mg/L	0.4	UJ	SI
DUP-GW-031616	SW6010C	Iron, dissolved	mg/L	0.4	UJ	SI
DUP-GW-031616	SW6010C	Magnesium	mg/L	2	UJ	SI
DUP-GW-031616	SW6010C	Manganese	mg/L	0.04	UJ	SI
DUP-GW-031616	SW6010C	Manganese, dissolved	mg/L	0.04	UJ	SI
DUP-GW-031616	SW6010C	Potassium	mg/L	4.06	J	SI
DUP-GW-031616	SW6010C	Sodium	mg/L	7360	J	SI
DUP-GW-061516	SW6020	Arsenic	mg/L	1	J	FD>RPD
DUP-GW-061516	SW6020	Arsenic, dissolved	mg/L	0.981	J	FD>RPD
DUP-GW-092716	SW6010C	Aluminum	mg/L	1.12	J	SI
DUP-GW-092716	SW6010C	Aluminum, dissolved	mg/L	0.887	J	SI
DUP-GW-092716	SW6020	Arsenic	mg/L	3.88	J	SI
DUP-GW-092716	SW6020	Arsenic, dissolved	mg/L	3.76	J	SI
DUP-GW-092716	SW6010C	Calcium	mg/L	2.85	J	SI
DUP-GW-092716	SW6020	Chromium	mg/L	0.17	J	SI
DUP-GW-092716	SW6020	Chromium, dissolved	mg/L	0.162	J	SI
DUP-GW-092716	SW6010C	Iron	mg/L	0.551	J	SI
DUP-GW-092716	SW6010C	Iron, dissolved	mg/L	0.386	J	SI
DUP-GW-092716	SW6010C	Magnesium	mg/L	1.6	J	SI
DUP-GW-092716	SW6010C	Manganese	mg/L	0.02	UJ	SI
DUP-GW-092716	SW6010C	Manganese, dissolved	mg/L	0.02	UJ	SI
DUP-GW-092716	SW6010C	Potassium	mg/L	5.44	J	SI
DUP-GW-092716	SW6010C	Sodium	mg/L	8070	J	SI
DUP-GW-120616	SW6010C	Calcium	mg/L	179	J	PS>UCL

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
DUP-GW-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
DUP-GW-120716-1	SW8270D	1,4-Dioxane	ug/L	5.38	UJ	LCS<LCL
DUP-GW-120716-1	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
DUP-GW-120716-1	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
DUP-GW-120716-1	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
DUP-GW-121316	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
DUP-GW-121316	SW8260C	Carbon Disulfide	ug/L	7.45	J	CCV<LCL, FD>RPD
DUP-GW-121316	SW8260C	Chloromethane	ug/L	0.5	R	CCV<LCL
DUP-GW-121316	SW8260C	Vinyl chloride	ug/L	0.5	UJ	CCV<LCL
MW01-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW01-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW01-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW02-120616	SW8260C	1,1-Dichloroethene	ug/L	0.5	UJ	SD<LCL
MW02-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW02-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW02-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL, MS<LCL, SD<LCL
MW02-120616	SW8260C	Methyl Acetate	ug/L	1	UJ	MS<LCL
MW02-120616	SW8260C	Methyl Cyclohexane	ug/L	1	UJ	MS<LCL, SD<LCL
MW02-120616	SW8260C	Trichlorotrifluoroethane	ug/L	2	UJ	SD<LCL
MW05I-120716	SW8270D	1,4-Dioxane	ug/L	6.85	UJ	LCS<LCL
MW05I-120716	SW6020	Arsenic	mg/L	0.00108	J	D_MET>T_MET
MW05I-120716	SW6020	Arsenic, dissolved	mg/L	0.000991	J	D_MET>T_MET
MW05I-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW05I-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW05I-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW06-120716	SW8270D	1,4-Dioxane	ug/L	5.32	UJ	LCS<LCL
MW06-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW06-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW06-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW07-120716	SW6020	Arsenic	mg/L	0.00454	J	D_MET>T_MET
MW07-120716	SW6020	Arsenic, dissolved	mg/L	0.00584	J	D_MET>T_MET
MW07-120716	SW8270D	1,4-Dioxane	ug/L	5	UJ	LCS<LCL, MS<LCL
MW07-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW07-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW07-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW09R-120616	SW6020	Arsenic	mg/L	0.00688	J	PS>UCL
MW09R-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW09R-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW09R-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW10-120716	SW8270D	1,4-Dioxane	ug/L	5.49	UJ	LCS<LCL
MW10-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW10-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW10-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW11S-061516	SW6020	Arsenic	mg/L	0.771	J	FD>RPD
MW11S-061516	SW6020	Arsenic, dissolved	mg/L	1.22	J	FD>RPD
MW11S-092716	E365.4	Phosphorus	mg/L	0.259	J	LCS<LCL
MW16I-120616	SW8260C	Bromomethane	ug/L	0.5	R	CCV<LCL
MW16I-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW16I-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL, MS<LCL, SD<LCL
MW16I-120616	SW8260C	Methyl Cyclohexane	ug/L	1	UJ	MS<LCL, SD<LCL
MW17-120616	SW8260C	Bromomethane	ug/L	0.5	R	CCV<LCL
MW17-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW17-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW18-120616	SW8270SIM	2-Methylnaphthalene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Acenaphthene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Acenaphthylene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Anthracene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Benzo (a) anthracene	ug/L	0.0358	J	Sur<LCL

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW18-120616	SW8270SIM	Benzo (a) pyrene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Benzo (b) fluoranthene	ug/L	0.0575	J	Sur<LCL
MW18-120616	SW8270SIM	Benzo (g,h,i) perylene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Benzo(k)fluoranthene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW18-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW18-120616	SW8270SIM	Chrysene	ug/L	0.0369	J	Sur<LCL
MW18-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW18-120616	SW8270SIM	Dibenzo (a,h) anthracene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Fluoranthene	ug/L	0.074	J	Sur<LCL
MW18-120616	SW8270SIM	Fluorene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Indeno (1,2,3-c,d) pyrene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Naphthalene	ug/L	0.0301	UJ	Sur<LCL
MW18-120616	SW8270SIM	Phenanthrene	ug/L	0.075	J	Sur<LCL
MW18-120616	SW8270SIM	Pyrene	ug/L	0.0801	J	Sur<LCL
MW19-121316	SW8270D	1,4-Dioxane	ug/L	5.62	UJ	LCS<LCL, LCSD<LCL
MW19-121316	SW8270D	Benzoic acid	ug/L	11.2	UJ	CCV>UCL
MW19-121316	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW19-121316	SW8260C	Carbon Disulfide	ug/L	0.5	R	CCV<LCL
MW19-121316	SW8260C	Chloromethane	ug/L	0.5	R	CCV<LCL
MW19-121316	SW8260C	Vinyl chloride	ug/L	0.5	UJ	CCV<LCL
MW20-120716	SW8270D	1,4-Dioxane	ug/L	5.62	UJ	LCS<LCL
MW20-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW20-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW20-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
MW21-031616	SW6010C	Aluminum	mg/L	1.39	J	SI
MW21-031616	SW6010C	Aluminum, dissolved	mg/L	1.4	J	SI
MW21-031616	E350.1	Ammonia-N	mg/L	9.5	J	SI
MW21-031616	SW6020	Arsenic	mg/L	3.92	J	SI

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW21-031616	SW6020	Arsenic, dissolved	mg/L	4.38	J	SI
MW21-031616	SW6010C	Calcium	mg/L	3.23	J	SI
MW21-031616	SW6010C	Iron	mg/L	0.55	J	SI
MW21-031616	SW6010C	Iron, dissolved	mg/L	0.4	UJ	SI
MW21-031616	SW6010C	Magnesium	mg/L	2.6	J	SI
MW21-031616	SW6010C	Manganese	mg/L	0.04	UJ	SI
MW21-031616	SW6010C	Manganese, dissolved	mg/L	0.04	UJ	SI
MW21-031616	E365.4	Phosphorus	mg/L	17.2	J	SI
MW21-031616	SW6010C	Potassium	mg/L	6.12	J	SI
MW21-031616	SW6010C	Silicon	mg/L	9.24	J	SI
MW21-031616	SW6010C	Sodium	mg/L	7200	J	SI
MW21-031616	SW6010C	Soluble Silica	mg/L	19.8	J	SI
MW21-031616	E351.2	Total Kjeldahl Nitrogen	mg/L	25.4	J	SI
MW21-031616	A5310C	Total Organic Carbon	mg/L	439	J	SI
MW21-061516	E310.2	Alkalinity	mg/L	16100	J	CCV<LCL
MW21-061516	SW6010C	Aluminum	mg/L	1.27	J	SI
MW21-061516	SW6010C	Aluminum, dissolved	mg/L	0.799	J	SI
MW21-061516	E350.1	Ammonia-N	mg/L	7.8	J	SI
MW21-061516	SW6020	Arsenic	mg/L	4.1	J	SI
MW21-061516	SW6020	Arsenic, dissolved	mg/L	4.08	J	SI
MW21-061516	SW6010C	Calcium	mg/L	2.98	J	SI
MW21-061516	SW6010C	Iron	mg/L	0.642	J	SI
MW21-061516	SW6010C	Iron, dissolved	mg/L	0.25	UJ	SI
MW21-061516	SW6010C	Magnesium	mg/L	2.96	J	SI
MW21-061516	SW6010C	Manganese	mg/L	0.025	UJ	SI
MW21-061516	SW6010C	Manganese, dissolved	mg/L	0.025	UJ	SI
MW21-061516	E353.2	Nitrate	mg/L	8.7	J	SI
MW21-061516	E353.2	Nitrate + Nitrite-N	mg/L	8.7	J	SI
MW21-061516	E365.4	Phosphorus	mg/L	18.7	J	SI

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW21-061516	SW6010C	Potassium	mg/L	2.93	J	SI
MW21-061516	A4500F	Sulfide	mg/L	6.7	J	SI
MW21-061516	E351.2	Total Kjeldahl Nitrogen	mg/L	21.6	J	SI
MW21-061516	A5310C	Total Organic Carbon	mg/L	574	J	SI
MW21-092716	SW6010C	Aluminum	mg/L	1.09	J	SI
MW21-092716	SW6010C	Aluminum, dissolved	mg/L	1.16	J	SI
MW21-092716	E350.1	Ammonia-N	mg/L	13.7	J	SI
MW21-092716	SW6020	Arsenic	mg/L	3.91	J	SI
MW21-092716	SW6020	Arsenic, dissolved	mg/L	3.92	J	SI
MW21-092716	SW6010C	Calcium	mg/L	2.73	J	SI
MW21-092716	SW6020	Chromium	mg/L	0.179	J	SI
MW21-092716	SW6020	Chromium, dissolved	mg/L	0.173	J	SI
MW21-092716	SW6010C	Iron	mg/L	0.47	J	SI
MW21-092716	SW6010C	Iron, dissolved	mg/L	0.392	J	SI
MW21-092716	SW6010C	Magnesium	mg/L	1.84	J	SI
MW21-092716	SW6010C	Manganese	mg/L	0.02	UJ	SI
MW21-092716	SW6010C	Manganese, dissolved	mg/L	0.02	UJ	SI
MW21-092716	E353.2	Nitrate	mg/L	12.6	J	SI
MW21-092716	E353.2	Nitrate + Nitrite-N	mg/L	12.6	J	SI
MW21-092716	E365.4	Phosphorus	mg/L	17.5	J	LCS<LCL, SI
MW21-092716	SW6010C	Potassium	mg/L	5.21	J	SI
MW21-092716	SW6010C	Silicon	mg/L	9.52	J	SI
MW21-092716	SW6010C	Sodium	mg/L	7580	J	SI
MW21-092716	SW6010C	Soluble Silica	mg/L	20.4	J	SI
MW21-092716	E351.2	Total Kjeldahl Nitrogen	mg/L	25.3	J	SI
MW21-092716	A5310C	Total Organic Carbon	mg/L	813	J	SI
MW26-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW26-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
MW26-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW30-031516	SW6010C	Magnesium	mg/L	12.7	J	MS<LCL
MW30-031516	SW6010C	Magnesium	mg/L	12.7	J	SD<LCL
MW30-092716	SW6010C	Calcium	mg/L	69.5	J	MS>UCL
MW30-092716	E365.4	Phosphorus	mg/L	0.126	J	LCS<LCL
MW30-120716	SW6010C	Manganese	mg/L	0.026	J	D_MET>T_MET
MW30-120716	SW6010C	Manganese, dissolved	mg/L	0.0448	J	D_MET>T_MET
MW31-031716	SW6020	Arsenic	mg/L	0.0507	J	D_MET>T_MET
MW31-031716	SW6020	Arsenic, dissolved	mg/L	0.0633	J	D_MET>T_MET
MW31-061516	SW6010C	Aluminum	mg/L	2.12	J	SI
MW31-061516	SW6010C	Aluminum, dissolved	mg/L	0.513	J	SI
MW31-061516	SW6010C	Calcium	mg/L	12.7	J	SI
MW31-061516	SW6010C	Iron	mg/L	5.78	J	SI
MW31-061516	SW6010C	Iron, dissolved	mg/L	2.13	J	SI
MW31-061516	SW6010C	Magnesium	mg/L	8.28	J	SI
MW31-061516	SW6010C	Manganese	mg/L	0.072	J	SI
MW31-061516	SW6010C	Manganese, dissolved	mg/L	0.025	UJ	SI
MW31-061516	SW6010C	Potassium	mg/L	10.4	J	SI
MW31-061516	SW6010C	Sodium	mg/L	2580	J	SI
MW31-092716	SW6010C	Aluminum	mg/L	1.14	J	SI
MW31-092716	SW6010C	Aluminum, dissolved	mg/L	0.684	J	SI
MW31-092716	E350.1	Ammonia-N	mg/L	2.3	J	SI
MW31-092716	SW6020	Arsenic	mg/L	0.0322	J	SI
MW31-092716	SW6020	Arsenic, dissolved	mg/L	0.0332	J	SI
MW31-092716	SW6010C	Calcium	mg/L	6.24	J	SI
MW31-092716	SW6020	Chromium	mg/L	0.979	J	SI
MW31-092716	SW6020	Chromium, dissolved	mg/L	0.949	J	SI
MW31-092716	SW6010C	Iron	mg/L	3.02	J	SI
MW31-092716	SW6010C	Iron, dissolved	mg/L	1.61	J	SI
MW31-092716	SW6010C	Magnesium	mg/L	4.29	J	SI

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW31-092716	SW6010C	Manganese	mg/L	0.0289	J	SI
MW31-092716	SW6010C	Manganese, dissolved	mg/L	0.02	UJ	SI
MW31-092716	E353.2	Nitrate	mg/L	14.4	J	SI
MW31-092716	E353.2	Nitrate + Nitrite-N	mg/L	14.4	J	SI
MW31-092716	E365.4	Phosphorus	mg/L	5.65	J	LCS<LCL, SI
MW31-092716	SW6010C	Potassium	mg/L	14.5	J	SI
MW31-092716	SW6010C	Silicon	mg/L	15.4	J	SI
MW31-092716	SW6010C	Sodium	mg/L	2890	J	SI
MW31-092716	SW6010C	Soluble Silica	mg/L	33	J	SI
MW31-092716	E351.2	Total Kjeldahl Nitrogen	mg/L	8.88	J	SI
MW31-092716	A5310C	Total Organic Carbon	mg/L	239	J	SI
MW35-061516	E350.1	Ammonia-N	mg/L	0.202	U	LB<RL
MW35-092716	E365.4	Phosphorus	mg/L	0.1	UJ	LCS<LCL
MW36-092716	E365.4	Phosphorus	mg/L	0.1	UJ	LCS<LCL
PZ03-120716	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
PZ03-120716	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
PZ03-120716	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
PZ04-121316	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
PZ04-121316	SW8260C	Carbon Disulfide	ug/L	21	J	CCV<LCL, FD>RPD
PZ04-121316	SW8260C	Chloromethane	ug/L	0.5	R	CCV<LCL
PZ04-121316	E365.4	Phosphorus	mg/L	0.542	J	CCV>UCL
PZ04-121316	SW8260C	Vinyl chloride	ug/L	0.5	UJ	CCV<LCL
PZ06-120616	SW8260C	Acetone	ug/L	6.31	U	AB<RL
PZ06-120616	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
PZ06-120616	SW8260C	Chloromethane	ug/L	0.5	UJ	CCV<LCL
PZ06-120616	SW8260C	Cyclohexane	ug/L	1	UJ	LCS<LCL
PZ07R-121316	E310.2	Alkalinity	mg/L	427	J	CCV>UCL
PZ07R-121316	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
PZ07R-121316	SW8260C	Carbon Disulfide	ug/L	0.5	R	CCV<LCL

Table 3
Qualified Data
2016 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
PZ07R-121316	SW8260C	Chloromethane	ug/L	0.5	R	CCV<LCL
PZ07R-121316	E365.4	Phosphorus	mg/L	0.301	J	CCV>UCL
PZ07R-121316	SW8260C	Vinyl chloride	ug/L	0.5	UJ	CCV<LCL
TW01-121316	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
TW01-121316	SW8260C	Carbon Disulfide	ug/L	0.5	R	CCV<LCL
TW01-121316	SW8260C	Chloromethane	ug/L	0.5	R	CCV<LCL
TW01-121316	SW8260C	Vinyl chloride	ug/L	0.5	UJ	CCV<LCL

Validation Reasons:

AB<RL	The analyte was detected in the ambient blank at a concentration less than the reporting limit
CCV<LCL	Continuing calibration verification recovery was less than criteria
CCV>UCL	Continuing calibration verification recovery was greater than criteria
D_MET>T_MET	Dissolved concentration greater than total concentration
FD>RPD	The relative percent difference exceeded control limits in the field duplicate pair.
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 recovery was less than the lower control limit
MS>UCL	The matrix spike recovery was greater than the upper control limit
PS>UCL	The post digestion spike recovery was greater than the upper control limit
SD<LCL	The matrix spike duplicate recovery was less than the lower control limit
SI	The samples were received with a pH greater than or less than criteria
Sur<LCL	The surrogate recovery was less than the lower control limit

Data Quality Evaluation for 2017 Groundwater Investigation, Former Hampshire Chemical Corporation Facility

PREPARED BY: CH2M

DATE: January 8, 2018

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. CH2M collected samples August 22 through August 25, 2017. Guidance for this DQE report came from the *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 Organic Superfund Methods Data Review, January 2017;* the *USEPA Contract Laboratory NFG for Inorganic Superfund Methods Data Review, January 2017;* and individual method requirements.

This report is intended as a general data quality assessment designed to summarize data issues.

Analytical Data

This DQE report covers 21 water samples, 4 field duplicates (FD), 4 ambient blanks (AB) and 4 trip blanks (TB). The samples were reported in four sample delivery groups identified in Table 1.

TABLE 1

Sample Delivery Groups	
2017 Groundwater Investigation, Dow Waterloo	
L17081212	L17081305
L17081366	L17081498

Samples were collected and delivered to Microbac Laboratory (MBLM) in Marietta, Ohio. The samples were analyzed by one or more of the methods listed in Table 2.

Table 2	
Analytical Parameters	
2017 Groundwater Investigation, Dow Waterloo	
Parameter	**Method**
Volatile Organic Compounds (VOC)	SW8260C
Semivolatile Organic Compounds (SVOC)	SW8270D
Polyaromatic Hydrocarbons (PAH)	SW8270D SIM
Select Metals (total/dissolved)	SW6010C/SW6020A
Chloride and Sulfate	E300.0
Alkalinity	E310.2
Nitrate	E353.2
Total Phosphorus	E365.4
Orthophosphate	SM4500 P-E
Total Organic Carbon (TOC)	SM5310 C
Total Dissolved Solids (TDS)	SM2540C
Ammonia	EPA 350.1
Total Kjeldahl Nitrogen (TKN)	EPA 351.2
Sulfide	SM4500 F

The sample delivery groups were assessed by reviewing the following: (1) the chain-of- custody documentation; (2) holding-time compliance; (3) initial and continuing calibration criteria; (4) method blanks and field blanks; (5) laboratory control sample/laboratory control sample duplicate (LCS/LCSD) precision and recoveries; (6) matrix spike/matrix spike duplicate (MS/MSD) precision and recoveries; (7) surrogate spike recoveries; (8) internal standard recoveries; (9) FD precision; and (10) the required quality control (QC) samples at the specified frequencies.

Data flags were assigned according to the Waterloo 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 Waterloo 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

Multiple samples were received with a pH that exceeded the criteria of pH<2 for ammonia, dissolved/total metals, nitrate, nitrate + nitrite, silica, phosphorus, TKN and/or TOC. Additional preservative was added by the laboratory and all samples adjusted to the correct pH. The data was not qualified.

A few SVOC samples were re-extracted for biphenyl only, four days past the hold time criteria of 7 days, resulting the data being qualified as estimated non-detected results and flagged “UJ”.

Calibration

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

The percent difference (%D) for benzoic acid was greater than criteria in a few SVOC initial calibration verification standards (ICVS), indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of benzoic acid.

The %Ds for a few analytes were less than criteria in several VOC continuing calibration verification (CCV) standards, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged “UJ” in the associated samples.

The %D for benzoic acid was less than criteria in a few SVOC CCVs, indicating a possible low bias. The analyte was qualified as an estimated non-detected result and flagged “UJ” in the associated samples. In addition, the %D for 4-nitrophenol 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 4-nitrophenol.

The %D for TOC was greater than criteria in one CCV, indicating a possible high bias. The data were qualified as estimated detected results and flagged “J” in the associated samples.

Method Blanks

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

Total iron was detected at concentrations less than the reporting limit (RL) in one method blank associated with the metals analysis. The data were qualified as not detected and flagged “U” when the associated sample concentrations were less than the concentration detected in the blank.

Field Blanks

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

Acetone and chloroform were detected at concentrations less than and/or greater than the RL in a few ABs and TBs associated with the VOC analysis. The data were qualified as not detected and flagged “U” when the sample concentrations were less than five times (10 times for acetone) the concentrations detected in the blanks.

Laboratory Control Samples

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

The recovery for 1,1-dichloroethene was less than the lower control limit in one VOC LCS, indicating a possible low bias. The analyte was qualified as an estimated non-detected result and flagged “UJ” in the associated sample.

The recovery for 1,4-dioxane was less than the lower control limits in a few SVOC LCS/LCSDs, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged “UJ” in the associated samples. In addition, dimethyl phthalate and isophorone were recovered greater than the upper control limits in a few LCSDs, indicating a possible high bias. The data were not qualified because the associated samples did not contain reportable levels of these analytes.

The relative percent differences (RPD) for benzoic acid and 2,4-dinitrophenol were greater than criteria in a few SVOC LCS/LCSDs. The data were not qualified because the associated samples did not contain reportable levels of these analytes.

Matrix Spike

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

Carbon disulfide was recovered greater than the upper control limit in the VOC MS for sample MW02-082217, indicating a possible high bias. The analyte was qualified as estimated and flagged “J” in the parent sample.

The recovery of 1,4-dioxane was less than criteria in the SVOC MS/MSD for sample MW06-082517, indicating a possible low bias. The analyte was qualified as an estimated non-detect and flagged “UJ” in the parent sample.

The RPD for bromomethane exceeded criteria in the VOC MS/MSD for sample MW02-082217. The analyte was not qualified because the parent sample did not contain a reportable level of bromomethane.

The RPDs for multiple analytes exceeded criteria in the SVOC MS/MSD for sample MW06-082517. The data were not qualified because the parent sample did not contain reportable levels of these analytes.

Post Digestion Spikes

Post digestion spikes (PS) were analyzed as required and accuracy criteria were met.

Serial Dilutions

Serial dilutions were analyzed as required and acceptance criteria were met.

Internal Standards

Acceptance criteria were met.

Surrogates

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

One surrogate was recovered less than the lower control limit in the PAH analysis for sample TW01-082417, indicating a possible low bias. The data were qualified as estimated non-detected results and flagged “UJ” in the sample.

Field Duplicates

FDs were collected and analyzed at the required frequency and precision acceptance criteria were met with the following exception:

The RPD for carbon disulfide exceeded criteria in FD pair PZ04-082317/ DUP-GW-082317-1. The data were qualified as estimated and flagged “J” in the FD pair.

Laboratory Duplicates

Laboratory duplicates were analyzed as required and precision criteria were met.

Interference Check Standards

Interference check standards were analyzed as required and all accuracy criteria were met.

Sample Quantitation

There were several instances where the RPD between the total/dissolved metals concentration exceeded criteria where the dissolved concentrations were greater than the total concentrations. The data were qualified as estimated and flagged “J” in the samples.

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 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, laboratory duplicate and serial dilution RPDs. Precision was acceptable. There were a few instances where the precision indicators exceeded criteria; however, the data were not impacted. Also, carbon disulfide was qualified as estimated in two samples due to FD 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, MS/MSD, post digestion spike, interference check standard, internal standard and surrogate recoveries, as well as the evaluation of method/field blank data. Accuracy was acceptable; however, a few compounds were qualified as estimated detected and non-detected results due to calibration, LCS/LCSD, MS/MSD, and/or surrogate issues. A few metals were qualified as estimated due to the dissolved concentration being greater than the total concentration. A few analytes were qualified as not detected in several samples due to ambient, method or trip blank contamination.

Representativeness of the data was verified through the sample's collection, storage and preservation procedures and the verification of holding-time compliance. Several samples were received with a pH above criteria for multiple analyses; however, the samples were adjusted by the laboratory and were not qualified. A few SVOC samples were re-extracted out of hold time, resulting in the data being qualified as estimated non-detected results. All other data were reported from analyses within the USEPA-recommended holding time.

Comparability of the data was ensured through the use of standard USEPA 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. The completeness goal of 95 percent was met for all analyte/method combinations.

The data can be used for decision making taking into consideration the validation flags applied.

Table 3
Qualified Data
2017 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
DUP-GW-082317-1	SW6010C	Iron	mg/L	0.0713	U	LB<RL
DUP-GW-082317-1	SW8260C	1,1-Dichloroethene	ug/L	0.5	UJ	LCS<LCL
DUP-GW-082317-1	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
DUP-GW-082317-1	SW8260C	2-Hexanone	ug/L	2.5	UJ	CCV<LCL
DUP-GW-082317-1	SW8260C	Acetone	ug/L	3.72	U	TB<RL, AB<RL
DUP-GW-082317-1	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
DUP-GW-082317-1	SW8260C	Carbon Disulfide	ug/L	14.3	J	FD>RPD
DUP-GW-082317-1	SW8260C	Chlorobenzene	ug/L	0.5	UJ	CCV<LCL
DUP-GW-082317-1	SW8260C	Chloroform	ug/L	1.31	U	AB>RL
DUP-GW-082317-2	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
DUP-GW-082317-2	SW8270D	1,4-Dioxane	ug/L	5.56	UJ	LCS<LCL, LCSD<LCL
DUP-GW-082317-2	SW8270D	Benzoic acid	ug/L	11.1	UJ	CCV<LCL
DUP-GW-082417	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW02-082217	A5310C	Total Organic Carbon	mg/L	13.8	J	CCV>UCL
MW02-082217	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW02-082217	SW8260C	Acetone	ug/L	3.23	U	TB<RL
MW02-082217	SW8260C	Carbon Disulfide	ug/L	18.9	J	MS>UCL
MW02-082217	SW8260C	Chloroform	ug/L	1.07	U	AB>RL
MW05I-082417	SW8260C	Acetone	ug/L	2.85	U	TB<RL, AB<RL
MW05I-082417	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW05I-082417	SW8270D	1,4-Dioxane	ug/L	5	UJ	LCS<LCL, LCSD<LCL
MW05I-082417	SW8270D	Benzoic acid	ug/L	10	UJ	CCV<LCL
MW06-082517	SW8260C	Acetone	ug/L	2.52	U	TB<RL, AB<RL
MW06-082517	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW06-082517	SW8270D	1,4-Dioxane	ug/L	5.26	UJ	LCS<LCL, LCSD<LCL, MS<LCL, SD<LCL
MW06-082517	SW8270D	Benzoic acid	ug/L	10.5	UJ	CCV<LCL
MW06-082517	SW8270D	Biphenyl	ug/L	2.66	UJ	HTp>UCL
MW07-082517	SW6010C	Manganese	mg/L	0.254	J	D_MET>T_MET
MW07-082517	SW6010C	Manganese, dissolved	mg/L	0.296	J	D_MET>T_MET

Table 3
Qualified Data
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Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW07-082517	SW8260C	Acetone	ug/L	3.2	U	TB<RL
MW07-082517	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW07-082517	SW8270D	1,4-Dioxane	ug/L	5.32	UJ	LCS<LCL, LCSD<LCL
MW07-082517	SW8270D	Benzoic acid	ug/L	10.6	UJ	CCV<LCL
MW07-082517	SW8270D	Biphenyl	ug/L	2.84	UJ	HTp>UCL
MW09R-082317	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW09R-082317	SW8260C	Acetone	ug/L	2.58	U	TB<RL, AB<RL
MW09R-082317	SW8270D	1,4-Dioxane	ug/L	5.49	UJ	LCS<LCL, LCSD<LCL
MW09R-082317	SW8270D	Benzoic acid	ug/L	11	UJ	CCV<LCL
MW10-082517	SW6010C	Iron	mg/L	0.276	J	D_MET>T_MET
MW10-082517	SW6010C	Iron, dissolved	mg/L	1.85	J	D_MET>T_MET
MW10-082517	SW8260C	Acetone	ug/L	3.66	U	TB<RL, AB<RL
MW10-082517	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW10-082517	SW8270D	1,4-Dioxane	ug/L	5	UJ	LCS<LCL, LCSD<LCL
MW10-082517	SW8270D	Benzoic acid	ug/L	10	UJ	CCV<LCL
MW10-082517	SW8270D	Biphenyl	ug/L	2.5	UJ	HTp>UCL
MW11S-082317	SW6010C	Iron	mg/L	0.115	U	LB<RL
MW16I-082417	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW16I-082417	SW8260C	Acetone	ug/L	3.23	U	TB<RL, AB<RL
MW17-082417	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW18-082417	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW18-082417	SW8260C	Acetone	ug/L	3.16	U	TB<RL, AB<RL
MW19-082317	SW6020	Arsenic	mg/L	0.00445	J	D_MET>T_MET
MW19-082317	SW6020	Arsenic, dissolved	mg/L	0.011	J	D_MET>T_MET
MW19-082317	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
MW19-082317	SW8260C	Acetone	ug/L	2.8	U	TB<RL, AB<RL
MW19-082317	SW8270D	1,4-Dioxane	ug/L	5	UJ	LCS<LCL, LCSD<LCL
MW19-082317	SW8270D	Benzoic acid	ug/L	10	UJ	CCV<LCL
MW20-082517	SW6010C	Manganese	mg/L	0.0328	J	D_MET>T_MET

Table 3
Qualified Data
2017 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
MW20-082517	SW6010C	Manganese, dissolved	mg/L	0.125	J	D_MET>T_MET
MW20-082517	SW8260C	Acetone	ug/L	7.78	U	TB<RL, AB<RL
MW20-082517	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW20-082517	SW8270D	1,4-Dioxane	ug/L	5.05	UJ	LCS<LCL, LCSD<LCL
MW20-082517	SW8270D	Benzoic acid	ug/L	10.1	UJ	CCV<LCL
MW20-082517	SW8270D	Biphenyl	ug/L	2.63	UJ	HTp>UCL
MW21-082217	A5310C	Total Organic Carbon	mg/L	653	J	CCV>UCL
MW26-082417	SW8260C	Bromomethane	ug/L	0.5	UJ	CCV<LCL
MW31-082317	SW6020	Arsenic	mg/L	0.0212	J	D_MET>T_MET
MW31-082317	SW6020	Arsenic, dissolved	mg/L	0.0244	J	D_MET>T_MET
MW35-082217	A5310C	Total Organic Carbon	mg/L	4.03	J	CCV>UCL
MW36-082217	A5310C	Total Organic Carbon	mg/L	4.47	J	CCV>UCL
PZ04-082317	SW6010C	Iron	mg/L	0.0929	U	LB<RL
PZ04-082317	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
PZ04-082317	SW8260C	Acetone	ug/L	2.73	U	TB<RL, AB<RL
PZ04-082317	SW8260C	Carbon Disulfide	ug/L	7.07	J	FD>RPD
PZ04-082317	SW8260C	Chloroform	ug/L	1.16	U	AB>RL
PZ06-082317	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
PZ06-082317	SW8260C	Acetone	ug/L	14.1	U	TB<RL, AB<RL
TW01-082417	SW8260C	1,2-Dibromo-3-chloropropane	ug/L	1	UJ	CCV<LCL
TW01-082417	SW8260C	Acetone	ug/L	3.89	U	TB<RL, AB<RL
TW01-082417	SW8270DSIM	2-Methylnaphthalene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Acenaphthene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Acenaphthylene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Anthracene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Benzo (a) anthracene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Benzo (a) pyrene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Benzo (b) fluoranthene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Benzo (g,h,i) perylene	ug/L	0.0272	UJ	Sur<LCL

Table 3
Qualified Data
2017 Groundwater Investigation, Dow Waterloo

Sample ID	Method	Analyte	Units	Final Result	Final Flag	Reason
TW01-082417	SW8270DSIM	Benzo(k)fluoranthene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Chrysene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Dibenzo (a,h) anthracene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Fluoranthene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Fluorene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Indeno (1,2,3-c,d) pyrene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Naphthalene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Phenanthrene	ug/L	0.0272	UJ	Sur<LCL
TW01-082417	SW8270DSIM	Pyrene	ug/L	0.0272	UJ	Sur<LCL

Validation Reasons:

AB<RL	The analyte was detected in the ambient blank at a concentration less than the reporting limit
AB>RL	The analyte was detected in the ambient blank at a concentration greater than the reporting limit
CCV<LCL	Continuing calibration verification recovery was less than criteria
CCV>UCL	Continuing calibration verification recovery was greater than criteria
D_MET>T_MET	Dissolved concentration greater than total concentration
FD>RPD	The relative percent difference exceeded control limits in the field duplicate pair.
HTp>UCL	The preparatory hold time criteria was exceeded
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 recovery was less than the lower control limit
MS>UCL	The matrix spike recovery was greater than the upper control limit
SD<LCL	The matrix spike duplicate recovery was less than the lower control limit
Sur<LCL	The surrogate recovery was less than the lower control limit
TB<RL	The analyte was detected in the trip blank at a concentration less than the reporting limit