AECOM Environment

Prepared for:
NYSDEC
625 Broadway Ave
Albany, NY

Prepared by:
AECOM
Chelmsford, MA
60301432
December 2013

Periodic Review Report – 2013
Former Ward Products Site
Amsterdam, New York
Site # 429004

AECOM Environment

Prepared for:
NYSDEC
625 Broadway Ave
Albany, NY

Prepared by:
AECOM
Chelmsford, MA
60301432
December 2013

Periodic Review Report – 2013
Former Ward Products Site
Amsterdam, New York
Site # 429004

Prepared By Laura Warren

Reviewed By Scott Underhill

Contents

List of Appendices

List of Figures

Engineering Certification

I, Scott A. Underhill, certify that I am currently a NYS registered professional engineer and that this Periodic Review Report for the Former Ward Products Site (Site No. 4-29-004) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

For each institutional or engineering control identified for the Site, I certify that all of the following statements are true:

(a) The institutional control and/or engineering control employed at this Site is unchanged from the date the control was put in place, or last approved by DER.

(b) Nothing has occurred that would impair the ability of such control to protect public health and the environment.

(c) Nothing has occurred that would constitute a violation or failure to comply with any Site Management Plan for this control.

(d) Access to the Site will continue to be provided to DER to evaluate the remedy, including access to evaluate the continued maintenance of this control.

Respectfully submitted,

AECOM Technical Services Northeast, Inc.

Scott Underhill
Registered Professional Engineer
New York License No. 075332

12-9-13
Date

Executive Summary

The Former Ward Products Site (Site) is located in Amsterdam, Montgomery County, NY (Figure 1). This Periodic Review Report (PRR) includes historical information, and all groundwater monitoring well data for the period of December 1, 2012 through November 30, 2013.

The Site was a former car antenna manufacturer. As part of the manufacturing process, small metal parts were cleaned with solvents (vapor degreasing) prior to electroplating operations using nickel/chromium, zinc/cyanide, and cadmium/cyanide lines. The Site encompasses approximately 8.6 acres and is located within an active industrial park. The Site was added by the New York State Department of Environmental Conservation (NYSDEC) Registry of Inactive Hazardous Waste Sites as a Class 2a site (Site # 4-29-004). A remedial investigation was performed on the Site between 1997 and 2005, and a feasibility study was performed in 2006.

A Record of Decision (ROD) was issued in March 2007. Under the ROD the remedial activities for the Site included In-Situ Chemical Oxidation (ISCO) with a supplemental Ground Water Extraction and Treatment System (GWETS), clean-up and maintenance of the downstream sediment basins, continued operation of the Sub-Slab Depressurization System (SSDS) when the building is occupied, unless future data warrants otherwise, and the implementation of a Site Management Plan (SMP).

Contaminated sediment was removed from the drainage ways downgradient from the Site between December 2008 and February 2009 in which approximately 3,475 tons of impacted sediments were removed. An SMP was developed for the Site and approved by the NYSDEC in March 2011. In August 2011 an Environmental Easement (EE) was recorded; the EE defines and regulates approximately 2.49 acres of the Site as Controlled Property. In March 2012, the NYSDEC issued a Certificate of Completion, documenting that the cleanup activities had been completed and that the Site activities had shifted to long term monitoring. A copy of the Certificate of Completion can be found as an appendix to the 2012 PRR.

A total of 13 groundwater wells were sampled in May and August 2013. Volatile Organic Compounds (VOCs) were detected in 9 of the 13 wells and chromium levels that exceeded the Ambient Water Quality Standards (AWQS) were detected in three samples. A summary of all analytical data is in Appendix A.

The GWETS was installed on the Site consisting of a single recovery well and a groundwater treatment system in June 2009. ISCO injections utilizing potassium permanganate was conducted on June 15, 2009 and May 10, 2010. The GWETS was enhanced in August 2012 by installation of a second recovery well.

Quarterly effluent sampling of the discharge from the GWETS is conducted in accordance with the City of Amsterdam's Publically Owned Treatment Works (POTW) Permit issued in April of 2009 and renewed in October of 2011. The GWETS is inspected on a regular basis and copies of system inspection records and repairs are stored in the on-site treatment shed.

Annual sediment basin inspection was performed in August 2013 in accordance with the SMP. The specific results of that inspection can be found in Section 2.2.2.3.

Recommendations for the Site include continuing the semi-annual groundwater monitoring, annual sediment basin inspections, continuing to operate the GWETS and overall Site inspections as required by the SMP. In the event that the building is occupied, operation of the SSDS will be conducted if necessary.

1.0 Site Overview

The periodic review process is used for determining if a remedy is properly managed, as set forth in Site documents, and if the remedy is protective of human health and the environment. This Periodic Review Report (PRR) includes historical information, and all groundwater monitoring well data for the period of December 1, 2012 through November 30, 2013.

This PRR has been prepared to evaluate the overall effectiveness of the existing remedies and their performance at the Site. AECOM Technical Services, Inc. (AECOM) monitors the Former Ward Products Site (Site) for the New Water Realty Corporation (NWR). The Site is located at 61 Edson Street in the Amsterdam Industrial Park, Amsterdam, NY in Montgomery County. The Site is listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State as Site Number 4-29-004 by the NYSDEC and was the subject of Orders on Consent Index #W4-0762-96-06 and #A4-0588-0507 between NWR and NYSDEC. An SMP was developed for the Site and approved by the NYSDEC in March 2011, and subsequently revised and re-approved by the NYSDEC in July 2011. On August 25, 2011 an EE for the Site's Controlled Property was recorded under instrument No. 2011-43591 in the Montgomery County Clerk's Office. A Certificate of Completion (COC) was issued by the NYSDEC in March of 2012 classifying the Site as Class 4. Class 4 is defined as being properly closed but requires on-going management.

The Site is near the eastern boundary of the City of Amsterdam within the Town of Amsterdam, approximately 3,300 feet northeast of the Mohawk River. The Site encompasses approximately 8.6 acres and includes a 69,556 square foot single story building, a large paved parking lot, lawn areas, and approximately 3.5 acres of undeveloped land behind the building.

Fiber Glass Industries (FGI), a manufacturer of fiberglass insulation, occupies the property adjacent to the Site to the east. Prozone Lockers, a firm that manufactures lockers for professional sports teams, is located across Edson Street to the south (in the building formerly occupied by UCMI). A business dealing in custom horse clothing and accessories is to the west, and undeveloped land lies to the north. Other commercial businesses are located in the industrial park in the general vicinity of the Site.

A small intermittent tributary begins uphill of the Ward Products building and flows in the ditch on the eastern property line. In the past, this drainage way split into two branches, which emptied into the Mohawk River. Development of commercial property located to the south of the Ward products Site channeled the drainage from the Ward Products building into one branch.

Soils at the Site consist of glacial till atop Chuctanunda Creek dolostone bedrock. The till layer is only about two feet thick near the north end of the Ward Products building but it increases to over fifty feet thick on the property to the south. Groundwater is scarce in the glacial till geological unit, and thus only a few overburden wells have been placed on the Site. Bedrock groundwater is mostly contained in fractures and joints in the shallow bedrock. Groundwater flow is generally west-southwest of the Site.

1.1 Remedial History

The Site building was initially constructed in 1957, although expanded thereafter, and was first occupied by the Gabriel Corporation, which manufactured car antennas. Ward Products (now NWR) purchased Gabriel's operation and the Site in 1959. As part of the manufacturing process, small metal parts were cleaned with solvents (vapor degreasing) prior to electroplating operations using nickel/chromium, zinc/cyanide, and cadmium/cyanide lines.

Between 1957 and 1973, untreated electroplating bath solutions containing chromium, zinc, cadmium, and nickel, and the degreasing solvent trichloroethene (TCE), were discharged to the nearby drainage ditch east of the Ward Products building. From 1973 through 1985, operations pretreated the plating solutions from the nickel/chromium line and dried the resulting sludge on an outdoor concrete pad prior to removal for off-site disposal. The spent cadmium/cyanide plating solution was discharged to an outdoor tank for both natural and mechanical evaporation and off-site disposal of the remaining sludges. The zinc/cyanide line was discontinued in 1973.

Ward Products connected to Amsterdam's sewer system in 1983 and then discontinued the vapor degreasing system. All electroplating operations at the Site were discontinued in 1985. In 1988 and 1989, the plant expanded with a new grinding shop built over the former sludge drying pad and a new warehouse area built to the north. The expansion of the manufacturing building over this area has eliminated some of the contaminant mass during removal of soil during the construction of the building footers and reduced the potential for migration of and exposure to the residuals remaining. The soils from the former sludge drying pad were excavated during the building expansion, stockpiled, and then removed from the Site during a subsequent Interim Remedial Measure (IRM).

In 1985, NYSDEC first listed the Site as a Class 2a site in the Registry of Inactive Hazardous Waste Disposal Sites in New York (the Registry). Class 2a was a temporary classification assigned to a site that had inadequate and/or insufficient data for inclusion in any of the other classifications.

A hydrogeologic investigation of the Site took place in 1986 and again in 1988. The 1988 investigation included excavation of test pits east and southeast of the former electroplating and treatment operations. Surface water and sediment samples were collected from the drainage ditch. Shallow soil samples were also collected from beneath the sludge drying pad and analyzed for metals and Volatile Organic Compounds (VOCs). In 1989, NYSDEC listed the Site as a Class 2 site in the Registry. Class 2 is where hazardous waste presents a significant threat to the public health or the environment and action is required. Further hydrogeologic investigation of the Site in 1996 included the installation of four groundwater monitoring wells and additional sediment sample collection from the drainage ditch.

In 1997 Ward Products removed and properly disposed of offsite 30 cubic yards (CY) of contaminated soil stockpiled during the plant expansion of 1988-1989. This soil exceeded the Toxicity Characteristics Leaching Procedure (TCLP) standard for cadmium and contained high concentrations of other electroplating-related materials.

In 1999, 15 CY of soil were excavated and properly disposed of offsite adjacent to the Ward Products building in the vicinity of the fenced-in transformers. The soil contained low concentrations of polychlorinated biphenyls (PCBs) as well as electroplating materials.

The Ward Products facility connected to the municipal sewers in 1983, the main effluent pipe, previously used to discharge plant effluent to the ditch on the eastern property line, was utilized to

direct stormwater runoff from the roof away from the building. However, examination of the inside of the pipe revealed sediment deposits which contained significantly elevated metals and VOC concentrations. This sediment was removed in an IRM in 2000 and was properly disposed of offsite.

In 2004, 700 tons of contaminated soil around the Ward Products building and 350 tons sediment from the on-site and off-site drainage ditch were removed and properly disposed of offsite.

In 2005, mitigation measures were taken at the Ward Products building to address current human exposures (via inhalation) to VOCs associated with soil vapor intrusion. A sub-slab depressurization system (SSDS) was installed to create a negative pressure gradient below the slab, thus minimizing infiltration into the building.

The ROD was issued in March 2007 and included a summary of the remedial investigations, Site geology and hydrogeology, nature and extent of the contamination, IRMs, human exposure pathways, and environmental impacts. The components of the remedy are as follows:

- Removal of approximately 400 CY of contaminated sediments from the eastern branch of the tributary draining from the Site. Removal of 700 CY of contaminated sediment from the Mohawk River at the mouth of the eastern branch of the tributary.
- Construction of two sediment collection basins: one immediately north of the CSX railroad tracks on the east branch, and one immediately north of the rail spur on the west branch.
- Pilot testing of potassium permanganate injection into the bedrock aquifer followed by full scale implementation of potassium permanganate injection into the bedrock aquifer.
- Drilling of a recovery well at a central location on the Site. Extracted groundwater is pumped to a GWETS, where VOCs will be reduced through the use of an air stripper.
- Maintaining the existing cover system to restrict exposure to impacted materials below the soil cover or building (removal of the contaminated soils from beneath the building will be required when they become accessible).
- Development and implementation of a Site Management Plan (SMP) for long-term management of remaining contamination as required by the EE, which includes plans for institutional and engineering controls (IC/EC), monitoring, operation and maintenance, and reporting.
- On-site and off-site inspections, sampling and corrective actions, occurring and certified at a frequency and in a manner defined in the SMP.
- On-site environmental treatment and monitoring devices inspected, protected, repaired, and replaced as necessary to ensure continued functioning in the manner specified in the SMP.
- Periodic certification of the ICs and ECs.

After the ROD was issued, the following activities were performed:

- Approximately 3,475 tons of metals impacted sediments were removed from the drainage ways downgradient from the Ward Product Site from December 2008 to February 2009. The sediment and soil remediation was performed in general accordance with the ROD (March 2007), Order on Consent (Index #A4-0588-0507, June 2007), and the Remedial Design/Remedial Action Work Plan (December 2007). All soils within the removal limits

indicated in the feasibility study and ROD were removed during the remediation, however some impacted material above LEL and SEL remains in the drainage areas. These areas have been capped with at least 18 inches of clean soil or 12 inches of armor stone to prevent or minimize exposures to and/or erosion of soils containing Site related contaminants. The sediment and soil remediation also included the construction of two sediment basins, one along the east branch drainage and one along the west branch drainage. All excavated sediment was properly disposed offsite.

- A GWETS was installed outside the southeast portion of the Ward Products building located on 61 Edson Street to reduce on-site source of contaminants in groundwater and to reduce future migration from the Site. The system was installed in June 2009 and began operation on June 15, 2009. (The GWETS has since been enhanced by installation of a second recovery well).
- A limited ISCO program was implemented to reduce TCE concentration within the area of MW-4R, MW-6, and MW-10, in accordance with the feasibility study, the ROD, and the Order on Consent of July 2007. The first two ISCO injections were performed the weeks of June 15, 2009 and May 10, 2010. During the first injection, each injection well (IW-01 through IW-04) was injected with 25 lbs of potassium permanganate. During the second ISCO injection, each well (IW-01, MW-4R, MW-6, and MW-10) was injected with approximately 20 lbs of potassium permanganate Based upon the results of the two full scale injections, it was determined that the third round would not be effective and with NYSDEC approval, was eliminated from the program.
- A SMP was developed for the Site and approved by the NYSDEC in February 2011. A revision to the SMP was submitted to the NYSDEC on July 26, 2011 that would allow future use of the Site to be either commercial or industrial. The revision was approved by the NYSDEC on July 27, 2011.
- On August 25, 2011 an EE for the Site's Controlled Property was recorded under instrument No. 2011-43591 in the Montgomery County Clerk's Office.
- A COC was issued by the NYSDEC in March of 2012.
- In accordance with the SMP, the following activities were performed:
    - Performed quarterly sampling of the GWETS effluent in accordance with the City of Amsterdam's POTW Permit.
    - Performed semi-annual groundwater sampling of 13 monitoring wells in May and August 2013.
    - Inspected the sediment basins in August 2013 in accordance with the SMP.
    - No inspection of the SSDs was performed since the building was unoccupied and the system was not operating.
    - Specific details of each of the IRMs are attached to the PRR submitted in 2012.

1.1.1 Groundwater Monitoring

Groundwater monitoring of the Site includes sampling of 13 wells for VOCs, total chromium and hexavalent chromium. See Figure 2 for groundwater monitoring well locations. Sampling occurred at the Site in May and August 2013.

In addition to collecting groundwater samples, depth-to-groundwater and water quality parameters are measured and recorded for all 13 wells. Water quality parameters, which include temperature, specific conductivity, conductivity, pH, turbidity, dissolved oxygen (DO), oxygen-reduction potential (ORP), color, and odor, are measured with a water quality meter (e.g., YSI-556). The depth-to-groundwater measurements are used to calculate groundwater elevations and develop contour maps.

All groundwater samples, including a blind field duplicate, were sent to Adirondack Environmental Services, Inc., a New York certified laboratory, utilizing standard chain-of-custody and quality assurance/quality control (QA/QC) procedures. QA/QC procedures include the addition of a trip blank with every shipping container (i.e., cooler) with VOC samples and a matrix spike/matrix spike duplicate with all sample delivery groups. Data from all sampling events are used to evaluate the post remedial aquifer conditions. In addition, analytical data for the constituents of concern (COCs) in the groundwater at the Site are tabulated after each sampling event to assess the effectiveness of the selected remedy for the Site. All monitoring data is compared to the NYS Ambient Water Quality Standards (AWQS) and Guidance Values (GV). All groundwater analytical data can be found in Section 2.0.

1.1.2 Groundwater Extraction and Treatment System Sampling

Sampling of the on-site GWETS includes quarterly sampling of the effluent from the GWETS for chromium, TCE, and pH. Sampling is conducted in accordance with the City of Amsterdam issued Publically Owned Treatment Works (POTW) Permit.

1.1.3 Sediment Basin Monitoring

Each of the three sediment basins downgradient from the Site, Sam Stratton Rd., Chapman Street, and Rt. 5 is inspected annually and subsequent to any emergency which might affect them (such as might occur after an extraordinary rain event), in accordance with the SMP. Inspection frequency is subject to change with the approval of the NYSDEC. The inspection will consist of an assessment of the annual (since the last inspection) and total accumulation of sediment within the basins and the overall functionality of the basins. If the annual accumulation in a basin exceeds 4 inches or if there is a total accumulation in the basin exceeding 18 inches (all measured from the basin bottom at the end of the 2009 Sediment projects), then sediment samples will be collected from the top 4 inches of sediment. The sediment samples will be analyzed for cadmium, chromium, nickel and zinc. In case of the smaller basins (Route 5 Basin and Chapman Drive Basin), all sediments will be removed and in case of the bigger basins, sediments from the zone sampled will be removed and disposed offsite if:

- There is 18 inches of accumulated sediment and the sample results are above LEL, or
- Sample results are above the SEL.

1.1.4 Sub-Slab Depressurization System

Currently, the building located on the Site is not occupied; therefore, no operation or inspection of the SSDS was required.

2.0 Evaluate Remedy Performance, Effectiveness, and Protectiveness

2.1 IC/EC Report

The Site is located in the City of Amsterdam, Montgomery County, State of New York. The Site consists of one parcel with an area of 8.6 acres located at 61 Edson Street. The Recorded Owner is New Water Reality (NWR).

During the reporting period, the Site property was not sold, subdivided, merged, did not undergo a tax map amendment, and was not issued any federal, state, and/or local permits and is unoccupied.

The institutional controls (ICs) reported by the NYSDEC and included for evaluation in this PRR are:

- Environmental Easement.

The engineering controls (ECs) reported by the NYSDEC and included for evaluation in this PRR are:

- Existing cover system to restrict exposure to impacted materials below the soil cover or building.
- Continued operation of the SSDS at the Site whenever the building is occupied, unless future data warrants otherwise.
- Continued operation of the GWETS.

During the reporting period, the current use of the Site was consistent with the ICs imposed on the property.

The EE was signed between NWR and the NYSDEC on August 11, 2011 and filed with the Montgomery County Clerk's office on August 25, 2011. A copy of the EE can be found as an appendix to the 2012 PRR report.

An annual inspection of the ECs occurred on August 26, 2013. All ECs on the Site have been unchanged since the date the controls were implemented or approved by the NYSDEC. Photographs of the sediment basin inspection are included as Appendix B.

A SMP was developed for the Site and approved by the NYSDEC in February 2011, and revised and re-approved in July 2011.

2.2 Monitoring Plan Compliance

2.2.1 Confirmation Compliance with Site Management Plan

The SMP, which was approved by the NYSDEC in February 2011 and subsequently revised and re-approved in July 2011, established a sampling and monitoring program that requires the monitoring of the GWETS effluent, groundwater sampling, and sediment basin inspections.

Activity	Required Frequency (X)			Compliance Dates
	Quarterly	Semi-Annually	As Required	
GWETS Effluent	X			2012-2013
Groundwater Sampling		X		2013
Sediment Basin			X	2013
Sub-Slab Depressurization System				As Required

2.2.2 Confirm that Performance Standards are Being Met

2.2.2.1 GWETS Influent and Effluent Monitoring

Quarterly Monitoring of the GWETS System occurred in November/December 2012 and February, May, and September 2013. The system effluent discharging to the City of Amsterdam's POTW is being monitored in accordance with the POTW permit dated April 1, 2009 and renewed in October 2011. The limits are set by the permit to ensure that the integrity of the City's waste water treatment plant is not compromised. A list of protocols and sampling frequencies are included below:

Parameter	Frequency	Sample Type	Limit
Flow, gpd	Continuous	Meter	Average not to exceed 20,000 gpd
pH	Quarterly	Grab	6.0 - 9.0
Trichloroethene	Quarterly	Grab	Monitor Only
Chromium	Quarterly	24 hr. composite	10 mg/L

Influent and effluent samples were collected on: February 22, 2013; May 14, 2013; and September 20, 2013. In addition, split samples were collected with the City of Amsterdam POTW on December 20, 2012 (the original 4th quarter 2012 samples were collected on November 29, 2012). In addition to the effluent samples listed above, influent samples are collected from each of the recovery wells (RW-01 and RW-02) and the combined influent. The results of the quarterly sampling are presented below. All required monitoring parameters were within the constraints of the POTW Permit.

	Influent			Effluent			Quarterly Flow
Parameter	**pH**	**TCE**	**Chromium**	**pH**	**TCE**	**Chromium**	
Units	SU	mg/L	mg/L	SU	mg/L	mg/L	gallons
Limits	n/a	n/a	n/a	6.0 - 9.0	Monitor	10	--
4Q2012 (sampled 11/29/12)	7.3	2.4 (RW-1) 0.75 (RW-2)*	0.009	8.1	<0.001	0.007	RW-01: 2,663,723 RW-02: 708,300
Split sample (12/20/12)	NS	NS	NS	8.2	<0.001	0.009	NA
1Q2013 (sampled 2/22/2013)	7.3	1.6 (comb.) 3.2 (RW-01) 1.4 (RW-02)	0.010	8.1	0.027	0.010	RW-01: 2,776,306 RW-02: 1,281,850

	Influent			Effluent			Quarterly Flow
Parameter	**pH**	**TCE**	**Chromium**	**pH**	**TCE**	**Chromium**	
Units	SU	mg/L	mg/L	SU	mg/L	mg/L	gallons
Limits	n/a	n/a	n/a	6.0 - 9.0	Monitor	10	--
2Q2013 (sampled 5/14/2013)	7.3	2.0 (comb.) 2.6 (RW-01) 1.4 (RW-02)	0.008	8.0	0.110	0.005	RW-01: 2,913,340 RW-02: 1,831,050
3Q2013 (sampled 9/20/2013)	7.3	1.7 (comb.) 2.4 (RW-01) 1.6 (RW-02)	0.005	7.8	0.510	0.006	RW-01: 3,030,256 RW-02: 2,332,800

NS – Not sampled
NA – Not applicable
* For the 4Q2012 (11/29/2012) sampling event, a combined influent sample was not collected.

Using the quarterly flow volumes and the influent concentrations of TCE, the estimated mass of TCE removed from system startup (June 2009) through September 2013 is 119 pounds, as shown below.

Event	Flow Volume (gallons)	Influent TCE (mg/L) [1]	Mass of TCE Removed (lbs) [2]
2009q2	1,700 [a]	NS	NC
2009q3	22,060 [b]	6.05 [c]	1.1
2009q4	258,080	3.9 [d]	8.4
2010q1	334,680	3.8	10.6
2010q2	153,080	3.2	4.1
2010q3	159,350	2.9	3.9
2010q4	215,800	3.6	6.5
2011q1	135,350 [e]	5.7	6.4
2011q2	284,040	7.3	17
2011q3	232,100	3.3	6.4
2011q4	263,356	2.5	5.5
2012q1	248,661	2	4.2
2012q2	208,383	2.2	3.8
2012q3	328,594	2.8	7.7
2012q4 (RW-01) (RW-02)	104,229 528,000	2.4 0.75	2.1 3.3
2013q1 (RW-01) (RW-02)	112,583 573,550	3.2 1.4	3.0 6.7
2013q2 (RW-01) (RW-02)	137,034 549,200	2.6 1.4	3.0 6.4
2013q3 (RW-01) (RW-02)	116,916 501,750	2.4 1.6	2.3 6.7
		Total Mass TCE Removed:	**119**

Notes:
[1] Combined influent TCE concentration, unless otherwise indicated.

[2] Estimated VOCs removed (lbs) = volume water pumped (gal) x TCE influent concentration (mg/L) x conversion factor (8.35 x 10-6 lb*L/gal*mg).
NS - not sampled
NC - not calculated
[a] 2009q2 - Flow volume is estimated.
[b] 2009q3 - flow volume is estimated, system was offline from June through mid-August 2009.
[c] 2009q3 - TCE is average of 2 sample results from August 2009.
[d] 2009q4 - TCE is average of 2 sample results from September and October 2009.
[e] 2011q1 - Flow is a minimum estimated value because flow meter was damaged by freezing conditions, and replaced in early February 2011.

The mass of TCE removed per quarter has fluctuated since system start up. As shown in the table above, the addition of RW-02 has significantly increased the mass of TCE removed. RW-02 is extracting 4-5 times the volume of RW-01 and removing 1.5-2.9 times the mass of TCE.

2.2.2.2 Groundwater Monitoring

A long term groundwater monitoring program has been established to monitor the extent of the groundwater contamination and to determine the effectiveness of the groundwater remedy. In May and August groundwater samples were collected from a subset 13 monitoring wells of the existing 22 monitoring wells per the SMP. The selected monitoring wells, well type, and sampling rationale are included below:

Monitoring Well	Well Type	Rationale
MW-1R	Bedrock	Along plume centerline; upgradient of source
MW-4	Overburden	In overburden above source area
MW-4R	Bedrock	Source area well
MW-10	Bedrock	Along plume centerline; downgradient of source
MW-11	Bedrock	Upgradient sentinel well
MW-13	Bedrock	Along plume centerline; downgradient of source
MW-14	Bedrock	Downgradient sentinel well
MW-15	Bedrock	Downgradient sentinel well
MW-16	Bedrock	Downgradient sentinel well
MW-17	Bedrock	Along plume centerline; downgradient of source
MW-18	Bedrock	Downgradient sentinel well
MW-19	Bedrock	Downgradient sentinel well
MW-20	Bedrock	Downgradient sentinel well

Field Activities

On May 14-16 and August 26-29, 2013, water levels were measured at 22 monitoring wells and groundwater quality samples were collected from the 13 monitoring wells, as specified under the SMP. Copies of the field sheets for the May and August sampling events are provided in Appendix C.

Prior to sampling the wells, depth to groundwater was measured at the 22 Site monitoring wells and the recovery wells (RW-01 and RW-02) using a water level indicator. (Please note depth to water in

RW-02 could not be measured during the May event due to obstruction of the riser by the extraction pump hoses and wires.) The depth to groundwater and the elevation of groundwater in each of the wells for the May and August sampling events are summarized in Appendix A, Table A-1.

The 13 monitoring wells were purged and sampled with a submersible pump using methods specified by the United States Environmental Protection Agency (USEPA) for low flow/low stress sampling [USEPA, 2010]. For each well, the intake of the pump was lowered to the middle of the screened interval and water was then pumped at a low flow rate to match the well infiltration rate, with a maximum flow rate of 0.5 liters per minute. Purge water was pumped through an in-line water quality meter to establish that stabilization of the groundwater had occurred prior to sample collection. Water quality readings were documented approximately every five minutes. Stabilization parameters included pH, conductivity, temperature, dissolved oxygen (D.O.), oxidation reduction potential (ORP), and turbidity were recorded on the field notes in Appendix C.

Samples from the May and August sampling events were analyzed by a New York State Department of Health Environmental Laboratory Approval Program (NYSDOH ELAP) certified laboratory, Adirondack Environmental Services, Inc., for VOCs by EPA Method 8260B, total chromium by Method E200.7, and hexavalent chromium by method SM3500-CR. The groundwater samples results for the primary constituents of concern are tabulated and shown in Appendix A, Table A-2.

During both the May and August sampling event, a duplicate sample (DUP) was collected from monitoring well MW-18 for quality assurance/quality control (QA/QC). Trip blanks were also submitted during both sampling events for analysis of VOCs.

Groundwater Flow Direction

Groundwater elevation contours for the bedrock aquifer based on May and August measurements are shown in Figures 3 and 4, respectively. Graphs of groundwater elevation and TCE over time are presented in Appendix D.

The May and August 2013 bedrock groundwater elevation contours indicate that groundwater flow in the bedrock south of the Ward Products property is to the south-southeast. In the western portion of the property, groundwater flow in the bedrock is to the west-southwest at a much shallower gradient than the rest of the property.

On the property, the effect of the recovery well RW-01 is evident by the cone of depression shown immediately to the south-southeast of the building, as seen in the May 2013 contours in Figure 3. The radius of influence of that recovery well is limited to approximately 40 to 80 feet, and the drawdown at that recovery well is approximately 40 feet. During the August 2013 event, RW-01 was not actively pumping at the time of well gauging as shown by the lack of a cone of depression in Figure 4. (Once the well is drawn down and the pump shuts off, based on a decrease in amp load on the motor, the controls will not let the pump restart for a set period of time to allow the well to recharge so that the pump can operate more efficiently).

A larger radius of influence is seen for recovery well RW-02, which was installed in late August 2012. Figures 3 and 4 show a cone of depression extending to the west of RW-02 approximately 300 feet. The influence of RW-02 on the bedrock groundwater extends potentially as far west as well MW-18 and as far south as MW-16. As seen in the groundwater elevation graphs in Appendix D, significant drawdown (roughly 10-20 feet) is seen at the wells closest to RW-02 (MW-9, MW-10, and MW-13)

and extending to MW-17. Less drawdown (roughly 5-10 feet) is seen upgradient from RW-02 at wells MW-4R, MW-6 and MW-7, to the northwest at MW-12 and MW-18, and to the southwest of RW-02 at MW-16. Well MW-8 (upgradient of RW-02) shows less influence from pumping at RW-02 (<5 feet of drawdown), even though this well is close to wells MW-4R, MW-7 and MW-9 which show more significant drawdown. Wells MW-14 and MW-19 may show some influence from pumping at RW-02 (3-5 feet of drawdown). However, MW-15 and MW-20 do not appear influenced by pumping at RW-02. The influence of RW-02 on groundwater flow will be evaluated as more rounds of groundwater elevation data are collected.

The addition of groundwater extraction well RW-02 has resulted in an improved radius of influence for the GWETS that extends along and across Edson Street on to the ProZone Lockers property and has the potential to capture impacted groundwater that has migrated to this adjacent property.

Groundwater Analytical Results

A summary of the May and August 2013 concentrations of TCE and total and hexavalent chromium (the primary constituents of concern) are provided in Appendix A, Table A-2. The results of laboratory analyses (over time) for select constituents in the 13 wells sampled under the SMP are summarized in Appendix A, Table A-3. The Form 1 laboratory data sheets for the May and August 2013 events were submitted to NYSDEC under separate cover on July 29 and October 21, 2013, respectively. TCE isoconcentration contours for the bedrock aquifer based on May and August 2013 measurements are shown in Figures 5 and 6, respectively. Appendix D presents graphs of TCE and groundwater elevation trends in the Site monitoring wells.

Volatile Organic Compounds

In May 2013, VOCs were detected in 9 of the 13 wells sampled, and in August 2013 they were detected in 6 of the wells sampled. TCE continues to be the predominant VOC detected in the groundwater both on- and off-site. In addition, chloroform, 1,1-dichloroethene (DCE), cis-1,2-DCE, and trans-1,2-DCE were detected infrequently at low concentrations in both the May and August events. Tetrachloroethene (PCE) was detected in well MW-4R at elevated concentrations in both the May and August 2013 sampling events.

On-Site Monitoring Wells

Five on-site monitoring wells are sampled: four bedrock wells (MW-1R, MW-4R, MW-10, and upgradient well MW-11) and one well (MW-4) that is mostly screened in overburden (5 feet into bedrock).

The highest TCE concentrations are typically detected in the on-site monitoring wells, particularly MW-4R (12,000 µg/L in May 2013, and 27,000 µg/L in August 2013). These concentrations are somewhat lower than those observed in 2012 but are within the range of historically observed concentrations for this well (see Appendix A, Table A-3 and the graphs in Appendix D).

As shown on Figures 5 and 6, TCE concentrations decrease by two to three orders of magnitude to the north at well MW-1R and downgradient to the west-southwest at MW-10. The concentrations in MW-1R are consistent with historical results (see Appendix A, Table A-3 and Appendix D). Well MW-10 was used for injection of permanganate in the May 2010 ISCO event and is located approximately 35 feet northwest of RW-02, and has exhibited a decreasing trend in TCE concentration since then.

The upgradient well (MW-11) continues to be non-detect for TCE.

Overburden well MW-4, which is adjacent to MW-4R and screened 5 feet into bedrock, had TCE concentrations in 2013 which are similar to TCE concentrations historically observed in this well (see Appendix A, Table A-3 and Appendix D). TCE concentrations in this well are typically in the hundreds of µg/L, with occasional spikes an order of magnitude higher (e.g., September 2002 at 6,000 µg/L; September 2005 at 20,000 µg/L; August 2007 at 6,600 µg/L; August 2010 at 5,500 µg/L; and August 2012 at 1,900 µg/L). These spikes correlate to low groundwater elevations measured in this well, when the water table is at or below the top of bedrock (approximately 461 feet msl) (see the graph in Appendix D).

Off-Site Monitoring Wells

Off-site monitoring wells include one cross-gradient well (MW-18) and seven downgradient wells (MW-13, MW-14, MW-15, MW-16, MW-17, MW-19, and MW-20).

As shown on Figures 5 and 6, the TCE plume extends to wells MW-13 and MW-17 on the ProZone Lockers property. TCE concentrations at these two wells were lower than in the 2012 sampling events, but were consistent with historical results (see Appendix A, Table A-3 and Appendix D). As discussed above, operation of the second recovery well (RW-02) is providing groundwater capture at these two wells, and may be influencing TCE concentrations at these two wells. The effects of ongoing groundwater extraction on TCE concentrations at these wells will continue to be evaluated during future groundwater monitoring events.

Cross-gradient well MW-18, which is located on the Bush Millworks property, exhibits occasional low TCE detections above the NYSDEC Ambient Water Quality Standard (AWAWQS) of 5 µg/L (see Appendix A, Table A-3 and Appendix D). However, in 2013, TCE was not detected in MW-18 above the NYSDEC AWQSAWQS. As discussed above, operation of the second recovery well (RW-02) is exerting some influence on water levels at this well, and its effect on TCE concentrations will continue to be evaluated during future groundwater monitoring events.

Figure 5 shows that detections of TCE slightly above the NYSDEC AWQSAWQS extended to wells MW-16 and MW-19 in May 2013; however, the August 2013 results for these wells were below the NYSDEC AWQS (Figure 6). As shown on Appendix A, Table A-3 and the graphs in Appendix D, these wells experience sporadic detections of TCE above the NYSDEC AWQSAWQS, and there does not appear to be a correlation between these detections of TCE and high or low groundwater elevations in these wells. As discussed above, MW-16 is experiencing some influence from the new extraction well that may extend to MW-19.

As shown in Figures 5 and 6, TCE was not detected in 2013 in wells MW-14, MW-15, and MW-20, which represent the downgradient limits of TCE impacts. TCE has been sporadically detected in these wells above the NYSDEC AWQS (see Appendix A, Table A-3 and Appendix D). Operation of RW-02 is expected to provide capture of impacted groundwater from areas upgradient of these two wells, and the effect on TCE concentrations at these wells will continue to be evaluated during future groundwater monitoring events.

Chromium

Groundwater samples were analyzed for hexavalent and total chromium in 2013 (Appendix A, Table A-2).

In 2013, hexavalent chromium was only detected in one well above the NYSDEC AWQS of 0.05 mg/L (MW-1R at 0.08 mg/L in May and 0.2 mg/L in August). These results are consistent with the historical hexavalent chromium results for well MW-1R, as shown on Appendix A, Table A-3.

Total chromium was detected above the NYSDEC AWQS of 0.05 mg/L in two wells in May 2013 (MW-1R at 0.117 mg/L, and MW-4R at 0.122 mg/L) and one well in August 2013 (MW-1R at 0.195 mg/L). Total chromium was detected in MW-4R in August 2013 at a concentration below the NYSDEC AWQS. The detections in well MW-1R for May and August 2013 are consistent with historical results.

For MW-4R, total chromium was first detected above the NYSDEC AWQS in the May 2012 event. Chromium was again detected above the NYSDEC AWQS in the May 2013 event. Potential trends in total chromium in MW-4R will continue to be evaluated during future groundwater monitoring events.

Chromium (hexavalent and total) was not detected at concentrations above the NYSDEC AWQS in 2013 in any of the other sampled wells.

2.2.2.3 Sediment Basin Monitoring

There are three sediment basins associated with the Site: Route 5 Area Basin, the Chapman Drive Basin, and the Sam Stratton Road Basin. These were last inspected in August 2013.

The results of the inspection indicated not more than 2 inches of new sediment accumulation in any of the three sediment basins since the last inspection in 2012. Therefore, sediment samples were not collected for metals analysis. NWR will continue to monitor the accumulation of sediment in the sedimentation basins. Photographs of each basin can be found in Appendix B.

2.2.2.4 Sub-Slab Depressurization System Monitoring

Currently the building remains unoccupied therefore no inspection of the system was required.

2.2.2.5 Site Management Periodic Review Report and IC/EC Certification Submittal

The completed Site Management Periodic Review Report and IC/EC Certification Submittal can be found in Appendix E.

3.0 Evaluate Costs

Total costs for completing the required activities associated with Site monitoring in 2013 are approximately $93,000 which includes routine Operations and Maintenance of the GWETS, Semi-Annual Groundwater Monitoring/Sampling and the submittal of the PRR. Major costs components consist of routine operation and maintenance, semi-annual groundwater monitoring/sampling and the submittal of the PRR.

4.0 Conclusions and Recommendations

This periodic review process is used to determine if the selected remedy continues to be properly managed (as set forth by the ROD), and if remedy continues to be protective of human health and the environment. This PRR is the second PRR for the Site since NYSDEC issuance of the COC and covers the period of December 1, 2012 through November 30, 2013.

4.1 Conclusions

The following conclusions discuss the effectiveness of the Site remedy in comparison to the applicable Site remedial goals derived from the ROD.

1. **Implement a remedial design program to provide the necessary details for the construction, operation, maintenance, and monitoring of the remedial program.**

   A Remedial Design/Remedial Action Work Plan was submitted to the NYSDEC (RETEC, December 2007). It has been implemented since then.

2. **Remove approximately 400 cubic yards of contaminated sediments from a 600-foot section (south of the railroad tracks) of the eastern branch of the tributary draining the Site. Additionally, 700 cubic yards of contaminated sediment will be excavated from the Mohawk River at the mouth of the eastern branch of the tributary. Two sediment collection basins will be constructed: one immediately north of the CSX railroad tracks on the east branch, and one immediately north of the rail spur (North of Chapman Street) on the west branch. An existing sediment basin exists on the east branch just south of Sam Stratton Road. The three sediment basins will be inspected annually and periodically sampled to determine if the sediment collecting in them would need to be removed for off-site disposal.**

   A sediment removal action performed between December 2008 and January 2009 removed approximately 1,600 tons of contaminated sediments. A sediment basin (Route 5 Area Sediment Basin) was constructed immediately north of the railroad tracks on the east branch in January 2009. A sediment basin (Chapman Road Area Sediment Basin) was also constructed on the west branch between January 2009 and February 2009 (AECOM, 2009). The basins have been inspected and sampled as required. Additional removal is not required.

3. **Conduct a treatability study and/or pilot study to determine the effectiveness of injection of an oxidant such as potassium permanganate into the bedrock via an existing monitoring well. Groundwater will be tested immediately before and after the injection. The information gathered during the pilot study will be used to determine the efficiency of the technology and the potential for a full-scale application. The results of the treatability study and/or pilot tests will determine the feasibility of this option.**

   A treatability study was performed during the week of June 15, 2009 to determine the effectiveness of potassium permanganate injections. Four wells were injected with 25 pounds of permanganate. The study indicated that full scale injections could be effective in reducing

the TCE concentration in the groundwater. However, after completing two full rounds of permanganate injections and based upon analytical data, it was determined that the injections did not have the anticipated result of reducing TCE concentrations in the groundwater. Based on the analytical data NWR petitioned the NYSDEC not to pursue the third round of injections and on April 4, 2012 the NYSDEC concurred. In lieu of the third round of permanganate injections, NWR enhanced the GWETS by installation of a second groundwater recovery well in August of 2012.

4. **Install a recovery well at a central location on the Site. Extracted groundwater will be pumped to a heated treatment shed, where the concentrations of VOCs will be reduced through use of an air stripper before the water is discharged to a sanitary sewer or re-injected into the bedrock.**

   A single well (RW-01) GWETS was installed outside the southeast portion of the building located on 61 Edson Street to reduce on-site source of contaminants in groundwater and to reduce future migration from the Site. The system was installed in June 2009 and started up on June 15, 2009. In August of 2012 a second groundwater extraction well was installed to attempt to reduce migration of TCE off site and piped into the existing GWETS.

5. **Following a successful pilot test, the in situ chemical oxidation will be implemented full scale in conjunction with the extraction and treatment system. The oxidant injections will be repeated as necessary as long as it remains cost effective to do so, though there will probably be no more than three events.**

   Please refer to Item 3.

6. **Imposition of an institutional control in the form of an environmental easement that will (a) limit the use and development of the property to industrial use; (b) require compliance with the approved site management plan; (c) restrict the groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) require the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.**

   An EE was approved on August 11, 2011 and filed with Montgomery County on August 25, 2011. This PRR includes the required periodic certification.

7. **Develop a site management plan which will include the following institutional and engineering controls: (a) management of the final cover system to restrict excavation below the soil cover or buildings. Excavated soil would be tested, properly handles to protect the health and safety of the workers and the nearby community, and would be properly managed in a manner acceptable to the Department. Entities responsible for maintenance of sediment basins downstream from the Site will be notified that sediment collecting in those basins may be contaminated; (b) if contaminated soils beneath the building slab ever become accessible, it will be removed and properly managed; (c) continued operation of the sub-slab depressurization system at the Ward Products building whenever it is occupied, unless future data warrants otherwise; (d) soil vapor intrusion evaluations at any buildings located above the contaminated groundwater plume if there is a change in the current use of the building; (e) monitoring of groundwater, sediment and indoor air; (f) identification of any use**

restrictions on the Site; and (g) provisions for the continued proper operation and maintenance of the components of the remedy.

The SMP was approved by the NYSDEC in March 2011. Revisions to the SMP were submitted in July 2011 and approved by the NYSDEC in July 2011. Excavation of soils for installation of the 2012 enhancement of the GWETS has occurred, was properly managed and reported to NYSDEC. No other excavation of soil cover or beneath the building has occurred. The building has been unoccupied so operation of the SSDS is not required. Monitoring has occurred as required. Use restrictions are set forth in the EE and have not been violated. Continuing components of the remedy are being properly operated and maintained as anticipated, except for isolated deviations separately reported to NYSDEC.

8. **The property owner will provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department until the Department notifies the property owner in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the Site; and (c) state that nothing has occurred that will impair the ability to the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.**

   This PRR satisfies this item.

9. **The operation of the component of the remedy will continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.**

   The GWETS installed in June 2009 is still operating to reduce on-site sources of contaminants in groundwater and to control and reduce future migration of contaminated groundwater from the Site. Based on the analytical data generated from the semi-annual groundwater monitoring, a portion of the TCE plume was not being captured by the existing groundwater extraction well. A pumping test conducted the week of July 9, 2012 utilizing injection well IW-01 determined that this well could effectively extract groundwater and increase the zone of capture and was subsequently converted to an extraction well and piped into the existing GWETS.

10. **Institute a long-term monitoring program for the Site. The monitoring well network at the Site will be sampled semi-annually to monitor the extent of the groundwater contamination. This program will allow the effectiveness of the oxidant injections and the groundwater extraction and treatment system to be monitored and will be a component of the long-term management for the Site. Sediment in the three basins will also be periodically monitored and the results will be sent to the entities responsible for maintenance of the basins.**

    A long-term monitoring program was implemented in the SMP submitted and approved in March 2011, and revised and re-approved in July 2011. A subset 13 monitoring wells have been selected out of the existing complete 22 monitoring well network for long-term

monitoring. Monitoring/inspection of the three sediment basins occurs annually with additional inspections after any emergency which might affect them (such as might occur after an extraordinary rain event).

4.2 Recommendations

The following recommendations are made for the Site:

1. Continued operation of the GWETS as outlined in the SMP and recently enhanced until further approval of, NYSDEC otherwise.
2. Groundwater monitoring should continue to be performed at the semi-annual interval established in the SMP. The sampling should include the 13 wells selected out of the existing 22 monitoring well network until further communication with, and approval of, NYSDEC otherwise. The next sampling event will be in May 2014.
3. Sediment basin monitoring should continue annually and after extraordinary rain events.
4. Perform annual site inspections as outlined in the SMP.
5. The SMP requires periodic PRRs, not annual PRRs. Given the results shown in this PRR, we recommend preparation and filing of the next PRR in December 2015 for the two year period of December 1, 2013 through November 30, 2015.

5.0 References

AECOM. 2009. Final Remediation Report, Former Ward Products Site, Amsterdam, NY. July 2009.

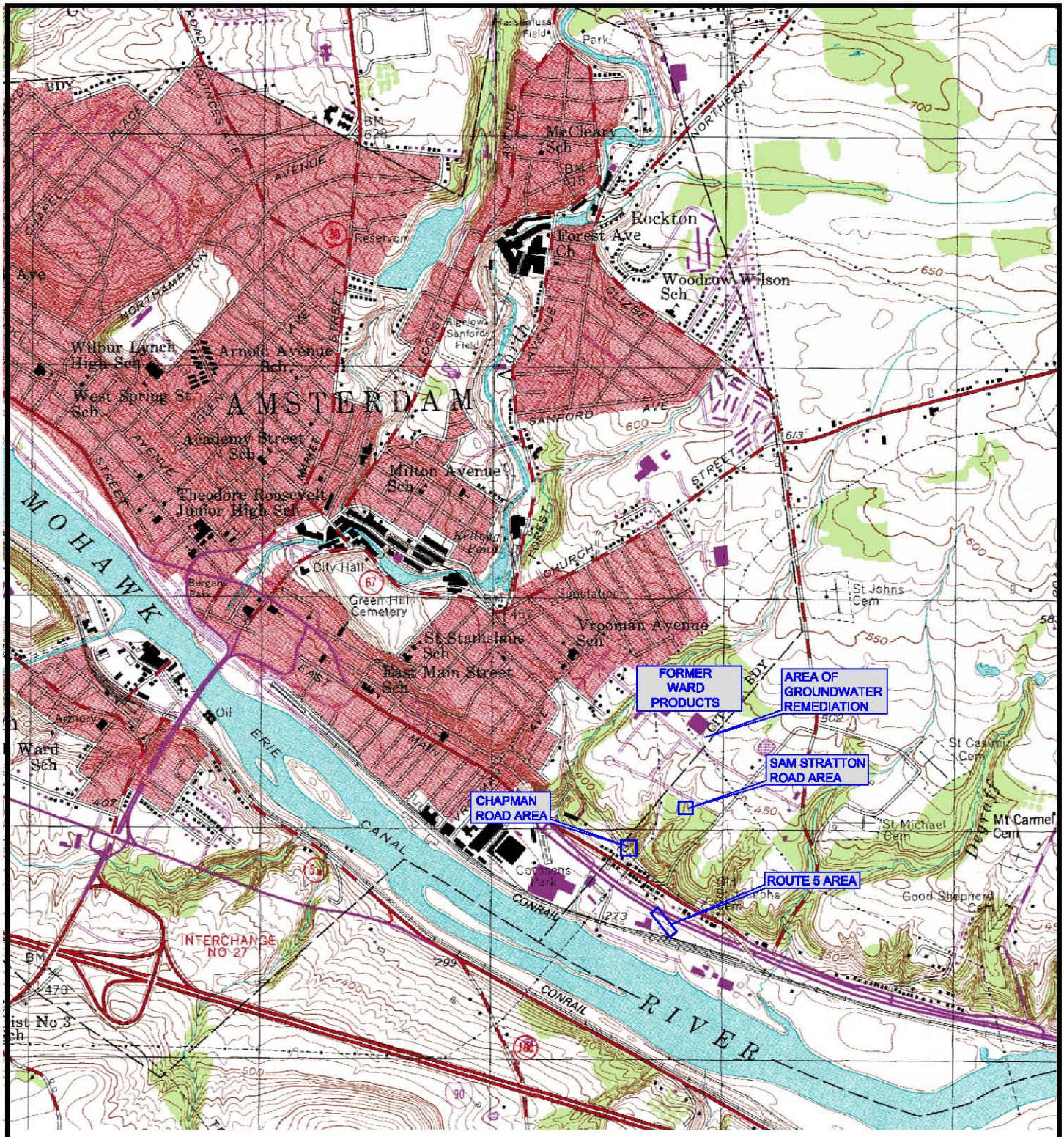
AECOM. 2010. Construction Completion Report, Ward Products Site, Amsterdam, NY. January 2010.

AECOM. 2011. Site Management Plan, Ward Products Site, Amsterdam, NY. February 2011, revised July 2011.

NYSDEC. 2007. Record of Decision. March 2007.

USEPA. 2010. Low Stress (Low Flow) Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells. EQASOP-GW-001, Rev. 3, January 19, 2010.

Figures



UNITED STATES GEOLOGIC SURVEY
AMSTERDAM QUADRANGLE
NEW YORK
7.5 MINUTE SERIES (TOPOGRAPHY)

0' 1000' 2000' 4000'

AECOM

FIGURE 1
SITE LOCATION MAP
FORMER WARD PRODUCTS

AMSTERDAM, NEW YORK

FILE NAME:	DRN	PROJECT NO.	DATE	FIGURE NO.
	KAM	60134119	11 - 2010	1

Plotted By: MeisterK
Layout-Sheet Name: 1
Plot File Date Created: Nov/11/2010 8:23 AM

Filename: L:\WORK\107297\CADD\AECOM-CADD\SITE_MANAGEMENT\WARDS-SITE-MAP_NAD83_EAST-ZONE_FT.DWG

SARATOGA HORSEWORKS
57 EDSON ST.

PARKING AREA

WARD PRODUCTS
61 EDSON ST.

BUSH MILLWORKS
54 EDSON ST.

FIBER GLASS INDUSTRIES, INC.
69 EDSON ST.

PROZONE LOCKERS FORMERLY UCMI
1 SAM STRATTON RD.

SAFARI ENTERPRISES INC.
64 EDSON ST.

DRIVEWAY AND PARKING LOT

STORAGE BUILDING

OFFICES AND MANUFACTURING BUILDING

GRAVEL PARKING LOT

EDSON STREET

SAM STRATTON ROAD

MW-1
MW-1R
MW-2
MW-3
MW-4
MW-4R
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20
IW-02
IW-03
IW-04
RW-01
RW-02

LEGEND

- SURFACE DITCH
- CHAINLINK FENCE
- MONITORING WELL LOCATION
- RECOVERY WELL
- ISCO INJECTION WELL

N

50 0 100

1"=100'

AECOM

WARD PRODUCTS SITE AMSTERDAM, NEW YORK 60301432-500			**GROUNDWATER MONITORING WELL NETWORK**
DATE: 11/20/13	DRWN: RCW		**FIGURE 2**

SARATOGA HORSEWORKS
57 EDSON ST.

PARKING AREA

WARD PRODUCTS
61 EDSON ST.

BUSH MILLWORKS
54 EDSON ST.

FIBER GLASS INDUSTRIES, INC.
69 EDSON ST.

SAFARI ENTERPRISES INC.
64 EDSON ST.

PROZONE LOCKERS FORMERLY UCMI
1 SAM STRATTON RD.

EDSON STREET

SAM STRATTON ROAD

GRAVEL PARKING LOT

DRIVEWAY AND PARKING LOT

STORAGE BUILDING

OFFICES AND MANUFACTURING BUILDING

MW-1 467.62
MW-1R 467.10
MW-2 466.80
MW-3 468.22
MW-4 463.57
MW-4R 448.06
MW-5 458.20
MW-6 448.04
MW-7 447.99
MW-8 459.16
MW-9 431.93
MW-10 434.94
MW-11 471.29
MW-12 444.78
MW-13 431.67
MW-14 442.35
MW-15 436.16
MW-16 426.64
MW-17 437.02
MW-18 440.90
MW-19 410.30
MW-20 419.56
RW-01 403.53
RW-02 NM
IW-02
IW-03
IW-04

LEGEND

- SURFACE DITCH
- CHAINLINK FENCE
- MONITORING WELL LOCATION
- RECOVERY WELL
- ISCO INJECTION WELL
- 445 — 5' GROUNDWATER CONTOUR (ft. MSL) (DASHED WHERE INFERRED)
- 450 — 10' GROUNDWATER CONTOUR (ft. MSL) (DASHED WHERE INFERRED)
- 468.49 — GROUNDWATER ELEVATION (ft. MSL)
- NM — NOT MEASURED
- GROUNDWATER FLOW DIRECTION

N

50 0 100

1"=100'

NOTES:
1. MW-1, MW-2, MW-3 AND MW-4 ARE OVERBURDEN WELLS AND ARE NOT USED TO CONTOUR.

AECOM

WARD PRODUCTS SITE AMSTERDAM, NEW YORK 60300184-1			**BEDROCK GROUNDWATER ELEVATIONS MAY 15, 2013**
DATE: 11/06/13	DRWN: RCW		**FIGURE 3**

SARATOGA HORSEWORKS
57 EDSON ST.

PARKING AREA

WARD PRODUCTS
61 EDSON ST.

BUSH MILLWORKS
54 EDSON ST.

FIBER GLASS INDUSTRIES, INC.
69 EDSON ST.

SAFARI ENTERPRISES INC.
64 EDSON ST.

PROZONE LOCKERS
FORMERLY UCMI
1 SAM STRATTON RD.

DRIVEWAY AND PARKING LOT

STORAGE BUILDING

OFFICES AND MANUFACTURING BUILDING

GRAVEL PARKING LOT

EDSON STREET

SAM STRATTON ROAD

MW-11 469.16
MW-5 458.33
MW-12 444.60
MW-18 440.92
MW-1 466.07
MW-1R 465.44
MW-2 465.09
MW-3 464.80
MW-4 461.08
MW-4R 450.74
MW-6 446.57
MW-7 446.74
MW-8 447.47
MW-9 434.73
MW-10 435.97
MW-13 433.71
MW-14 442.25
MW-15 434.80
MW-16 425.92
MW-17 436.44
MW-19 409.46
MW-20 418.98
RW-01 448.85
RW-02 431.97
IW-02
IW-03
IW-04

445 450 455 460 465 435 440 430 425 420 415 410 400

LEGEND

- SURFACE DITCH
- CHAINLINK FENCE
- MONITORING WELL LOCATION
- RECOVERY WELL
- ISCO INJECTION WELL
- 445 — 5' GROUNDWATER CONTOUR (ft. MSL) (DASHED WHERE INFERRED)
- 450 — 10' GROUNDWATER CONTOUR (ft. MSL) (DASHED WHERE INFERRED)
- 468.49 — GROUNDWATER ELEVATION (ft. MSL)
- NM — NOT MEASURED
- GROUNDWATER FLOW DIRECTION

N

50 0 100
1"=100'

NOTES:
1. MW-1, MW-2, MW-3 AND MW-4 ARE OVERBURDEN WELLS AND ARE NOT USED TO CONTOUR.

AECOM

WARD PRODUCTS SITE
AMSTERDAM, NEW YORK
60300184-1

BEDROCK GROUNDWATER ELEVATIONS AUGUST 26, 2013

DATE: 11/06/13 | DRWN: RCW | **FIGURE 4**

PARKING AREA

SARATOGA HORSEWORKS
57 EDSON ST.

WARD PRODUCTS
61 EDSON ST.

BUSH MILLWORKS
54 EDSON ST.

FIBER GLASS INDUSTRIES, INC.
69 EDSON ST.

PROZONE LOCKERS
FORMERLY UCMI
1 SAM STRATTON RD.

SAFARI ENTERPRISES INC.
64 EDSON ST.

EDSON STREET

SAM STRATTON ROAD

GRAVEL PARKING LOT

DRIVEWAY AND PARKING LOT

STORAGE BUILDING

OFFICES AND MANUFACTURING BUILDING

MW-11 <5
MW-5
MW-12
MW-18 2.75 J
MW-1
MW-1R 53
MW-2
MW-6
IW-04
MW-3
MW-10 240
IW-03
RW-02
RW-01
MW-7
MW-4 130
MW-4R 12000
IW-02
MW-9
MW-13 390
MW-8
MW-14 <5
MW-17 320
MW-16 7.7
MW-15 <5
MW-20 <5
MW-19 5.3

5
100
500
1,000
5,000
10,000

LEGEND

- SURFACE DITCH
- CHAINLINK FENCE
- MONITORING WELL LOCATION
- RECOVERY WELL
- ISCO INJECTION WELL
- 1700 — TCE CONCENTRATION (µg/L)
- E — ESTIMATED AND OVER CALIBRATION RANGE
- 5 — TCE CONCENTRATIONS IN GROUNDWATER, µg/L, MAY 2013 (DASHED WHERE INFERRED)

NOTES:

1. MW-4 IS AN OVERBURDEN WELL, AND IS NOT USED TO CONTOUR. THE OTHER SAMPLED WELLS ARE BEDROCK WELLS.

N

50 0 100

1"=100'

AECOM

WARD PRODUCTS SITE AMSTERDAM, NEW YORK 60300184-1			**BEDROCK TCE CONCENTRATIONS (ug/L) MAY 14-16, 2013**
DATE: 11/06/13	DRWN: RCW		**FIGURE 5**

PARKING AREA

SARATOGA HORSEWORKS
57 EDSON ST.

WARD PRODUCTS
61 EDSON ST.

BUSH MILLWORKS
54 EDSON ST.

FIBER GLASS INDUSTRIES, INC.
69 EDSON ST.

PROZONE LOCKERS
FORMERLY UCMI
1 SAM STRATTON RD.

SAFARI ENTERPRISES INC.
64 EDSON ST.

SAM STRATTON ROAD

EDSON STREET

GRAVEL PARKING LOT

DRIVEWAY AND PARKING LOT

STORAGE BUILDING

OFFICES AND MANUFACTURING BUILDING

MW-1 <5
MW-1R 86
MW-2
MW-3
MW-4 190
MW-4R 27000
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10 260
MW-11 <5
MW-12
MW-13 320
MW-14 <5
MW-15
MW-16 <5
MW-17 170
MW-18 <5
MW-19 <5
MW-20 <5
RW-01
RW-02
IW-02
IW-03
IW-04

5
100
500
1,000
5,000
10,000

LEGEND

- SURFACE DITCH
- CHAINLINK FENCE
- MONITORING WELL LOCATION
- RECOVERY WELL
- ISCO INJECTION WELL
- 1700 — TCE CONCENTRATION (µg/L)
- J — ESTIMATED CONCENTRATION
- 5 — TCE CONCENTRATIONS IN GROUNDWATER, µg/L, AUGUST 2013 (DASHED WHERE INFERRED)

NOTES:

1. MW-4 IS AN OVERBURDEN WELL, AND IS NOT USED TO CONTOUR. THE OTHER SAMPLED WELLS ARE BEDROCK WELLS.

N

50 0 100

1"=100'

AECOM

WARD PRODUCTS SITE AMSTERDAM, NEW YORK 60300184-1			**BEDROCK TCE CONCENTRATIONS (ug/L) AUGUST 26-29, 2013**
DATE: 11/06/13	DRWN: RCW		**FIGURE 6**

Appendix A

2013 Groundwater Tables

Table A-1
Summary of Groundwater Elevation Measurements - May and August 2013
61 Edson Street, Amsterdam, NY
NYSDEC Site #4-029-004

		May 15, 2013		August 26, 2013	
Monitoring Well	Top of Casing Elevation (Ft)	Depth to Water (Ft)	Water Elevation (Ft)	Depth to Water (Ft)	Water Elevation (Ft)
MW-1	471.55	3.93	467.62	5.48	466.07
MW-1R	471.46	4.36	467.10	6.02	465.44
MW-2	471.20	4.40	466.80	6.11	465.09
MW-3	473.03	4.81	468.22	8.23	464.80
MW-4	470.17	6.60	463.57	9.09	461.08
MW-4R	470.29	22.23	448.06	19.55	450.74
MW-5	475.62	17.42	458.20	17.29	458.33
MW-6	470.97	22.93	448.04	24.40	446.57
MW-7	469.14	21.15	447.99	22.40	446.74
MW-8	467.38	8.22	459.16	19.91	447.47
MW-9	465.43	33.50	431.93	30.70	434.73
MW-10	466.77	31.83	434.94	30.80	435.97
MW-11	485.37	14.08	471.29	16.21	469.16
MW-12	468.18	23.40	444.78	23.58	444.60
MW-13	462.12	30.45	431.67	28.41	433.71
MW-14	453.66	11.31	442.35	11.41	442.25
MW-15	445.20	9.04	436.16	10.40	434.80
MW-16	449.50	22.86	426.64	23.58	425.92
MW-17	450.84	13.82	437.02	14.40	436.44
MW-18	463.76	22.86	440.90	22.84	440.92
MW-19	441.64	31.34	410.30	32.18	409.46
MW-20	442.38	22.82	419.56	23.40	418.98
RW-01	472.08	68.55	403.53	23.23	448.85
RW-02*	465.57	NM	NM	33.60	431.97

Notes:
NM - Not Measured
*RW-02 was formerly IW-01. RW-02 TOC estimated.

Table A-2
Summary of Primary Constituents of Interest - May and August 2013
61 Edson Street, Amsterdam, NY
NYSDEC Site #4-029-004

Sampling Date: May 14-16, 2013

Well Number	Trichloroethene µg/L	Total Chromium mg/L	Hexavalent Chromium mg/L
NYSDEC GQS	**5**	**0.05**	**0.05**
MW-1R	**53**	**0.117**	**0.08**
MW-4	**130**	0.0285	<0.02
MW-4R	**12,000**	**0.122**	<0.02
MW-10	**240**	<0.0027	<0.02
MW-11	<5	<0.0027	<0.02
MW-13	**390**	0.0053 B	<0.02
MW-14	<5	<0.0027	<0.02
MW-15	<5	<0.0027	<0.02
MW-16	**7.7**	0.0125	<0.02
MW-17	**320**	<0.0027	<0.02
MW-18*	2.75 J	<0.0027	<0.02
MW-19	**5.3**	<0.0027	<0.02
MW-20	<5	0.0166	<0.02

August 26-29, 2013

Well Number	Trichloroethene µg/L	Total Chromium mg/L	Hexavalent Chromium mg/L
NYSDEC GQS	**5**	**0.05**	**0.05**
MW-1R	**86**	**0.195**	**0.2**
MW-4	**190**	0.0027 B	<0.02
MW-4R	**27,000**	0.0196	<0.02
MW-10	**260**	0.0035 B	<0.02
MW-11	<5	<0.0027	<0.02
MW-13	**320**	<0.0027	<0.02
MW-14	<5	<0.0027	<0.02
MW-15	<5	<0.0027	<0.02
MW-16	<5	<0.0027	<0.02
MW-17	**170**	0.004 B	<0.02
MW-18*	<5	0.00395 B	<0.02
MW-19	<5	<0.0027	<0.02
MW-20	<5	<0.0027	<0.02

Notes:
NS - Not Sampled
BOLD values are greater that NYSDEC Groundwater Quality Standards
NYSDEC GQS - New York State Department of Environmental Conservation Groundwater Quality Standard
* Average of primary and duplicate sample results (reporting limit used for non-detect results)
J - Estimated value below the Reporting Limit
B - Contamination in associated method blank
Semiannual groundwater monitoring conducted according to the
"Site Management Plan, Ward Products Site, Site # 4-29-004,

Table A-3
Relevant Groundwater Analytical Results
61 Edson Street, Amsterdam, NY
NYSDEC Site #4-029-004

MW-10												
	METALS (mg/L)		VOCs (µg/L)									
	Hexavalent Chromium	Total Chromium	Carbon Tetrachloride	Chloro-benzene	Chloroform	Dichloro-difluoromethane	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Tetrachloro-ethene	Trichloro-ethene	Vinyl Chloride
NYSDEC STANDARD	**0.05**	**0.05**	**5**	**5**	**7**	**5**	**5**	**5**	**5**	**5**	**5**	**2**
1/22/98	**0.0071**	**0.0146J**	<2	<2	**5J**	NA	**7J**	**39**	**6J**	**8J**	**2900**	<4
5/8/98	**0.09**	**0.094**	<50	<50	<50	<100	<50	NA	NA	<50	**1800**	<100
8/26/98	**0.05**	**0.021**	<125	<125	<125	<250	<125	NA	NA	<125	**5500**	<250
11/17/98	**0.05**	**0.023**	<250	<250	<250	<500	<250	NA	NA	<250	**5000**	<500
5/25/99	**0.02**	<0.005	<120	<120	<120	<250	<120	NA	NA	<120	**6000**	<250
8/24/99	<0.02	**0.016**	<250	<250	<250	<500	<250	NA	NA	<250	**7800**	<500
11/16/99	<0.02	**0.008**	<250	<250	<250	<500	<250	NA	NA	<250	**8000**	<500
5/23/00	<0.02	**0.021**	<250	<250	<250	<500	<250	NA	NA	<250	**12000**	<500
8/23/00	<0.02	**0.012**	<250	<250	<250	<500	<250	NA	NA	<250	**7000**	<500
5/22/01	<0.02	**0.012**	<250	<250	<250	<500	<250	NA	NA	<250	**6000**	<500
8/30/01	<0.02	**0.012**	<250	<250	<250	<500	<250	NA	NA	<250	**5700**	<500
6/18/02	<0.02	**0.008**	<500	<500	<500	<1000	<500	NA	NA	<500	**7200**	<1000
9/18/02	<0.02	**0.012**	<125	<125	<125	<250	<125	NA	NA	<125	**4500**	<250
9/11/03	<0.02	<0.005	<120	<120	<120	<250	<120	<120	<120	<120	**5000**	<250
5/19/04	<0.02	**0.045**	<120	<120	<120	NA	<120	<120	<120	<120	**3800**	<250
8/18/04	<0.020	**0.0229**	<250	<250	<250	NA	<250	<250	<250	<250	**3500**	<250
5/12/05	<0.020	**0.0269**	<500	<500	<500	<500	<500	<500	<500	<500	**3800**	<500
9/22/05	<0.020	**0.0232**	<500	<500	<500	<500	<500	<500	<500	<500	**4100**	<500
5/23/06	<0.020	**0.0213**	<250	<250	<250	<250	<250	<250	<250	<250	**4700**	<250
8/24/06	<0.020	**0.0332**	<500	<500	<500	NA	<500	<500	<500	<500	**5100**	<500
5/29/07	<0.020	**0.0064 J**	<1000	<1000	<1000	<1000	<1000	<1000	<1000	<1000	**6300**	<1000
8/6/07	<.02	**0.01**	<250	<250	<250	<500	<250	<250	<250	<250	**5400**	<500
6/25/08	<0.02	**0.008**	<250	<250	<250	<250	<250	<250	<250	<250	**3700**	<250
8/26/08	<0.02	<0.005	<250	<250	<250	<500	<250	<250	<250	<250	**3900**	<500
5/20/09	<0.02	**0.0095**	<250	<250	<250	<500	<250	<250	<250	<250	**5900**	<500
8/12/09	<0.02	<0.0052	<100	<100	<100	<200	<100	<100	<100	<100	**3400**	<200
5/6/10	<0.020	<0.0047	<50	<50	<50	<100	<50	<50	<50	<50	**1000**	<100
9/1/10	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
10/28/10	NA	NA	<50	<50	<50	<100	<50	<50	<50	<50	**2000 E**	<100
5/26/11	<0.02	<0.005	<50	<50	<50	<100	<50	<50	<50	<50	**1300**	<100
8/30/11	<0.02	<0.0047	<50	<50	<50	<100	<50	<50	<50	<50	**940**	<100
5/23/12	<0.02	<0.0051	<25	<25	<25	<50	<25	**14 J**	<25	<25	**700**	<50
8/22/12	<0.02	<0.0051	<50	<50	<50	<100	<50	**18 J**	<50	<50	**980**	<100
5/14/13	< 0.02	< 0.0027	< 10	< 10	< 10	< 20	< 10	**6.1 J**	< 10	< 10	**240**	< 20
8/28/13	< 0.02	**0.0035 B**	< 10	< 10	< 10	< 20	**2.7 J**	**8.5 J**	< 10	< 10	**260**	< 20

Notes:

NA - not analyzed
NS - not sampled
J - estimated value below the detection limit
E - estimated value ouside of the calibration range
D - Initial result was outside the calibration range; sample re-analyzed at dilution.
B - Contamination in associated method blank
BOLD = parameter was detected
BOLD & shaded = value exceeds the NYSDEC Standard

Appendix B

Sediment Basin Photographs

Sam Stratton Road Basin - Inlet

Sam Stratton Road Basin – Measure Point

Sam Stratton Road Basin - Overview

Sam Stratton Road Basin - Vegetation

Chapman Road Basin – Measure Point

Chapman Road Basin - Overview

Route 5 Basin – Measure Point

Route 5 Basin – Measure Point

Route 5 Basin - Sediment

Route 5 Basin - Vegetation

Appendix C

Field Sheets for May and August 2013 Groundwater Sampling

Field Notes

May 2013

WELL ID	Groundwater Measurement (fbmp)
MW-1	3.93
MW-1R	4.36
MW-2	4.40
MW-3	4.81
MW-4	6.60
MW-4R	22.23
MW-5	17.42
MW-6	22.93
MW-7	21.15
MW-8	8.22
MW-9	33.50
MW-10	31.83
MW-11	14.08
MW-12	23.40
MW-13	30.45
MW-14	11.31
MW-15	9.04
MW-16	22.86
MW-17	13.82
MW-18	22.86
MW-19	31.34
MW-20	22.82
IW-1	NM
IW-2	NM
IW-3	NM
IW-4	NM
RW-1	68.55

Note:
All water levels taken on 5/15/13 .
fbmp - feet below measuring point

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-1R Date: 5-13-13

Samplers: Matt - Steve

Sample Number: MW-1R QA/QC Collected? No

Purging / Sampling Method: Ground Fos

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	4.36	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	11:20	11:25	11:30	11:35	11:40	11:45	11:50
Water Level (0.33)	feet	5.75	5.95	6.27	6.46	6.48	6.48	
Volume Purged	gal	0	.25	.25	.50	.50	.75	
Flow Rate	mL/min	100	100	100	100	100	100	
Turbidity (+/- 10%)	NTU	58.5	71.4	74.2	67.4	68.0	68.7	
Dissolved Oxygen (+/- 10%)	%	45.8	32.6	28.9	30.1	30.0	29.9	
Dissolved Oxygen (+/- 10%)	mg/L	5.15	3.70	3.27	3.38	3.37	3.32	
Eh / ORP (+/- 10)	MeV	268.5	274.3	275.7	272.5	271.0	271.5	
Specific Conductivity (+/- 3%)	mS/cm°	.665	.672	.666	.667	.666	.666	
Conductivity (+/- 3%)	mS/cm	.469	.476	.478	.478	.478	.478	
pH (+/- 0.1)	pH unit	7.28	7.25	7.25	7.23	7.24	7.23	
Temp (+/- 0.5)	C°	9.54	9.69	10.10	10.22	10.23	10.22	
Color	Visual	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	
Odor	Olfactory	None	None	None	None	None	None	

Comments: Sampled @ 11:47

MW-1R 081313

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-4 Date: ~~8-13-13~~ 5-13-13 JLA 5/21/13

Samplers:

Sample Number: MW-4 QA/QC Collected?

Purging / Sampling Method: Grundfos

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	6.60	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
~~1-inch~~	0.08
~~2-inch~~	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	~~2-inch~~	3-inch	4-inch	6-inch
V (gal / ft)	0.041	~~0.163~~	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	13:45	13:50	13:55	14:00	14:05	14:10	14:15
Water Level (0.33)	feet	7.38	7.68	7.98	8.10	8.51	8.62	8.70
Volume Purged	gal	0	.25	.25	.50	.50	.75	.75
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	63.2	41.4	27.4	26.1	20.7	16.7	18.6
Dissolved Oxygen (+/- 10%)	%	80.4	45.5	40.2	39.8	39.9	40.3	32.2
Dissolved Oxygen (+/- 10%)	mg/L	9.00	5.22	4.43	4.42	4.29	4.32	3.45
Eh / ORP (+/- 10)	MeV	232.1	246.0	250.6	25.8	247.3	251.4	249.3
Specific Conductivity (+/- 3%)	mS/cm^c	.488	.480	478	.479	.488	.487	.487
Conductivity (+/- 3%)	mS/cm	.338	.334	341	.345	.362	.366	.368
pH (+/- 0.1)	pH unit	7.45	7.40	7.39	7.38	7.38	7.38	7.37
Temp (+/- 0.5)	C°	8.90	9.49	10.01	10.38	11.51	12.04	12.20
Color	Visual	Cloudy	Cloudy	Clearing	Clear	Clear	Clear	Clear
Odor	Olfactory	None	None	None	None	None	None	None

Comments:

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-4 Date: ~~8-13-13~~ 5-13-13
JLA 5/21/13

Samplers:

Sample Number: MW-4 081313 QA/QC Collected?

Purging / Sampling Method: GroundFos

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	17	feet
3. W = Depth to Water:	6.60	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	14:20	14:25	14:30	14:35			
Water Level (0.33)	feet	8.85	9.23	9.45				
Volume Purged	gal	.75	1.00	1.00				
Flow Rate	mL/min	100	100	100				
Turbidity (+/- 10%)	NTU	16.9	15.6	13.6				
Dissolved Oxygen (+/- 10%)	%	37.5	39.1	31.0				
Dissolved Oxygen (+/- 10%)	mg/L	3.97	4.06	3.18				
Eh / ORP (+/- 10)	MeV	250.7	250.4	248.9				
Specific Conductivity (+/- 3%)	mS/cm[c]	.488	.489	.489				
Conductivity (+/- 3%)	mS/cm	.374	.384	.387				
pH (+/- 0.1)	pH unit	7.37	7.38	7.38				
Temp (+/- 0.5)	C°	12.66	13.83	14.10				
Color	Visual	Clear	Clear	Clear				
Odor	Olfactory	None	None	None				

Comments:

Purged Dry @ 14:32

Sampled @ 15:50

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-4R Date: 5/13/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-4R 05313 QA/QC Collected? no

Purging / Sampling Method: (Grundfos) or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	22.23	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
(2-inch)	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	(2-inch)	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	13:42	13:47	13:52	13:57	14:02	14:18	14:23
Water Level (0.33)	feet	23.75	23.76	23.37	23.34	23.37	24.33	24.36
Volume Purged	gal	0	.25	.50	.65	.80	1.0	1.5
Flow Rate	mL / min	150	150	150	150	150	150	200
Turbidity (+/- 10%)	NTU	31.8	29.7	24.7	28.3	25.8	limit	1404
Dissolved Oxygen (+/- 10%)	%	13.3	12.6	11.2	8.3	9.4	3.0	2.6
Dissolved Oxygen (+/- 10%)	mg/L	1.44	1.42	1.23	.91	1.08	.32	.28
Eh / ORP (+/- 10)	MeV	92.7	94.0	91.4	80.1	74.9	87.8	86.9
Specific Conductivity	mS/cm[c]	.453	.450	.449	.455	.482	1.461	1.466
Conductivity (+/- 3%)	mS/cm	.321	.322	.327	.335	.367	1.069	1.078
pH (+/- 0.1)	pH unit	7.61	7.44	7.39	7.36	7.35	7.24	7.21
Temp (+/- 0.5)	C	9.75	10.19	10.73	11.27	12.58	10.99	11.16
Color	Visual	clear	clear	clear	clear	clear	Brown	Brown
Odor	Olfactory	none	none	none	none	none	none	none

Comments: Start purge @ 13:41

14:15 Tubing not long enough. New tubing replaced. Restart purge

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-4R Date: 5/13/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-4R 051313 QA/QC Collected? NO

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	22.23	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	14:28	14:33	14:38	14:43	14:48	14:53	14:58
Water Level (0.33)	feet	24.37	23.36	24.30	24.18	24.24	24.30	24.10
Volume Purged	gal	1.75	2.0	2.5	2.80	3.00	3.50	3.70
Flow Rate	mL / min	200	200	200	150	150	150	150
Turbidity (+/- 10%)	NTU	2573	1611	1008	1012	811	773	618
Dissolved Oxygen (+/- 10%)	%	4.1	5.7	6.1	5.7	6.2	6.4	5.8
Dissolved Oxygen (+/- 10%)	mg/L	.45	.62	.65	.61	.65	.67	.60
Eh / ORP (+/- 10)	MeV	82.4	77.0	75.6	75.9	75.5	75.3	75.6
Specific Conductivity	mS/cm[c]	1.436	1.392	1.372	1.361	1.357	1.357	1.357
Conductivity (+/- 3%)	mS/cm	1.066	1.039	1.039	1.042	1.051	1.057	1.062
pH (+/- 0.1)	pH unit	7.23	7.26	7.26	7.28	7.28	7.28	7.28
Temp (+/- 0.5)	C	11.51	11.74	12.32	12.74	13.20	13.47	13.61
Color	Visual	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Odor	Olfactory	none	none	none	none	none	none	none

Comments: Sampled @ 14:58

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-10 Date: 5/14/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-10 051413 QA/QC Collected? ~~no~~ ms/msd

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	31.83	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	8:02	8:07	8:12	8:17	8:22		
Water Level (0.33)	feet	33.55	33.15	33.00	32.72	32.65		
Volume Purged	gal	0	.5	1.25	2.25	3.0		
Flow Rate	mL / min	150	150	150	200	200		
Turbidity (+/- 10%)	NTU	212.7	38.3	33.4	28.8	18.7		
Dissolved Oxygen (+/- 10%)	%	2.9	2.5	7.0	10.5	7.4		
Dissolved Oxygen (+/- 10%)	mg/L	.30	.26	.73	1.08	.76		
Eh / ORP (+/- 10)	MeV	254.6	249.0	240.4	230.4	220.3		
Specific Conductivity	mS/cm[c]	.656	.641	.610	.587	.548		
Conductivity (+/- 3%)	mS/cm	.500	.495	.474	.461	.475		
pH (+/- 0.1)	pH unit	7.52	7.37	7.33	7.33	7.30		
Temp (+/- 0.5)	C	12.59	13.08	13.35	13.81	14.21		
Color	Visual	Brown	clear	clear	clear	clear		
Odor	Olfactory	none	none	none	none	none		

Comments: Start purge @ 8:00

Sample @ 8:22

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-11 Date: 5/13/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-11 051313 QA/QC Collected? no

Purging / Sampling Method: (Grundfos) or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Static Depth to Water (TOC):	14.68	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
(2-inch)	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	(2-inch)	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	11:24	11:29	11:34	11:39			
Water Level (0.33)	feet	15.71	16.46	17.23	18.60			
Volume Purged	gal	0	<.25	<.25	.25			
Flow Rate	mL / min	150	150	100	100			
Turbidity (+/- 10%)	NTU	20.7	20.4	38.6	42.8			
Dissolved Oxygen (+/- 10%)	%	25.1	26.6	24.4	22.7			
Dissolved Oxygen (+/- 10%)	mg/L	2.88	3.06	2.80	2.59			
Eh / ORP (+/- 10)	MeV	36.8	43.3	-15.7	46.4			
Specific Conductivity	mS/cm[c]	.561	.534	.520	.506			
Conductivity (+/- 3%)	mS/cm	.390	.373	.362	.355			
pH (+/- 0.1)	pH unit	7.35	7.35	7.34	7.32			
Temp (+/- 0.5)	C	9.05	9.18	9.08	9.51			
Color	Visual	clear	clear	clear	clear			
Odor	Olfactory	none	none	none	none			

Comments:

Start purge @ 11:23
Purged dry @ 11:42 ~2 gal
Sampled @ 15:25 not enough water for parameters

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-13 Date: ~~8-14-13~~ 5-14-13

JLA 5/21/13

Samplers:

Sample Number: MW-13 081413 QA/QC Collected?

Purging / Sampling Method: Grundfos

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:		feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	11:00	11:05	11:10	11:15	11:20	11:25	11:30
Water Level (0.33)	feet	30.10	34.40	34.45	34.48	34.52	34.55	34.59
Volume Purged	gal	0	.25	.50	.50	.75	.75	1.0
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	717	636	-23	-26	-26	-24	1651
Dissolved Oxygen (+/- 10%)	%	12.4	9.7	7.3	6.5	5.4	5.1	3.9
Dissolved Oxygen (+/- 10%)	mg/L	1.32	1.04	.79	.71	.59	.51	.42
Eh / ORP (+/- 10)	MeV	-95.2	-94.5	-91.4	-91.9	94.5	-102.7	121.3
Specific Conductivity (+/- 3%)	mS/cm	.684	.685	.700	.702	707	.711	.709
Conductivity (+/- 3%)	mS/cm	.514	514	516	516	519	520	.520
pH (+/- 0.1)	pH unit	7.13	7.14	7.16	7.16	7.15	7.15	7.16
Temp (+/- 0.5)	C°	12.07	11.87	11.17	11.18	11.06	10.94	11.06
Color	Visual	Dark Br	Brown	Brown	Brown	Brown	Clearing	Brown again
Odor	Olfactory	None	None	None	None	None	None	None

Comments: started purge @ 11:00

Clearing still cloudy Notes Br

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-13 Date: ~~8-14-13~~ 5-14-13

JLA 5/21/13

Samplers: SRG - MD

Sample Number: MW-13 081413 QA/QC Collected? No

Purging / Sampling Method: Grundfos

1. L = Well Depth:	_____	feet
2. D = Riser Diameter (I.D.):	_____	feet
3. W = Depth to Water:	_____	feet
4. C = Column of Water in Well:	_____	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$	_____	gal
6. 3(V) = Target Purge Volume	_____	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	11:35	11:40	11:45				
Water Level (0.33)	feet	34.61	34.68	34.72				
Volume Purged	gal	1.0	1.25	1.25				
Flow Rate	mL/min	100	100	100				
Turbidity (+/- 10%)	NTU	1587	1576	1569				
Dissolved Oxygen (+/- 10%)	%	3.3	3.2	3.1				
Dissolved Oxygen (+/- 10%)	mg/L	.34	.33	.32				
Eh / ORP (+/- 10)	MeV	-124.9	-124.4	-121.9				
Specific Conductivity (+/- 3%)	mS/cm°	.702	.700	.699				
Conductivity (+/- 3%)	mS/cm	.518	.516	.516				
pH (+/- 0.1)	pH unit	7.18	7.18	7.18				
Temp (+/- 0.5)	C°	11.26	11.24	11.24				
Color	Visual	DK Br	DK Br	Dr Br				
Odor	Olfactory	None	None	None				

Comments: Sampled @ 11:47

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-14 Date: 5/14/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-14 051413 QA/QC Collected? NO

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	11.31	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	10:32	10:37	10:42	10:47	10:52		
Water Level (0.33)	feet	13.73	14.38	14.57	14.50	14.53		
Volume Purged	gal	0	.25	.50	.65	.75		
Flow Rate	mL / min	100	100	100	100	100		
Turbidity (+/- 10%)	NTU	14.6	17.4	18.5	16.5	12.4		
Dissolved Oxygen (+/- 10%)	%	11.3	5.6	2.2	1.9	2.4		
Dissolved Oxygen (+/- 10%)	mg/L	1.24	60	.24	.21	.26		
Eh / ORP (+/- 10)	MeV	104.4	98.3	82.5	78.6	67.0		
Specific Conductivity	mS/cm[c]	1.004	1.072	1.085	1.081	1.072		
Conductivity (+/- 3%)	mS/cm	.734	.785	.799	.801	.789		
pH (+/- 0.1)	pH unit	7.22	7.12	7.10	7.10	7.11		
Temp (+/- 0.5)	C	10.83	10.98	11.17	11.44	11.17		
Color	Visual	clear	clear	clear	clear	clear		
Odor	Olfactory	none	none	none	none	none		

Comments: Start purge @ 10:31
Sample @ 10:52

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-15 Date: 5/15/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-15 051513 QA/QC Collected? no

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	9.04	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	9:09	9:14	9:19	9:24	9:29		
Water Level (0.33)	feet	11.21	11.20	11.26	11.26	11.26		
Volume Purged	gal	0	.25	.50	.75	1.0		
Flow Rate	mL / min	100	100	100	100	100		
Turbidity (+/- 10%)	NTU	1954	100	60	48.9	35.2		
Dissolved Oxygen (+/- 10%)	%	13.0	4.7	4.0	3.6	3.5		
Dissolved Oxygen (+/- 10%)	mg/L	1.39	.51	.44	.40	.38		
Eh / ORP (+/- 10)	MeV	-69.0	-73.4	-73.0	-68.2	-62.7		
Specific Conductivity	mS/cm[c]	.801	.825	.870	.893	.899		
Conductivity (+/- 3%)	mS/cm	.597	.616	.648	.662	.666		
pH (+/- 0.1)	pH unit	7.16	7.14	7.15	7.15	7.15		
Temp (+/- 0.5)	C	11.62	11.72	11.62	11.45	11.43		
Color	Visual	cloudy	cloudy	cloudy	clear	clear		
Odor	Olfactory	sulfur	sulfur	sulfur	sulfur	sulfur		

Comments: Start purge @ 9:08

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-16 Date: 5/14/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-16 051413 QA/QC Collected? no

Purging / Sampling Method: ~~Grundfos~~ or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ feet
3. W = Static Depth to Water (TOC): _____ feet
4. C = Column of Water in Casing: _____ feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ _____ gal
6. D2 = Pump Setting Depth (ft): _____ feet
7. C2 = Column of water in Pump/Tubing (ft): _____ feet
8. Tubing Volume = C2(0.005737088) _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	14:00	14:05	14:10	14:15	14:20	14:25	14:30
Water Level (0.33)	feet	27.45	27.90	29.70	29.60	30.30	31.70	35.38
Volume Purged	gal	0	.25	.50	.65	.75	1.0	1.5
Flow Rate	mL / min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	113	697	868	754	110	75	142
Dissolved Oxygen (+/- 10%)	%	24.0	6.7	1.6	1.5	1.7	2.2	1.8
Dissolved Oxygen (+/- 10%)	mg/L	2.57	.74	.17	.16	.19	.24	.18
Eh / ORP (+/- 10)	MeV	-41.2	-39.0	-45.4	-41.4	-42.3	-39.0	-24.2
Specific Conductivity	mS/cm[c]	.486	.468	.444	.434	.422	.400	.334
Conductivity (+/- 3%)	mS/cm	.356	.347	.332	.325	.308	.292	.266
pH (+/- 0.1)	pH unit	7.26	7.25	7.27	7.27	7.28	7.27	7.26
Temp (+/- 0.5)	C	11.00	11.46	11.85	11.86	10.90	10.84	14.38
Color	Visual	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy
Odor	Olfactory	none	none	none	none	none	none	none

Comments: Start purge @ 14:00

~~Sample @~~

~~Retu~~ Returned pump up to help introduce water and wL.

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-16 Date: 5/14/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-16 051413 QA/QC Collected? no

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ feet
3. W = Static Depth to Water (TOC): _____ feet
4. C = Column of Water in Casing: _____ feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ _____ gal
6. D2 = Pump Setting Depth (ft): _____ feet
7. C2 = Column of water in Pump/Tubing (ft): _____ feet
8. Tubing Volume = C2(0.005737088) _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	14:35	14:40					
Water Level (0.33)	feet	36.20						
Volume Purged	gal	1.20						
Flow Rate	mL / min	100						
Turbidity (+/- 10%)	NTU	92.5						
Dissolved Oxygen (+/- 10%)	%	1.9						
Dissolved Oxygen (+/- 10%)	mg/L	.20						
Eh / ORP (+/- 10)	MeV	-10.5						
Specific Conductivity	mS/cm^c	.320						
Conductivity (+/- 3%)	mS/cm	.247						
pH (+/- 0.1)	pH unit	7.25						
Temp (+/- 0.5)	C	13.04						
Color	Visual	clear						
Odor	Olfactory	none						

Comments:

Sampled @ 14:35

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-17 Date: 5-14-13

Samplers: SRG - MD

Sample Number: MW-17 051413 QA/QC Collected? No

Purging / Sampling Method:

1. L = Well Depth:	_____	feet
2. D = Riser Diameter (I.D.):	_____	feet
3. W = Depth to Water:	_____	feet
4. C = Column of Water in Well:	_____	feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$	_____	gal
6. 3(V) = Target Purge Volume	_____	gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	15:05	1510	1515	1520			
Water Level (0.33)	feet	18.53	18.60	18.68	18.70			
Volume Purged	gal	1.0	1.0	1.25	1.25			
Flow Rate	mL/min	100	100	100	100			
Turbidity (+/- 10%)	NTU	1.32	1.22	1.66	1.67			
Dissolved Oxygen (+/- 10%)	%	3.0	2.8	2.7	2.6			
Dissolved Oxygen (+/- 10%)	mg/L	.33	.30	.29	.28			
Eh / ORP (+/- 10)	MeV	-152.6	-152.9	-153.6	-154.0			
Specific Conductivity (+/- 3%)	mS/cm[c]	.870	.869	.864	.863			
Conductivity (+/- 3%)	mS/cm	.648	.649	.650	.651			
pH (+/- 0.1)	pH unit	7.17	7.18	7.18	7.18			
Temp (+/- 0.5)	C°	11.64	11.66	11.68	11.82			
Color	Visual	Clear	Clear	Clear	Clear			
Odor	Olfactory	Sulfur	Sul	Sul	Sul			

Comments: Sampled @ 15:20

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-18 Date: 5/14/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-18 051413 QA/QC Collected? Dup

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	22.86	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings					
Time	24 hr	8:54	8:59	9:04	9:09	9:14	9:19
Water Level (0.33)	feet	23.63	24.22	24.25	24.32	24.40	24.42
Volume Purged	gal	0	.5	.75	1.0	1.25	1.50
Flow Rate	mL / min	150	150	100	100	100	100
Turbidity (+/- 10%)	NTU	57.0	52.7	53.7	47.4	44.1	39.9
Dissolved Oxygen (+/- 10%)	%	41.6	38.3	33.7	19.6	10.6	10.1
Dissolved Oxygen (+/- 10%)	mg/L	4.62	4.21	3.56	2.13	1.15	1.11
Eh / ORP (+/- 10)	MeV	232.2	234.5	233.3	230.6	227.1	224.3
Specific Conductivity	mS/cm[c]	.236	.232	.236	.318	.350	.360
Conductivity (+/- 3%)	mS/cm	.171	.171	.175	.235	.260	.267
pH (+/- 0.1)	pH unit	7.88	7.65	7.53	7.43	7.38	7.36
Temp (+/- 0.5)	C	10.61	11.10	11.50	11.42	11.48	11.43
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	none	none	none	none	none	none

Comments: Start purge @ 8:53

Sample @ 9:19

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging/Sampling Form

Project Name and Number: Former Ward Products 60268873

Monitoring Well Number: MW-19 Date: 5/15/13

Samplers: Steve Gray and Matt Dean

Sample Number: MW-19 051513 QA/QC Collected? NO

Purging / Sampling Method: Grundfos or Peristaltic Pump with Dedicated Tubing/Low-Flow

1. L = Total Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Static Depth to Water (TOC):	31.34	feet
4. C = Column of Water in Casing:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. D2 = Pump Setting Depth (ft):		feet
7. C2 = Column of water in Pump/Tubing (ft):		feet
8. Tubing Volume = C2(0.005737088)		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings							
Time	24 hr	10:38	10:43	10:48	10:53	10:58	11:03	11:08	11:13
Water Level (0.33)	feet	33.00	34.30	34.95	35.35	38.28	38.28	38.28	38.28
Volume Purged	gal	0	.25	.45	.60	1.0	1.20	1.30	1.5
Flow Rate	mL / min	100	150	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	54.9	limit	1100 au	186	113	109	148	98
Dissolved Oxygen (+/- 10%)	%	36.6	5.4	2.4	2.3	3.0	3.5	3.5	3.7
Dissolved Oxygen (+/- 10%)	mg/L	4.00	.58	.26	.25	.31	.36	.37	.39
Eh / ORP (+/- 10)	MeV	35.0	27.7	24.1	22.3	25.7	24.5	27.0	27.7
Specific Conductivity	mS/cm[c]	673	1.011	1.016	1.018	1.016	1.013	1.004	1.002
Conductivity (+/- 3%)	mS/cm	.499	.740	.748	.753	.793	.793	.765	.754
pH (+/- 0.1)	pH unit	7.62	7.06	7.02	7.01	7.01	7.02	7.01	7.01
Temp (+/- 0.5)	C	11.10	11.01	11.18	11.39	13.55	13.61	12.51	12.05
Color	Visual	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy
Odor	Olfactory	sl. sulfur	some	same	same	same	same	same	same

Comments: Start purge @ 10:37

* Increased volume to help mL

Sampled @ 11:13

* Three consecutive readings within range indicates stabilization of that parameter.

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW-20 Date: 5·15·13

Samplers: SRG · MD

Sample Number: MW-20051513 QA/QC Collected? No

Purging / Sampling Method: Grundfos

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	22.82	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	9:20	9:25	9:30	9:35	9:40	9:45	9:50
Water Level (0.33)	feet	24.55	24.91	25.23	25.34	25.62	25.82	26.30
Volume Purged	gal	Ø	.25	.25	.50	.50	.75	.75
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	992 AU	1933 AU	1521 AU	1170 AU	762 AU	687 AU	670 AU
Dissolved Oxygen (+/- 10%)	%	29.6	9.3	7.6	6.8	5.3	5.1	4.7
Dissolved Oxygen (+/- 10%)	mg/L	3.11	1.00	.83	.73	.58	.56	.51
Eh / ORP (+/- 10)	MeV	7.7	-9.5	-13.0	-15.5	-22.9	-35.3	-44.1
Specific Conductivity (+/- 3%)	mS/cm^c	.889	.903	.906	.908	.910	.911	.906
Conductivity (+/- 3%)	mS/cm	.657	.668	.670	.671	.673	.672	.668
pH (+/- 0.1)	pH unit	7.03	7.06	7.08	7.09	7.10	7.11	7.12
Temp (+/- 0.5)	C°	11.34	11.38	11.33	11.31	11.35	11.28	11.26
Color	Visual	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy
Odor	Olfactory	None	None	None	None	None	None	None

Comments:

Monitoring Well Purging / Sampling Form

Project Name and Number: Ward Products

Monitoring Well Number: MW - 20 Date: 5 - 15 - 13

Samplers:

Sample Number: MW - 20051513 QA/QC Collected?

Purging / Sampling Method:

1. L = Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ feet
3. W = Depth to Water: _____ feet
4. C = Column of Water in Well: _____ feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ _____ gal
6. 3(V) = Target Purge Volume _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 and LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	9:55	10:00	10:05	10:10	10:15		
Water Level (0.33)	feet	26.38	26.42	26.48	26.52	26.61		
Volume Purged	gal	1.0	1.0	1.25	1.25	1.50		
Flow Rate	mL/min	100	100	100	100	100		
Turbidity (+/- 10%)	NTU	796 AU	645 AU	63	76	73		
Dissolved Oxygen (+/- 10%)	%	4.2	4.2	4.1	3.9	3.8		
Dissolved Oxygen (+/- 10%)	mg/L	.45	.45	.44	.43	.41		
Eh / ORP (+/- 10)	MeV	-38.0	-38.0	-37.9	-37.2	-37.1		
Specific Conductivity (+/- 3%)	mS/cm[c]	.889	.887	.885	.883	.883		
Conductivity (+/- 3%)	mS/cm	.666	.666	.666	.667	.667		
pH (+/- 0.1)	pH unit	7.12	7.13	7.13	7.14	7.14		
Temp (+/- 0.5)	C°	11.85	11.92	12.10	12.21	12.26		
Color	Visual	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy		
Odor	Olfactory	None	None	None	None	None		

Comments:

Sampled @ [redacted] 10:17

Adirondack Environmental Services Inc.
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

CHAIN OF CUSTODY RECORD

AES Work Order #

A full service analytical research laboratory offering solutions to environmental concerns

Client Name: AECOM	Address: 40 British American Blvd Latham, NY 12110	
Send Report To: Mark Howard	Project Name (Location): Former Wood Products	Samplers: (Names): Steve Gr[illegible] / Matt O[illegible]
Client Phone No: 515-951-2200 / Client Email: mark.h[illegible]	PO Number:	Samplers: (Signature): [signature]

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.	A/P	Matrix	Comp	Grab	Number of Cont's	VOCs 8260	Tot [illegible] 6010	[illegible]	Analysis Required
	MW-15 051513	5/15/13	9:29	A	GW		X	4	2	1	1	
	MW-20 051513	↓	10:17	A	↓		X	4	2	1	1	
	MW-19 051513	↓	11:13	A	↓		X	4	2	1	1	
	Trip Blank 3	↓		A / P	↓			1	1			
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								
				A / P								

Shipment Arrived Via:
FedEx UPS Client AES Other:______________

CC Report To / Special Instructions/Remarks:
CAT B Deliverables
Close SDG no more samples

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☑ Normal
☐ 2 Day ☐ 5 Day

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Mark Howard		5/15/13 1600
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by:	Date/Time
	[signature]	5/15/13 4:?? PM

TEMPERATURE	AES Bottles	PROPERLY PRESERVED	RECEIVED WITHIN HOLDING TIMES
Ambient or Chilled	Y ☑ N ☐	Y N	Y N
Notes: 13°C		Notes:	Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services, Inc.

Adirondack Environmental Services Inc.®
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

CHAIN OF CUSTODY RECORD

AES Work Order #

A full service analytical research laboratory offering solutions to environmental concerns

Client Name: AEcom	Address: 40 British American Blvd, Latham, NY 12110		
Send Report To: Mark Howard	Project Name (Location): Former Ward Products	Samplers: (Names) Steve Gray / Matt [illegible]	
Client Phone No: 518-951-2200	Client Email: mark.howard@aecom	PO Number:	Samplers: (Signature) [signature]

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.	A/P	Sample Type: Matrix	Comp	Grab	Number of Cont's	VOC 8260	Total Cr, 6010	Hex Chr. SM 3500CRD	
	MW-10 051413	5/14/13	8:22	A	GW		X	12	6	3	3	Extra MS/MSD
	MW-18 051413	↓	9:49	A	GW		X	4	2	1	1	
	MW-14 051413	↓	10:52	A	GW		X	4	2	1	1	
	MW-13 051413	↓	11:47	A	GW		X	4	2	1	1	
	MW-16 051413	↓	14:53	P	GW		X	4	2	1	1	
	MW-17 051413	↓	15:20	P	GW		X	4	2	1	1	
	DUP 051413	↓	—		GW		X	4	2	1	1	
	Trip Blank 2	↓					X	1	1			
				A/P								
				A/P								
				A/P								
				A/P								
				A/P								
				A/P								

Shipment Arrived Via:
FedEx UPS Client AES Other:________

CC Report To / Special Instructions/Remarks: CAT B Deliverables

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☒ Normal
☐ 2 Day ☐ 5 Day

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
[signature] Mark Howard		5/14/13 1635
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by: [signature]	Date/Time 5/14/13 4:37 Pm

Temperature	AES Bottles	Properly Preserved	Received Within Holding Times
Ambient or (Chilled)	Y ☒ N ☐	(Y) N	(Y) N
Notes: 8		Notes:	Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services, Inc.

Adirondack Environmental Services Inc.
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

CHAIN OF CUSTODY RECORD

AES Work Order #

A full service analytical research laboratory offering solutions to environmental concerns

Client Name: AECOM	Address: 40 British American Blvd, Latham, NY 12110
Send Report To: Mark Howard mark.howard@aecom.com	Project Name (Location): Former Ward Products
Samplers: (Names)	Steve Gr[illegible] / Matt Dean
Client Phone No: 518-951-2200	Client Email:
PO Number:	Samplers: (Signature) Matt Dean

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.	A/P	Matrix	Comp	Grab	Number of Cont's	VOCs 8260	Tot Chrome 6010	Hex Chrom 3500 CRD
	MW-1R 051313	5/13/13	11:17	A P	GW		X	4	2	1	1
	MW-4R 051313	↓	14:[illegible]	A P	↓		X	4	2	1	1
	MW-11 051313		15:2[illegible]	A P			X	4	2	1	1
	MW-4 051313		15:[illegible]	A P			X	4	2	1	1
	Trip Blank		—	A P			X	1	1		
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							

Shipment Arrived Via:
FedEx UPS (Client) AES Other:

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☒ Normal
☐ 2 Day ☐ 5 Day

CC Report To / Special Instructions/Remarks:
Category B Deliverables

Relinquished by: (Signature) Matt Dean	Received by: (Signature) Mark Howard	Date/Time 5/13/13 16:30
Relinquished by: (Signature) Mark Howard	Received by: (Signature)	Date/Time 5/14/13 920
Relinquished by: (Signature)	Received for Laboratory by:	Date/Time [illegible]

TEMPERATURE	AES Bottles	PROPERLY PRESERVED	RECEIVED WITHIN HOLDING TIMES
Ambient or Chilled	Y ☐ N ☐	Y N	Y N
Notes:		Notes:	Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services, Inc.

Field Notes

August 2013

WELL ID	Groundwater Measurement (fbmp)
MW-1	5.48
MW-1R	6.02
MW-2	6.11
MW-3	8.23
MW-4	9.09
MW-4R	19.55
MW-5	17.29
MW-6	24.40
MW-7	22.40
MW-8	19.91
MW-9	30.70
MW-10	30.80
MW-11	16.21
MW-12	23.58
MW-13	28.41
MW-14	11.41
MW-15	10.40
MW-16	23.58
MW-17	14.40
MW-18	22.84
MW-19	32.18
MW-20	23.40
IW-1	NM
IW-2	NM
IW-3	NM
IW-4	NM
RW-1	23.23
RW-2	33.60

Note:

All water levels taken on 8/26/13 .

fbmp - feet below measuring point

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-1R Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-1R 082813 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	5.32	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1226	1231	1236	1241	1246	1251	1256
Water Level (0.33)	feet	6.42	6.61	6.89	7.15	10.02	10.04	10.07
Volume Purged	gal	0	20.25	0.25	20.25	1.00	>1.00	21.25
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	60	40	45	55	95	80	70
Dissolved Oxygen (+/- 10%)	%	30.1	20.9	17.6	16.3	19.7	18.1	16.9
Dissolved Oxygen (+/- 10%)	mg/L	2.77	1.92	1.59	1.46	1.86	1.67	1.52
Eh / ORP (+/- 10)	MeV	-86.6	-74.8	-58.4	-52.4	-45.9	-39.0	-34.1
Specific Conductivity (+/- 3%)	mS/cm^c	0.634	0.626	0.648	0.667	0.656	0.643	0.631
Conductivity (+/- 3%)	mS/cm	0.555	0.558	0.591	0.614	0.567	0.574	0.575
pH (+/- 0.1)	pH unit	7.63	7.51	7.48	7.43	7.42	7.45	7.46
Temp (+/- 0.5)	C°	18.72	19.34	20.36	20.82	17.98	19.35	20.37
Color	Visual	Clear	Clear	Clear	Clear	Cloudy	Cloudy	Cloudy
Odor	Olfactory	None	None	None	None	None	None	None

Comments: 1242 increased flow, UL dropping

Started purge @ 1226
Sampled @

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-1R Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-1R 082813 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	5.32	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units			1436	Readings			
Time	24 hr	1301	1306	~~1311~~	1316			
Water Level (0.33)	feet	10.06	11.04	—				
Volume Purged	gal	1.25	~~1.5~~	/				
Flow Rate	mL/min	100	100	—				
Turbidity (+/- 10%)	NTU	60	45	230				
Dissolved Oxygen (+/- 10%)	%	16.5	16.9	41.4				
Dissolved Oxygen (+/- 10%)	mg/L	1.47	1.52	3.65				
Eh / ORP (+/- 10)	MeV	-36.3	-36.5	-18.4				
Specific Conductivity (+/- 3%)	mS/cm[c]	0.620	0.572	0.666				
Conductivity (+/- 3%)	mS/cm	0.571	0.520	0.607				
pH (+/- 0.1)	pH unit	7.48	7.48	7.84				
Temp (+/- 0.5)	C°	20.98	20.33	20.38				
Color	Visual	Cloudy	Clear	Cloudy				
Odor	Olfactory	None	None	None				

Comments: 1303 Increased Flow

Started purge @

Sampled @ 1436

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-4 Date: 8/26/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-4 082613 QA/QC Collected? NO

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.77	feet
3. W = Depth to Water:	9.09	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1240	1245	1250				
Water Level (0.33)	feet	12.10	12.68	-				
Volume Purged	gal	0		-				
Flow Rate	mL/min	100	100	-				
Turbidity (+/- 10%)	NTU	116	limit	limit				
Dissolved Oxygen (+/- 10%)	%	29.6	25.0	48.3				
Dissolved Oxygen (+/- 10%)	mg/L	3.01	2.45	4.75				
Eh / ORP (+/- 10)	MeV	-75.4	-20.5	31.0				
Specific Conductivity (+/- 3%)	mS/cm^c	0.546	.521	.521				
Conductivity (+/- 3%)	mS/cm	0.435	.432	.431				
pH (+/- 0.1)	pH unit	7.33	7.21	7.31				
Temp (+/- 0.5)	C°	14.56	16.08	15.94				
Color	Visual	cloudy	cloudy	cloudy				
Odor	Olfactory	none	none	none				

Comments:

WL dropped significantly, increased Flow Rate to purge dry
purged dry @ 1248, purged ~ 1 gal

Started purge @ 1240
Sampled @ 1350

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-4R Date: 8/20/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-4R 082013 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth: _____ feet
2. D = Riser Diameter (I.D.): 0.17 feet
3. W = Depth to Water: _____ feet
4. C = Column of Water in Well: _____ feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ _____ gal
6. 3(V) = Target Purge Volume _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings							
Time	24 hr	1258	1303	1308	1313	1318	1323	1328	1333
Water Level (0.33)	feet	24.80	25.00	24.85	24.85	24.85	24.85	24.85	24.85
Volume Purged	gal	0	0.50	>0.50	0.75	1.00	>1.00	1.25	>1.25
Flow Rate	mL/min	100	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	Error3	Error3	Error3	Error3	Error3	Error3	Error3	Error3
Dissolved Oxygen (+/- 10%)	%	8.0	5.5	4.4	3.4	3.6	2.8	4.1	3.9
Dissolved Oxygen (+/- 10%)	mg/L	0.80	0.54	0.42	0.33	0.35	0.27	0.31	0.37
Eh / ORP (+/- 10)	MeV	62.7	76.5	64.3	59.1	89.5	119.0	122.5	110.2
Specific Conductivity (+/- 3%)	mS/cm[c]	1.520	1.525	1.542	1.557	1.565	1.559	1.532	1.524
Conductivity (+/- 3%)	mS/cm	1.211	1.230	1.259	1.282	1.306	1.312	1.304	1.295
pH (+/- 0.1)	pH unit	7.22	7.21	7.20	7.21	7.21	7.21	7.21	7.22
Temp (+/- 0.5)	C°	14.40	14.43	15.38	15.78	16.34	16.72	17.26	17.15
Color	Visual	Brown	Brown	Same	Same	Same	Same	Same	Same
Odor	Olfactory	None	None	Same	Same	Same	Same	Same	Same

Comments: permanganate present, brown spent

Started purge @ 1258
Sampled @ 1333

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-10 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-10 082813 QA/QC Collected? ms/msd

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	29.66	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings					
Time	24 hr	13:53	13:58	14:03	14:08	14:13	14:18
Water Level (0.33)	feet	30.10	30.41	30.35	30.30	30.38	30.25
Volume Purged	gal	0	.5	.70	1.10	1.50	1.75
Flow Rate	mL/min	100	100	100	100	200	200
Turbidity (+/- 10%)	NTU	45	130	95	60	45	35
Dissolved Oxygen (+/- 10%)	%	12.5	1.7	1.4	1.6	1.3	1.2
Dissolved Oxygen (+/- 10%)	mg/L	1.17	.17	.13	.15	.12	.12
Eh / ORP (+/- 10)	MeV	100.4	40.5	28.4	29.9	26.8	20.5
Specific Conductivity (+/- 3%)	mS/cm^c	.681	.686	.683	.686	.687	.689
Conductivity (+/- 3%)	mS/cm	.585	.574	.574	.585	.586	.584
pH (+/- 0.1)	pH unit	7.41	7.32	7.31	7.30	7.29	7.29
Temp (+/- 0.5)	C°	17.64	16.48	16.70	17.32	17.27	17.02
Color	Visual	clear	cloudy	cloudy	cloudy	cloudy	clear
Odor	Olfactory	none	none	none	none	none	none

Comments:

Started purge @ 13:52

Sampled @ 14:18

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-11 Date: 8/26/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-11 082613 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth: ______ feet
2. D = Riser Diameter (I.D.): 0.17 feet
3. W = Depth to Water: 16.21 feet
4. C = Column of Water in Well: ______ feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$ ______ gal
6. 3(V) = Target Purge Volume ______ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1200	1205	1210	1215			
Water Level (0.33)	feet	18.04	18.41	19.19	21.53			
Volume Purged	gal	0	<0.25	0.25	–			
Flow Rate	mL/min	100	100	100	–			
Turbidity (+/- 10%)	NTU	29	31	33	err 1			
Dissolved Oxygen (+/- 10%)	%	5.9	10.0	9.3	10.0			
Dissolved Oxygen (+/- 10%)	mg/L	0.59	1.04	0.84	100.1%			
Eh / ORP (+/- 10)	MeV	-24.0	-1.23	6.0	10.0			
Specific Conductivity (+/- 3%)	mS/cm^c	0.581	0.580	0.578	.541			
Conductivity (+/- 3%)	mS/cm	0.477	0.487	0.496	.444			
pH (+/- 0.1)	pH unit	7.27	7.27	7.29	7.74			
Temp (+/- 0.5)	C°	15.67	16.57	17.52	15.60			
Color	Visual	Clear	Clear	Clear	clear			
Odor	Olfactory	None	None	None	none			

Comments: WL dropped significantly, increased flow rate to purge dry
Purged dry @ 12:18, removed ~ 2 gallons

Started purge @ 1200

Sampled @ 8/27/13 9:30

800 858 9860

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-13 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-13082813 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ feet
3. W = Depth to Water: 27.32 feet
4. C = Column of Water in Well: _____ feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48) _____ gal
6. 3(V) = Target Purge Volume _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	946	951	956	1001	1006	1011	1016
Water Level (0.33)	feet	30.20	30.10	30.21	30.24	30.10	30.10	30.10
Volume Purged	gal	0	<0.25	0.25	0.50	>0.50	0.75	>0.75
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	70	130	250	270	240	210	160
Dissolved Oxygen (+/- 10%)	%	58.6	34.3	25.4	17.9	16.5	16.2	15.5
Dissolved Oxygen (+/- 10%)	mg/L	6.01	3.46	2.57	1.81	1.65	1.61	1.54
Eh / ORP (+/- 10)	MeV	82.2	47.3	-25.4	-67.1	-88.6	-114.4	-173.4
Specific Conductivity (+/- 3%)	mS/cm^c	0.466	0.592	0.690	0.709	0.710	0.713	0.717
Conductivity (+/- 3%)	mS/cm	0.368	0.477	0.554	0.572	0.579	0.585	0.586
pH (+/- 0.1)	pH unit	7.61	7.59	7.59	7.61	7.63	7.62	7.62
Temp (+/- 0.5)	C°	13.78	14.72	14.66	14.94	15.37	15.46	15.60
Color	Visual	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy
Odor	Olfactory	None	None	None	None	None	None	None

Comments:

Started purge @ 946
Sampled @

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-13 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-13 082813 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth: _____ feet
2. D = Riser Diameter (I.D.): _____ feet
3. W = Depth to Water: 27.32 feet
4. C = Column of Water in Well: _____ feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48) _____ gal
6. 3(V) = Target Purge Volume _____ gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1021	1026	1031	1036	1041	1046	1051
Water Level (0.33)	feet	30.10	30.10	30.10	30.10	30.10		
Volume Purged	gal	>1.00	1.25	>1.25	>1.50	1.75		
Flow Rate	mL/min	100	100	100	125	125		
Turbidity (+/- 10%)	NTU	120	110	85	65	60		
Dissolved Oxygen (+/- 10%)	%	14.5	14.7	14.8	14.3	13.8		
Dissolved Oxygen (+/- 10%)	mg/L	1.43	1.46	1.47	1.44	1.37		
Eh / ORP (+/- 10)	MeV	-240.3	-332.7	-346.5	-364.9	-365.9		
Specific Conductivity (+/- 3%)	mS/cm^c	0.713	0.713	0.706	0.702	0.700		
Conductivity (+/- 3%)	mS/cm	0.590	0.585	0.577	0.572	0.576		
pH (+/- 0.1)	pH unit	7.63	7.66	7.64	7.63	7.62		
Temp (+/- 0.5)	C°	16.09	15.63	15.54	15.32	15.74		
Color	Visual	Cloudy	Cloudy	Cloudy	Cloudy	Cloudy		
Odor	Olfactory	None	None	None	None	None		

Comments:

Started purge @
Sampled @ 1041

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-14 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-14 082813 QA/QC Collected? NO

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	12.05	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	9:42	9:47	9:52	9:57	10:02	10:07	10:12
Water Level (0.33)	feet	12.65	13.10	13.16	13.16	13.16	13.16	13.16
Volume Purged	gal	0	~.25	.25	.30	.85	.75	.90
Flow Rate	mL/min	100	90	80	80	80	80	80
Turbidity (+/- 10%)	NTU	28	18	19	23	21	15	15
Dissolved Oxygen (+/- 10%)	%	26.0	6.5	6.5	6.6	6.0	5.8	5.9
Dissolved Oxygen (+/- 10%)	mg/L	2.67	.67	.66	.65	.58	.56	.57
Eh / ORP (+/- 10)	MeV	-5.4	-50.6	-49.1	-41.3	-36.6	-42.7	-47.6
Specific Conductivity (+/- 3%)	mS/cm^c	.836	.882	.905	.910	.915	.917	.920
Conductivity (+/- 3%)	mS/cm	.647	.687	.727	.748	.763	.773	.783
pH (+/- 0.1)	pH unit	7.67	7.25	7.24	7.21	7.20	7.20	7.20
Temp (+/- 0.5)	C°	13.03	13.46	14.73	15.68	16.26	16.76	17.21
Color	Visual	clear	clear	clear	clear	clear	clear	clear
Odor	Olfactory	none	none	none	none	none	none	none

Comments:

Started purge @ 9:40
Sampled @ 10:12

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-14 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-14 082813 QA/QC Collected? NO

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	12.05	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	10:17	10:22	~~10:27~~	~~10:32~~			
Water Level (0.33)	feet	13.16	13.16					
Volume Purged	gal	1.0	1.10					
Flow Rate	mL/min	80	80					
Turbidity (+/- 10%)	NTU	14	14					
Dissolved Oxygen (+/- 10%)	%	5.8	5.5					
Dissolved Oxygen (+/- 10%)	mg/L	.56	.52					
Eh / ORP (+/- 10)	MeV	-51.0	-51.0					
Specific Conductivity (+/- 3%)	mS/cm^c	.919	.918					
Conductivity (+/- 3%)	mS/cm	.784	.790					
pH (+/- 0.1)	pH unit	7.20	7.21					
Temp (+/- 0.5)	C°	17.34	17.25					
Color	Visual	clear	clear					
Odor	Olfactory	none	none					

Comments:

Started purge @ 9:40
Sampled @ 10:22

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-15 Date: 8/29/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-15 08293 QA/QC Collected? NO

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	7.04	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	11:30	11:35	11:40	11:45	11:50	11:55	12:00
Water Level (0.33)	feet	11.29	11.15	11:15	11.15	11.15	11.15	11.15
Volume Purged	gal	0	.25	.50	.75	1.0	1.25	1.50
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	45	45	33	31	23	17	14
Dissolved Oxygen (+/- 10%)	%	6.0	1.8	1.7	2.5	1.8	1.3	1.0
Dissolved Oxygen (+/- 10%)	mg/L	.63	.18	.16	.23	.17	.12	.09
Eh / ORP (+/- 10)	MeV	-69.5	-81.0	-68.1	-73.4	-72.7	-76.6	-79.6
Specific Conductivity (+/- 3%)	mS/cm^c	.865	.899	.983	.990	1.002	1.007	1.003
Conductivity (+/- 3%)	mS/cm	.677	.738	.865	.876	.895	.916	.919
pH (+/- 0.1)	pH unit	7.22	7.11	7.14	7.13	7.12	7.09	7.12
Temp (+/- 0.5)	C°	13.61	15.64	18.64	18.96	19.43	20.24	20.61
Color	Visual	clear	clear	clear	clear	clear	clear	clear
Odor	Olfactory	none	none	none	none	none	none	none

Comments: * Temp increasing; direct sunlight/heat

Started purge @ 11:28

Sampled @

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-16 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-16 082713 QA/QC Collected? no

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	22.53	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings							
Time	24 hr	13:36	13:41	13:46	13:51	13:56	14:01	14:06	14:45
Water Level (0.33)	feet	24.45	25.00	25.60	30.80	31.10	40.71	41.35	—
Volume Purged	gal	0	.25	.40	1.5	1.60	3.0	3.25	—
Flow Rate	mL/min	100	100	90	100	90	90	90	—
Turbidity (+/- 10%)	NTU	40	40	370	170	150	limit	60	850
Dissolved Oxygen (+/- 10%)	%	15.0	4.9	2.5	.6	1.0	1.0	.8	24.3
Dissolved Oxygen (+/- 10%)	mg/L	1.58	.51	.25	.06	.11	.10	.09	2.41
Eh / ORP (+/- 10)	MeV	71.9	-80.2	-105.2	-102.4	-96.9	-84.7	-61.2	-63.5
Specific Conductivity (+/- 3%)	mS/cm^c	.316	.530	.647	.677	.680	.299	.292	.606
Conductivity (+/- 3%)	mS/cm	.246	.418	.517	.510	.526	.222	.223	.500
pH (+/- 0.1)	pH unit	7.36	7.20	7.20	7.25	7.25	7.25	7.21	7.31
Temp (+/- 0.5)	C°	13.00	13.74	14.49	12.26	13.23	11.66	12.69	15.84
Color	Visual	clear	clear	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy
Odor	Olfactory	none	none	none	none	none	none	none	none

Comments:

Started purge @ 13:35
Sampled @ 14:45

13:46 Turned up rate to stabilize well
13:51 Return to 100 mL/min @ 1.0 gal purged
WL dropping ~ 1ft/5min
Purged dry @ 14:10 ~ 6 gal

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-17 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-17 082713 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	13.11	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1330	1335	1340	1345	1350	1355	1400
Water Level (0.33)	feet	15.99	15.43	15.61	15.81	21.68	20.71	20.71
Volume Purged	gal	0	<0.25	0.75	>0.25	1.25	1.50	1.50
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	260	36	11	9.8	15	13	12
Dissolved Oxygen (+/- 10%)	%	52.9	502.5	484.5	452.8	495.8	428.8	448.2
Dissolved Oxygen (+/- 10%)	mg/L	5.281	49.30	45.42	41.82	50.59	42.02	40.58
Eh / ORP (+/- 10)	MeV	-30.8	-20.8	-9.1	-2.8	2.8	10.7	13.2
Specific Conductivity (+/- 3%)	mS/cm^c	0.578	0.575	0.576	0.576	0.561	0.567	0.566
Conductivity (+/- 3%)	mS/cm	0.461	0.479	0.502	0.514	0.445	0.471	0.476
pH (+/- 0.1)	pH unit	7.70	7.55	7.48	7.46	7.49	7.44	7.44
Temp (+/- 0.5)	C°	14.47	16.31	18.35	19.36	14.22	16.21	16.64
Color	Visual	Cloudy	clear	Clear	Clear	Clear	Clear	Clear
Odor	Olfactory	None	None	None	None	None	None	None

Comments:

1346 increased flow, WL was dropping

Started purge @ 1330

Sampled @

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-17 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-17 082713 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	13.11	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = $C(3.14159)(0.5D)^2(7.48)$		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1405	1410					
Water Level (0.33)	feet	20.71	20.75					
Volume Purged	gal	~~1.50~~	1.75					
Flow Rate	mL/min	100	100					
Turbidity (+/- 10%)	NTU	14	15					
Dissolved Oxygen (+/- 10%)	%	436.11	422.6					
Dissolved Oxygen (+/- 10%)	mg/L	43.63	42.20					
Eh / ORP (+/- 10)	MeV	18.4	19.8					
Specific Conductivity (+/- 3%)	mS/cm[c]	0.562	0.565					
Conductivity (+/- 3%)	mS/cm	0.454	0.463					
pH (+/- 0.1)	pH unit	7.50	7.47					
Temp (+/- 0.5)	C°	14.07	15.54					
Color	Visual	Clear	Clear					
Odor	Olfactory	None	None					

Comments:

Started purge @
Sampled @ 1410

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-18 Date: 8/28/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-18 082813 QA/QC Collected? Dup

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	.17	feet
3. W = Depth to Water:	22.72	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings					
Time	24 hr	12:37	12:42	12:47	12:52	12:57	13:02
Water Level (0.33)	feet	23.60	23.90	23.72	23.72	23.72	23.72
Volume Purged	gal	0	.5	.75	1.0	1.15	1.25
Flow Rate	mL/min	100	150	100	100	100	100
Turbidity (+/- 10%)	NTU	32	17	14	12	35	32
Dissolved Oxygen (+/- 10%)	%	41.0	30.1	27.0	28.4	28.0	28.2
Dissolved Oxygen (+/- 10%)	mg/L	4.34	3.20	2.81	2.94	2.92	2.94
Eh / ORP (+/- 10)	MeV	81.2	82.1	80.4	81.0	82.3	81.5
Specific Conductivity (+/- 3%)	mS/cm^c	.263	.254	.250	.251	.250	.250
Conductivity (+/- 3%)	mS/cm	.199	.194	.196	.195	.195	.195
pH (+/- 0.1)	pH unit	7.52	7.23	7.17	7.14	7.11	7.12
Temp (+/- 0.5)	C°	12.35	12.65	13.68	13.41	13.50	13.48
Color	Visual	clear	clear	clear	clear	clear	clear
Odor	Olfactory	none	none	none	none	none	none

Comments:

Started purge @ 12:35
Sampled @ 13:02

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-19 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-19 082713 QA/QC Collected? No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	31.46	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1105	1110	1115	1120	1125	1130	1135
Water Level (0.33)	feet	33.96	34.19	34.55	40.45	40.85	40.92	40.90
Volume Purged	gal	0	~0.25	0.50	1.50	1.50	1.75	2.00
Flow Rate	mL/min	100	100	100	100	100	100	100
Turbidity (+/- 10%)	NTU	30	33	280	120	120	140	150
Dissolved Oxygen (+/- 10%)	%	19.3	17.1	2.3	0.7	1.7	1.8	1.2
Dissolved Oxygen (+/- 10%)	mg/L	1.94	1.69	0.23	0.07	0.17	0.17	0.11
Eh / ORP (+/- 10)	MeV	91.6	64.8	8.4	101.9	98.6	98.0	89.4
Specific Conductivity (+/- 3%)	mS/cm^c	0.717	1.024	1.129	1.123	1.133	1.134	1.135
Conductivity (+/- 3%)	mS/cm	0.585	0.849	0.938	0.902	0.925	0.943	0.958
pH (+/- 0.1)	pH unit	6.93	6.92	6.96	6.97	6.99	6.99	6.99
Temp (+/- 0.5)	C°	15.13	15.90	16.11	14.66	15.43	16.19	16.72
Color	Visual	Clear	Clear	Cloudy	Cloudy	Same	Same	Same
Odor	Olfactory	None	None	None	None	Some	Same	Same

Comments: increased Flow @ 1116, WL continues to Drop @ Low Flow

Started purge @ 1105
Sampled @

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-19 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-19 082713 QA/QC Collected? ~~Yes~~ No

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):	0.17	feet
3. W = Depth to Water:	31.46	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	1140	1145	1150				
Water Level (0.33)	feet	40.90	40.90	40.90				
Volume Purged	gal	2.00	2.25	2.25				
Flow Rate	mL/min	100	100	100				
Turbidity (+/- 10%)	NTU	130 ~~200~~	100	80				
Dissolved Oxygen (+/- 10%)	%	1.1	1.1	1.0				
Dissolved Oxygen (+/- 10%)	mg/L	0.10	0.11	0.10				
Eh / ORP (+/- 10)	MeV	41.5	33.1	34.4				
Specific Conductivity (+/- 3%)	mS/cm^c	1.134	1.134	1.123				
Conductivity (+/- 3%)	mS/cm	0.953	0.939	0.940				
pH (+/- 0.1)	pH unit	6.99	6.99	7.00				
Temp (+/- 0.5)	C°	16.58	16.13	16.45				
Color	Visual	Same	Same	Same				
Odor	Olfactory	Same	Same	Same				

Comments:

Started purge @

Sampled @ 1150

Monitoring Well Purging / Sampling Form

Project Name and Number: Former Ward Products 60300184.2

Monitoring Well Number: MW-20 Date: 8/27/13

Samplers: Tim Steinhofer and Matt Dean

Sample Number: MW-20082713 QA/QC Collected? NO

Purging / Sampling Method: Grundfos/Low Flow

1. L = Well Depth:		feet
2. D = Riser Diameter (I.D.):		feet
3. W = Depth to Water:	22.43	feet
4. C = Column of Water in Well:		feet
5. V = Volume of Water in Well = C(3.14159)(0.5D)^2(7.48)		gal
6. 3(V) = Target Purge Volume		gal

D (inches)	D (feet)
1-inch	0.08
2-inch	0.17
3-inch	0.25
4-inch	0.33
6-inch	0.50

Conversion factors to determine V given C

D (inches)	1-inch	2-inch	3-inch	4-inch	6-inch
V (gal / ft)	0.041	0.163	0.37	0.65	1.5

Water Quality Readings Collected Using YSI-556 LaMotte 2020

Parameter	Units	Readings						
Time	24 hr	10:32	10:37	10:42	10:47	10:52	10:57	14:30
Water Level (0.33)	feet	24.43	24.75	24.90	25.15	27.98	28.20	—
Volume Purged	gal	0	.25	.95	.60	1.0	1.25	=
Flow Rate	mL/min	100	100	100	100	100	100	=
Turbidity (+/- 10%)	NTU	600	limit	limit	limit	limit	limit	210
Dissolved Oxygen (+/- 10%)	%	200*	*	*	*	*	*	11.0
Dissolved Oxygen (+/- 10%)	mg/L	20*	*	*	*	*	*	1.07
Eh / ORP (+/- 10)	MeV	-61.1	-57.6	-54.9	-57.0	-52.2	-46.5	-27.1
Specific Conductivity (+/- 3%)	mS/cm^c	.462	.277	.221	.203	.207	.213	.468
Conductivity (+/- 3%)	mS/cm	.361	.228	.185	.165	.164	.172	.393
pH (+/- 0.1)	pH unit	8.91	8.77	8.78	8.83	8.78	8.78	7.81
Temp (+/- 0.5)	C°	14.40	16.04	16.70	13.47	14.33	14.83	16.71
Color	Visual	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy	cloudy
Odor	Olfactory	none	none	none	none	none	none	none

Comments:

Started purge @ 10:31
Sampled @ 14.30

purged .5 gal @ increased rate to stabalize.
purged dry @ 11:02 @ ~5gal

* DO very unusual calibrated 3 times, changed membrane, etc.

Adirondack Environmental Services Inc.
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

CHAIN OF CUSTODY RECORD

AES Work Order #

A full service analytical research laboratory offering solutions to environmental concerns

Client Name:	Address:
AECOM	40 British American Blvd Latham NY 12110
Send Report To: Mark Howard	**Project Name (Location)**
mark.howard@aecom.com	Former Wood Products
Client Phone No:	**Client Email:**
518 951 2200	mark.howard@aecom.com
PO Number:	**Samplers: (Names)**
	Mark Howard / Matt Dean
Samplers: (Signature)	
Mark Howard	

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.	Sample Type: Matrix	Comp	Grab	Number of Cont's	Analysis Required: VOCs 8260	Total Chromium 6010	Hexavalent Chromium 7196
	MW-4R 082613	8/26/13	1330 P	GW		X	4	X	X	X
	MW-4 082613	8/26/13	1350 P	GW		X	4	X	X	X
	Trip Blank 082613	—	—	TB	—	—	2	X		

Shipment Arrived Via:
FedEx UPS Client AES Other:_____

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☒ Normal
☐ 2 Day ☐ 5 Day

CC Report To / Special Instructions/Remarks:
Category B Deliverables
Keep SDG Open, more samples to come

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Matt Dean		8/26/13 15:05
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by:	Date/Time
	J. Miller	8/26/13 3:04 PM

Temperature	AES Bottles	Properly Preserved	Received Within Holding Times
Ambient or (Chilled)	Y ☒ N ☐	(Y) N	(Y) N
Notes: 7		Notes:	Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services Inc.
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

A full service analytical research laboratory offering solutions to environmental concerns

CHAIN OF CUSTODY RECORD

AES Work Order #

Client Name: AECOM	Address: 40 British American Blvd Latham NY 12110		
Send Report To: Mark Howard	Project Name (Location): Former Ward Products		Samplers: (Names) Mark Howard + Matt Dean
Client Phone No: 518 9512200	Client Email: mark.howard@aecom.com	PO Number: 60300484.2	Samplers: (Signature) Mark Howard

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.	A/P	Sample Type: Matrix	Comp	Grab	Number of Cont's	Analysis Required: VOCs 8260	Total Chrome 6010	Hex Chrome SM3500 CR
	MW-11 082713	8/27/13	925	A	GW		X	4	X	X	X
	MW-19 082713	↓	1150	A	↓		↓	4	↓	↓	↓
	MW-17 082713	↓	140	P	↓		↓	4	↓	↓	↓
	MW-20 082713	↓	1430	P	↓		↓	4	↓	↓	↓
	MW-16 082713	↓	1445	P	↓		↓	4	↓	↓	↓
	Trip Blank 082713				TB	-	-	2	↓		

Shipment Arrived Via: FedEx UPS (Client) AES Other:

CC Report To / Special Instructions/Remarks:
Category B Deliverables
Keep SDG Open

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☒ Normal
☐ 2 Day ☐ 5 Day

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Mark Howard		8/27/13 1624
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by: [signature]	Date/Time: 8/27/13 4:24Pm

Temperature	AES Bottles	Properly Preserved	Received Within Holding Times
Ambient or (Chilled) Notes: 3	Y ☒ N ☐	(Y) N Notes:	(Y) N Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services Inc.
Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

CHAIN OF CUSTODY RECORD

AES Work Order #

A full service analytical research laboratory offering solutions to environmental concerns

Client Name:	Address:	
AECOM	40 British American Blvd Latham NY 12110	
Send Report To: Mark Howard	Project Name (Location) Former Ward Products	Samplers: (Names) Mark Howard + Matt Dean
Client Phone No: 518 951 2200	Client Email: mark.howard@aecom.com	PO Number:
		Samplers: (Signature) Mark Howard

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.		Sample Type Matrix	Comp	Grab	Number of Cont's	Analysis Required: VOCs 8260	Total Chrom 6010	Hexchrom SW 7196 CRD
	MW-14 082813	8/28/13	1140	A P	GW		X	4	X	X	X
	MW-13 082813		1041	A P			X	4	X	X	X
	MW-18 082813		1302	A P			X	4	X	X	X
	MW-10 082813		1416	A P			X	12	X	X	X
	MW-1R 082813		1436	A P			X	4	X	X	X
	Trip Blank 082813	—	—	A P	—	—	—	2	X		
	Dup 082813	8/28/13	—	A P	GW		X	4	X	X	X
				A P							
				A P							
				A P							
				A P							
				A P							

Shipment Arrived Via: FedEx UPS Client AES Other:_____

Turnaround Time Request:
☐ 1 Day ☐ 3 Day ☒ Normal
☐ 2 Day ☐ 5 Day

CC Report To / Special Instructions/Remarks:
Category B Deliverables
Closes SDG

Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Mark Howard		8/29/13
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by:	Date/Time
	J. Mehan	8/28/13 4:37PM

Temperature	AES Bottles	Properly Preserved	Received Within Holding Times
Ambient or Chilled	Y ☒ N ☐	Y N	Y N
Notes: 2		Notes:	Notes:

WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

Adirondack Environmental Services Inc.

Experience is the solution

314 North Pearl Street
Albany, New York 12207
518-434-4546/434-0891 FAX

A full service analytical research laboratory offering solutions to environmental concerns

CHAIN OF CUSTODY RECORD

AES Work Order #

Client Name: AECOM	**Address:** 410 British American Blvd Latham NY 12110		
Send Report To: Mark Howard	**Project Name (Location)** Former Ward Products	**Samplers: (Names)** Mark Howard/Matt Dean	
Client Phone No: 518-951-2200	**Client Email:** mark.howard@aecom.com	**PO Number:** 60360184.2	**Samplers: (Signature)**

AES Sample Number	Client Sample Identification & Location	Date Sampled	Time A=a.m. P=p.m.		Sample Type: Matrix	Comp	Grab	Number of Cont's	Analysis Required: VOC 8260	Tot Chrom 6010	Hex Chrom SM 3500 CrD
				A P							
	MW-15 082913	8/29/13	10:12	A P	GW	X		4	X	X	X
	Trip Blank 082913	8/29/13	-	A P	-	-		2	X		
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							
				A P							

Shipment Arrived Via:

FedEx UPS (Client) AES Other: _____

Turnaround Time Request:

☐ 1 Day ☐ 3 Day ☑ Normal
☐ 2 Day ☐ 5 Day

CC Report To / Special Instructions/Remarks:

Category B Deliverables
Add to SDG

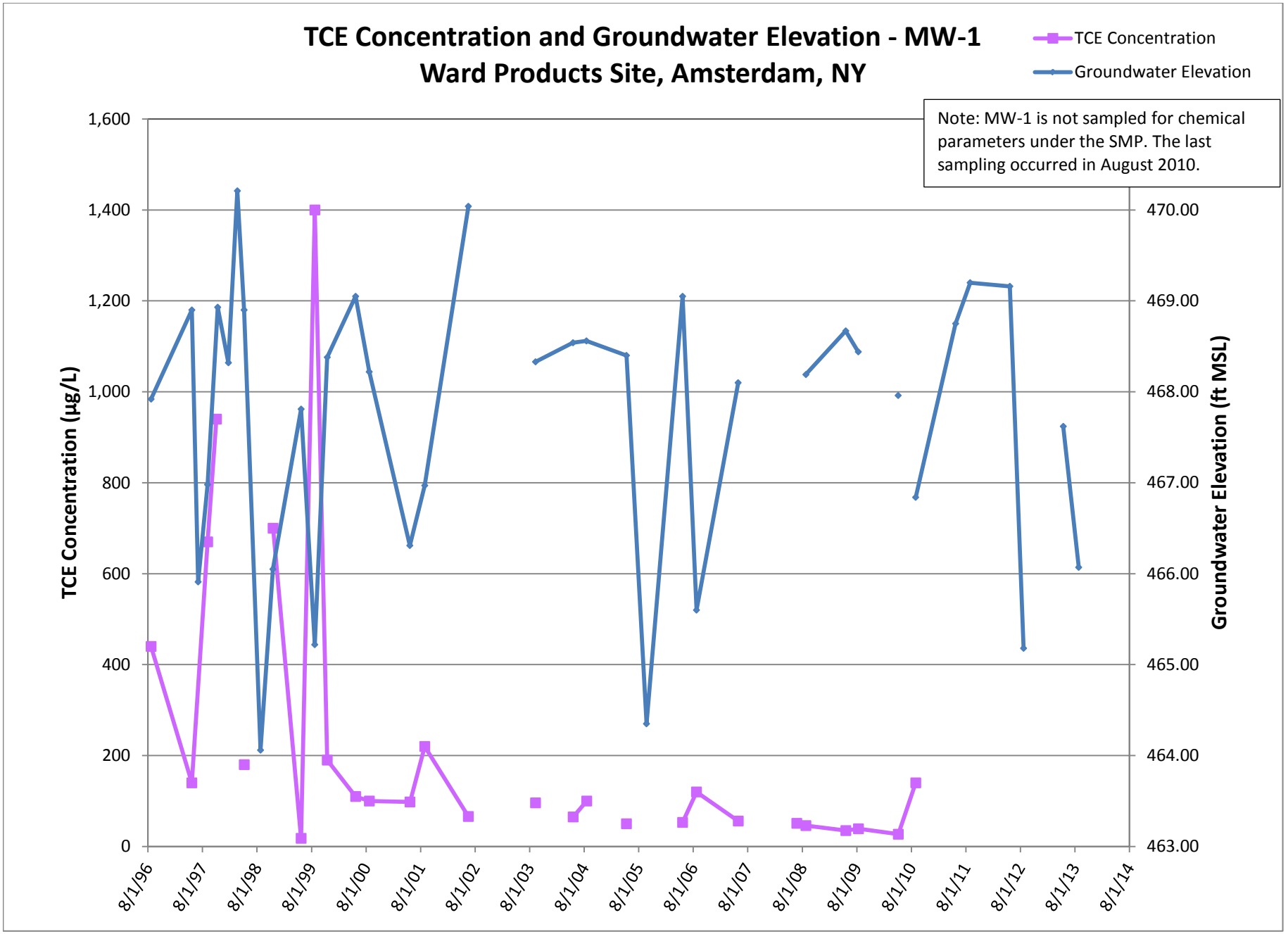
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received by: (Signature)	Date/Time
Relinquished by: (Signature)	Received for Laboratory by:	Date/Time

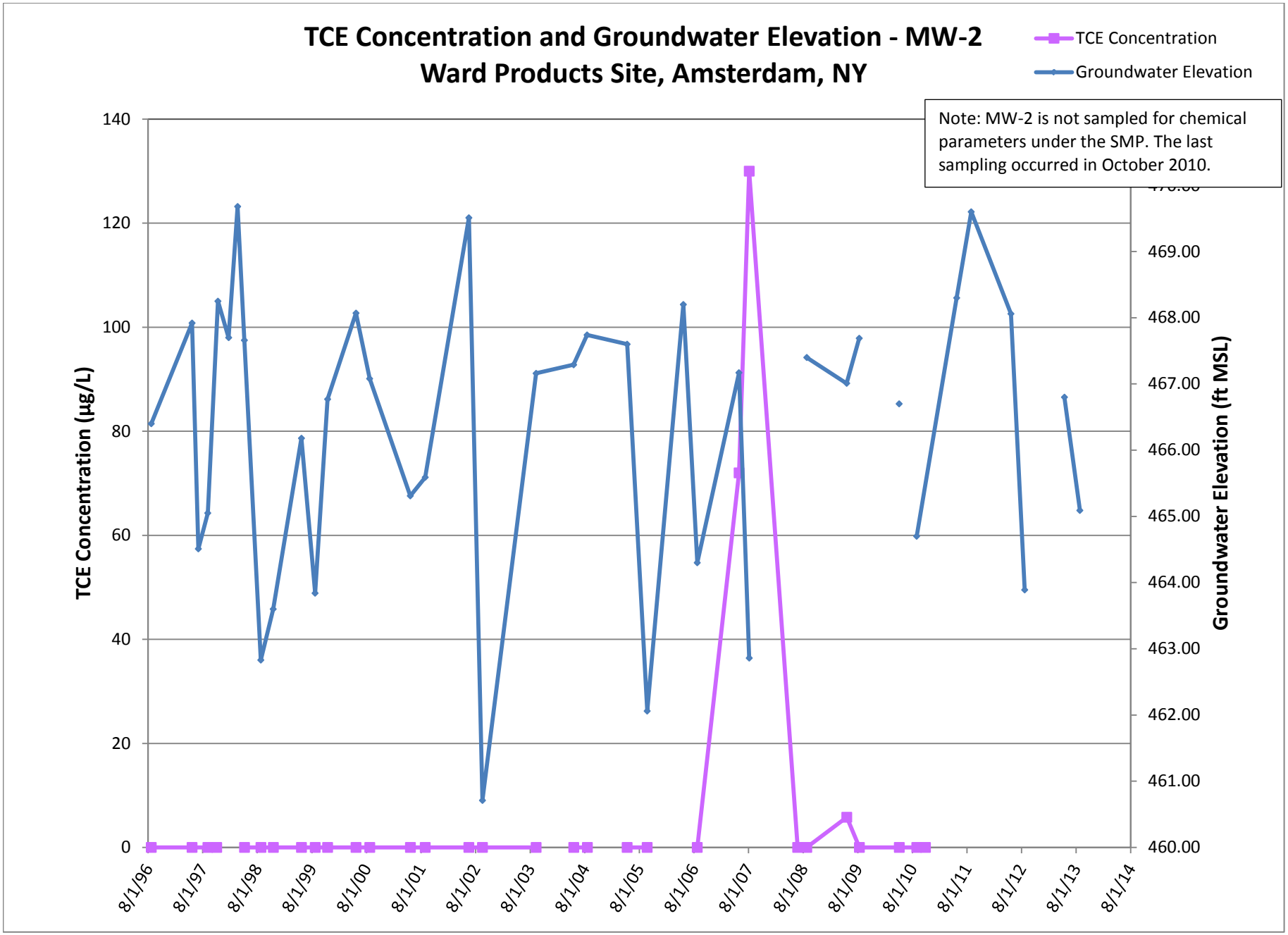
Temperature	AES Bottles		Properly Preserved	Received Within Holding Times
Ambient or Chilled	Y	N	Y N	Y N
Notes:	☐	☐	Notes:	Notes:

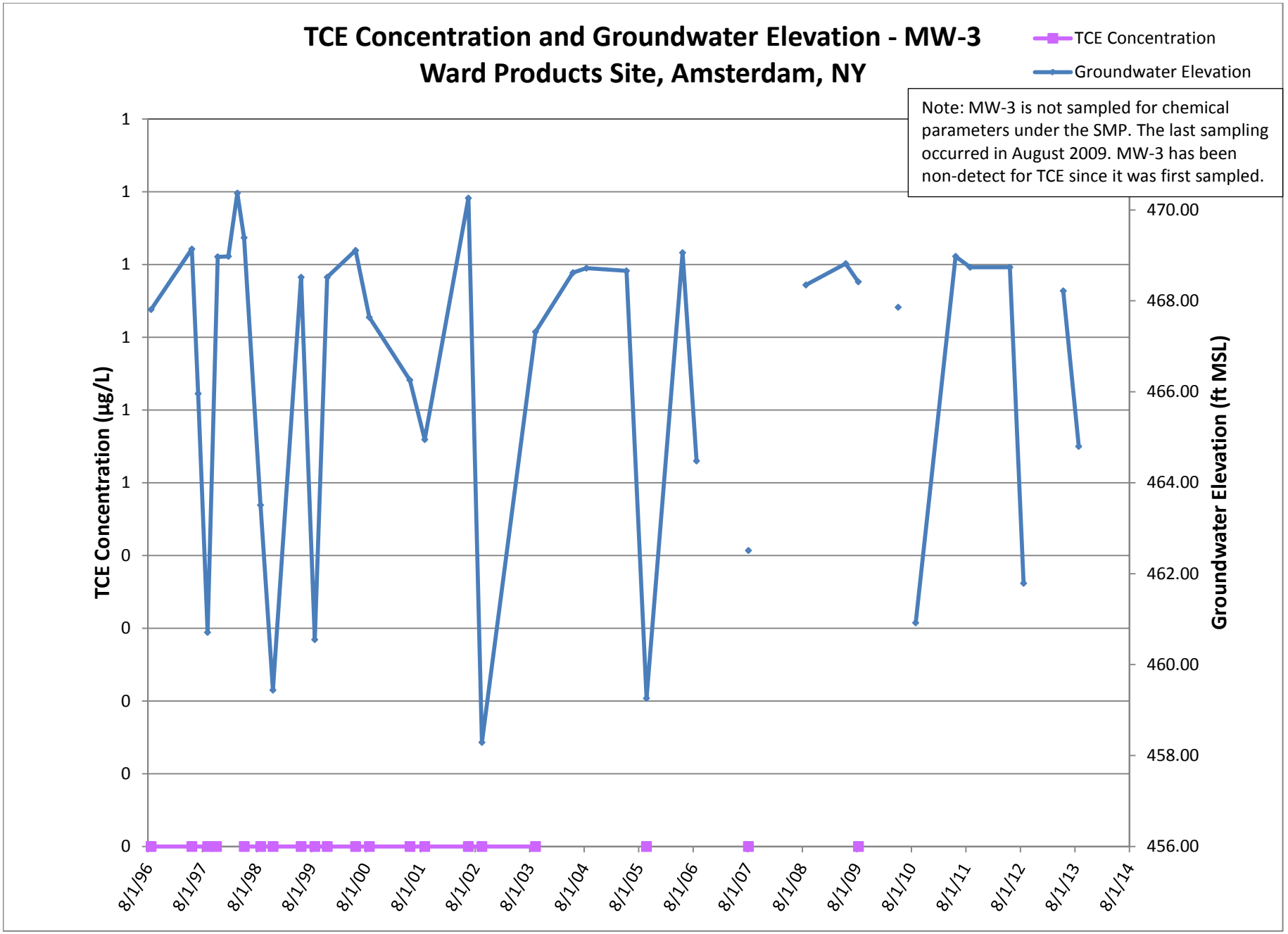
WHITE - Lab Copy YELLOW - Sampler Copy PINK - Generator Copy

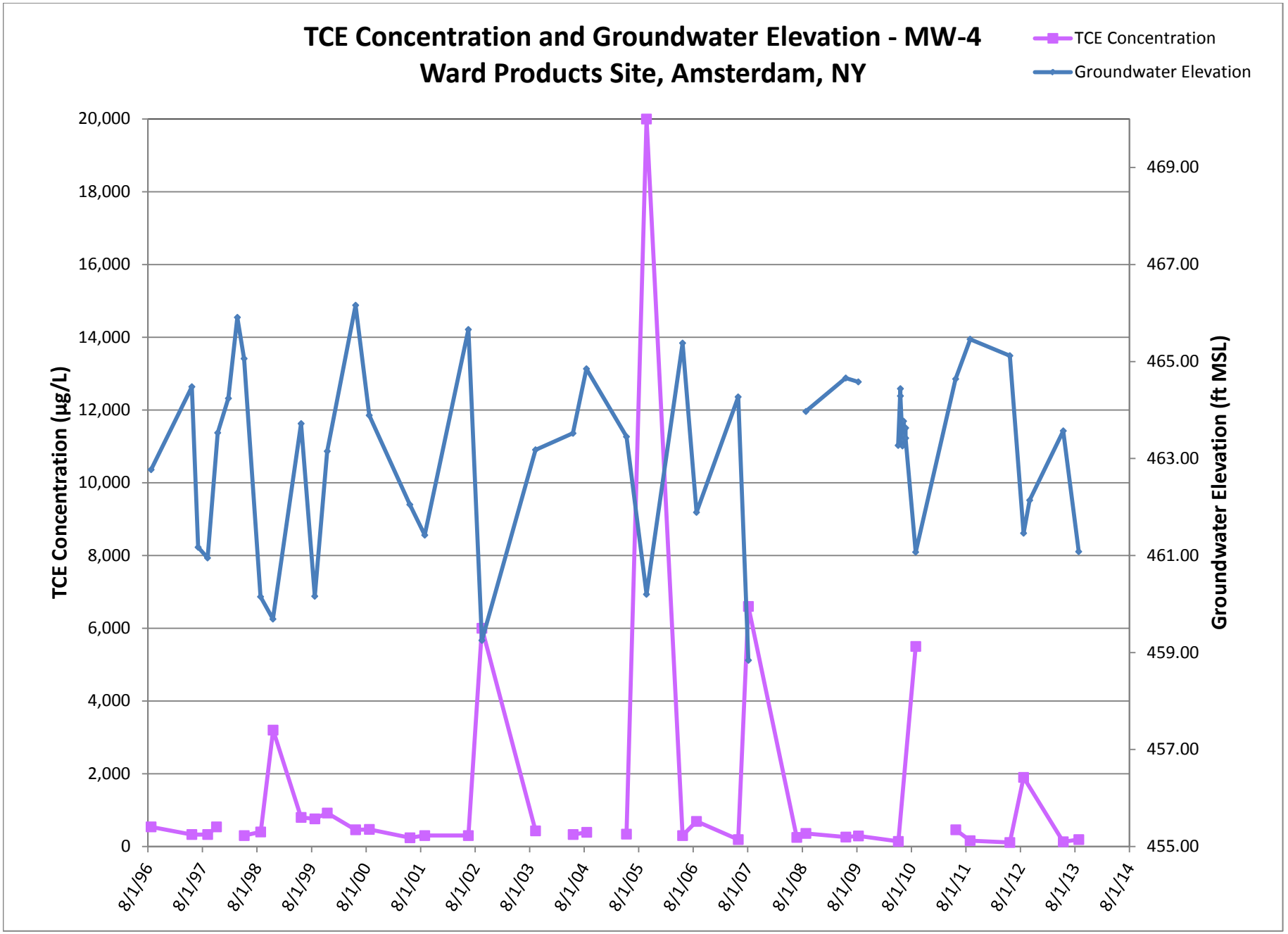
Appendix D

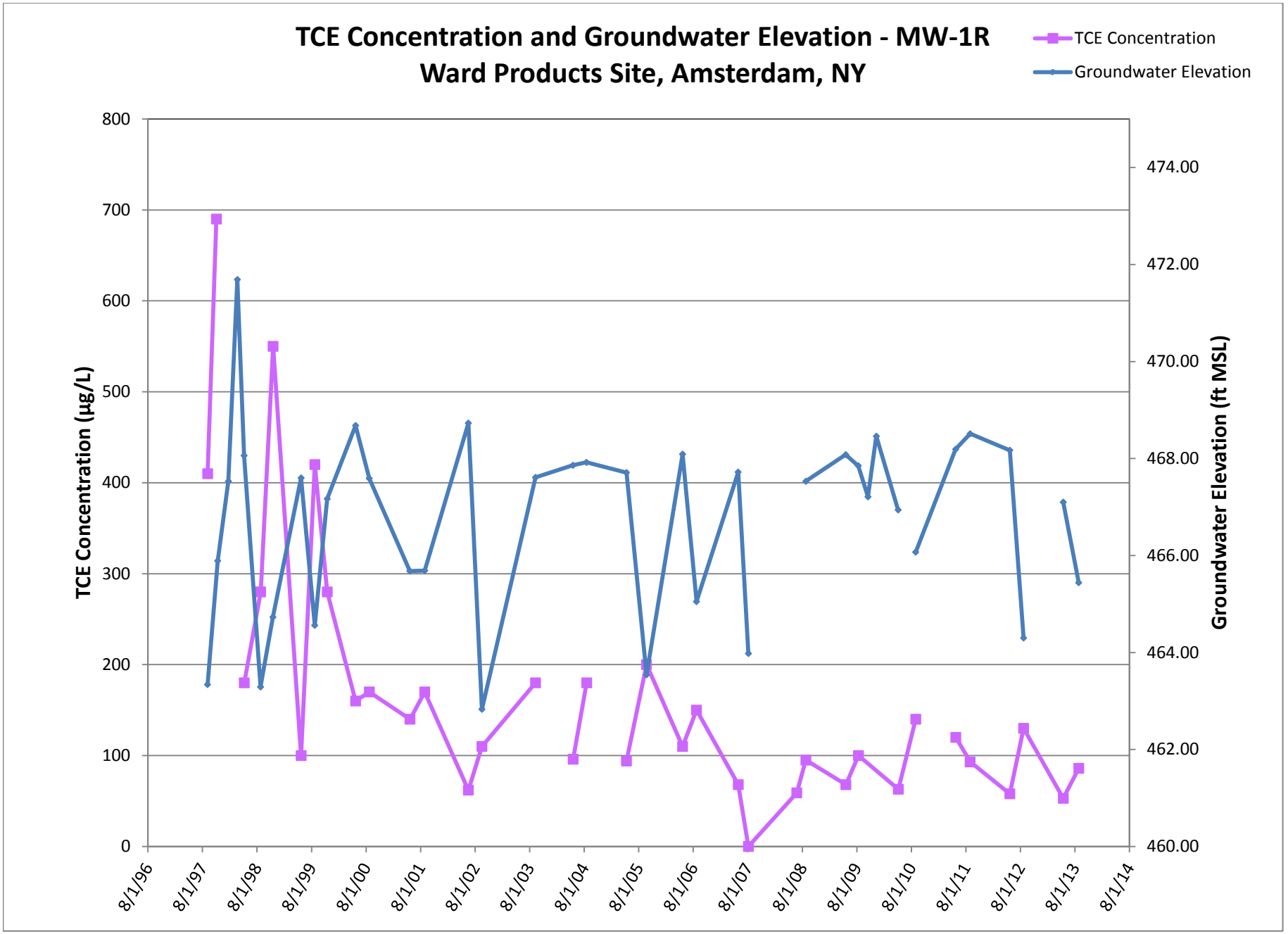
Graphs – Groundwater Elevations and TCE Over Time

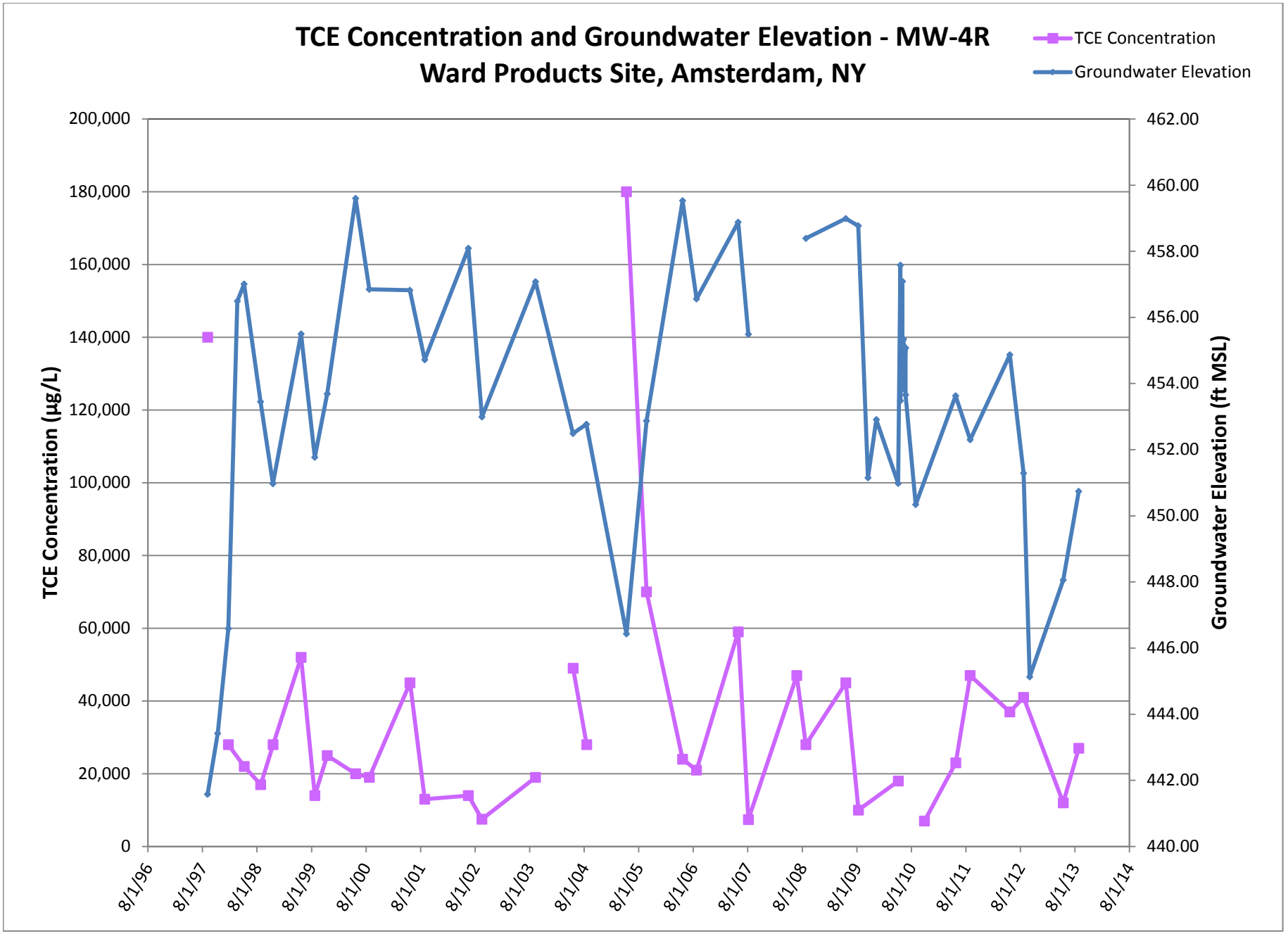

TCE Concentration and Groundwater Elevation - MW-1
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-1 is not sampled for chemical parameters under the SMP. The last sampling occurred in August 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
1,600
1,400
1,200
1,000
800
600
400
200
0
470.00
469.00
468.00
467.00
466.00
465.00
464.00
463.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

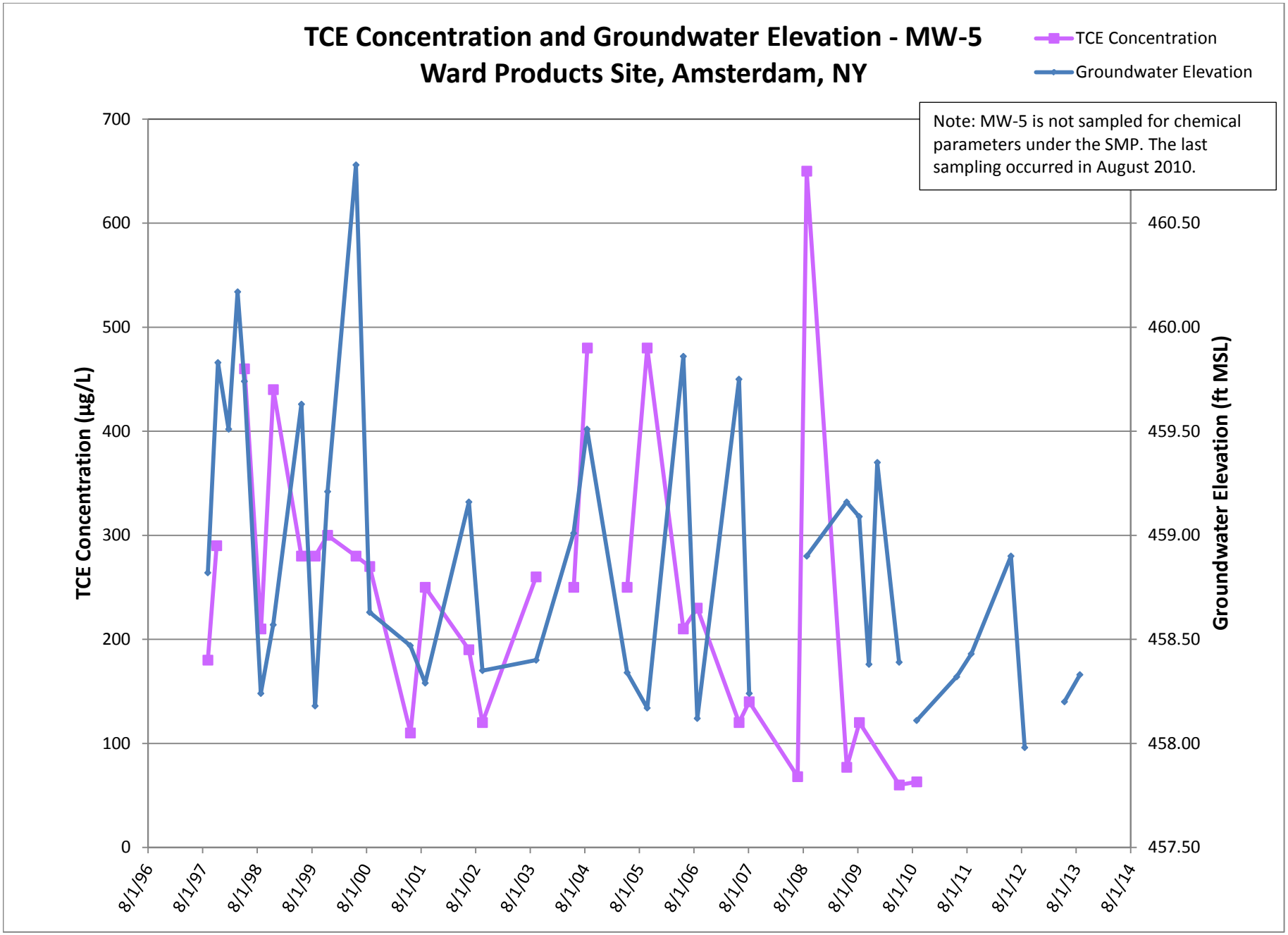

TCE Concentration and Groundwater Elevation - MW-2
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-2 is not sampled for chemical parameters under the SMP. The last sampling occurred in October 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
0
20
40
60
80
100
120
140
460.00
461.00
462.00
463.00
464.00
465.00
466.00
467.00
468.00
469.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

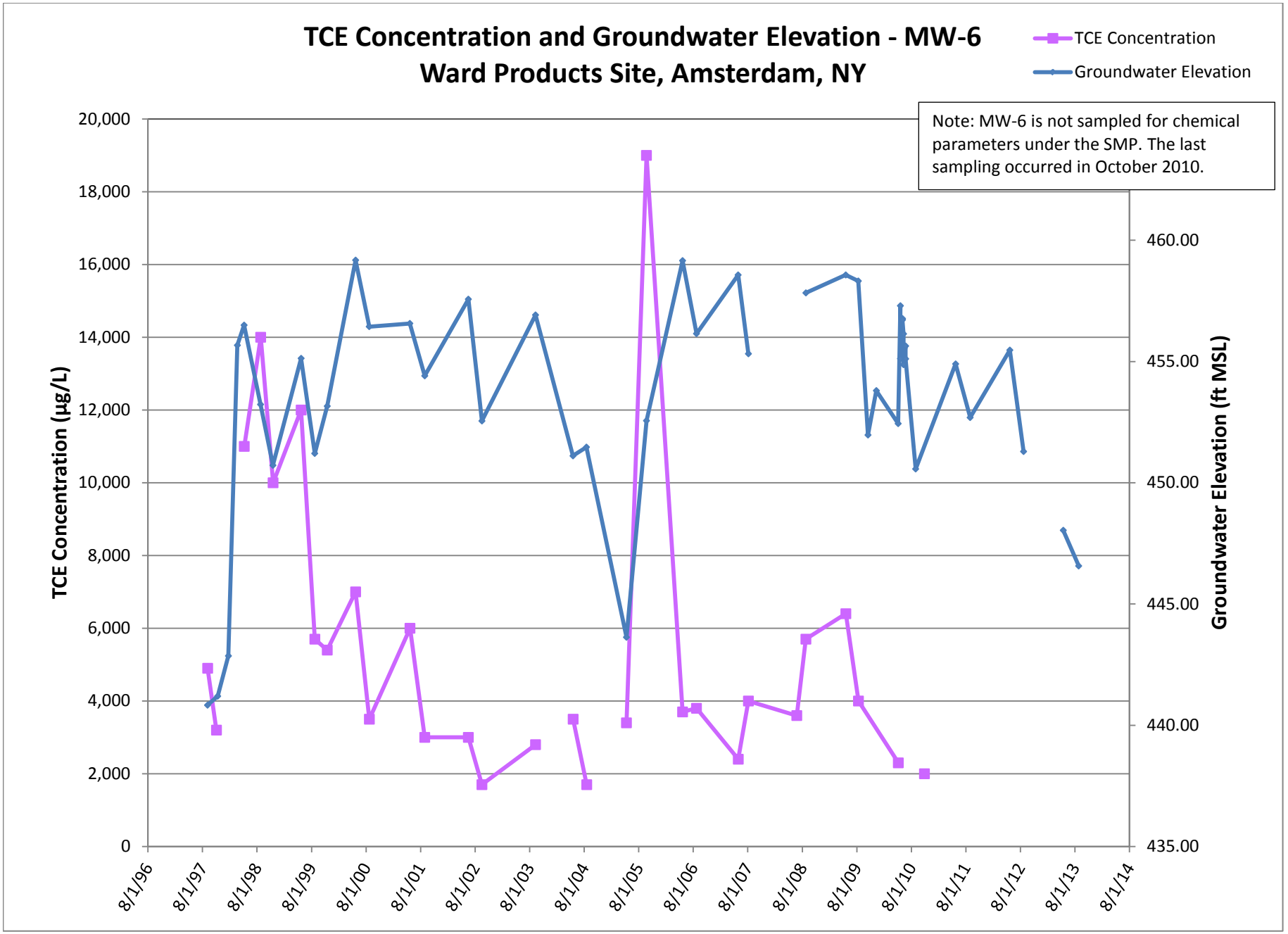

TCE Concentration and Groundwater Elevation - MW-3
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-3 is not sampled for chemical parameters under the SMP. The last sampling occurred in August 2009. MW-3 has been non-detect for TCE since it was first sampled.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
1
1
1
1
1
0
0
0
0
470.00
468.00
466.00
464.00
462.00
460.00
458.00
456.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

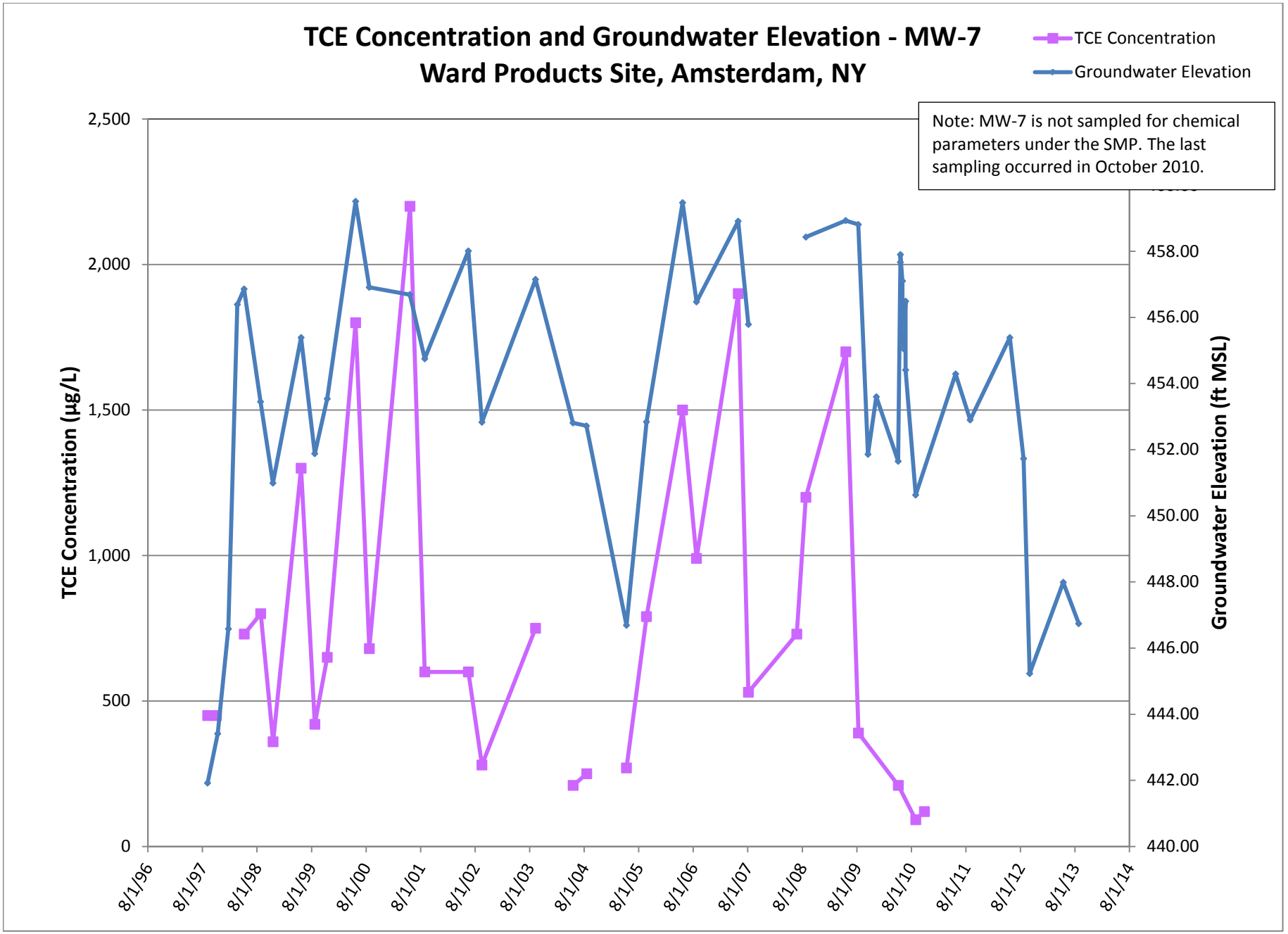

TCE Concentration and Groundwater Elevation - MW-4
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
469.00
467.00
465.00
463.00
461.00
459.00
457.00
455.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

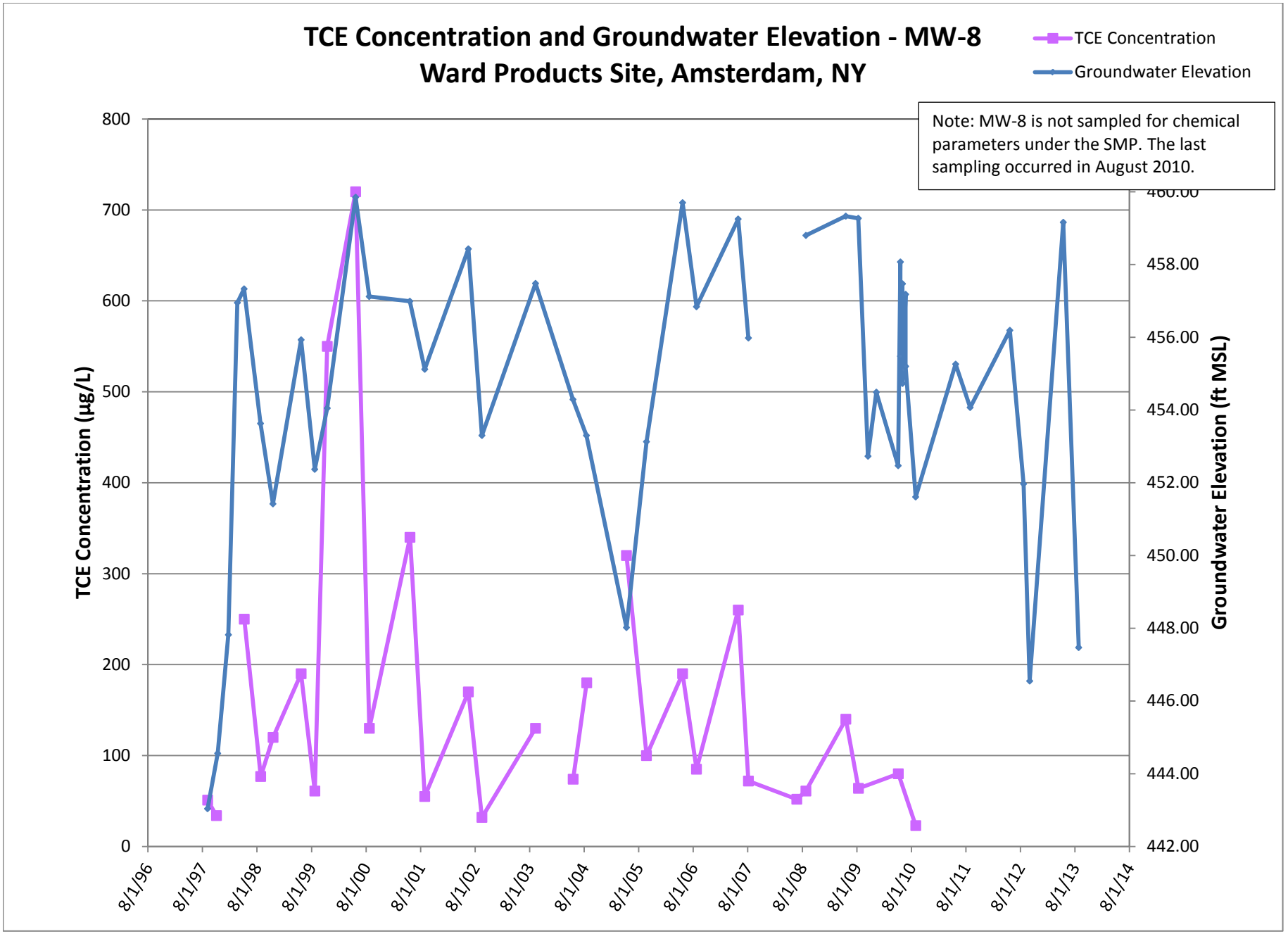

TCE Concentration and Groundwater Elevation - MW-1R
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
800
700
600
500
400
300
200
100
0
474.00
472.00
470.00
468.00
466.00
464.00
462.00
460.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

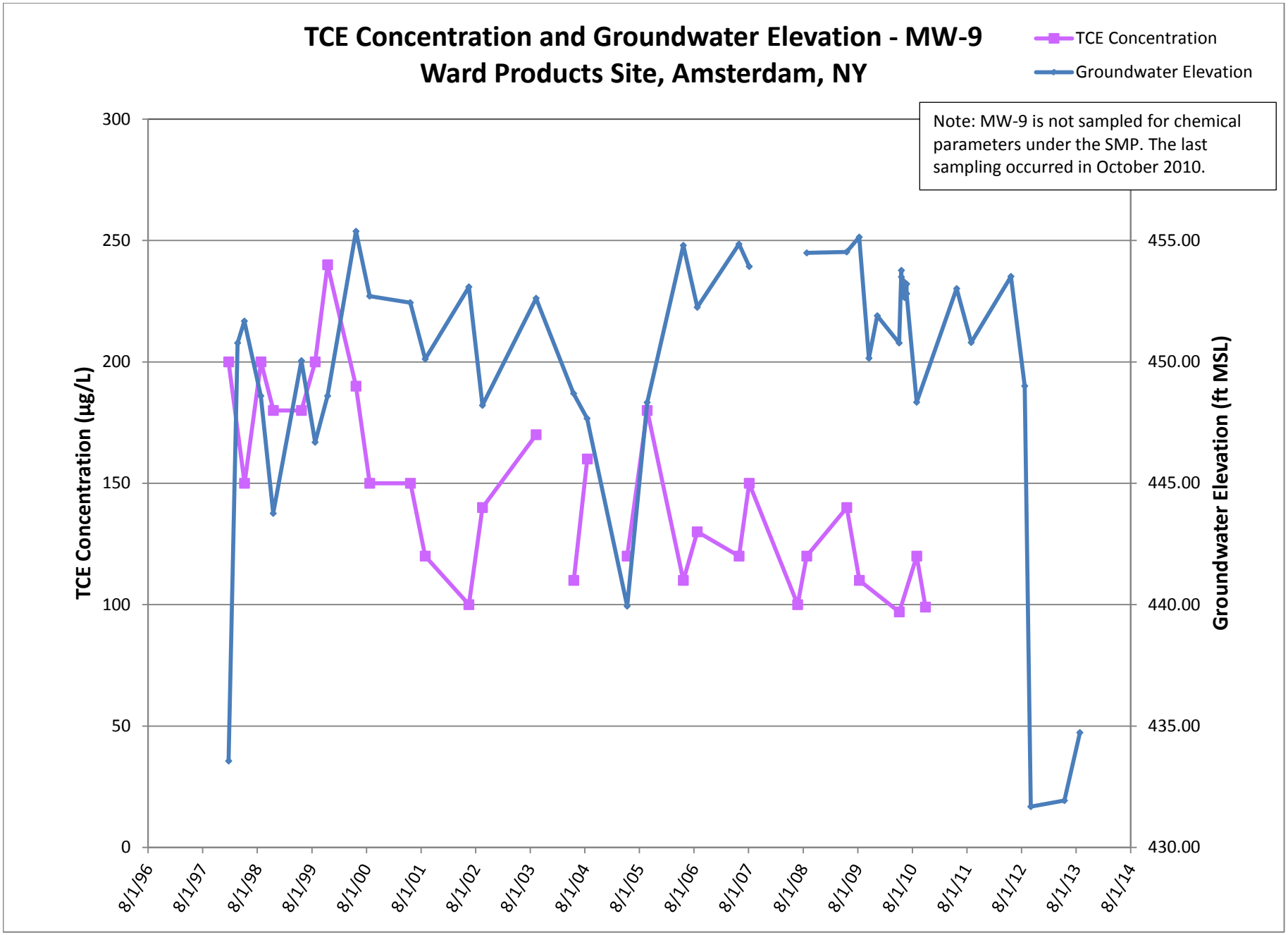

TCE Concentration and Groundwater Elevation - MW-4R
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
200,000
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
462.00
460.00
458.00
456.00
454.00
452.00
450.00
448.00
446.00
444.00
442.00
440.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

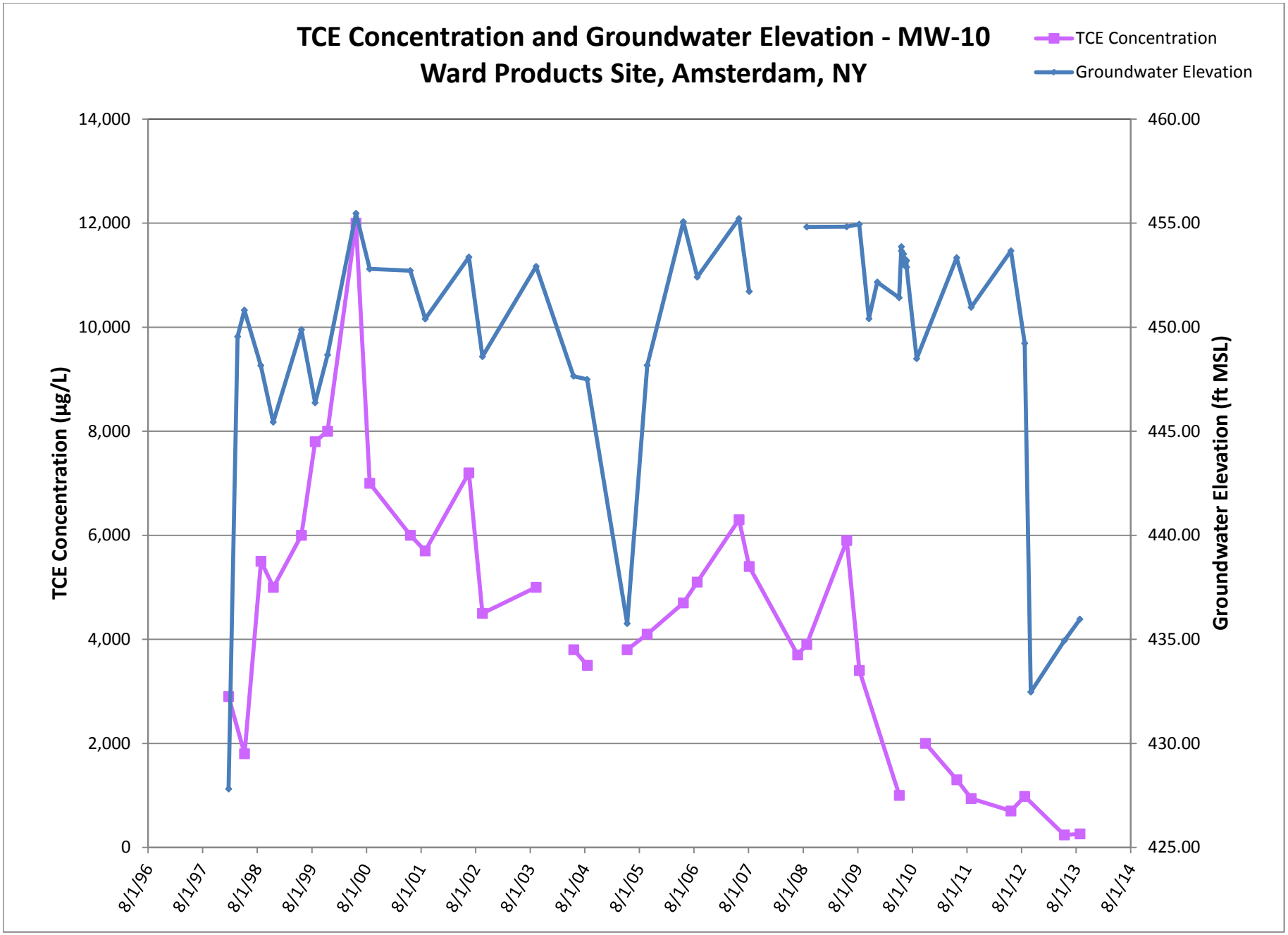

TCE Concentration and Groundwater Elevation - MW-5
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-5 is not sampled for chemical parameters under the SMP. The last sampling occurred in August 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
700
600
500
400
300
200
100
0
460.50
460.00
459.50
459.00
458.50
458.00
457.50
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

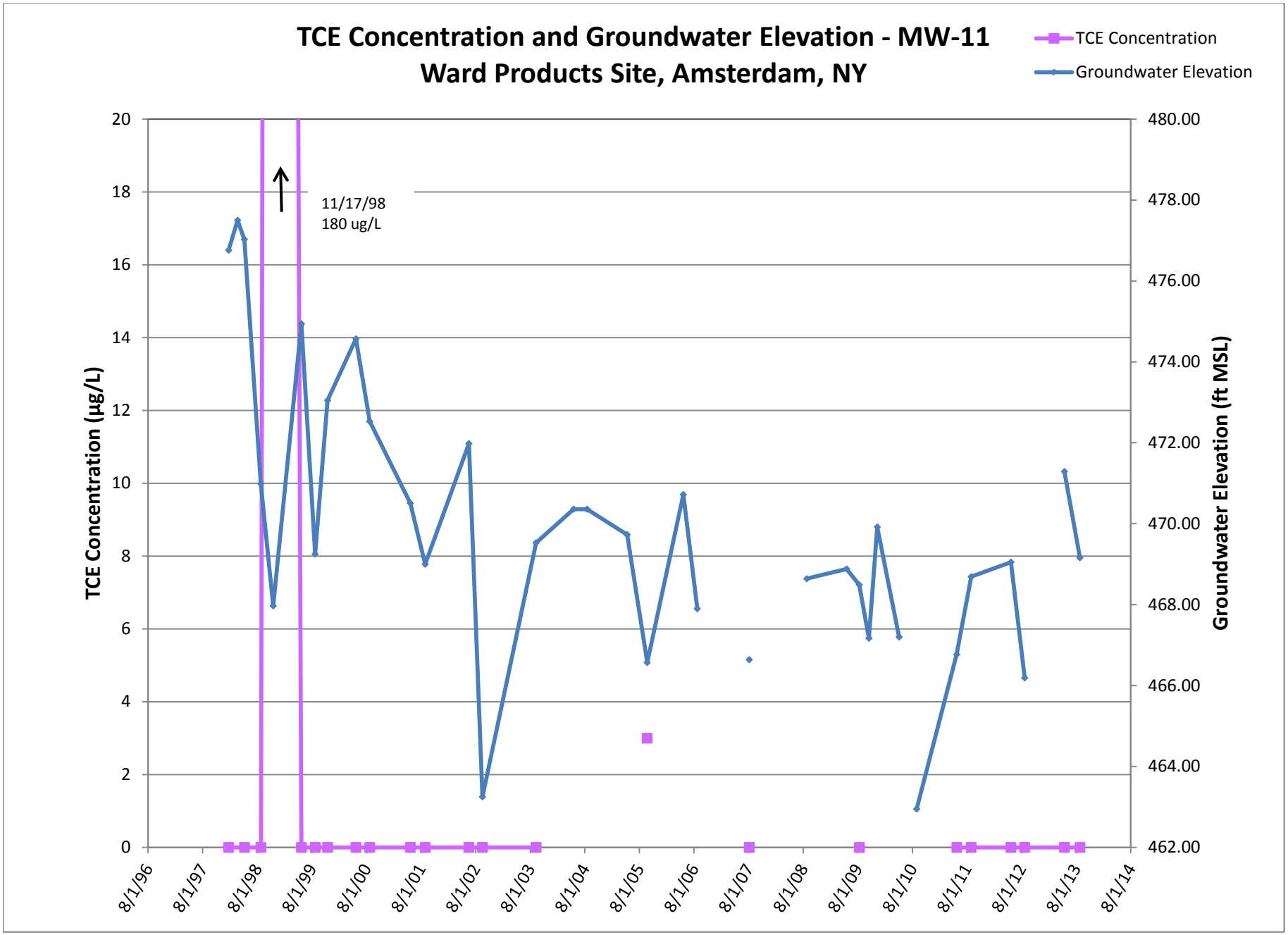

TCE Concentration and Groundwater Elevation - MW-6
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-6 is not sampled for chemical parameters under the SMP. The last sampling occurred in October 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
460.00
455.00
450.00
445.00
440.00
435.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

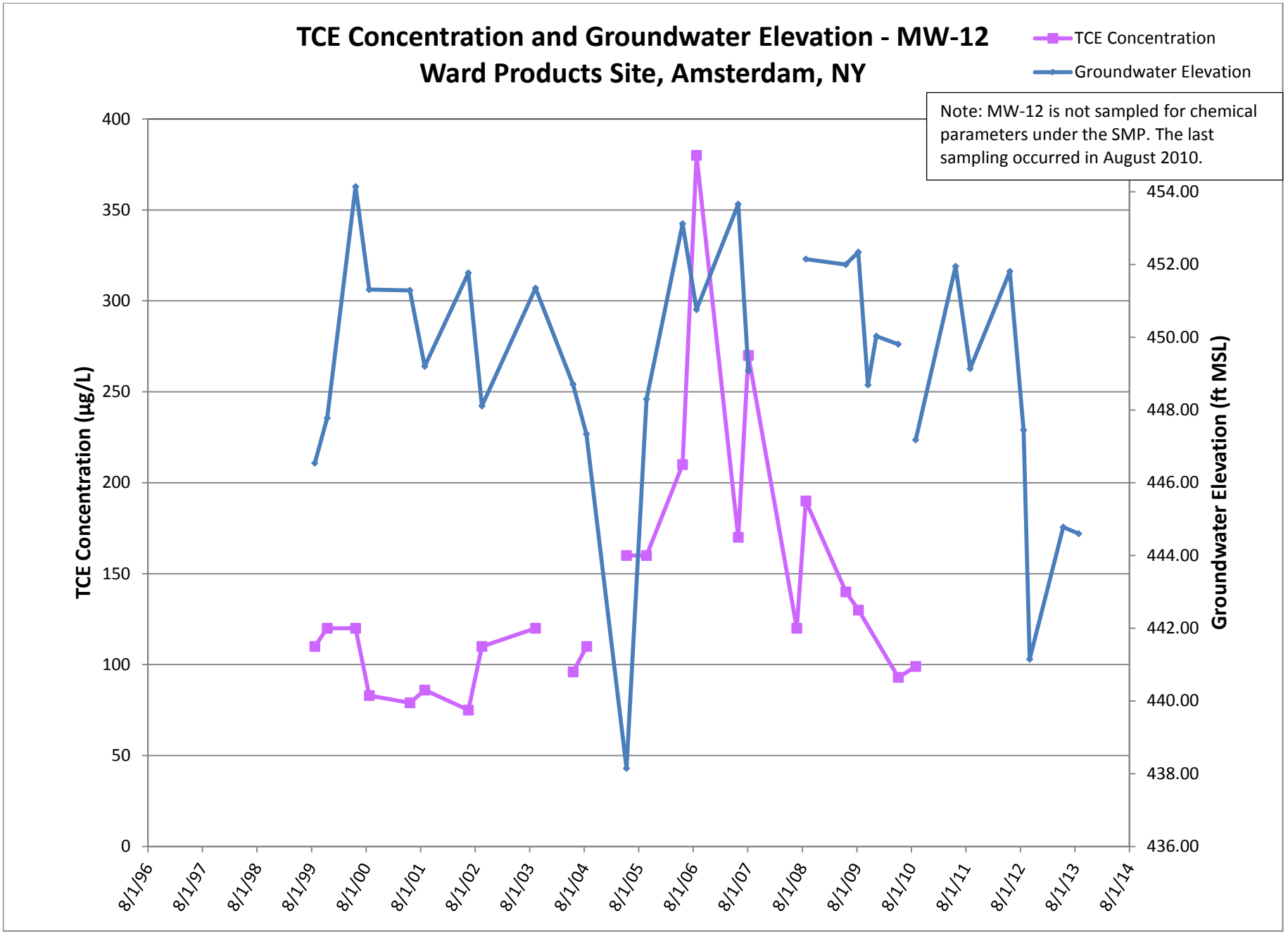

TCE Concentration and Groundwater Elevation - MW-7
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-7 is not sampled for chemical parameters under the SMP. The last sampling occurred in October 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
2,500
2,000
1,500
1,000
500
0
458.00
456.00
454.00
452.00
450.00
448.00
446.00
444.00
442.00
440.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

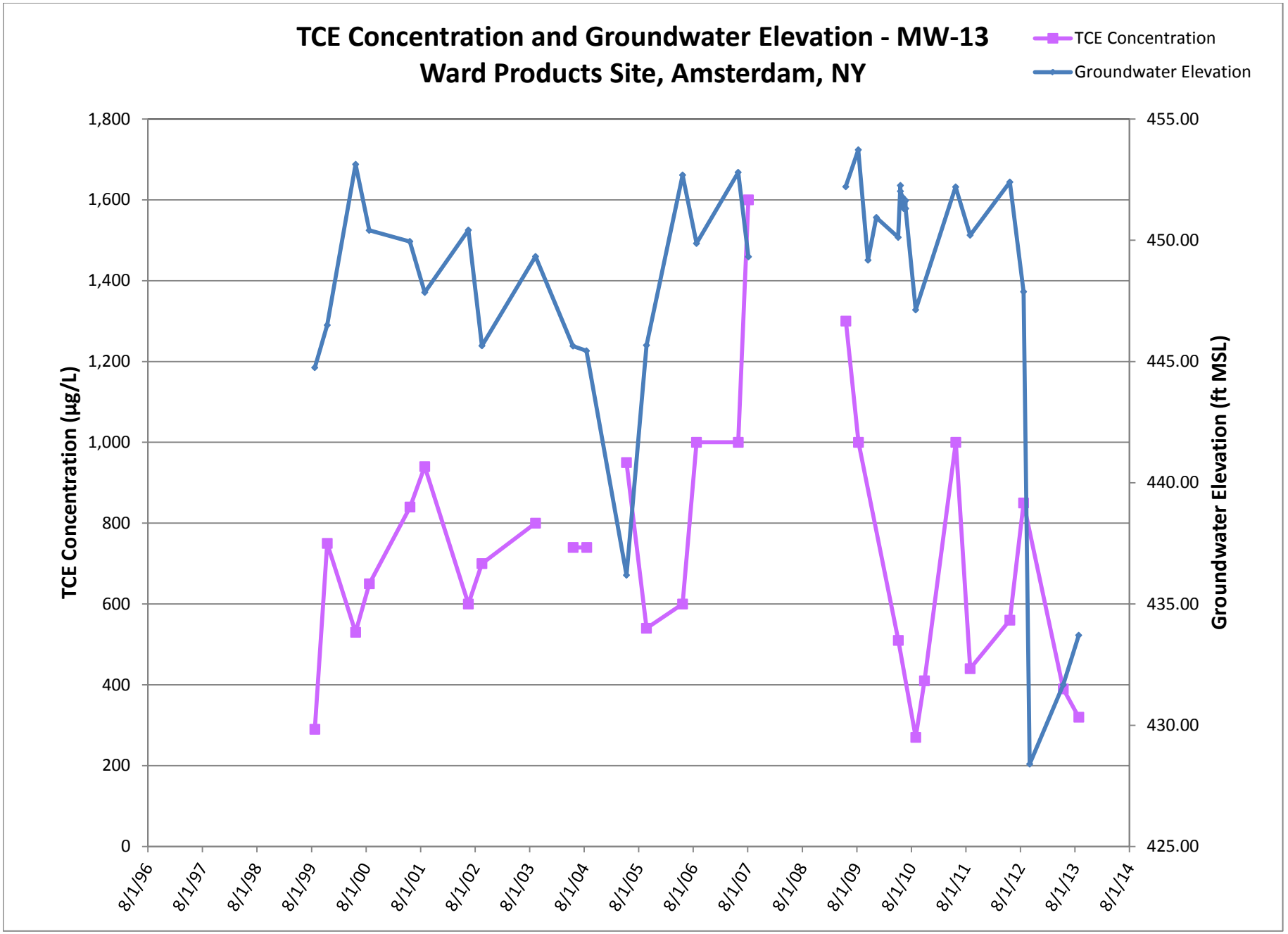

TCE Concentration and Groundwater Elevation - MW-8
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-8 is not sampled for chemical parameters under the SMP. The last sampling occurred in August 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
800
700
600
500
400
300
200
100
0
460.00
458.00
456.00
454.00
452.00
450.00
448.00
446.00
444.00
442.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

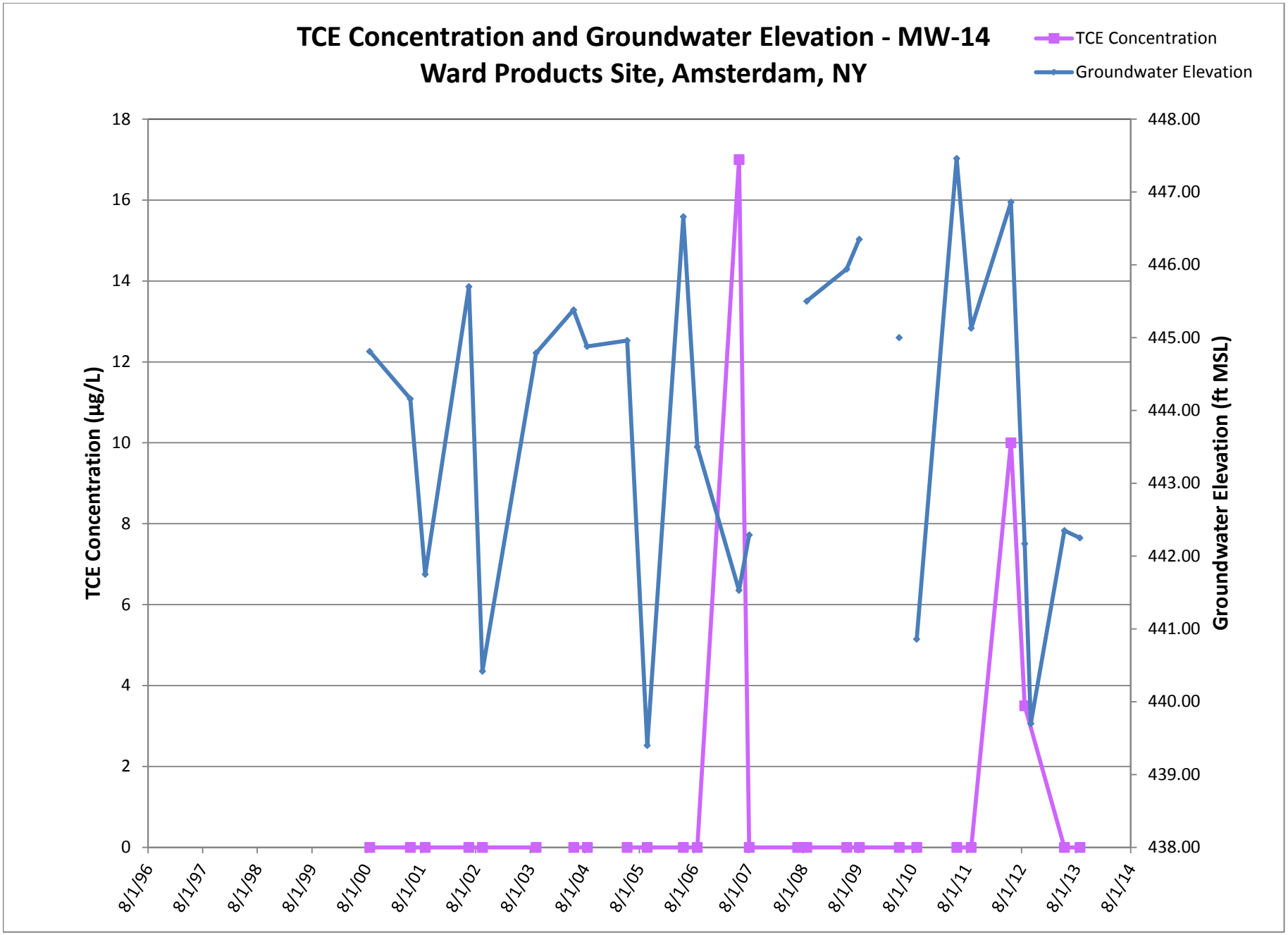

TCE Concentration and Groundwater Elevation - MW-9
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-9 is not sampled for chemical parameters under the SMP. The last sampling occurred in October 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
300
250
200
150
100
50
0
455.00
450.00
445.00
440.00
435.00
430.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

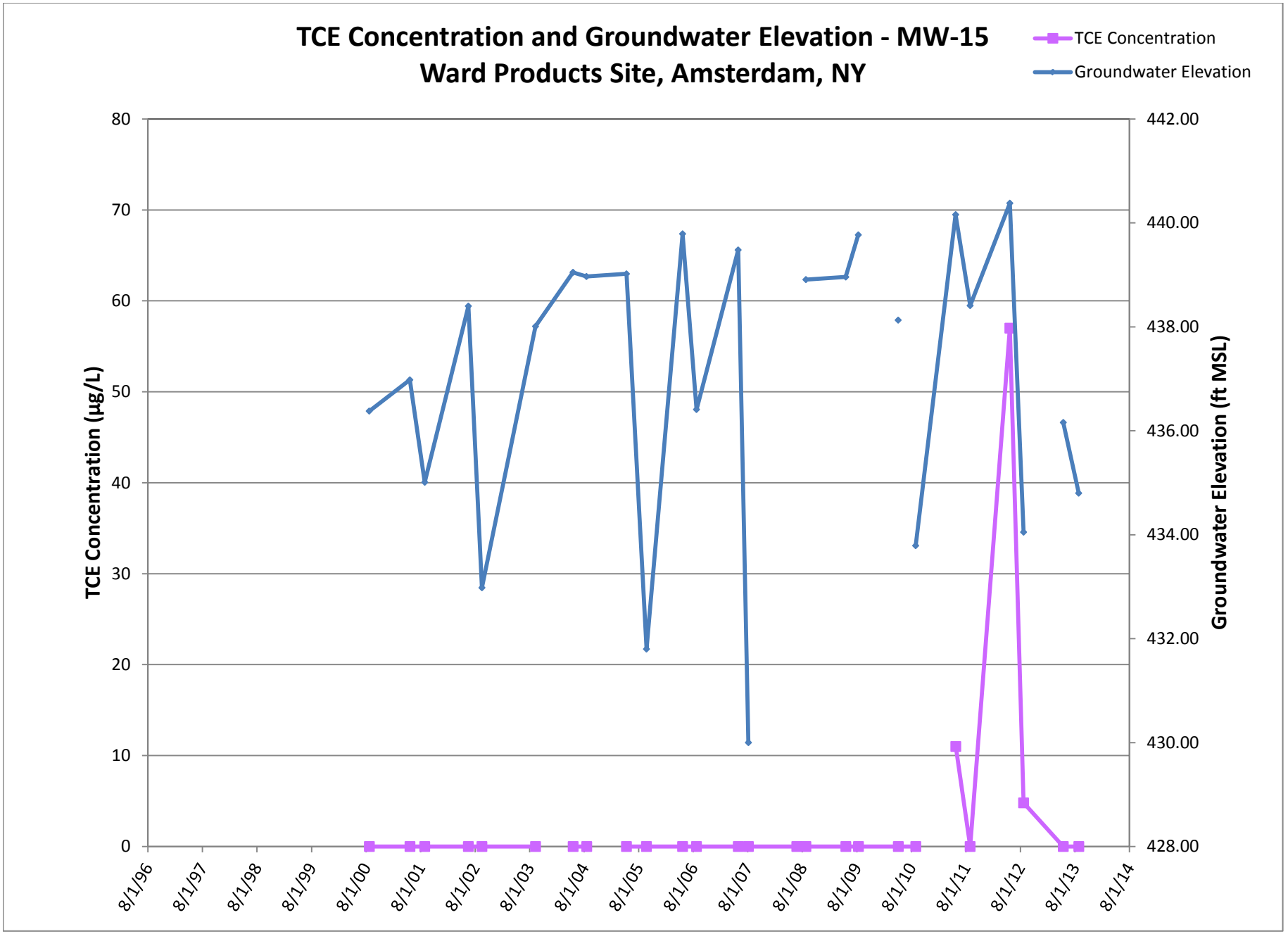

TCE Concentration and Groundwater Elevation - MW-10
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
460.00
455.00
450.00
445.00
440.00
435.00
430.00
425.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

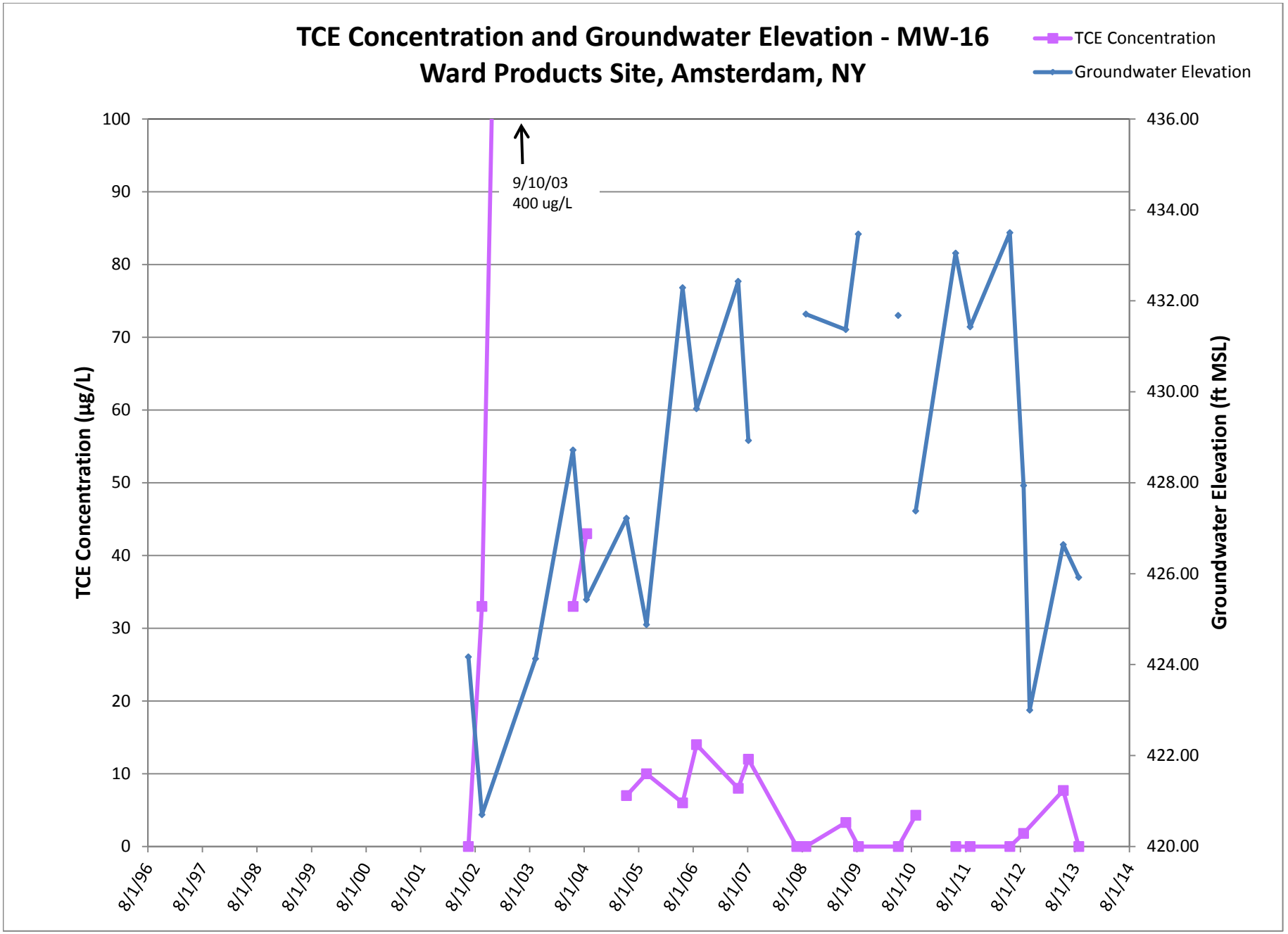

TCE Concentration and Groundwater Elevation - MW-11
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
11/17/98
180 ug/L
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
0
2
4
6
8
10
12
14
16
18
20
462.00
464.00
466.00
468.00
470.00
472.00
474.00
476.00
478.00
480.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

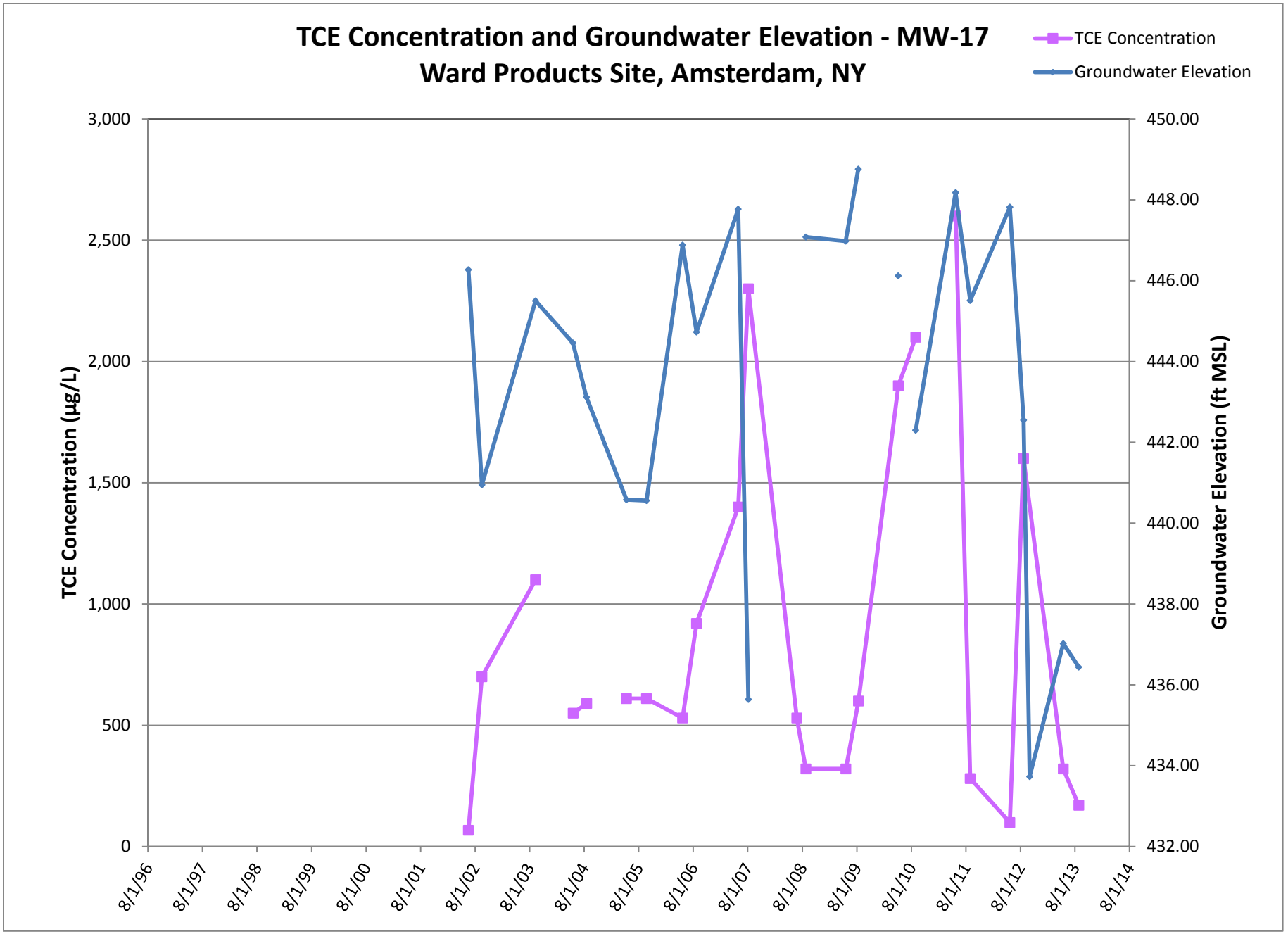

TCE Concentration and Groundwater Elevation - MW-12
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
Note: MW-12 is not sampled for chemical parameters under the SMP. The last sampling occurred in August 2010.
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
400
350
300
250
200
150
100
50
0
454.00
452.00
450.00
448.00
446.00
444.00
442.00
440.00
438.00
436.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

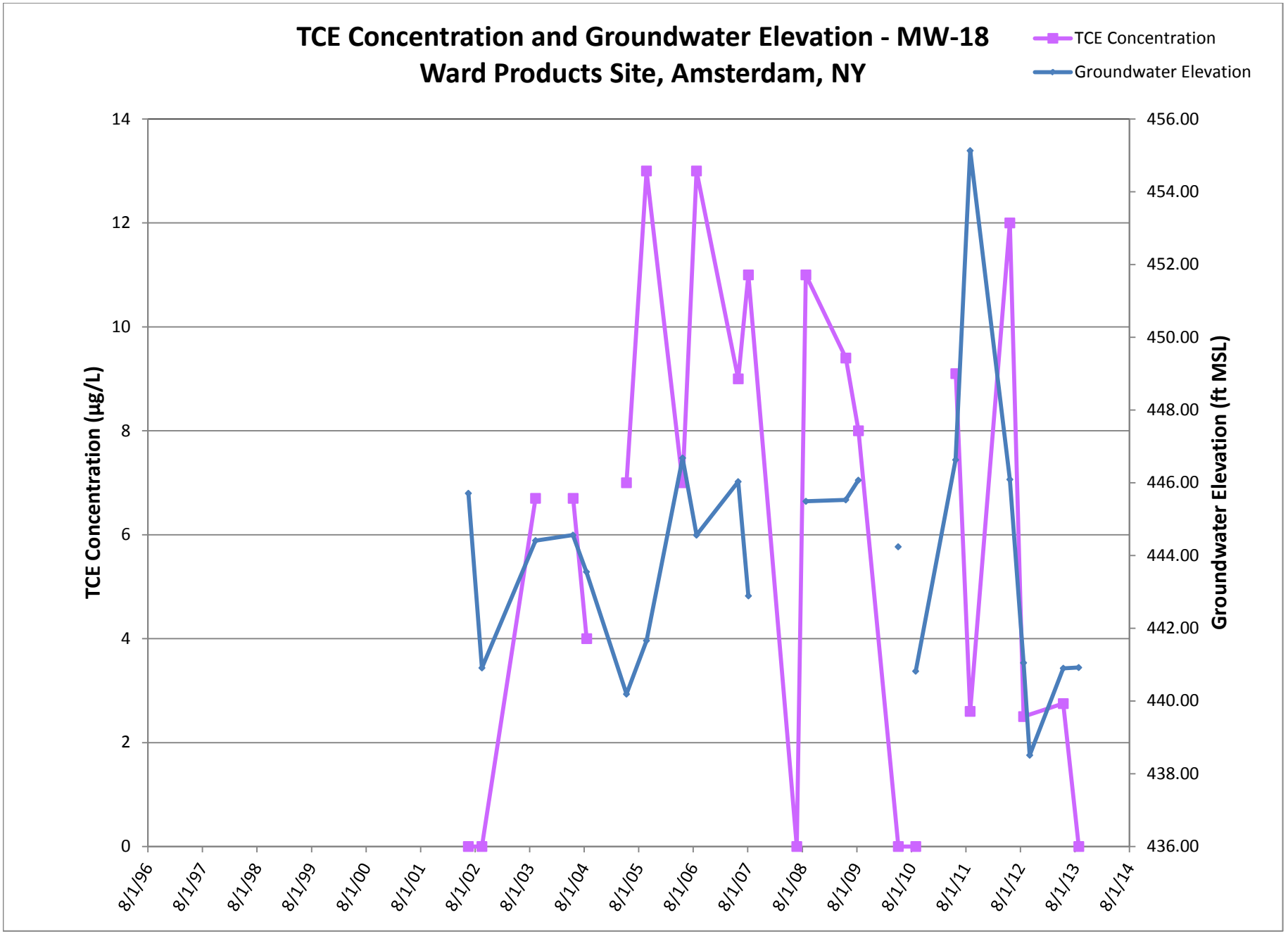

TCE Concentration and Groundwater Elevation - MW-13
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
455.00
450.00
445.00
440.00
435.00
430.00
425.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

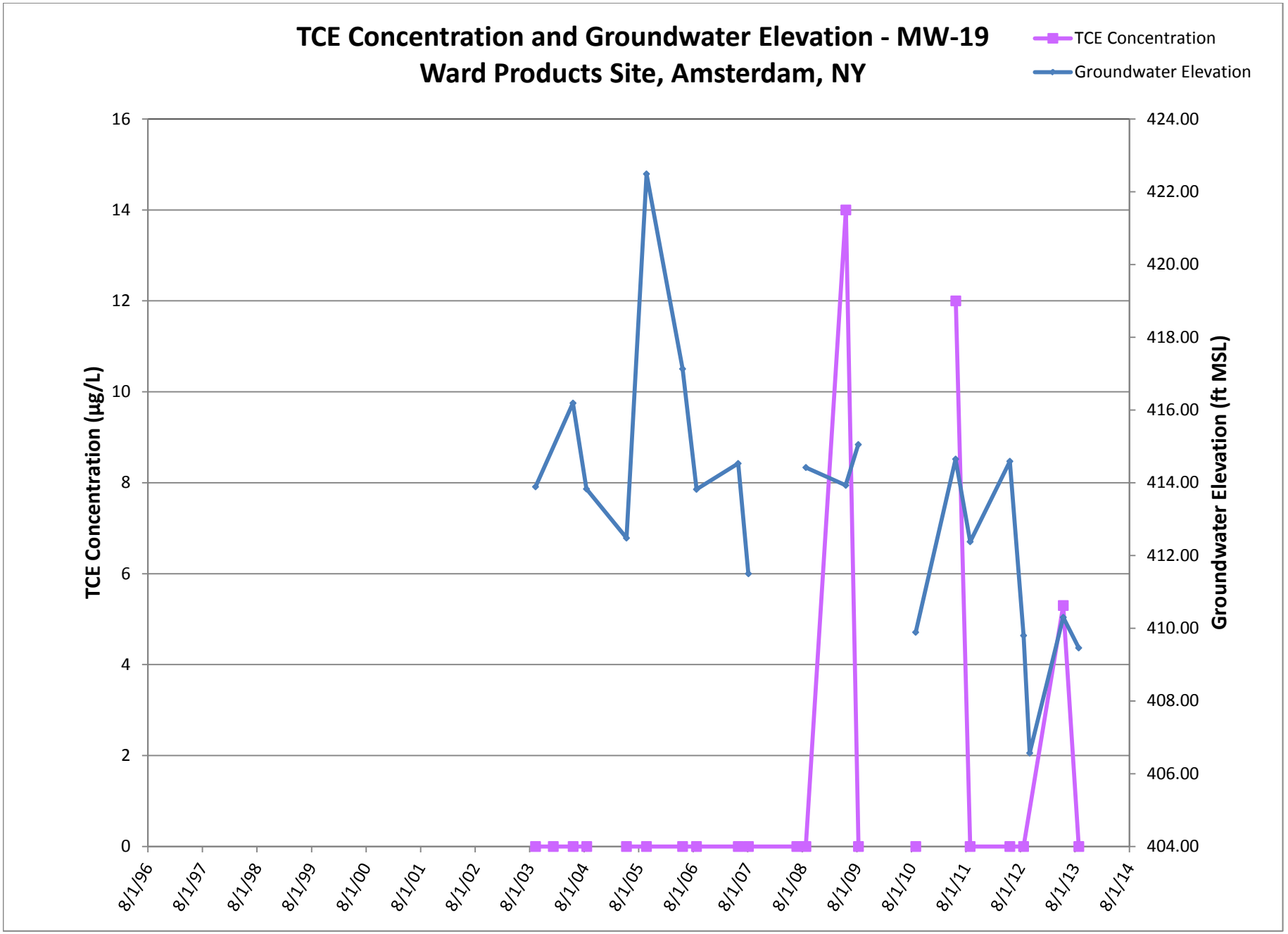

TCE Concentration and Groundwater Elevation - MW-14
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
0
2
4
6
8
10
12
14
16
18
438.00
439.00
440.00
441.00
442.00
443.00
444.00
445.00
446.00
447.00
448.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

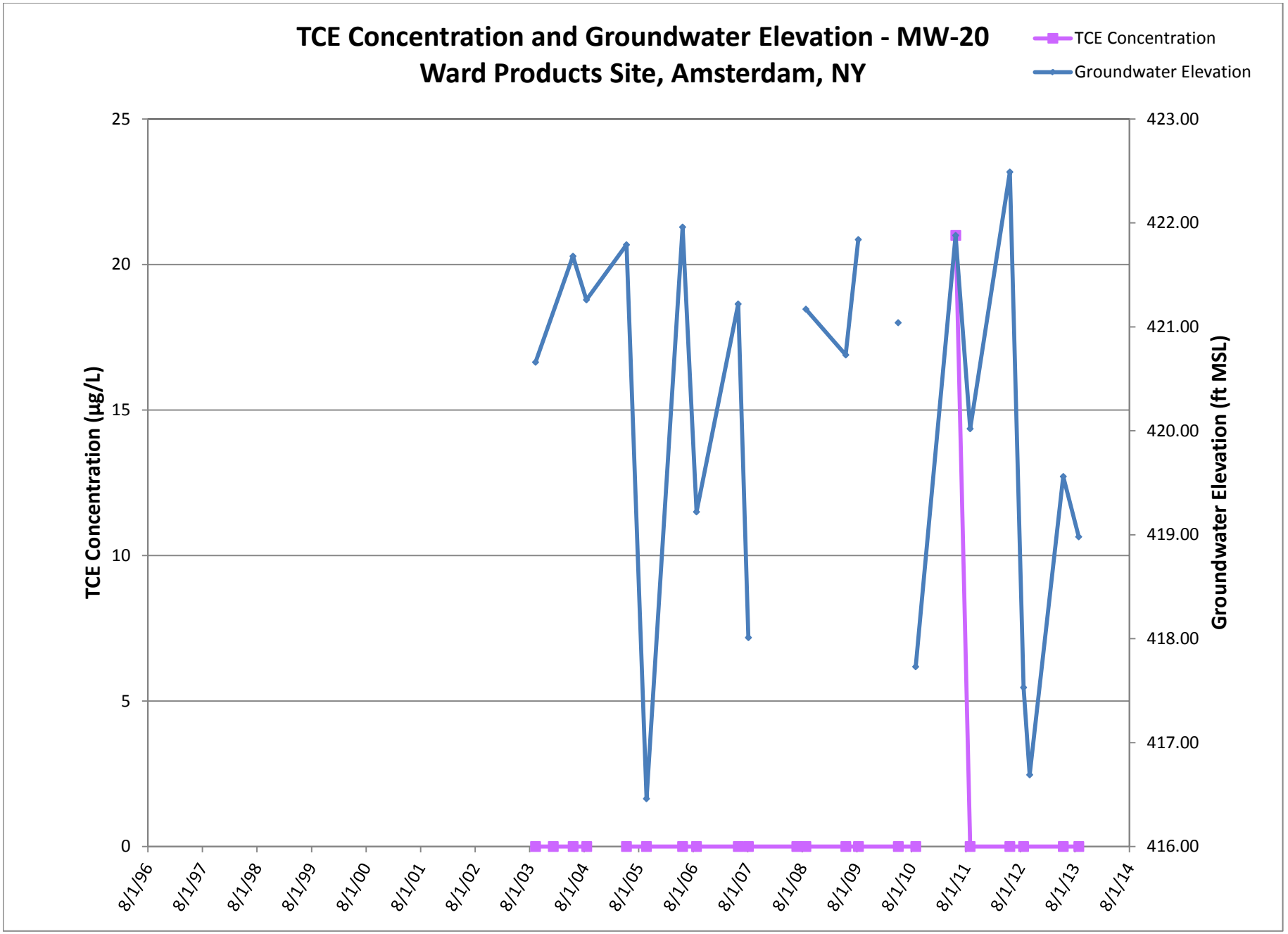

TCE Concentration and Groundwater Elevation - MW-15
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
80
70
60
50
40
30
20
10
0
442.00
440.00
438.00
436.00
434.00
432.00
430.00
428.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14


TCE Concentration and Groundwater Elevation - MW-16
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
9/10/03
400 ug/L
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
100
90
80
70
60
50
40
30
20
10
0
436.00
434.00
432.00
430.00
428.00
426.00
424.00
422.00
420.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14


TCE Concentration and Groundwater Elevation - MW-17
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
3,000
2,500
2,000
1,500
1,000
500
0
450.00
448.00
446.00
444.00
442.00
440.00
438.00
436.00
434.00
432.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14


TCE Concentration and Groundwater Elevation - MW-18
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
0
2
4
6
8
10
12
14
436.00
438.00
440.00
442.00
444.00
446.00
448.00
450.00
452.00
454.00
456.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14


TCE Concentration and Groundwater Elevation - MW-19
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
0
2
4
6
8
10
12
14
16
404.00
406.00
408.00
410.00
412.00
414.00
416.00
418.00
420.00
422.00
424.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14


TCE Concentration and Groundwater Elevation - MW-20
Ward Products Site, Amsterdam, NY
TCE Concentration
Groundwater Elevation
TCE Concentration (µg/L)
Groundwater Elevation (ft MSL)
25
20
15
10
5
0
423.00
422.00
421.00
420.00
419.00
418.00
417.00
416.00
8/1/96
8/1/97
8/1/98
8/1/99
8/1/00
8/1/01
8/1/02
8/1/03
8/1/04
8/1/05
8/1/06
8/1/07
8/1/08
8/1/09
8/1/10
8/1/11
8/1/12
8/1/13
8/1/14

Appendix E

Site Management Periodic Review Report and IC/EC Certification Submittal

Enclosure 2

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 429004

Site Name Ward Products

Site Address: Edson Street Zip Code: 12010
City/Town: Amsterdam
County: Montgomery
Site Acreage: 2.5

Reporting Period: December 01, 2012 to December 01, 2013

	YES	NO
1. Is the information above correct?	☒	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☒
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☒
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☒
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☒

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Commercial and Industrial	☒	☐
7. Are all ICs/ECs in place and functioning as designed?	☒	☐

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative

Date

SITE NO. 429004 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
56.10-2-34	New Water Realty Corp. c/o B. Littleton	Soil Management Plan Building Use Restriction Ground Water Use Restriction Landuse Restriction Monitoring Plan Site Management Plan O&M Plan IC/EC Plan

From ROD:

6.Imposition of an institutional control in the form of an environmental easement that will (a) limit the use and development of the property to industrial use; (b) require compliance with the approved site management plan; (c) restrict the use of groundwater as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (d) require the property owner to complete and submit to the Department a periodic certification of institutional and engineering controls.

7.Development of a site management plan which will include the following institutional and engineering controls:(a) management of the final cover system to restrict excavation below the soil cover or buildings. Excavated soil would be tested, properly handled to protect the health and safety of workers and the nearby community, and would be properly managed in a manner acceptable to the Department. Entities responsible for maintenance of sediment basins downstream from the site will be notified that sediment collecting in those basins may be contaminated; (b) if contaminated soil beneath the building slab ever becomes accessible, it will be removed and properly managed; (c) continued operation of the sub-slab depressurization system at the Ward Products building whenever it is occupied, unless future data warrants otherwise; (d) soil vapor intrusion evaluations at any buildings located above the contaminated groundwater plume if there is a change in the current use of that building; (e) monitoring of groundwater, sediment, and indoor air; (f) identification of any use restrictions on the site; and (g) provisions for the continued proper operation and maintenance of the components of the remedy.

8.The property owner will provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owner in writing that this certification is no longer needed. This submittal will: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that will impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
56.10-2-34	Vapor Mitigation Cover System Groundwater Treatment System Groundwater Containment

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☒	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) If a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☒	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

Signature of Owner, Remedial Party or Designated Representative

Date

IC CERTIFICATIONS
SITE NO. 429004

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Barbara Littleton, CEO, New Water Realty Corporation (print name) at c/o 2900 Orchard Place, Orchard Lake, MI 48324 (print business address)

am certifying as President & CEO of Owner (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

Barbara Littleton
Signature of Owner, Remedial Party, or Designated Representative Rendering Certification

12/17/13
Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I SCOTT UNDERHILL (print name) at AECOM 40 BRITISH AMERICAN BLVD, LATHAM, NY, 12110 (print business address)

am certifying as a Professional Engineer for the OWNER (Owner or Remedial Party)

Scott Underhill
Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification

Stamp (Required for PE)

12-9-13
Date