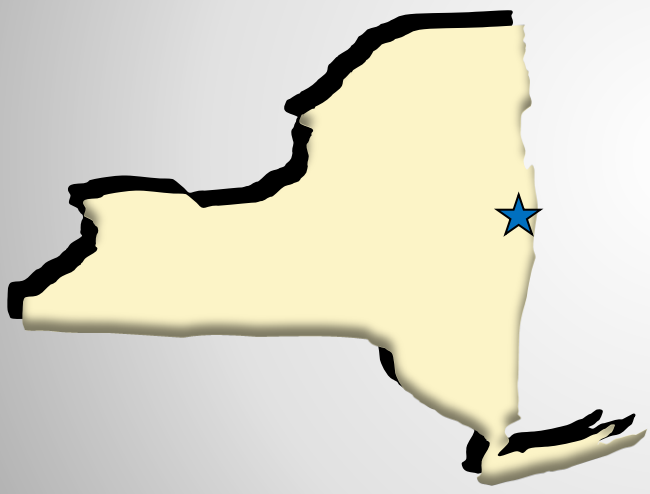
PERIODIC REVIEW REPORT
30 July 2017 – 30 July 2020

Perfection Plating (401037)
Watervliet, Albany County, New York



Prepared for:

NEW YORK STATE OF OPPORTUNITY | Department of Environmental Conservation

New York State Department of Environmental Conservation
Division of Environmental Remediation
Remedial Bureau E, Section D

Prepared by:

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EA Science and Technology

August 2020

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Watervliet, New York

Prepared for

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Revision: FINAL
EA Project No. 16025.13

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LIST OF ACRONYMS AND ABBREVIATIONS

Cr^{+6}	Hexavalent chromium
AWQS	Ambient Water Quality Standard(s)
Aztech	Aztech Environmental Technologies
BOD	Basis of Design
EA	EA Engineering, P.C. and its affiliate EA Science and Technology
EC	Engineering controls
EEE	Ecology and Environment Engineering, P.C.
EPA	United States Environmental Protection Agency
FS	Feasibility study
gpm	Gallon(s) per minute
IC	Institutional Control
mg/kg	Milligram(s) per kilogram
mg/L	Milligram(s) per liter
No.	Number
NYSDEC	New York State Department of Environmental
OM&M	Operation, Monitoring, and Maintenance
PRR	Periodic Review Report
PDI	Preliminary Design Investigation
RA-O	Remedial action objectives
ROD	Record of Decision
RI	Remedial investigation
SCG	Standards, Criteria, and Guidance
SMP	Site Management Plan

ES. EXECUTIVE SUMMARY

The New York State Department of Environmental Conservation (NYSDEC) tasked EA Engineering, P.C. and its affiliate EA Science and Technology (EA) to provide site management services from 30 July 2017 through 30 July 2020 at the Perfection Plating Site (Site) (NYSDEC Site No. 401037), located in the city of Watervliet, Albany County, New York (**Figure 1**). These services were conducted under NYSDEC Standby Engineering Services Contract Nos. D007624-15 and D009806-13.

Operation, maintenance, and monitoring program (OM&M) activities have been conducted at the Perfection Plating Site since 1998 in accordance with the New York State Inactive Hazardous Waste Disposal Site Remedial Program and as stipulated in the Record of Decision (NYSDEC 1995) and Amended Record of Decision (NYSDEC 2018) in order to attain identified cleanup goals.

The purpose of this Periodic Review Report is to summarize the results of the 30 July 2017 through 30 July 2020 site inspection events, monthly influent/effluent water monitoring, quarterly overburden groundwater monitoring, and annual bedrock groundwater monitoring; evaluate the effectiveness of the remedial actions implemented at the Site; and to provide sufficient documentation that the remedy remains in place, is performing properly and effectively, and is protective of public health and the environment.

This report also documents any problems or changes necessary for the Site to be in compliance with the OM&M Plan (Ecology and Environment Engineering, P.C. [EEE] 1998) including removal of institutional controls/engineering controls that are no longer applicable, modifications in monitoring requirements, as applicable, or a Corrective Action Work Plan and schedule, as necessary.

ES.1 COMPLIANCE

The following activities must be performed to be in compliance with the Operation & Maintenance Manual (EEE 1998) and subsequent revisions:

- Weekly preventative maintenance of the groundwater treatment system
- Monthly treatment system (influent and effluent) sampling
- Quarterly overburden groundwater sampling
- Annual bedrock groundwater sampling.

Weekly preventative maintenance site visits were conducted as required by Aztech Environmental Technologies, Inc. The treatment system was largely operational during this reporting period and was observed to be running upon arrival during approximately 89 percent of site visits. However, the treatment system was off for an extended period of time beginning from 29 November 2019 to 21 January 2020 due to a faulty metering pump for the acid tank.

Groundwater treatment system influent and effluent samples were collected every month in the reporting period except December 2019 due to contracting issues. Effluent samples were in compliance with requirements for effluent limitations in all months monitored, except in December 2018 (0.71 milligrams per liter [mg/L]), July 2019 (0.56 mg/L), and January 2020 (0.52 mg/L), when total chromium (Cr) results exceeded the State Pollutant Discharge Elimination System limit of 0.50 mg/L.

Ten quarterly groundwater sampling events (seven overburden monitoring events and three overburden and bedrock monitoring events) were performed during this reporting period at the well locations shown in **Figure 2**. Due to budget constraints and contracting funding issues, overburden groundwater monitoring events were not conducted in the second quarter of 2018, the fourth quarter of 2018, or the first quarter of 2019.

ES.2 EFFECTIVENESS OF REMEDIAL PROGRAM

From 1965 to 1990, the Site was used as a plating facility by three different owners. A leaking chromic acid tank and exhaust vents resulted in significant contamination to soil, groundwater, and building materials. A Cr groundwater plume resulted from the chromic acid source underlying the building, and that plume migrated downgradient to the Siberia area of the adjacent Watervliet Arsenal and towards 12th Street.

The remedial investigation/feasibility study and Record of Decision (ROD) was completed in December of 1995 (NYSDEC 1995). The ROD required removal and disposal of contaminated soil and the installation of a groundwater inceptor trench and treatment system, which was completed in 1998. An Amended ROD (NYSDEC 2018) was issued for the Site in May 2018 to address remaining source area contamination. Remedial action objectives (RA-Os) presented in the original ROD are included the following table.

Media	RA-O	Status
Soil	Reduce, control, or eliminate the contamination present within the soil.	Although some soil excavation has been implemented, contaminated soil is still present at the Site. Remaining contaminated soil is to be removed in upcoming remedial actions in accordance with the Amended ROD.
	Eliminate the potential for direct human or animal contact with the contaminated soil onsite and miscellaneous contaminated materials inside the Perfection Plating building.	Impacted surface soil and building materials is present within the former Perfection Plating building. However, site access is limited by site security fence and passageways into the former plating building are locked. Site access is restricted to those with proper training.
	Prevent migration of contaminants from the Site to groundwater.	Concentrations of hexavalent chromium in groundwater near the source area (MW-EE-5S) have decreased slightly since 2003 but remain at the same order of magnitude since the previous PRR reporting period. This indicates that soil in the source area is acting as a continuing source of contamination The possibility still exists for groundwater to come in contact with remaining impacted soil. However, remaining contaminated soil is to be removed in upcoming remedial actions in accordance with the Amended ROD. Additionally, impacted groundwater is not used as a public drinking water source.
Groundwater	Mitigate the impacts of contaminated groundwater to the environment.	An interceptor trench is operating to prevent offsite migration; however, groundwater results from this reporting period and previous periods indicate that a portion of the Cr plume is bypassing the trench. However, downgradient receptors are supplied with public water and impacted groundwater is not used as a public drinking water source.
	Provide for attainment of Standards, Criteria, and Guidance (SCGs) for groundwater quality at the limits of the area of concern.	Groundwater exceedances of SCGs exist in five overburden wells. Although the size of the groundwater plume has decreased between the June 2017 to the July 2020 sampling events (**Figures 3 and 4**), the current concentrations of hexavalent chromium in the source area are on the same order of magnitude as sampling events completed from July 2014 to July 2017 (**Figures 5A through 5E)**.
Building	Eliminate the potential for direct human or animal contact with the contaminated soil onsite and miscellaneous contaminated materials inside the Perfection Plating building.	Potential for direct human or animal contact with both the contaminated soil onsite and miscellaneous contaminated materials inside the Perfection Plating building exists as a result of unauthorized access. However, site access is limited by site security fence and passageways into the former plating building are locked. Site access is restricted to those with proper training.

ES.3 CONCLUSIONS AND RECOMMENDATIONS

The treatment system was largely operational, institutional controls and engineering controls are in place, and OM&M activities have been performed in accordance with the OM&M Plan during this reporting period (with a few exceptions due to contracting and funding issues). However, exceedances of groundwater SCGs continued to be observed in several overburden wells; groundwater SCG detections and exceedances have been observed downgradient of the treatment trench; and building materials and soil within the footprint of the former plating building (i.e. source area) continue to provide an ongoing source of contamination. Additionally, although the overall area of the groundwater contaminant plume appears to have decreased from June 2017 to July 2020, the change is based on the difference in concentrations from two downgradient wells (MW-ESE-9R and MW-EA-11S), at which there is a history of intermittent detections of hexavalent chromium above SCGs. The main portion of the plume, located around the source area, has not decreased in size, and concentrations of hexavalent chromium near the source area are on the same order of magnitude as those from sampling events completed in the previous PRR reporting period.

Thus, as of July 2020, several of the RA-Os have not been achieved or partially achieved:

- Reduce, control, or eliminate contamination present within soil onsite.
- Prevent, to the extent possible, migration of contaminants from the Site to groundwater.
- Provide for attainment of SCGs for groundwater quality at the limits of the area of concern.

These conclusions are consistent with those discussed in the 2017 PRR (EA 2018). EA's recommendations for additional remediation from the 2017 PRR were incorporated into an Amended ROD (NYSDEC 2018), which presented changes to the original remedy to help achieve RA-Os. These changes included demolition of the former plating building, excavation and offsite disposal of contaminated soil beneath the building footprint, in-situ geochemical fixation, and placement of an environmental easement on the property to restrict the Site to commercial and industrial use, and to restrict use of groundwater.

Draft work planning documents for the amended remedy, including a Basis of Design report prepared by EA in October 2019 (Revised Final version), Remedial Construction Estimate in October 2019, a Remedial Action Scope of Work in May 2020, and an in-situ geochemical fixation Pilot Study Work Plan in June 2020 were started under the previous contract D-007624 and continued during this contract under a separate Work Assignment (EA 2019, 2020b, and 2020c). The amended remedy is intended to be completed in 2021 and is anticipated to help achieve RA-Os when implemented with the original remedy and existing OM&M program. It is recommended that future PRRs should be prepared and submitted at 3-year intervals to evaluate the effectiveness of the previous and upcoming remedial actions implemented at the Site.
Compliance issues with the OM&M plan were largely the result of delays and funding issues under the D-007624 contract. These issues have since been resolved and are unlikely to affect upcoming work.

1. SITE OVERVIEW

EA Engineering, P.C. and its affiliate EA Science and Technology (EA) have prepared this Period Review Report (PRR) for the Perfection Plating Site (Site) (New York State Department of Environmental Conservation [NYSDEC] Site No. 401037). The Site is an inactive plating facility located at 911 11th Street in the City of Watervliet, New York, approximately 5 miles north of the City of Albany (**Figure 1**). The Site covers 1.7 acres and is located in an urban area (**Figure 2**). The Site is bordered to the north and east by a residential area, to the south by commercial and residential properties, and to the west by the "Siberia Area" of the Watervliet Arsenal. The Perfection Plating Site is currently classified as a Class 4 Site, requiring site management consisting of operation, maintenance, and/or monitoring. A groundwater treatment system is currently in operation and a routine monitoring program is in place.

1.1 OBJECTIVES OF THE PERIODIC REVIEW

The periodic review process is used to determine whether a remedy is being managed properly, as set forth in the Record of Decision (ROD). The objectives of the periodic review for sites in the State Superfund Program are as follows:

- Determine if the remedy remains in place, is performing properly and effectively, and is protective of public health and the environment.
- Evaluate compliance with the decision document(s) and, if available, the Site Management Plan (SMP).
- Evaluate all treatment units, and recommend repairs or changes, if necessary.
- Evaluate the condition of the remedy.
- Certify, if appropriate, that the intent of institutional controls (IC) continues to be met, and that engineering controls (EC) remain in place, are effective and protective of public health and the environment.
- Evaluate costs.

1.2 REMEDIAL HISTORY

1.2.1 Site History and Initial Responses

From 1965 to 1990, the Site was used as a plating facility by three different owners as follows:

- Watervliet Plating, operating from 1965 to 1973, with the facility conducting chrome and nickel bumper plating.

- Perfection Plating, operating from 1974 to 1989, with the primary operation consisting of zinc and cadmium plating and later changing to chrome and copper plating of brake parts.

- Pinnacle Plating, operating from 1989 to 1990, with the facility conducting copper and Cr plating with some zinc and cadmium plating. The facility was abandoned on 1 September 1990.

On 24 October 1989, a Consent Order (File No. R4-0641-89-03) was issued to the owners of Perfection Plating requiring submittal and implementation of a remedial investigation (RI)/feasibility study (FS). During operation of the facility, a significant leak in the chromic acid tank was noted. The tank was removed, and a new tank was installed adjacent to the former location. Chromic acid had apparently dissolved the concrete foundation beneath the tank. A second Consent Order was issued during Pinnacle Plating's operations to Perfection Plating and Pinnacle Plating on 12 December 1989. The second Consent Order required a submittal of an application for an air contamination source permit, submittal of an industrial hazardous waste management plan, and construction of a fence to isolate the area on the west side of the plating building. An industrial hazardous waste management plan was submitted by Pinnacle Plating later that month and the required fence was constructed. On 4 May 1990, in compliance with the Consent Order (File No. R4-0641-89-03), Perfection Plating submitted a RI/FS Work Plan prepared by Clough Harbour, and Associates (1990). The NYSDEC approved the work plan on 9 October 1990; however, the plan was never implemented.

The Bureau of Construction Services of NYSDEC's Division of Hazardous Waste Remediation requested an emergency removal action on 24 June 1991 including emptying and disposal of the plating and rinse tanks; and removal and disposal of at least six drums of plating waste stored in the warehouse. On 26 June 1991, NYSDEC sent a certified letter to Perfection Plating's consultant requesting the removal of the above-mentioned waste. Due to lack of response, an emergency removal action was performed by Clean Harbors under contract to NYSDEC in late-1991 and early-1992.

1.2.2 Remedial Investigation, Record of Decision, and Remedial Action

Ecology and Environment Engineering, P.C. (EEE) completed a RI of the Site and prepared a FS in 1992 (EEE 1994). In August 1994, the final RI was completed, and the final FS was completed in August 1995. Based on the FS, a ROD was issued in December 1995 (NYSDEC 1995). The selected remedy of the 1995 ROD included:

- Excavation of contaminated soils and offsite disposal

- Construction of a groundwater cutoff trench to intercept and collect the plume contaminated groundwater.

- Operation and maintenance (O&M) of a groundwater treatment system onsite

- Discharge of treated wastewater to a local storm drain.

A localized excavation of soil was performed in 1995. Contaminated soil was removed from beneath the former plating building slab and in the area of the former chromic acid tank and transported offsite for disposal. Philip Service Corporation initiated construction of the groundwater treatment system in December 1997 and completed construction in June 1998. The treatment system included the installation of a downgradient collection trench and collection system to remediate site groundwater (**Figure 2**). EEE submitted a Post-Remediation O&M Manual to NYSDEC in October 1998 (EEE 1998). After the conclusion of the demonstration period, the groundwater treatment system was turned over to NYSDEC for operation. In March 2000, the Site was reclassified from Class 2 to Class 4 in the Registry as a result of completion of remedial activities in accordance with the ROD (NYSDEC 1995). A remediation program was implemented to maintain the treatment system with weekly O&M visits. From October 2007 to the present, Aztech Environmental Technologies, Inc. (Aztech) has performed weekly O&M visit; and from March 2008 to the present, EA has performed routine groundwater sampling and oversight of the O&M activities. Site activities since remedy completion have included the following:

- Treatment system operations and maintenance
- Monthly influent and effluent sampling
- Groundwater sampling
- Groundwater level monitoring
- Soil sampling (performed in 2009)
- Pre-Design Investigation (PDI) (performed in 2014 and 2019).

Further information regarding additional investigation activities are provided in the following sections.

1.2.3 Additional Investigations

Although a localized soil excavation was performed concurrent with the 1995 tank excavation from within the building, there was visual evidence that contamination had leached upward through the backfill material in the former excavation area. Based on these observations, an additional sampling event was conducted in April 2009. Hexavalent chromium (Cr^{+6}) was detected in soil samples collected from the former tank excavation area and outside the building footprint. Cr^{+6} concentrations in surface soils in the building were observed at 4,600 milligrams per kilogram (mg/kg) and concentrations at the base of the tank excavation were recorded at 4.2 mg/kg. In April, November, and December 2009, paint and concrete block samples collected from the west side of the plating facility indicated that residual Cr^{+6} contamination was also present on the walls of the building.

A PDI implemented in August 2014 evaluated the condition of the former plating building and further delineated the extent of soil contamination in the former tank excavation area and beneath the remainder of the building. In August 2015, EA submitted a Draft Basis of Design report to summarize the results of the PDI and an assessment of the full building demolition and soil removal.

In November 2015, a technical memorandum was submitted by EA to present a conceptual approach and cost estimate for the implementation of geochemical fixation (i.e., via injection of sodium lactate solution) to address remaining groundwater contamination at the Perfection Plating Site, once the full building demolition and source soil removal activities have been performed. Further work to advance the BOD and geochemical fixation of groundwater began in 2018. Additional investigation activities, including an asbestos-containing material survey, a site survey, and a geophysical survey, were performed in July and August 2019. The results of these activities were included in a revised BOD that was submitted in October 2019, and a Draft Remedial Action Scope of Work was submitted in May 2020 (EA 2019 and 2020b). Updated cost estimates for implementation of the geochemical fixation remedy were presented in a Geochemical Fixation Memorandum submitted in February 2020. A Draft In Situ Geochemical Fixation Pilot Study Work Plan was submitted in June 2020 (EA 2020a and 2020c).

1.2.4 Groundwater Remediation

A long-term monitoring program was implemented to monitor plume migration and provide a line-of-evidence necessary to demonstrate the effectiveness of the groundwater remediation. Groundwater monitoring was initially performed on a 5-quarter basis (every 15 months) to capture seasonal changes in groundwater elevation. In June 2013, Cr^{+6} was detected downgradient of the collection trench (at MW-EA-8) at a concentration of 0.15 milligrams per liter (mg/L), exceeding the NYSDEC Class GA Ambient Water Quality Standard (AWQS) and Guidance Values of 0.05 mg/L. Confirmatory sampling was conducted in August 2013, with Cr^{+6} detected above the AWQS at MW-EA-8 (3.2 mg/L). A quarterly overburden groundwater sampling program was initiated in October 2013 to assist in monitoring the effectiveness of the collection trench and to monitor the rate of advancement and migration direction of the plume.

In April 2014, three additional overburden groundwater monitoring wells were installed and included in the quarterly groundwater sampling events (**Figure 2**). In November 2016, EA observed that 5 wells, MW-EE-6S, MW-EE-6D, MW-EA-7, MW-EA-8, and MW-ESE-9, were decommissioned by a contractor to the Watervliet Arsenal. Two of the 5 wells (MW-EA-7R and MW-ESE-9R) were replaced by the U.S. Army Corps of Engineers in August 2017. To date, samples are collected from 10 overburden groundwater monitoring locations under the ongoing quarterly sampling program, and samples are collected from 3 additional bedrock wells on an annual basis.

1.2.5 Amended Record of Decision and Remedial Design

Long-term monitoring and site inspections completed in support of the remedy selected under the 1995 ROD have identified that soil and former plating building materials are a continuing source to observed groundwater contamination. An Amended ROD was issued for the Site in May 2018 (NYSDEC 2018), which presented changes to the original remedy to address the residual source area contamination and contaminant plume migration. These changes included demolition of the former plating building, excavation and offsite disposal of contaminated soil beneath the building

footprint, in-situ geochemical fixation, and placement of an environmental easement on the property to restrict the Site to commercial and industrial use, and to restrict use of groundwater.

An additional PDI, consisting of an asbestos-containing materials survey, a site survey, and a geophysical survey was completed in July and August 2019. Results from this PDI and the 2014 PDI were summarized in a BOD Report prepared by EA in October 2019 (Revised Final version). EA has also submitted a Remedial Construction Estimate in October 2019, a Draft Remedial Action Scope of Work in May 2020, and a Draft In-situ geochemical fixation Pilot Study Work Plan in June 2020 (EA 2019, 2020b, and 2020c).

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2. REMEDY PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

Based on previous site visits and a review of the Operation, Monitoring, and Maintenance (OM&M) Plan (EEE 1998), the groundwater treatment system consists of the following primary elements:

- Collection trench and sump
- Recovery pump (inside sump)
- Equipment building
- Process equipment (as described below).

Contaminated groundwater collected in the trench is pumped from the collection sump to an aerator followed by a plate filter unit for removal of suspended solids and oxidized iron. As a preparation for the ion-exchange process, the water is adjusted to a pH range of 4.5 to 5.0. Three ion-exchange units containing disposable anionic exchange resin are then used to remove Cr^{+6} from solution. The first two units provide the primary treatment, and the third unit is used for polishing and acts as a fail-safe. The treated water then flows to a pH adjustment tank where the pH is increased to between 6.2 and 6.5 prior to final disposal (via gravity drain) to a stormwater catch basin located on 12th Street.

2.1 OPERATION, MONITORING, AND MAINTENANCE PLAN COMPLIANCE REPORT

The following summarizes the current OM&M Plan:

- The treatment system is currently operated and maintained by Aztech located in Ballston Spa, New York.

- Bi-weekly visits are typically required to maintain the system. The system is not equipped with remote monitoring capabilities.

- Groundwater treatment system sampling (influent and effluent) is performed monthly for inductively coupled plasma metals, cyanide amenable to chlorination, Cr^{+6}, and total suspended solids.

- Overburden monitoring wells are currently sampled quarterly, and bedrock wells are sampled annually. Groundwater samples are analyzed for Cr^{+6} and total Cr.

- Maintenance of the collection trench, collection sump, and treatment system.

2.1.1 OM&M Plan Compliance Report

The groundwater treatment system effluent samples were in compliance with requirements for effluent limitations and monitoring (**Appendix A**) in all months monitored, except in December 2018, July 2019, and January 2020, when total Cr results exceeded the State Pollutant Discharge

Elimination System limit of 0.5 mg/L. Concentrations of total Cr found in effluent samples during these months were 0.71 mg/L, 0.56 mg/L, and 0.52 mg/L, respectively. It is suspected that the influent and effluent samples from December 2018 were mislabeled, since concentrations of several analytes, including total chromium and hexavalent chromium, are higher in the effluent than in the influent. The exceedance of total chromium observed in July 2019 may be attributed to issues with components of the pH adjustment in the system train. The influent and effluent samples collected in January 2020 were collected approximately three hours after the treatment system was restarted after being offline for the previous two months for repairs. It is suspected that the system may not have had enough time between restarting and sample collection for the system to stabilize.

The following table lists the frequency of O&M activities that were completed in order to be in compliance with the OM&M Plan.

Activity	Required Frequency (X)						Compliance Dates
	Weekly/ Bi-weekly[e]	Monthly	Quarterly	Annual	Every 15-Months	As Needed	
Preventative maintenance	X						2008–Present[a]
Treatment system (influent and effluent) sampling		X					2008–Present[a,b,c]
Monitoring well sampling			X	X			2013–Present[d]
Change-out iron filters						X	2008–Present[a]

a. O&M was not conducted from April through June 2012 as the NYSDEC did not have a contractor under contract.
b. Samples were not collected from November 2011 through February 2012, due to the NYSDEC not having a laboratory subcontractor under contract.
c. Samples were not collected in December 2019 due to extended period of system downtime.
d. Monitoring well samples were not collected during the second quarter of 2018, the fourth quarter of 2018, and the first quarter of 2019 due to contract funding issues.
e. Bi-weekly visits and preventative system maintenance began in January 2016.

2.1.2 Evaluation of OM&M Activities

Since 23 October 2007, Aztech has performed weekly (or bi-weekly) O&M visits including collection of monthly treatment system samples. Aztech has been acting as the Investigation and Remediation Contractor onsite through a NYSDEC callout contract prior to the start of EA's contract in 2008. Since March 2008, EA has performed oversight of the O&M activities, which have included periodic site visits to discuss and evaluate system performance and efficiency. Additionally, EA has performed routine groundwater monitoring events.

2.1.2.1 System Maintenance

During the reporting period of 30 July 2017 through 30 July 2020, the system was observed to be running upon arrival during 180 of 203 total site visits, approximately 89 percent of visits. The

treatment system was largely operational during the reporting period. During the current reporting period (July 2017 to July 2020), a total of 3,402,436 gallons of water were treated for an average of 3,102 gallons per day, which is the total volume treated divided by the total days in the reporting period. Based on a review of weekly O&M forms, the most frequent reasons for the system to be down include low water levels in the collection trench/sump and alarm issues associated with components of the pH adjustment in the system train. The treatment system was also off for an extended period beginning 29 November 2019 through 21 January 2020 due to a faulty metering pump for the acid tank. The system was restarted without issue once the pump was replaced in January 2020. Additionally, the system was down for most of July 2020 due to issues with the effluent pH probe and low water levels in the collection trench/sump. The pH probe was repeatedly calibrated and water levels in the collection trench increased so that the system was operational by month end.

Other system maintenance activities during the period included:

- Periodic change out and backwash of the filter media and resin
- Maintenance of aerator blower and acid injection chemical pump
- Periodic cleaning of flow meters
- Maintenance to the bubbler seams
- pH system maintenance:

    — Recalibrating, cleaning, and/or changing out/replacing probe

    — Adjusting chemical pump dosing

    — Acid and base tank maintenance (refilling/changing out barrels, replacing piping, replacing mixer motors, etc.).

Between July 2017 and July 2020, the groundwater treatment system removed approximately 13.25 pounds of Cr^{+6}. Total operating costs over this reporting period (36 months) were approximately $392,943.45. This total cost is based on a cost breakdown that includes actual costs for EA's site management services through 30 July 2020 and estimated costs for services supplied by Aztech and Test America Laboratory, as provided by NYSDEC on 7 July 2020. The cost breakdown for the reporting period is as follows:

- EA – $230,385.20
- Aztech – $157,480.73
- Test America Laboratory – $5,077.52.

The average contaminant removal during the reporting period ranged from 0.0000 to 0.0284 pounds per day and the average monthly cost for system operations is approximately $10,915.10. For this reporting period, the average contaminant removal cost per pound is approximately $29,656.11.

2.1.2.2 System Flow Rates

During the monitoring period (July 2017 to July 2020), the groundwater treatment system recovered and treated a total of 3,402,436 gallons of groundwater. Average quarterly flow rates ranged from 0.63 gallons per minute (gpm) to 2.84 gpm with an overall average flow rate of 2.07 gpm. The overall average flow rate for this reporting period was less than the design flow rate of 5.0 gpm. Based on the design flow rate of 5 gpm, the system had the capacity to treat 7,891,200 gallons during the reporting period. However, with an average flow rate of 2.07 gpm, 43 percent of total design capacity was treated during the reporting period. Factors contributing to total volume of water treated include system uptime and influent rate. As mentioned in Section 2.1.2.1, the treatment system was largely operational during the reporting period. Additionally, low water levels in the collection trench/sump were observed on multiple occasions resulting in low influent flow rates.

2.1.2.3 System Laboratory Results

Samples were collected from the influent pipeline from the interceptor trench in conjunction with the treatment system effluent samples. These samples provide a basis for determining the mass of contaminants recovered in groundwater from the interceptor trench and is also used in determining the removal efficiency of the treatment system. Historical treatment system analytical data including purgeable halocarbons, inductively coupled plasma metals, cyanide, Cr^{+6}, oil and grease, and total suspended solids levels in the influent are shown in **Table 1**. During the reporting period Cr^{+6} concentrations in the influent samples have ranged from non-detect (December 2017 and December 2018) to 0.88 mg/L (October 2018).

During the reporting period, the treatment system effluent continuously met the discharge criteria (effluent limitations and monitoring requirements) for cyanide, Cr^{+6} and other monitored inductively coupled plasma metals and total suspended solids. The treatment system effluent did not meet discharge criteria for total Cr in December 2018 (0.710 mg/L), July 2019 (0.56 mg/L), and January 2020 (0.52 mg/L) (**Table 1**). It is suspected that the December 2018 influent and effluent samples from were mistakenly mislabeled, since concentrations total chromium, hexavalent chromium, copper, and zinc are higher in the effluent sample than in the influent sample. The exceedance of total chromium observed in July 2019 may be attributed to issues with components of the pH adjustment in the system train. The influent and effluent samples collected in January 2020 were collected approximately three hours after the treatment system was restarted after being offline for two months for repairs. It is suspected that the system may not have had enough time to stabilize prior to sample collection, resulting in the effluent sample exceeding the SPDES limit.

2.1.2.4 System Evaluation

The quarterly overburden groundwater sample results were evaluated to determine the effectiveness of the interceptor trench. The monitoring well network currently consists of one well downgradient of the interceptor trench (MW-EA-11S) as well as one side gradient well (MW-EA-12S).

Monitoring well MW-EA-11S has shown concentrations of Cr^{+6} above the AWQS in 2 of the 10 sampling events during this reporting period. EA compared these sample results to the treatment system influent to determine the effectiveness of the interceptor trench (**Figure 6**). Concentrations of Cr^{+6} in MW-EA-11S did not exceed those detected in influent water samples during this reporting period. On average, concentrations of Cr^{+6} in influent water were greater than those in MW-EA-11S by 0.37 mg/L, with a standard deviation of 0.23, during this reporting period. The data suggest that while the interceptor trench is recovering groundwater impacted with Cr^{+6}, a portion of groundwater is bypassing the trench. As a result, the treatment system is no longer meeting its remedial action objectives (RA-Os). However, impacted groundwater is not used as a public drinking water source.

2.2 MONITORING PLAN COMPLIANCE REPORT

This PRR assesses whether the Site has been managed as set forth in the ROD (NYSDEC 1995), the Amended ROD (NYSDEC 2018), and the OM&M Plan (EEE 1998).

2.2.1 Groundwater Monitoring

Historically, the groundwater monitoring program consisted of 12 monitoring wells sampled every 5 quarters. The groundwater monitoring program is used to monitor plume migration and provide a line-of-evidence necessary to demonstrate the effectiveness of the groundwater remediation (i.e., installation and operation of the treatment system). The monitoring well network initially consisted of 8 overburden (MW-CMT-1, MW-CMT-3, MW-EE-4S, MW-EE-5S, MW-EE-6S, MW-EA-7, MW-EA-8, and MW-EA-9) and 4 bedrock monitoring wells (MW-EE-2D, MW-EE-4D, MW-EE-5D, MW-EE-6D) (**Figure 2**), with samples collected for total Cr by U.S. Environmental Protection Agency (EPA) Method 200.7 and Cr^{+6} by SM 3500 Cr.

Due to Cr^{+6} detections in monitoring wells downgradient of the treatment system collection trench, EA initiated a quarterly groundwater monitoring program in October 2013 of the overburden wells to monitor the rate of advancement and migration direction of the plume. Additional monitoring well installations (MW-EA-10S, MW-EA-11S, MW-EA-12S, and MW-EA-13S) were completed in April 2014 to further delineate groundwater plume and to assess the effectiveness of the collection trench. During the November 2016 sampling event, it was observed that 5 wells were decommissioned by a contractor for the Watervliet Arsenal. The 5 wells decommissioned included 4 overburden wells (MW-EE-6S, MW-EA-7, MW-EA-8, and MW-EA-9) and 1 deep bedrock well (MW-EE-6D). Replacement wells MW-EA-7R and MW-ESE-9R were installed approximately 5 feet from the original locations in August 2017. As of August 2017, the monitoring well network consists of 10 overburden and 3 bedrock monitoring wells (**Figure 2**). Ten overburden wells are sampled quarterly while the bedrock monitoring wells are sampled on an annual basis.

Depth-to-water measurements were collected prior to collecting groundwater samples and are included as **Table 2**. Hydraulic groundwater gradient across the Site was determined to be 0.03 in July 2020. The observed groundwater flow direction in the overburden wells was in a north-northwest direction, which mimics topography and is similar to historical groundwater flow.

Groundwater samples are analyzed for Cr^{+6} and total Cr by Methods SM 3500 Cr and EPA Method 200.7, respectively. The following section details analytical results for the overburden and bedrock monitoring wells during the reporting period.

2.2.2 Overburden Monitoring Wells

A total of 10 quarterly sampling events were conducted from July 2017 to July 2020. From July 2017 to July 2020, Cr^{+6} concentrations were detected above the AWQS of 0.05 mg/L in samples collected from 5 of the 10 overburden wells as detailed below:

- MW-5S; 9 of the 10 events. Cr^{+6} results are not available for the February 2018 event because the sample was inadvertently collected in a bottle with preservative instead of an unpreserved bottled.
- MW-EA-7R; 10 of 10 events.
- MW-4S; 1 of 10 events.
- MW-ESE-9R; 4 of 10 events.
- MW-EA-11S, 2 of 10 events.

Historical Cr^{+6} concentration trend graphs for these wells are included as **Figures 5A** through **5E**. The results of the latest sampling event (July 2020) are depicted in **Figure 4**.

The overburden groundwater analytical data for the 2020 sampling event and all available historical data for the contaminant of concern (Cr^{+6}) are presented in **Table 3**. These data include seventeen 5-quarter groundwater sampling events completed from May 2003 to June 2013, and 24 quarterly events conducted from October 2013 to July 2020.

EA evaluated change in the Cr^{6+} plume based on analytical results, which show the areal extent of the plume has decreased in length from June 2017 to July 2020 (**Figures 3 and 4**). The size of the hexavalent plume that exceeded the AWQS was approximately 380 ft long by 115 ft wide in June 2017, and 210 ft long by 100 ft wide in July 2020 (**Figure 4**). The main portion of the plume, centered around the source area and MW-EA-5S, has remained consistent in size from 2017 to 2020, and concentrations of Cr^{+6} are on the same order of magnitude. However, the length of the plume, which extended from the source area to MW-ESE-9R and past the collection trench to MW-EA-11S in June 2017 (due to high Cr^{+6} concentrations at those locations) no longer extends as far north due to recent non-detects in MW-ESE-9R and MW-EA-11S. Since detections at MW-ESE-9R and MW-EA-11S have been intermittent in the past (**Table 3**), these locations will continue to be monitored for rebounding concentrations.

As the treatment system has had little impact on reducing Cr^{+6} concentrations in groundwater within the source area, source area remediation was recommended consisting of demolition of the former

plating facility to facilitate access to the impacted soil to remove residual contamination from the Site. Additionally, concentrations of Cr^{+6} above the AWQS have been detected at MW-EA-11S, located downgradient of the collection trench in several sampling events between 2014 and 2020. This indicates that a portion of the contaminant plume is bypassing the interceptor trench.

2.2.3 Bedrock Monitoring Wells

Bedrock monitoring wells were sampled annually in February 2018, June 2019, and July 2020. Historically, 4 bedrock monitoring wells were sampled annually; however, MW-EE-6D was one of the 5 wells decommissioned as of November 2016. Therefore, three bedrock wells are sampled annually as part of the monitoring program. During this reporting period, Cr^{+6} was not detected in bedrock monitoring wells above AWQS standards (**Table 4**).

2.2.4 Confirm Compliance with Monitoring Plan

As indicated in the following table, the Monitoring Plan currently consists of quarterly sampling of 10 overburden wells and annual sampling of 3 bedrock wells.

	Required Frequency (X)					
Activity	**Semi-Annual**	**Monthly**	**Quarterly**	**Five-Quarterly**	**Annual**	**Compliance Dates**
Groundwater Sampling			X (Overburden Wells)		X (Bedrock Wells)	2013-Present

Quarterly and annual monitoring was conducted in accordance with the Monitoring Plan during this reporting period, with the exception of the following:

- Quarterly sampling was not performed in the second and fourth quarter of 2018, nor the first quarter of 2019 due to contract funding issues.
- The sample for Cr^{+6} from MW-EE-5S in February 2018 was mistakenly collected in a bottle with preservative. As a result, there are no Cr^{+6} results for this location from the first quarter of 2018.
- MW-EA-10S was not sampled during the August 2018 sampling event. It could not be located at the time of sampling.
- Coolers containing samples for MW-EA-10S and MW-EA-13S from July 2019 were lost in transit to the analytical laboratory. As a result, there are no analytical results for these locations for the third quarter of 2019.

2.3 INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS CERTIFICATION PLAN COMPLIANCE REPORT

IC/ECs at the Site currently consist of:

- O&M of groundwater treatment system;
- Environmental monitoring to determine effectiveness of the remedy;
- A deed restriction prohibiting use of the property for residential dwelling or daycare purposes, including restrictions from disturbing soil below 1 foot;
- A groundwater use, building use, and land use restriction;
- Maintaining restricted access with a fence and posted warning notifications.

2.3.1 Institutional Control/Engineering Control Requirements and Compliance

Determination of compliance with the IC/EC at the Site is made based on the following criteria:

- The ICs/ECs applied at the Site are in place and unchanged from the previous certification.
- Nothing has occurred that would impair the ability of such controls to protect the public health and the environment or constitute a violation or failure to comply with any element of the ROD for such controls.
- Access to the Site will continue to be provided to the NYSDEC, to evaluate the remedy including access to evaluate the continued maintenance of such controls.
- Access to the Site for maintenance and inspections is guaranteed by Environmental Conservation Law Section 27-1309.3 and Section 1313.8.

For this reporting period, EA certifies that the IC/ECs are still in place; however, environmental monitoring and further investigation activities at this Site has determined that the treatment system has not met the RA-O of reducing groundwater concentration to AWQS. Per the BOD (EA 2019) and the Amended ROD (NYSDEC 2018), an amended remedy was developed to remove the continuing source to groundwater contamination (e.g., contaminated soil and former plating building) and to accelerate reduction of the groundwater plume through in-situ treatment.

2.3.2 Institutional Control/Engineering Control Certification Forms

The certified IC/EC form is provided in **Appendix B** of this PRR.

2.4 SITE MANAGEMENT PLAN COMPLIANCE REPORT

An SMP does not currently exist for this Site. Per the 2018 Amended ROD, an SMP will be implemented as part of the amended remedy to continue appropriate site monitoring and IC/ECs at the Site. Therefore, this PRR report is certified based on an assessment of the effectiveness and protectiveness of the current remedy and OM&M Plan, which includes the operation of a treatment system and long-term monitoring of groundwater wells.

As directed by NYSDEC, sampling and gauging events are being performed per Section 3.2 of the OM&M Plan, and the Site is inspected concurrently with groundwater sampling and monitoring events. Treatment system operation and maintenance is being completed by a State Investigation and Remediation contractor, Aztech, as per the OM&M Plan.

2.5 PROTECTIVENESS

Based on analytical results of the 2009 soil samples, additional investigation, and long-term groundwater monitoring, it is believed that the presence of impacted soil at the building is acting as a continued source of groundwater contamination. The impacted soil and building structure have resulted in the RA-Os presented in **Table 5** not being achieved.

An Amended ROD was issued for the Site in May 2018, which presented changes to the original remedy to address the residual source area contamination and contaminant plume migration. The elements of the amended remedy included the following:

- Demolition, characterization, and appropriate disposal of the former metal-plating building.
- Excavation, characterization, and appropriate disposal of the underlying source of contamination and any contamination in soils adjacent to the building.
- In situ remediation of Cr^{+6} in groundwater using a sodium lactate solution or other fixation agent.
- Implementation of an SMP as part of the amended remedy to continue appropriate site monitoring and IC/ECs at the Site.

EA is currently preparing a remedial design package for the amended remedy, consisting of a BOD Report, Remedial Construction Estimates, a Remedial Action Scope of Work, and an In-Situ Geochemical Fixation Pilot Study Work Plan (EA 2019, 2020b, and 2020c). Remedial action activities are projected to begin in 2021. Site management activities continue to be performed in the interim.

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3. COST EVALUATION

3.1 SUMMARY OF COSTS

The costs incurred during this reporting period for EA were for the site management field activities, which included, but were not limited to, the following:

- Ten groundwater sampling events were conducted as part of the quarterly monitoring program. Sampling of the overburden wells (10 wells) was conducted in September and December 2017, February 2018, August 2018, June 2019, July 2019, October 2019, February 2020, April 2020, and July 2020. Three bedrock monitoring wells were also sampled during the February 2018, June 2019, and July 2020 events. Quality assurance/quality control samples (e.g., duplicate, matrix spike, and matrix spike duplicate) were collected during each sampling event. Groundwater samples were analyzed for total Cr by EPA Method 200.7 and Cr^{+6} by Standard Method 3500.

- Groundwater gauging and monitoring well inspections were completed during all quarterly groundwater sampling events. All wells sampled in the monitoring program were gauged during respective events.

- Bi-weekly system inspections were completed by Aztech between July 2017 and July 2020. Aztech completed bi-weekly site visits to perform system operation checks and routine equipment maintenance. Monthly treatment system sampling was also completed by Aztech.

- Additional investigation activities performed between July and August 2019, consisting of an asbestos-containing material survey, a site survey, and a geophysical survey.

- A revised draft of the BOD (initially submitted as Draft in 2015) was updated and resubmitted in October 2019, which presented data collected in PDI investigations, asbestos survey, and topographical survey (EA 2019). The data and assumptions are being used to develop a scope of work for full building demolition and impacted soil excavation to be implemented by a NYSDEC callout contractor. The Draft Remedial Action Scope of Work was submitted in May 2020 (EA 2020b).

- A Geochemical Fixation Memorandum was submitted in February 2020 to present a cost estimate for the implementation of geochemical fixation to address remaining groundwater contamination at the Perfection Plating Site (EA 2020a). The Draft In Situ Geochemical Fixation Pilot Study Work Plan was submitted in June 2020 (EA 2020c).

- The results of Aztech's system O&M activities were included in 11 quarterly operation and maintenance reports.

- Preparation of this PRR. At a minimum, the PRR will be used to verify that IC/ECs are still in effect and performing as designed.

Site management activities were performed under two contracts and work assignment numbers during this reporting period. The total costs for EA incurred at the Site over each contract/work assignments during this reporting period are tabulated in the following table.

Contract/Work Assignment Number	Task	Totals
D007624-15: Site Management	Task 1 Preliminary Activities	$8,165.68
	Task 2 SMP	$2,988.26
	Task 3 OM&M	$74,173.63
	Task 4 PRR	$7,318.34
	Task 5 Remedial System Operations	$1,413.73
	WA Total*	**$94,059.64**
D007624-43: Remedial Design	Task 1 Preliminary Activities	$4,751.50
	Task 2 Plans and Specifications	$81,782.35
	WA Total*	**$86,533.85**
D009806-08: Remedial Design	Task 1 Preliminary Activities	$3,034.21
	Task 2 Plans and Specifications	$21,215.95
	WA Total*	**$24,250.16**
D009806-13: Site Management	Task 1 Preliminary Activities	$6,872.52
	Task 2 SMP	$0.00
	Task 3 O&M	$5,080.28
	Task 4 Monitoring and Reporting	$4,564.96
	Task 5 PRR	$9,023.79
	WA Total*	**$25,541.55**
Total costs incurred during reporting period		**$230,385.20**
*Costs are up to date as of 30 July 2020		

Annual site management costs for EA are anticipated to remain generally the same for the overall management of the Site during the next period.

4. CONCLUSIONS/RECOMMENDATIONS

4.1 CONCLUSIONS

Treatment system operations, maintenance, and monitoring was performed in accordance with the OM&M Plan (EEE 1998) during this reporting period with some exceptions, due to budget constraints and contract funding issues.

The system was operational for the majority of this reporting period. System effluent concentrations were lower than required SPDES permit limits in all months monitored except for exceedances of total chromium in December 2018, July 2019, and January 2020.

Analytical data for MW-EA-11S (located downgradient of the interceptor trench) revealed detections above the AWQS for Cr^{+6} in 2 of the 10 quarterly groundwater monitoring events conducted during the reporting period. Sampling events conducted during this reporting period and the previous reporting period indicated that a portion of the groundwater flow is bypassing the collection trench. The concentrations of Cr^{+6} in the monitoring well network (up to 22 mg/L in MW-EE-5S, within the source area during this reporting period) are generally greater than the concentrations in system influent water collected from the interceptor trench (up to 0.88 mg/L).

The treatment system is not designed to address groundwater concentrations within the source area. Concentrations of Cr^{+6} in the source area (near MW-EE-5S) have been on the same order of magnitude since May 2013; however, concentrations have generally declined over time since baseline conditions in May 2003, as shown in **Figure 5A**.

There is currently no SMP for the Site; an SMP will be implemented as part of the amended remedy. For this reporting period, EA certifies that the IC/ECs are still in place, yet the treatment system is no longer as effective at controlling the migration of Cr^{+6} as illustrated by the detection of Cr^{+6} at a downgradient monitoring well in 2 out of the 10 quarterly groundwater monitoring events. It should be noted however, that areas downgradient of the site are supplied by public water and that impacted site groundwater is not a source of drinking water.

4.2 RECOMMENDATIONS

The failures of the remedy and monitoring program to achieve RA-Os as detailed in Section 2.5 has continued since the previous reporting period and was discussed in the 2017 PRR (EA 2018). Recommendations provided in the 2017 PRR (EA 2018) are still in progress and have been incorporated into the 2018 Amended ROD. The amended remedy includes building demolition and additional soil excavation (source removal), in-situ geochemical fixation to address remaining groundwater contamination, development of an SMP, and continuation of the groundwater monitoring program. The amended remedies and continuation of work at the site are anticipated to help achieve RA-Os by eliminating the ongoing source of contamination contributing to the continued groundwater exceedances of AWQS and remediating the existing groundwater contamination near the source area to prevent continued migration of the contaminant plume.

Work planning documents for the amended remedy are currently being developed. Once these documents are completed, the remedy can be implemented in accordance with the Amended ROD. Demolition activities and in-situ geochemical fixation activities are anticipated to begin in 2021. Quarterly groundwater monitoring activities and treatment O&M will continue to be performed in the interim. An SMP will be developed following remedial construction activities.

OM&M requirements not met during this reporting period were largely caused by delays and/or funding issues, some associated with transitioning to the new contract during Spring/Summer 2020. With EA's new contract with NYSDEC in place, these issues are not likely to affect OM&M activities in the upcoming reporting period.

It is recommended that future PRRs be prepared and submitted at 3-year intervals to evaluate the effectiveness of the previous and upcoming remedial actions implemented at the Site.

5. REFERENCES

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———. 2018. *Amended Record of Decision. Perfection Plating, City of Watervliet, Albany County, Site Number 401037.* May.

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Figures

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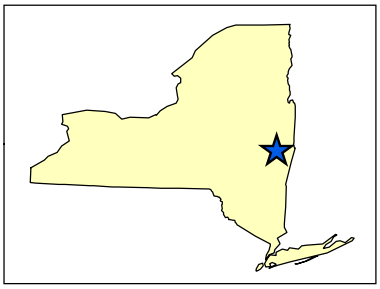

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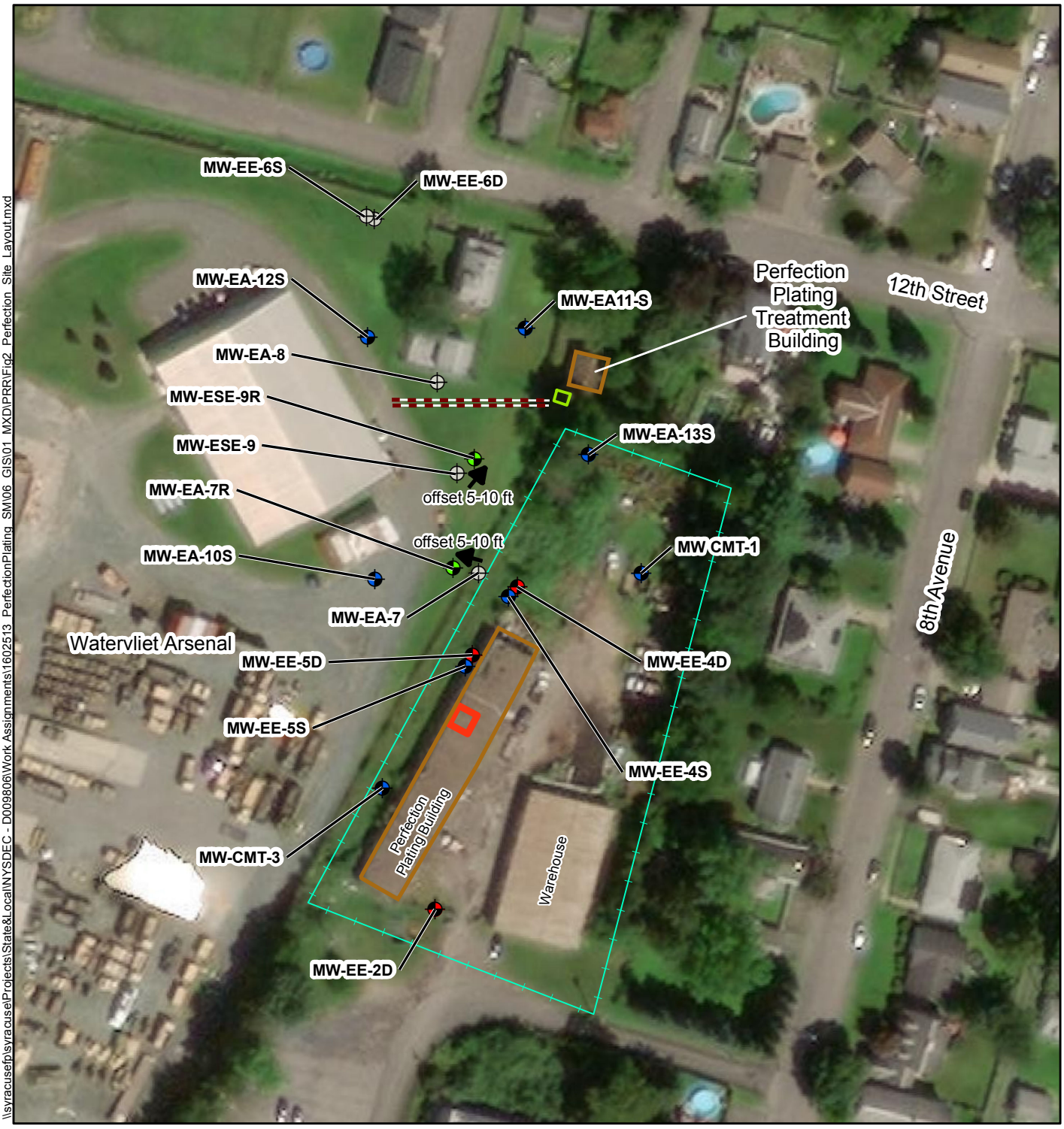
★ Site Location

Figure 1
Site Location Map
Perfection Plating Site (401037)
Watervliet, New York

Map Date: 7/15/2020
Projection: State Plane NAD83 New York East (feet)

NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

EA



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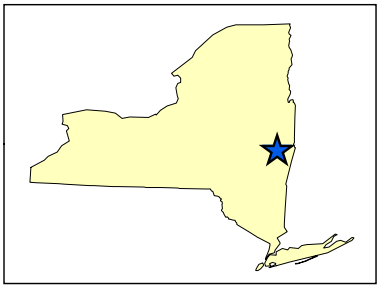

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- Perfection Plating Site Boundary
- Buildings
- Former Excavation Area
- Collection Trench
- Sump Location
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Replacement Monitoring Well (approximate location)
- Abandoned Well

Figure 2
Site Layout
Perfection Plating Site (401037)
Watervliet, New York

Map Date: 8/13/2020
Projection: State Plane NAD83 New York East (feet)

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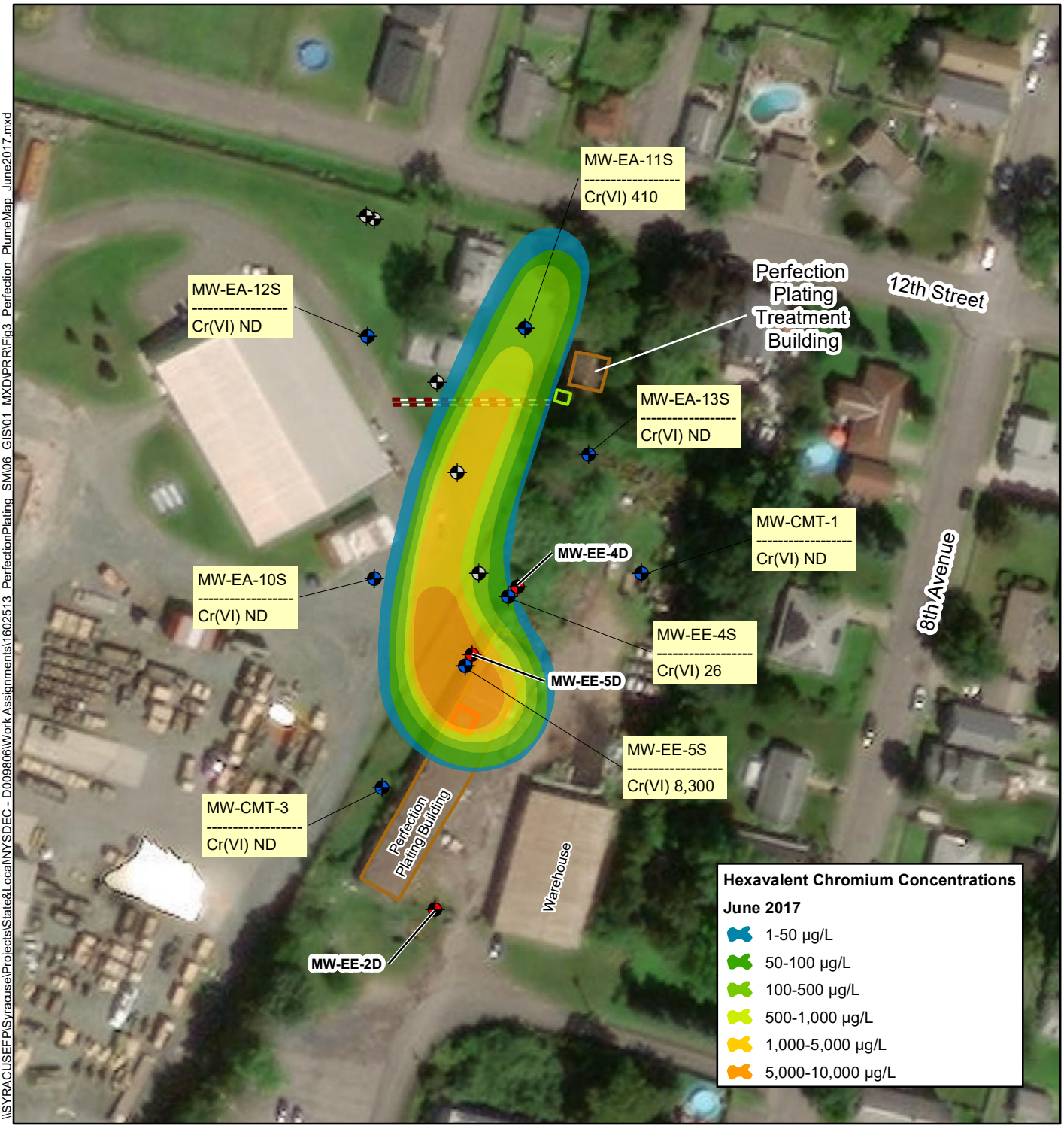
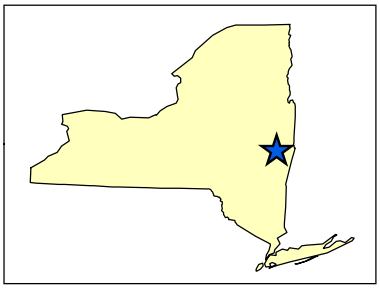


\\SYRACUSEFP\Syracuse\Projects\State&Local\NYSDEC - D009806\Work Assignments\1602513 PerfectionPlating SM\06 GIS\01 MXD\PRR\Fig3 Perfection PlumeMap June2017.mxd



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Legend

- Buildings
- Overburden Monitoring Well
- Bedrock Monitoring Well
- Abandoned Well
- Collection Trench
- Sump Location
- Former Excavation Area

Note:
1. MW-EE-6S, MW-EE-6D, MW-EA-7, MW-EA-8, and MW-ESE-9 were decommissioned by Watervliet Arsenal prior to the November 2016 sampling event; MW-EA-7 and MW-ESE-9 were subsequently replaced by the USACE in August 2017 with wells MW-EA-7R and MW-ESE-9R, respectively.
2. All results are reported in µg/L

Figure 3
Hexavalent Chromium June 2017
Overburden Isopleth Map
Perfection Plating Site (401037)
Watervliet, New York

Map Date: 7/15/2020
Projection: State Plane NAD83 New York East (feet)

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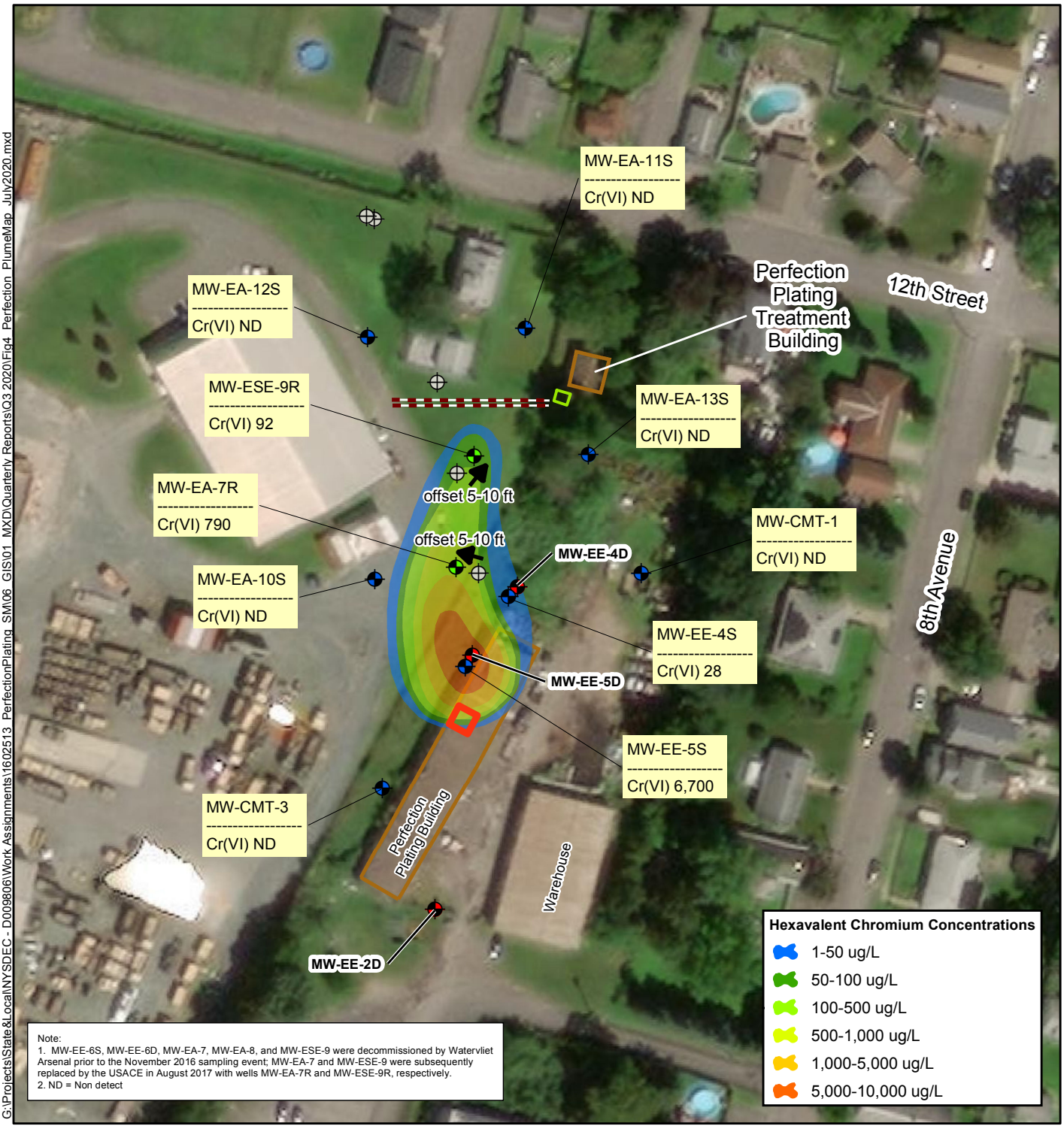

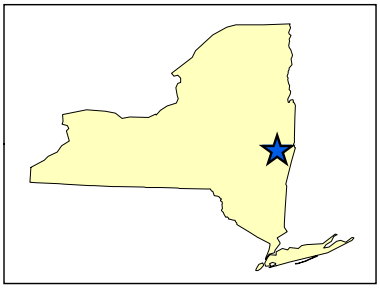

0 25 50 100
Feet

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Legend

- Overburden Monitoring Well
- Bedrock Monitoring Well
- Replacement Monitoring Well (approximate location)
- Abandoned Well
- Collection Trench
- Sump Location
- Former Excavation Area
- Buildings

Figure 4
Hexavalent Chromium July 2020
Overburden Isopleth Map
Perfection Plating Site (401037)
Watervliet, New York

Map Date: 8/17/2020
Projection: State Plane NAD83 New York East (feet)

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Figure 5A Historical Groundwater Analytical Results for Hexavalent Chromium at MW-EE-5S

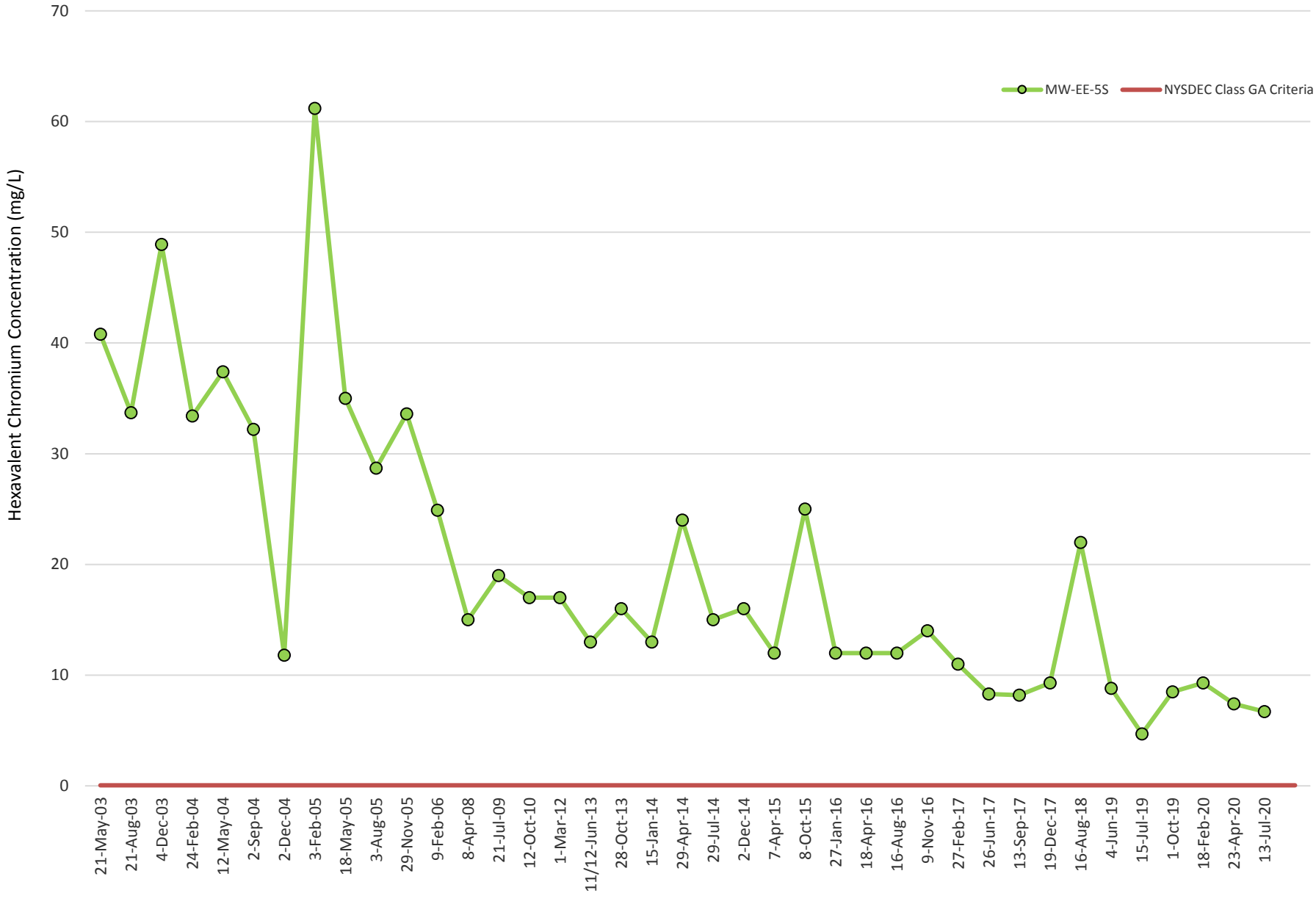
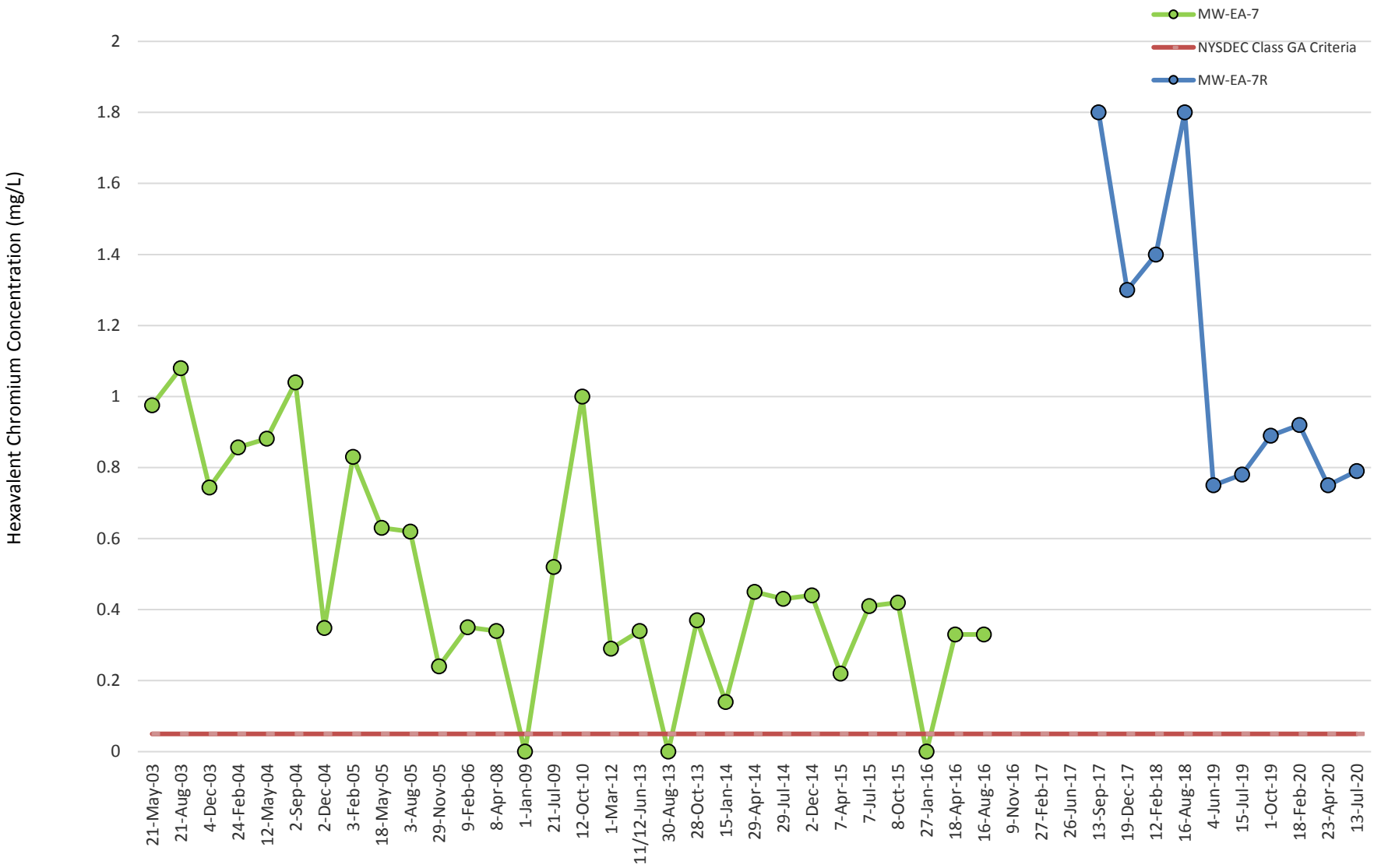


Figure 5B Historical Groundwater Analytical Results for Hexavalent Chromium at MW-EA-7/MW-EA-7R



*MW-EA-7 was decommissioned by a contractor of the Watervliet Armory prior to the Novbember 2016 event. MW-EA-7R was installed in August 2017 to replace MW-EA-7.

Figure 5C Historical Groundwater Analytical Results for Hexavalent Chromium at MW-EE-4S

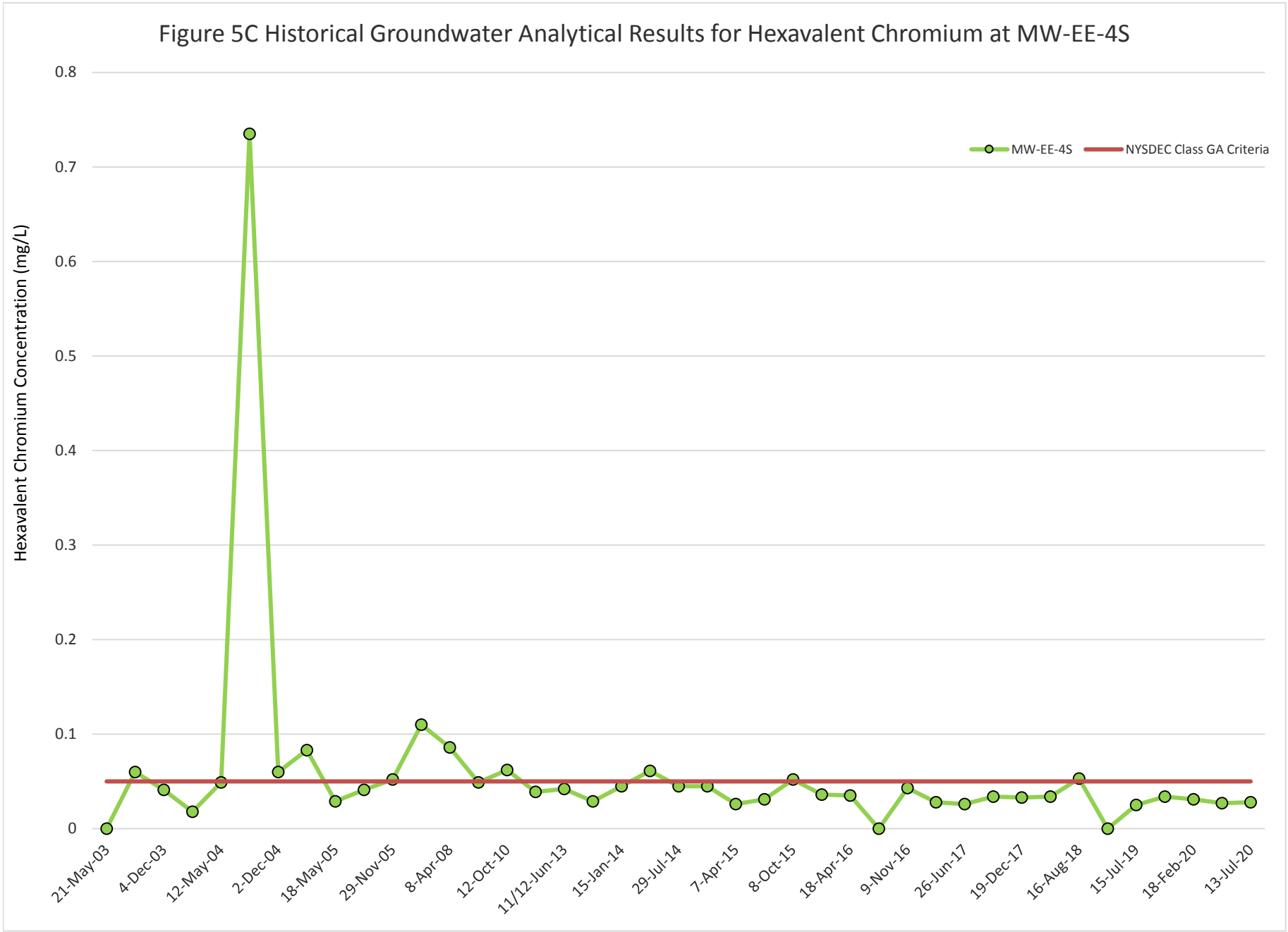
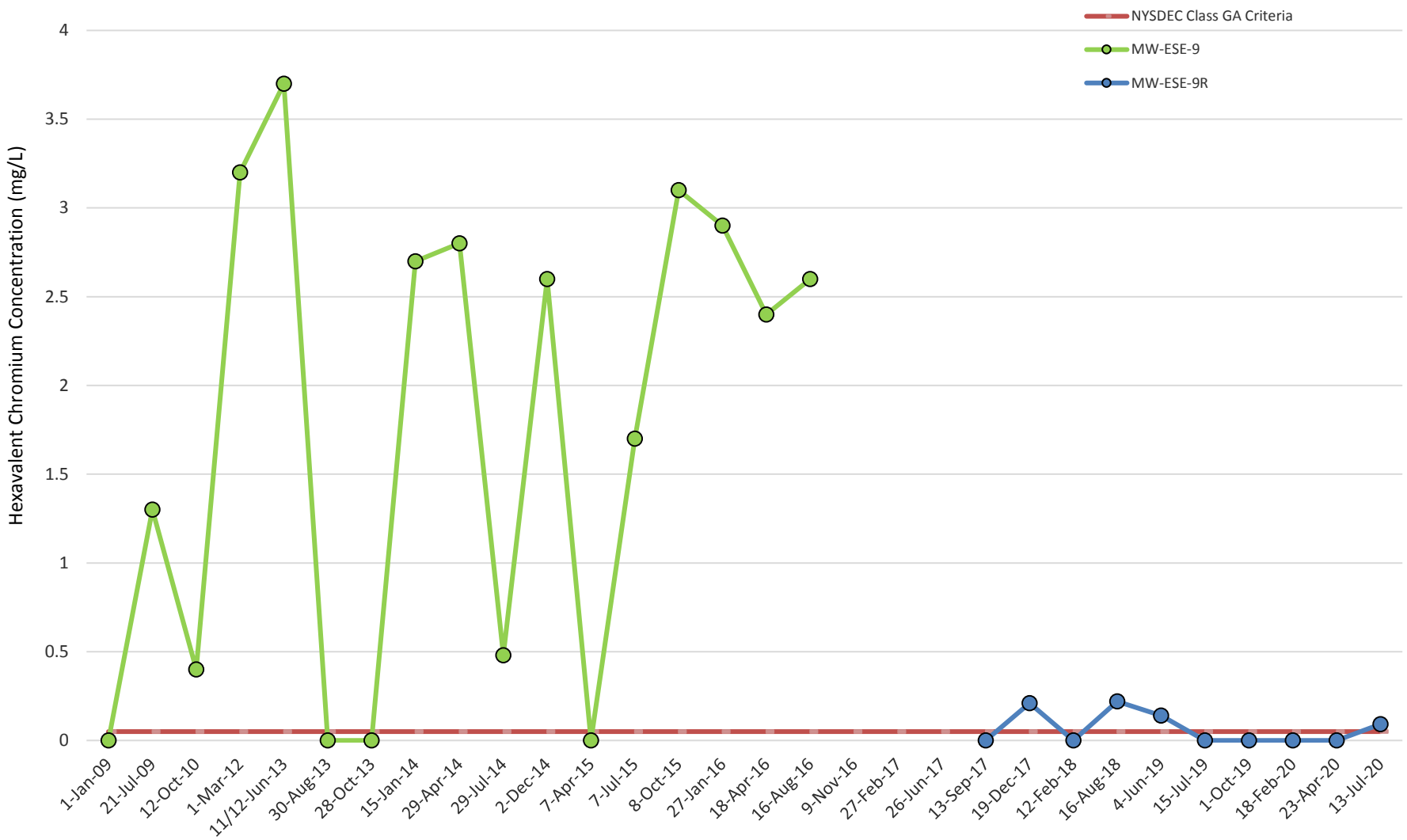


Figure 5D Historical Groundwater Analytical Results for Hexavalent Chromium at MW-ESE-9/MW-ESE-9R*



*MW-ESE-9 was decommissioned by a contractor of the Watervliet Armory prior to the Novbember 2016 event. MW-ESE-9R was installed in August 2017 to replace MW-ESE-9.

Figure 5E Historical Groundwater Analytical Results for Hexavalent Chromium at MW-EA-11S

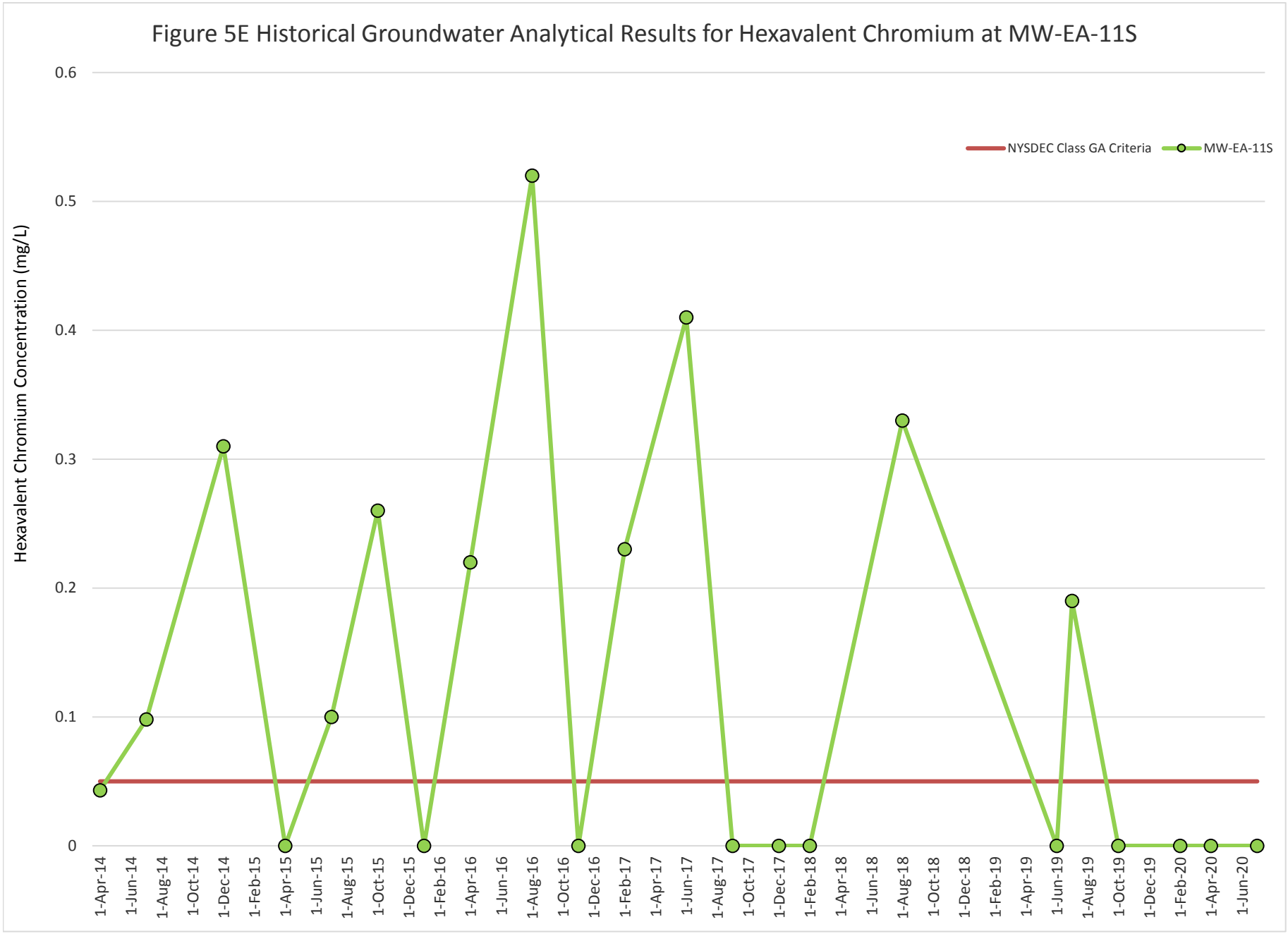
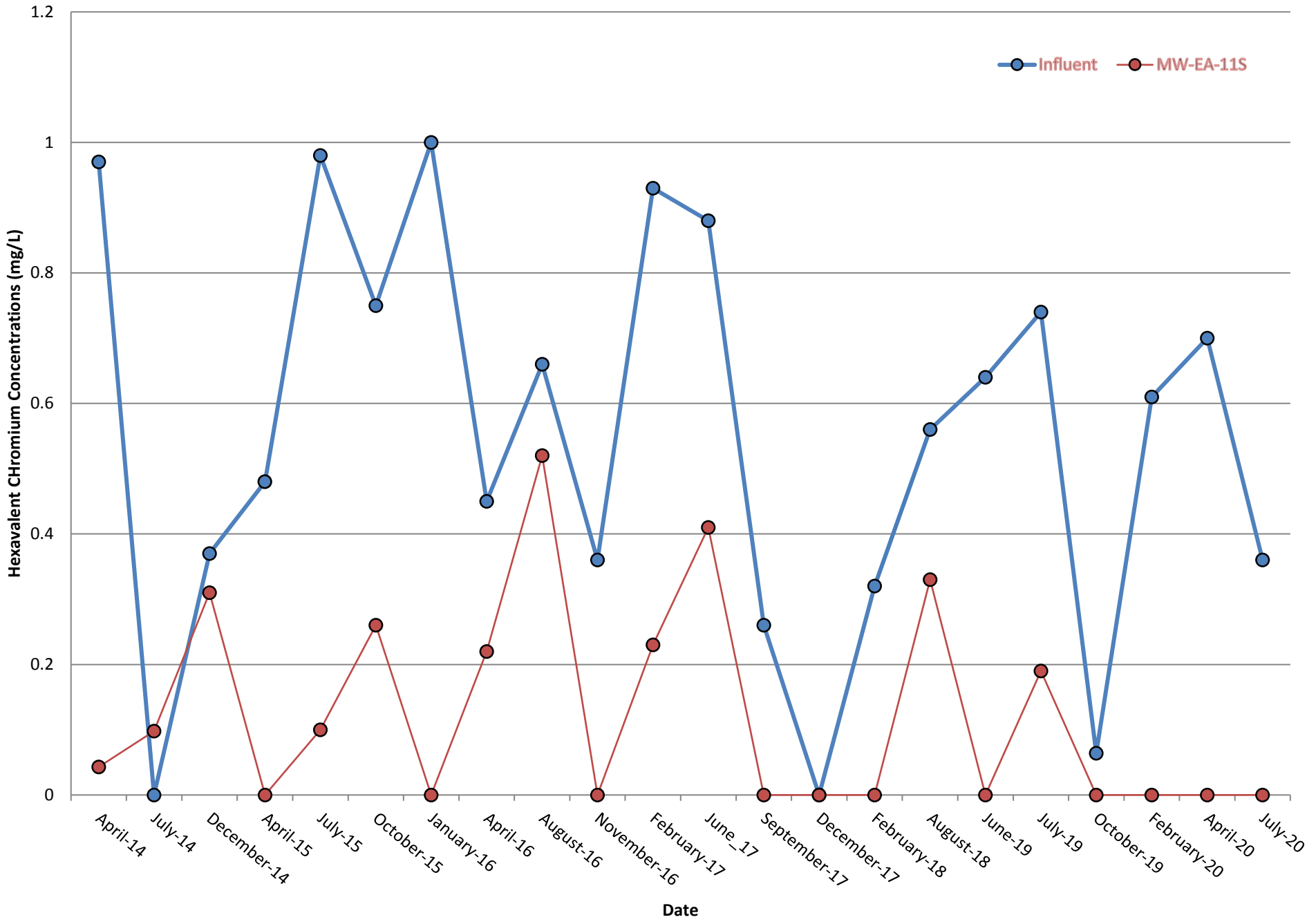


Figure 6
Historical Analytical Results for MW-EA-11S and System Influent



Tables

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EA Engineering, P.C. and Its Affiliate
EA Science and Technology

Table 1 Treatment System Historical Analytical Results

	Apr-08		Jul-08		Aug-08		Sep-08		Oct-08		Nov-08		Dec-08		
Parameters List	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**SPDES Limits**
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	<1.0	<1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005
trans 1,2-Dichloroethene	<1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
cis 1,2-Dichloroethene	<1.0	<1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.15
Cadmium	<0.005	<0.005	<0.005	<0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03
Chromium	0.179	0.175	1.47	0.106	1.88	**0.662**	1.47	0.106	1.77	0.093	0.621	0.266	2.02	0.108	0.5
Copper	<0.005	<0.005	< 0.005	< 0.005	<0.005	0.016	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.010	<0.005	0.5
Iron	0.356	<0.050	< 0.050	1.4	0.076	1.08	<0.050	1.44	<0.050	0.232	< 0.050	0.076	<0.050	<0.050	4
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.4
Nickel	<0.020	<0.020	<0.020	<0.020	< 0.020	< 0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3
Selenium	<0.005	<0.005	<0.005	< 0.005	< 0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
Zinc	0.014	0.015	0.017	0.012	0.014	0.016	0.017	0.012	0.012	<0.010	0.018	<0.010	0.011	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.03	<0.01	<0.01	<0.01	< 0.01	< 0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.07	<0.02	1.4	<0.02	1.8	< 0.02	1.4	<0.02	1.7	<0.02	0.53	<0.02	2.0	<0.02	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and grease	<1.0	<1.0	<1.0	<1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	1.0	3.0	<1.0	19.5	< 1.0	< 1.0	< 1.0	2.0	<1.0	<1.0	<1.0	<1.0	<1.0	<2.0	50

(a) Discharge Limitations for total 1,2-Dichloroethylene
NOTES:
mg/L = Milligram(s) per liter
NA = Not applicable
SPDES = State Pollutant Discharge Elimination System
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Adirondack Laboratories.

Table 1 Treatment System Historical Analytical Results

	Jan-09		Feb-09		Mar-09		Apr-09		May-09		Jun-09		Jul-09		
Parameters List	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**SPDES Limits**
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005
trans 1,2-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
cis 1,2-Dichloroethene	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.15
Cadmium	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03
Chromium	1.23	0.145	0.606	0.065	1.34	0.173	0.841	0.153	0.381	0.129	1.5	0.144	1.15	0.104	0.5
Copper	< 0.005	< 0.005	< 0.005	< 0.005	0.007	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.5
Iron	0.060	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	0.069	<0.050	0.382	<0.050	0.119	0.208	0.104	0.208	4
Lead	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.4
Nickel	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3
Selenium	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
Zinc	0.011	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	<0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.01	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01	0.01	<0.01	0.01	<0.01	0.02	<0.01	0.02	<0.01	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	1.1	< 0.02	0.52	< 0.02	1.2	< 0.02	0.83	<0.02	0.52	0.04	1.4	<0.02	1.2	<0.02	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	< 1.0	< 1.0	1.8	< 1.0	< 1.0	< 1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	2.5	2.5	<1.0	<1.0	1.5	<1.0	<1.0	<1.0	2	<1.0	<1.0	<1.0	<1.0	3	50

(a) Discharge Limitations for total 1,2-Dichloroethylene
NOTES:
mg/L = Milligram(s) per liter
NA = Not applicable
SPDES = State Pollutant Discharge Elimination System
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Adirondack Laboratories.

Table 1 Treatment System Historical Analytical Results

Parameters List	Aug-09		Sep-09		Oct-09		Nov-09		Feb-10		Mar-10		Apr-10		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005
trans 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
cis 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.15
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03
Chromium	0.67	0.474	0.394	0.195	0.903	0.233	0.271	0.256	0.202	0.098	0.202	0.387	1.130	0.259	0.5
Copper	<0.005	0.018	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.5
Iron	0.265	1.140	0.810	<0.05	0.061	<0.05	0.136	<0.05	1.170	<0.050	1.170	0.106	0.109	<0.050	4
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.4
Nickel	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.07
Zinc	0.012	0.011	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	0.010	<0.010	<0.010	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.01	<0.01	0.02	<0.01	0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.52	0.04	0.02	<0.01	0.88	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.39	1.1	<0.02	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	<1.0	1.8	<1.0	<1.0	1.1	1	<1	<1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	1.0	5.0	6.5	1	1.5	6	4	4	4.5	2	4.5	2.5	<1.0	<1.0	50

(a) Discharge Limitations for total 1,2-Dichloroethylene
NOTES:
mg/L = Milligram(s) per liter
NA = Not applicable
SPDES = State Pollutant Discharge Elimination System
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Adirondack Laboratories.

Table 1 Treatment System Historical Analytical Results

Parameters List	May-10		Jun-10		Jul-10		Aug-10		Sep-10		Oct-10		Nov-10		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005
trans 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
cis 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.15
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03
Chromium	0.188	0.16	0.51	0.134	0.431	0.096	0.023	0.13	0.03	0.219	1.33	0.233	1.39	0.321	0.5
Copper	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.5
Iron	2.04	<0.050	0.124	<0.050	4.03	<0.050	1.03	<0.050	3	0.054	0.06	<0.050	0.056	<0.050	4
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.4
Nickel	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.07
Zinc	0.01	<0.010	<0.010	<0.010	0.011	<0.010	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.03	<0.01	0.02	<0.01	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	<0.02	<0.02	0.45	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02	1.3	<0.02	0.15	<0.02	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	<1.0	<1.0	LA	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	4.5	1	2	<1.0	11	<1.0	6.5	<1.0	2	<1.0	<1.0	<1.0	<1.0	<1.0	50

(a) Discharge Limitations for total 1,2-Dichloroethylene
NOTES:
mg/L = Milligram(s) per liter
NA = Not applicable
SPDES = State Pollutant Discharge Elimination System
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Adirondack Laboratories.

Table 1 Treatment System Historical Analytical Results

Parameters List	Dec-10		Jan-11		Feb-11		Mar-11		Apr-11		May-11		Jun-11		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.005
trans 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
cis 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.15
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.03
Chromium	1.140	0.131	0.785	0.333	0.971	**0.502**	1.210	0.182	0.778	0.125	1.320	0.204	1.270	0.335	0.5
Copper	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.017	<0.005	0.007	0.011	<0.005	<0.005	<0.005	0.007	0.5
Iron	<0.050	0.054	<0.050	<0.050	0.051	<0.050	<0.050	<0.050	<0.050	0.065	0.145	<0.050	0.051	<0.050	4
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	0.008	0.005	<0.005	<0.005	0.4
Nickel	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	1.3
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.07
Zinc	<0.010	<0.010	<0.010	<0.010	0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.02	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.01	<0.01	0.02	<0.01	<0.01	<0.01	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	<0.02	<0.02	0.75	<0.02	0.92	<0.02	0.82	<0.02	0.85	<0.02	0.25	<0.02	1.3	<0.02	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	50

(a) Discharge Limitations for total 1,2-Dichloroethylene

NOTES:

mg/L = Milligram(s) per liter

NA = Not applicable

SPDES = State Pollutant Discharge Elimination System

Effluent values in bold exceed applicable SPDES limits.

All analytical data results provided by Adirondack Laboratories.

Table 1 Treatment System Historical Analytical Results

Parameters List	Jul-11		Aug-11		Sep-11		Oct-11		Mar-12		Jul-12		Aug-12		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	N/A	N/A	N/A	N/A	NA	NA	0.005
trans 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	N/A	N/A	N/A	N/A	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	N/A	N/A	N/A	N/A	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.010	<0.010	<0.010	<0.010	0.15
Cadmium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.517	**0.994**	0.933	**0.519**	0.955	0.172	1.09	0.132	0.400	0.074	0.032	0.22	0.18	0.11	0.5
Copper	<0.005	0.031	<0.005	0.006	<0.005	<0.005	<0.005	<0.005	0.002	<0.0010	<0.010	0.0017 J	<0.010	<0.010	0.5
Iron	0.248	0.337	0.075	0.082	<0.050	0.196	0.072	<0.050	0.093	<0.050	1.3 B	<0.050	2.2	<0.050	4
Lead	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.005	<0.005	0.4
Nickel	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.005	0.005	0.0064 J	0.0050 J	0.0059 J	0.0053 J	1.3
Selenium	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.007	0.008	0.015	0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.035	0.036	<0.010	<0.010	0.025	0.029	0.050	0.048	0.007	0.006	0.059	0.0046 J	0.0034 J	0.0024 J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	N/A	N/A	<0.010	<0.010	0.0074 J	<0.010	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.42	<0.02	0.83	<0.02	0.97	<0.02	1.1	<0.02	0.33	<0.02	<0.0050	0.0075 JH	<0.010	<0.010	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	N/A	N/A	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	3.0	2.5	<1.0	2.5	1.5	2.5	<1.0	1.5	<1.0	4.8	25.2	<4.0	12.0	5.6	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
H = Sample was prepped or analyzed beyond the specified holding time.
Effluent values in bold exceed applicable SPDES limits.
Analytical data results through October 2012 provided by Adirondack Laboratories.
Analytical data results for March, July, and August 2012 provided by Test America Laboratories, Inc.

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Table 1 Treatment System Historical Analytical Results

Parameters List	Sep-12		Oct-12		Nov-12		Dec-12		Jan-13		Feb-13		Mar-13		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0066 J	<0.010	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.74	0.24	0.42	0.10	0.27	0.11	0.33	0.17	0.33	0.10	0.52	0.02	1.1	0.034	0.5
Copper	0.0024 J	0.0022 J	0.0023 J	<0.010	<0.010	<0.010	0.0041 J	0.0027 J	<0.010	<0.010	0.0027 JB	0.0019 JB	0.0031 J	0.0021 J	0.5
Iron	0.13	0.18	0.54	<0.050	2.0	<0.050	0.55	0.056	0.11	<0.050	0.029 J	0.02 J	0.027 J	0.024 J	4
Lead	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.4
Nickel	0.011	0.0053 J	0.0068 J	0.0065 J	0.0069 J	0.0053 J	0.0046 J	0.0052 J	0.0043 J	0.0056 J	0.0049 J	0.003 J	0.0088 J	<0.010	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.0076 J	0.0035 J	0.0019 J	0.0015 J	0.0034 J	0.0021 J	0.0037 J	0.0016 J	0.0031 J	<0.010	<0.010	<0.010	0.0064 J	0.0023 J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	NA	NA	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	0.0065 J	<0.010	<0.010	<0.010	<0.010	<0.010	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.52	<0.010	0.23	0.0076 J	<0.010	<0.010	0.22	0.0093 J	0.30 B	0.0061 J	0.47 B	0.0078 J	1.0 H	<0.010	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	4.4	<4.0	<4.0	<4.0	9.2	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	6.4	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Apr-13		May-13		Jun-13		Jul-13		Aug-13		Sep-13		Oct-13		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	0.0085 J	0.0069 J	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.6	0.03	0.74	0.1	0.94	0.10	1.1	0.043	0.54	0.1	0.32	0.027	0.17	0.031	0.5
Copper	<0.010	<0.010	0.0025 J	<0.0040	0.0022 J	0.0021 J	0.0030 J	<0.010	0.0018 J	0.002 J	0.0034 J	<0.010	<0.010	0.0018 J	0.5
Iron	0.043 J	<0.050	0.047 JB	0.15 B	0.043 JB	0.11 B	0.075	<0.050	0.7	0.023 J	3.2	<0.050	2.2	<0.050	4
Lead	<0.005	0.0031 J	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	0.4
Nickel	0.0067 J	0.0056 J	0.0063 J	0.0043 J	0.0071 J	0.0068 J	0.0090 J	0.0057 J	0.0067 JB	0.0035 JB	0.0061 J	0.004 J	0.0058 J	0.0038 J	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.0090 J	0.0079 J	0.0078 J	0.010	0.0085 J	0.0076 J	0.0067 J	0.0049 J	0.0078 JB	0.0017 JB	0.033	0.0019 J	0.010	<0.010	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.011	<0.010	0.01	<0.010	0.0084 J	<0.010	0.017	<0.010	0.0079 J	<0.010	0.0057 J	0.025	<0.010	<0.010	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.5	<0.010	0.63	<0.010	0.78	<0.010	1.0	<0.010	0.38	<0.010	<0.010	<0.010	<0.010	0.0063 J	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	19.2	<4.0	10.0	<4.0	<4.0	5.2	<4.0	5.6	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

	Nov-13		Dec-13		Jan-14		Feb-14		Mar-14		Apr-14		May-14		SPDES Limits
Parameters List	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.093	0.042	0.36	0.032	1.3	0.150	0.16	0.033	0.31	0.015	1.3	0.150	1.1	0.038	0.5
Copper	0.0016 J	<0.010	<0.010	<0.010	0.0034 J	0.005	0.0027 J	0.0025 J	0.0056 J	<0.010	0.0016 J	0.0086 J	0.0066 JB	0.0055 JB	0.5
Iron	3.3	<0.050	0.1	0.027 J	0.7	0.210	2.4	<0.050	0.46	<0.050	0.021 J	0.066	0.028 J	<0.050	4
Lead	<0.005	<0.0050	0.0049 J	0.0031 J	<0.005	<0.0050	<0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.005	<0.005	<0.0050	0.4
Nickel	0.0062 J	0.0033 J	0.0056 J	0.0052 J	0.0095 J	0.0054 J	0.0050 J	0.0034 J	0.0032 J	0.0021 J	0.0095 J	0.0092 J	0.0089 J	0.0063 J	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.0038 J B	0.0025 J B	0.0067 J	0.0049	0.010	0.0052 J	0.0041 J	0.0045 J	0.012 B	0.0036 JB	0.0080 J	0.0061 J	0.0077 J	0.0058 J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.010	<0.010	0.0068 J	0.017	0.0056 J	0.0097 J	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.011	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	<0.010	<0.010	0.3	<0.010	1.0	< 0.010	<0.010	<0.010	0.57	<0.010	0.97	< 0.010	0.99	<0.010	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	5.6	<4.0	<4.0	<4.0	5.2	7.2	<4.0	<4.0	<4.0	<4.0	4.0	7.6	<4.0	10.4	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

Table 1 Treatment System Historical Analytical Results

Parameters List	Jun-14		Jul-14		Aug-14		Sep-14		Oct-14		Nov-14		Dec-14		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.71	0.028	1.300	0.120	1.400	0.044	0.086	0.064	0.011	0.055	0.920	0.065	0.410	0.100	0.5
Copper	0.0021 J	<0.010	0.0033J	0.0046J	0.0032J	<0.010	0.0016J	<0.010	<0.010	<0.010	0.0028J	<0.010	0.0034J	0.0028J	0.5
Iron	0.13	<0.050	0.094	<0.050	0.120	0.280	1.300	<0.050	3.200	<0.050	0.200	<0.050	0.090	<0.050	4
Lead	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0039J	0.0039J	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.4
Nickel	0.0080 J	0.0053 J	0.0088J	0.0080J	0.011	0.0078J	0.0042J	0.0037J	0.0056J	0.0030J	0.011	0.0095J	0.0052J	0.0073J	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	0.0094	0.011J	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.0069 B	0.0033 J	0.0061J	0.004	0.0085	0.006J	0.0023J	0.0035J	0.0033JB	0.0024JB	0.0130	0.0071	0.012J	0.0059JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.010	<0.010	<0.010	<0.010	0.011	<0.010	0.0069J	<0.010	<0.010	0.0053J	0.0051J	<0.010	<0.010	<0.010	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	<0.010	<0.010	<0.010	<0.010	1.3	<0.010	<0.010	<0.010	<0.010	<0.010	0.57	0.0052	0.37	0.0052J	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	75.2	16.4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.4	<4.0	<4.0	5.6	50

NOTE: SPDES = State Pollutant Discharge Elimination System.

(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Jan-15		Feb-15		Mar-15		Apr-15		May-15		Jun-15		Jul-15		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.03
Chromium	0.960	**1.600**	0.095	0.055	0.170	0.031	0.630	0.071	0.710	0.088	0.630	0.150	0.940	0.064	0.5
Copper	0.002J	0.019	<0.010	<0.010	0.0038J	<0.010	0.0016J	<0.010	0.0018J	<0.010	<0.010	0.0028J	<0.010	<0.010	0.5
Iron	0.026J	1.500	0.260	<0.0050	0.029J	<0.0050	0.026J	<0.0050	2.800	0.035J	0.430	0.130	0.046J	<0.0050	4
Lead	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0032J	<0.0050	<0.0050	0.0035J	<0.0050	<0.0050	0.006	0.0045J	0.4
Nickel	0.0078J	0.021	0.0030J	0.0063J	0.0031J	0.0027J	0.0084J	0.0072J	0.0051J	0.0054J	0.0076J	0.0046J	0.0083J	0.0063J	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	<0.015	0.0087J	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	0.07
Zinc	0.0074JB	0.0083JB	0.0020JB	0.0023JB	0.0036JB	0.0033JB	0.0075J	0.0063J	0.0048JB	0.0090JB	0.0065J	0.0056J	0.0083JB	0.0043JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.026	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.0054J	<0.010	<0.010	<0.010	<0.010	<0.010	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.95	<0.010	0.036	<0.010	0.15	<0.010	0.48	0.031	0.3	<0.010	0.69	<0.010	0.98	0.0068J	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	24.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

Table 1 Treatment System Historical Analytical Results

	Aug-15		Sep-15		Oct-15		Nov-15		Dec-15		Jan-16		Feb-16		SPDES Limits
Parameters List	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0005	<0.0005	<0.0005	<0.0005	0.03
Chromium	0.820	0.061	0.510	0.085	0.810	0.270	0.460	0.015	0.680	0.097	0.980	0.270	0.240	0.240	0.5
Copper	<0.010	<0.010	0.0040J	<0.010	0.0018J	<0.010	0.003	<0.010	0.0021J	<0.010	0.0022J	<0.0016	<0.0016	<0.0016	0.5
Iron	0.150	<0.0050	11.700	<0.0050	0.063	0.019J	0.080	<0.0050	7.700	<0.0050	0.040J	<0.019	0.120	<0.019	4
Lead	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0098J	0.0055J	0.0160	0.0047J	0.0077J	0.0260	0.0071	0.0037	0.0058J	0.0071J	0.0085J	0.0100	0.0036J	0.0063J	1.3
Selenium	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.015	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0084JB	<0.010	0.019	0.0031J	0.0093J	0.0072J	0.007	0.002	0.0053JB	0.0020JB	0.0075JB	0.0061JB	0.0033J	0.0016J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	0.021	0.02	0.029	0.022	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.42	0.0074J	<0.010	0.015	0.75	<0.010	0.42	0.0074J	<0.010	<0.010	1.00	0.011	0.20H	<0.005	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	45.2	<4.0	24.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Mar-16		Apr-16		May-16		Jun-16		Jul-16		Aug-16		Sep-16		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.03
Chromium	0.440	0.440	0.430	**0.980**	0.700	**0.600**	0.660	**0.540**	0.29	0.0048	0.68	**0.57**	0.24	**0.640**	0.5
Copper	0.0019J	<0.0016	<0.0016	<0.0016	0.0018J	<0.0016	<0.0016	<0.0016	<0.0016	0.017	0.0025 J	<0.0016	<0.0016	<0.0016	0.5
Iron	0.060	0.032J	0.045J	0.410	0.023J	0.170	0.027J	0.170	<0.019	6.500	0.089	0.099	0.32 B	0.33 B	4
Lead	0.0042J	0.0036J	0.0046J	<0.0030	0.0031J	<0.0030	<0.0030	<0.0030	<0.0030	0.058	<0.0030	<0.0030	0.0040 J	0.0036 J	0.4
Nickel	0.0054J	0.0089J	0.0057J	0.0140	0.0077J	0.0130	0.0069J	0.0130	0.0081 J	0.021	0.0090 J	0.0110	0.0061 JB	0.013 B	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0077JB	0.0049JB	0.010	0.0038J	0.0065JB	0.0046JB	0.0064J	0.0050J	0.0046 JB	0.16 B	0.0051 J	0.0021 J	0.0044 JB	0.0015 JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	0.028	0.019	<0.0050	<0.0050	0.013	<0.0050	0.014	0.015	<0.0095J	<0.0050	<0.0050	<0.0050	0.0052J	<0.0050	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.39	<0.0050	0.45	<0.0050	0.71	<0.0050	0.8 F1	<0.0065J	0.23	<0.0050	0.66	0.008	0.17	0.0089J	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	4.4	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
F1 = MS and/or MSD Recovery is outside acceptable limits.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

EA Engineering, P.C. and Its Affiliate
EA Science and Technology

Table 1 Treatment System Historical Analytical Results

Parameters List	Oct-16		Nov-16		Dec-16		Jan-17		Feb-17		Mar-17		Apr-17		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.16	0.130	0.36	0.14	0.88	0.15	0.46	0.089	0.85	0.16	0.51	0.14	0.74 B	0.21 B	0.5
Copper	<0.0016	<0.0016	0.0024 J	<0.0016	0.0027 J	<0.0016	0.0035 J	<0.0016	0.0022 J	<0.0016	0.0022 J	<0.0016	0.0033 J	0.0032 J	0.5
Iron	0.18	<0.019	0.081	<0.019	0.052	<0.019	0.066 B	<0.019	0.025 JB	<0.019	0.14 B	<0.019	<0.019	<0.019	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0049 J	0.0076 J	0.0070 J	0.0064 J	0.0090 J	0.0085 J	0.0073 J	0.0059 J	0.012 B	0.0089 JB	0.0069 J	0.0058 J	0.0058 J	0.0069 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0036 J	0.0015	0.0065 JB	0.0024 JB	0.0072 J	0.0033 J	0.0085 J	<0.0015	0.0057 J	0.0020 J	0.0084 J	0.0067 J	0.0070 J	0.0062 J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050	0.0059 J	0.0087 J	0.0066 J	<0.0050	<0.0050	0.0050 J	<0.0050	<0.0050	<0.0050	0.0053 J	<0.0050	<0.0050	<0.0050	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.140	0.0058 J	0.36	0.0075 J	1.00	<0.0050	0.410	0.0050 J	0.93	<0.0050	0.47	0.0059 J	0.670	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	6.8	<4.0	5.6	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	8.4	10.4	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	May-17		Jun-17		Jul-17		Aug-17		Sep-17		Oct-17		Nov-17		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.0068 JB	0.0064 JB	0.011 J	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00054 J	0.03
Chromium	0.75	0.21	0.9	0.25	0.820	0.180	0.350	0.240	0.110	0.280	0.150	0.440	5.100	0.230	0.5
Copper	0.0026 J	<0.0016	0.0042 J	0.0017 J	0.003 J	<0.0016	0.0027 J	<0.0016	<0.0016	<0.0016	0.0022 J	0.0021 J	0.011	<0.0016	0.5
Iron	0.024 J	<0.019	0.030 J	<0.019	0.034 J	<0.019	0.460	<0.019	0.460	<0.019	0.280	0.160	144.000	0.039 J	4
Lead	0.0035 J	0.0043 J	<0.0030	<0.0030	<0.0030	<0.015	<0.0030	<0.0030	<0.0030	<0.0060	<0.0030	<0.0030	0.0088 J	<0.0030	0.4
Nickel	0.0081 J	0.0073 J	0.0087 J	0.0082 J	0.008 J	0.010	0.0066 J	0.0053 J	0.0028 J	0.0048 J	0.0064 J	0.0052 J	0.0074 J	0.0054 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.0097 J	<0.0087	0.07
Zinc	0.0077JB	0.0053JB	0.0076JB	0.0064JB	0.0066 J	0.0059 J	0.0073 J	<0.0015	0.0026 J	<0.0015	0.0052 J	<0.0015	0.030	0.0027 J	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050	<0.0050	0.02	<0.0050	<0.0050	<0.0050	<0.0050	0.0098 J	<0.0050	<0.0050	<0.0050	<0.0050	0.012	<0.0050	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.730	<0.0050	0.88	<0.0050	0.75	<0.0050	0.26	<0.0050	0.016	<0.0050	0.098	<0.0050	0.0069 J	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	4.8	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	490.0	28.8	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Dec-17		Jan-18		Feb-18		Mar-18		Apr-18		May-18		Jun-18		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	NS	NS	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	0.00052 J	<0.00050	<0.00050	<0.00050	<0.00050	NS	NS	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.029	0.26	0.57	0.18	0.320	0.200	NS	NS	0.370	0.280	0.850	0.320	0.720	0.370	0.5
Copper	<0.0016	<0.0016	0.0023 J	<0.0016	<0.0016	<0.0016	NS	NS	<0.0016	<0.0016	<0.0016	<0.0016	0.0021 J	0.0027 J	0.5
Iron	1.400	<0.019	<0.019	<0.019	0.037 J	0.089	NS	NS	<0.019	<0.019	0.019 J	0.020 J	0.025 J	0.250	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	NS	NS	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0038 J	0.0048 J	0.0084 J	0.0092 J	0.0062 J	0.0071 J	NS	NS	0.0064 J	0.0073 J	0.0083 J	0.0086 J	0.0089 J	0.0075 J	1.3
Selenium	<0.0087	0.010 J	<0.0087	<0.0087	<0.0087	<0.0087	NS	NS	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0047 J	0.0018 J	0.0068 J	0.0058 J	0.0051 J	0.0046 J	NS	NS	0.0060 J	0.0058 J	0.0071 J	0.0055 J	0.0087 JB	0.0021 JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050	<0.0050	<0.0050	<0.0050	0.0061 J	<0.0050	NS	NS	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	<0.0050	<0.0050	0.58 H	<0.0050 H	0.33 B	0.0055 JB	NS	NS	0.38	<0.0050	0.87	<0.0050	0.74	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	NS	NS	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.
Samples were not collected in March 2018 due to budget concerns and a lapse in Aztech's remedial contract during this monitoring period.

Table 1 Treatment System Historical Analytical Results

Parameters List	Jul-18		Aug-18		Sep-18		Oct-18		Nov-18		Dec-18		Jan-19		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.074	0.33	0.69	0.28	0.420	0.280	0.880	0.340	0.720	0.390	0.420	**0.710**	0.720	0.430	0.5
Copper	<0.0016	<0.0016	0.0017 J	<0.0016	0.0016 J	<0.0016	0.0020 J	<0.0016	0.0030 J	<0.0016	<0.0016	0.0021 J	0.0019 J	<0.0016	0.5
Iron	0.240	<0.019	0.098	<0.019	0.058	<0.019	0.037 J	<0.019	0.038 J	0.040 J	<0.019	<0.019	0.035 J	0.062	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0040 J	0.0046 J	0.0072 J	0.0064 J	0.0071 J	0.0072 J	0.0097 J	0.0092 J	0.0083 J	0.0081 J	0.0078 J	0.0072 J	0.0080 J	0.0090 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0051 J	0.0028 J	0.0057 JB	<0.0015	0.0081 JB	0.0032 JB	0.0080 JB	0.0017 JB	0.0075 JB	<0.0015	0.0022 JB	0.0049 JB	0.0071 JB	0.0022 JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0054 J	<0.0050	0.0069 J	0.0060 J	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.0099 J	<0.0050	0.56	<0.0050	0.44	<0.0050	0.88	<0.0050	0.69	0.0098 JT	<0.0050	0.69	0.74	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	20.4	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.

(a) Discharge Limitations for total 1,2-Dichloroethylene

mg/L = Milligrams per liter

NA = Not Applicable

J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.

B = Compound was found in the blank and sample.

Effluent values in bold exceed applicable SPDES limits.

All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

	Feb-19		Mar-19		Apr-19		May-19		Jun-19		Jul-19		Aug-19		SPDES Limits
Parameters List	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	**System Influent**	**System Effluent**	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.54	0.37	0.46	0.37	0.590	0.380	0.830	0.490	0.650	0.470	0.800	**0.560**	0.660	0.490	0.5
Copper	<0.0016	<0.0016	0.0018 J	<0.0016	0.0018 J	<0.0016	0.0016 J	<0.0016	<0.0016	<0.0016	<0.0016	<0.0016	0.0045 J	0.0017 J	0.5
Iron	0.035 J	<0.019	0.040 J	<0.019	<0.019	<0.019	0.025 J	<0.019	0.024 J	<0.019	0.030 J	<0.019	0.037 J	<0.019	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0067 J	0.0076 J	0.0064 J	0.0070 J	0.0084 J	0.0087 J	0.0084 J	0.0079 J	0.0080 J	0.0083 J	0.0093 J	0.0096 J	0.0091 J	0.0093 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0046 JB	0.0058 JB	0.0078 J	0.0073 J	0.0071 J	0.0033 J	0.0076 J	0.0023 J	0.0055 J	<0.0015	0.0087 JB	<0.0015	0.012 B	0.0049 JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.029	<0.0050	<0.0050	0.0052 J	<0.0050	<0.0050	<0.0050	0.0052 J	<0.0050	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.510	<0.0050	0.45	<0.0050	0.6	<0.0050	0.57	<0.0050	0.64	<0.0050	0.74	<0.0050	0.57	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	14.8	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Sep-19		Oct-19		Nov-19		Dec-19		Jan-20		Feb-20		Mar-20		SPDES Limits
	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	System Influent	System Effluent	
PURGEABLE HALOCARBONS E601 (mg/L)															
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)															
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	NS	NS	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	NS	NS	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.81	0.46	0.12	0.38	0.810	0.420	NS	NS	0.550	**0.520**	0.620	0.160	0.620	0.190	0.5
Copper	0.0025 J	<0.0016	0.0018 J	<0.0016	0.0065 J	0.0020 J	NS	NS	<0.0016	0.0029 J	0.0029 J	<0.0016	0.0017 J	<0.0016	0.5
Iron	0.110	<0.019	0.220	<0.019	0.051 B	<0.019	NS	NS	0.073	1.500	0.024 J	<0.019	<0.019	<0.019	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	NS	NS	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0089 J	0.0090 J	0.0065 J	0.0069 J	0.0081 J	0.0091 J	NS	NS	0.0062 J	0.011	0.0064 J	0.0067 J	0.0066 J	0.0065 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	NS	NS	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0093 JB	0.0029 JB	0.010 B	0.0041 JB	0.010 B	0.0047 JB	NS	NS	0.0036 J	0.0023 J	0.0063 J	0.0053 J	0.0075 JB	0.0064 JB	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)															
Cyanide Amenable to Chlorination	<0.0050 H	<0.0050 H	0.025	<0.0050	0.0070 J	<0.0050	NS	NS	<0.0050	<0.0050	<0.0050	0.0087 J	0.013	0.013	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)															
Hexavalent Chromium	0.160	0.022	0.064	0.0062 J	0.69	<0.0050	NS	NS	0.5	<0.0050	0.61	<0.0050	0.39	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)															
Oil and Grease	NA	NA	NA	NA	NA	NA	NS	NS	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)															
Total Suspended Solids	<4.0	<4.0	<4.0 H	<4.0 H	52.0	6.0	NS	NS	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 1 Treatment System Historical Analytical Results

Parameters List	Apr-20 System Influent	Apr-20 System Effluent	May-20 System Influent	May-20 System Effluent	Jun-20 System Influent	Jun-20 System Effluent	Jul-20 System Influent	Jul-20 System Effluent	SPDES Limits
PURGEABLE HALOCARBONS E601 (mg/L)									
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	0.005
trans 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
cis 1,2-Dichloroethene	NA	NA	NA	NA	NA	NA	NA	NA	0.003 [(a)]
INDUCTIVELY COUPLED PLASMA METALS E200.7 (mg/L)									
Arsenic	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	<0.0056	0.15
Cadmium	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.03
Chromium	0.65	0.15	0.7	0.21	0.330	0.180	0.400	0.470	0.5
Copper	<0.0016	<0.0016	0.0020 J	<0.0016	0.0024 J	<0.0016	<0.0016	0.00611 J	0.5
Iron	<0.019	<0.019	0.051	0.100	0.077 B	<0.019	0.250	0.110	4
Lead	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	<0.0030	0.4
Nickel	0.0066 J	0.0068 J	0.0071 J	0.0070 J	0.0053 J	0.0055 J	0.0066 J	0.0049 J	1.3
Selenium	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	<0.0087	0.07
Zinc	0.0061 J	0.0027 J	0.0051 J	0.0032 J	0.0063 JB	0.0031 JB	0.0069 J	0.025	0.4
CYANIDE AMENABLE TO CHLORINATION SM 4500CN_G (mg/L)									
Cyanide Amenable to Chlorination	0.027	0.018	0.011	<0.0050	0.010	0.0067 J	0.0075 J	0.019	1.1
HEXAVALENT CHROMIUM SM3500-CR D (mg/L)									
Hexavalent Chromium	0.700	0.017	0.7	<0.0050	0.25	0.0080 J F1	0.36	<0.0050	2.7
OIL AND GREASE E1664 (mg/L)									
Oil and Grease	NA	NA	NA	NA	NA	NA	NA	NA	15
TOTAL SUSPENDED SOLIDS E160.2 (mg/L)									
Total Suspended Solids	<4.0	<4.0	4.0	4.8	<4.0	<4.0	<4.0	<4.0	50

NOTE: SPDES = State Pollutant Discharge Elimination System.
(a) Discharge Limitations for total 1,2-Dichloroethylene
mg/L = Milligrams per liter
NA = Not Applicable
J = Result is less than the reporting but greater than or equal to the method detection limit and the concentration is an approximate value.
B = Compound was found in the blank and sample.
F1 = MS and/or MSD recovery exceeds control limits
Effluent values in bold exceed applicable SPDES limits.
All analytical data results provided by Test America Laboratories, Inc.

Table 2 Groundwater Table Elevations

Well Number	TOIC Elevation (feet AMSL)	TOIC Water Level (Depth to Water) (feet)									
		Sep-17	Dec-17	Feb-18	Aug-18	Jun-19	Jul-19	Oct-19	Feb-20	Apr-20	Jul-20
Overburden Monitoring Wells											
MW-CMT-1	49.75	9.04	9.52	9.79	8.15	8.75	NR(1)	9.38	8.21	8.60	8.70
MW-CMT-3	51.10	10.34	10.94	8.48	9.26	9.52	10.70	10.97	9.45	9.72	10.20
MW-EE-4S	49.55	8.50	8.94	8.11	8.02	8.28	8.62	9.89	8.11	8.33	8.54
MW-EE-5S	50.63	9.7	10	9.25	9.15	9.63	NR(1)	9.94	9.24	9.47	9.60
MW-EA-7R	46.69	2.81	3.35	2.33	2.46	2.15	2.90	3.00	2.65	2.73	2.81
MW-ESE-9R	43.37	6.1	6.12	5.9	5.73	5.82	5.94	6.12	5.94	5.92	5.86
MW-EA-10S	43.60	4.09	4.35	0	NR	3.75	4.02	4.22	3.8	3.82	3.96
MW-EA-11S	41.38	4.8	5.19	4.58	4.4	4.61	4.71	5.13	4.47	4.35	4.58
MW-EA-12S	42.25	5.47	6.01	5.35	4.98	5.3	5.4	5.68	5.19	5.21	5.36
MW-EA-13S	41.54	1.32	1.79	1.31	0.95	1.44	NR(1)	1.59	1.37	1.4	1.35
Bedrock Monitoring Wells											
MW-EE-2D	51.56	NS		10.33	NS	10.41	NS				10.70
MW-EE-4D	46.84			8.91		7.72					8.49
MW-EE-5D	50.09			11.41		12.1					11.29

(1) PFAS samples were collected from MW-CMW-1, MW-EE-5S, MW-EA-13S, and MW-EE-5D during the July 2019 sampling event. Available water level indicators were not PFAS-free, so water levels were not collected prior to sampling from those wells.

NOTES:

AMSL = Above mean sea level

NR = Not Recorded

NS = Not sampled

TOIC = Top of inner casing

Table 2 Groundwater Table Elevations

Well Number	TOIC Elevation (feet AMSL)	Groundwater Table Elevation (ft AMSL)									
		Sep-17	Dec-17	Feb-18	Aug-18	Jun-19	Jul-19	Oct-19	Feb-20	Apr-20	Jul-20
Overburden Monitoring Wells											
MW-CMT-1	49.75	40.71	40.23	39.96	41.60	41.00	NR(1)	40.37	41.54	41.15	41.05
MW-CMT-3	51.10	40.76	40.16	42.62	41.84	41.58	40.40	40.13	41.65	41.38	40.90
MW-EE-4S	49.55	41.05	40.61	41.44	41.53	41.27	40.93	39.66	41.44	41.22	41.01
MW-EE-5S	50.63	40.93	40.63	41.38	41.48	41.00	NR(1)	40.69	41.39	41.16	41.03
MW-EA-7R	46.69	43.88	43.34	44.36	44.23	44.54	43.79	43.69	44.04	43.96	43.88
MW-ESE-9R	43.37	37.27	37.25	37.47	37.64	37.55	37.43	37.25	37.43	37.45	37.51
MW-EA-10S	43.60	39.51	39.25	43.60	NR	39.85	39.58	39.38	39.80	39.78	39.64
MW-EA-11S	41.38	36.58	36.19	36.80	36.98	36.77	36.67	36.25	36.91	37.03	36.80
MW-EA-12S	42.25	36.78	36.24	36.90	37.27	36.95	36.85	36.57	37.06	37.04	36.89
MW-EA-13S	41.54	40.22	39.75	40.23	40.59	40.10	NR(1)	39.95	40.17	40.14	40.19
Bedrock Monitoring Wells											
MW-EE-2D	51.56	NS		41.23	NS	41.15	NS				40.86
MW-EE-4D	46.84			37.93		39.12					38.35
MW-EE-5D	50.09			38.68		37.99					38.80

(1) PFAS samples were collected from MW-CMW-1, MW-EE-5S, MW-EA-13S, and MW-EE-5D during the July 2019 sampling event. Available water level indicators were not PFAS-free, so water levels were not collected prior to sampling from those wells.

NOTES:

AMSL = Above mean sea level

NR = Not Recorded

NS = Not sampled

TOIC = Top of inner casing

Table 3 Historical Hexavalent Chromium Overburden Groundwater Analytical Results

Date	MW-EE-4S	MW-EE-5S	MW-EE-6S*	MW-EA-7R*	MW-EA-8*	MW-CMT-1	MW-ESE-9R*	MW-CMT-3	MW-EA-10S	MW-EA-11S	MW-EA-12S	MW-EA-13S	NYSDEC Class GA Criteria (mg/L)[a]
21-May-03	ND	**40.8**	ND	**0.975**	**0.099**	- -	- -	- -	- -	- -	- -	- -	0.05
21-Aug-03	**0.06**	**33.7**	0.046	**1.08**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
4-Dec-03	0.041	**48.9**	0.018	**0.744**	0.041	- -	- -	- -	- -	- -	- -	- -	0.05
24-Feb-04	0.018	**33.4**	ND	**0.857**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
12-May-04	0.049	**37.4**	ND	**0.881**	0.049	- -	- -	- -	- -	- -	- -	- -	0.05
2-Sep-04	**0.735**	**32.2**	ND	**1.04**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
2-Dec-04	**0.06**	**11.8**	ND	**0.348**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
3-Feb-05	**0.083**	**61.2**	ND	**0.83**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
18-May-05	0.029	**35**	ND	**0.63**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
3-Aug-05	0.041	**28.7**	ND	**0.62**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
29-Nov-05	**0.052**	**33.6**	ND	**0.24**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
9-Feb-06	**0.11**	**24.9**	ND	**0.35**	ND	- -	- -	- -	- -	- -	- -	- -	0.05
8-Apr-08	**0.086**	**15**	ND	**0.34**	0.049	ND	- -	ND	- -	- -	- -	- -	0.05
1-Jan-09	- -	- -	- -	- -	- -	- -	**0.51**[b]	- -	- -	- -	- -	- -	0.05
21-Jul-09	0.049	**19**	ND	**0.52**	ND	ND	**1.3**	ND	- -	- -	- -	- -	0.05
12-Oct-10	**0.062**	**17**	ND	**1**	ND	ND	**0.4**	ND	- -	- -	- -	- -	0.05
1-Mar-12	0.039	**17**	ND	**0.29**	ND	ND	**3.2**	ND	- -	- -	- -	- -	0.05
11/12-Jun-13	0.042	**13**	ND	**0.34**	**0.15**	ND	**3.7**	ND	- -	- -	- -	- -	0.05
30-Aug-13	- -	- -	- -	- -	**3.2**[c]	- -	- -	- -	- -	- -	- -	- -	0.05
28-Oct-13	0.029	**16**	ND	**0.37**	ND	ND	- -	- -	- -	- -	- -	- -	0.05
15-Jan-14	0.045	**13**	ND	**0.14**	ND	ND	**2.7**	ND	- -	- -	- -	- -	0.05
29-Apr-14	**0.061**	**24**	ND	**0.45**	ND	ND	**2.8**	ND	ND	0.043	ND	ND	0.05
29-Jul-14	0.045	**15**	ND	**0.43**	ND	ND	**0.48**	ND	ND	**0.098**	ND	ND	0.05
2-Dec-14	0.045	**16**	ND	**0.44**	ND	ND	**2.6**	ND	ND	**0.31**	ND	ND	0.05
7-Apr-15	0.026	**12**	ND	**0.22**	ND	ND	ND	ND	ND	ND	ND	ND	0.05
7-Jul-15	0.031	- -	ND	**0.41**	- -	ND	**1.7**	ND	ND	**0.1**	ND	ND	0.05
8-Oct-15	**0.052**	**25**	ND	**0.42**	ND	ND	**3.1**	ND	ND	**0.26**	ND	ND	0.05
27-Jan-16	0.036	**12**	ND	ND	ND	ND	**2.9**	ND	ND	ND	ND	ND	0.05
18-Apr-16	0.035	**12**	ND	**0.33**	ND	ND	**2.4**	ND	ND	**0.22**	ND	ND	0.05
16-Aug-16	ND	**12**	ND	**0.33**	ND	ND	**2.6**	ND	ND	**0.52**	ND	ND	0.05
9-Nov-16	0.043	**14**				ND		ND	ND	ND	ND	ND	0.05
27-Feb-17	0.028	**11**		Decommissioned		ND	Decommissioned	ND	ND	**0.23**	ND	ND	0.05
26-Jun-17	0.026	**8.3**				ND		ND	ND	**0.41**	ND	ND	0.05
13-Sep-17	0.034	**8.2**		**1.8**		ND	ND	ND	ND	ND	ND	ND	0.05
19-Dec-17	0.033	**9.3**		**1.3**		ND	**0.21**	ND	ND	ND	ND	ND	0.05
12-Feb-18	0.034	- -[d]		**1.4**		ND	ND	ND	ND	ND	ND	ND	0.05
16-Aug-18	**0.053**	**22**	Decommissioned	**1.8**	Decommissioned	ND	**0.22**	ND	- -[e]	**0.33**	ND	ND	0.05
4-Jun-19	ND	**8.8**		**0.75**		ND	**0.14**	ND	ND	ND	ND	ND	0.05
15-Jul-19	0.025	**4.7**		**0.78**		ND	ND	ND	- -[f]	**0.19**	ND	- -[f]	0.05
1-Oct-19	0.034	**8.5**		**0.89**		ND	ND	ND	ND	ND	ND	ND	0.05
18-Feb-20	0.031	**9.3**		**0.92**		ND	ND	ND	ND	ND	ND	ND	0.05
23-Apr-20	0.027	**7.4**		**0.75**		ND	ND	ND	ND	ND	ND	ND	0.05
13-Jul-20	0.028	**6.7**		**0.79**		ND	**0.092**	ND	ND	ND	ND	ND	0.05

(a) 6 NYCRR Part 703.5 Class GA Groundwater Quality Regulations, as presented in the Division of Water Technical and Operational Guidance Series 1.1.1, 1998, as amended.
(b) Sample was collected on 14 January 2009
(c) Grab sample collected to confirm June 2013 results. Five gallons of water was removed from the monitoring well prior to collecting the sample. Sample was analyzed by Test America Laboratories
(d) Sample inadvertently collected in bottle with preservative, and could not be analyzed for hexavalent chromium.
(e) MW-EA-10S could not be located during August 2018 sampling event.
(f) Cooler with July 2019 samples from MW-EA-10S and MW-EA-13S were lost during shipping.
NOTE: NYSDEC = New State Department of Environmental Conservation
ND = Non-Detect.
- - = Not Available
All samples reported in milligrams per liter (mg/L).
Bold values indicate exceedance of Class GA groundwater standards or guidance values.
*MW-EE-6S, MW-EA-7, MW-EA-8, and MW-ESE-9 were decommissioned by a contractor of the Watervliet Arsenal prior to the November 2016 sampling event; MW-EA-7 and MW-ESE-9 were subsequently replaced by the USACE in August 2017

Table 4 Historical Hexavalent Chromium Bedrock Groundwater Analytical Results

Date	MW-EE-4D	MW-EE-5D	MW-EE-6D[(b)]	MW-EE-2D	NYSDEC Class GA Criteria (mg/L)[(a)]
21-May-03	0.008	ND	ND	- -	0.05
21-Aug-03	**0.129**	ND	0.023	- -	0.05
4-Dec-03	ND	0.004	ND	- -	0.05
24-Feb-03	ND	ND	ND	- -	0.05
12-May-04	0.013	ND	ND	- -	0.05
2-Sep-04	0.016	ND	**0.075**	- -	0.05
2-Dec-04	0.007	0.034	ND	- -	0.05
3-Feb-05	ND	0.021	ND	- -	0.05
18-May-05	ND	0.031	ND	- -	0.05
3-Aug-05	ND	0.037	ND	- -	0.05
29-Nov-05	ND	ND	ND	- -	0.05
9-Feb-06	ND	ND	ND	- -	0.05
8-Apr-08	ND	ND	ND	ND	0.05
21-Jul-09	ND	ND	ND	ND	0.05
12-Oct-10	ND	ND	ND	ND	0.05
1-Mar-12	ND	ND	ND	ND	0.05
11/12-Jun-13	ND	ND	ND	ND	0.05
2-Dec-14	ND	ND	ND	ND	0.05
27-Jan-16	ND	ND	ND	ND	0.05
27-Feb-17	ND	ND	Decommissioned	ND	0.05
12-Feb-18	ND	ND		ND	0.05
4-Jun-19	ND	ND		ND	0.05
13-Jul-20	0.011	0.011		0.018	0.05

(a) 6 NYCRR Part 703.5 Class GA Groundwater Quality Regulations, as presented in the Division of Water Technical and Operational Guidance Series 1.1.1, 1998, as amended.

(b) MW-EE-6D was decommissioned prior to the November 2016 sampling event.

NOTES: NYSDEC = New State Department of Environmental Conservation

ND = Non-detect

- - = Not available

All samples reported in milligrams per liter (mg/L).

Bold values indicate exceedance of Class GA groundwater standards or guidance values.

Table 5 Remedy Protectiveness

Media	Remedial Action Objectives	Previous Actions	Status	Evidence	Future actions to achieve RA-Os
Soil	Reduce, control, or eliminate the contamination present within the soil.	Tank excavation and localized excavation of soil in source area in 1995.	Partially achieved	Visual evidence in late 2000s indicated that contamination had leached upward through backfill material in the former excavation area. This was followed up by an additional soil sampling event in April 2009, which confirmed the continued presence of hexavalent chromium in surface soil (4,600 mg/kg) and subsurface soil (4.2 mg/kg) in the footprint of the former excavation area.	An additional excavation of contaminated soil around the former tank area and under the footprint of the Perfection Plating building will be performed in accordance with the Amended ROD (NYSDEC 2018), the Basis of Design (EA 2019), and Remedial Action Scope of Work (EA 2020).
	Eliminate the potential for direct human or animal contact with the contaminated soil onsite and miscellaneous contaminated materials inside the Perfection Plating building.		Achieved	Impacted surface soil and building materials are still present within the former plating building; however, unauthorized access is prevented through site security fencing and exterior entrances to building being locked.	
	Prevent migration of contaminants from the site to groundwater		Not achieved	Concentrations of hexavalent chromium in groundwater near the source area (MW-EE-5S) have decreased slightly since 2003, but remain at the same order of magnitude since the previous PRR reporting period. This indicates that soil in the source area is acting as a continuing source of contamination. The possibility still exists for groundwater to come in contact with remaining impacted soil. However, remaining contaminated soil is to be removed in upcoming remedial actions in accordance with the Amended ROD. Additionally, impacted groundwater is not used as a public drinking water source.	
Groundwater	Mitigate the impacts of contaminated groundwater to the environment.	Installation and long-term operation and maintenance of an interceptor trench and groundwater treatment system in 1998 to prevent offsite migration of contamination, and regular groundwater monitoring to demonstrate system effectiveness.	Achieved	An interceptor trench is operating to prevent offsite migration; however, groundwater results from this reporting period and previous periods indicate that a portion of the Cr plume is bypassing the trench. However, downgradient receptors are supplied with public water and impacted groundwater is not used as a drinking water source.	An in-situ geochemical fixation pilot study will be performed to remediate the groundwater in the source area in accordance with the Amended ROD (NYSDEC 2018), the Basis of Design (EA 2019), the Remedial Action Scope of Work (EA 2020) and the In Situ Geochemical Fixation Pilot Study Work Plan Memorandum (EA 2020). Groundwater monitoring and O&M of the treatment system to be continued in accordance with the OM&M plan (EEE 1998) until finalization of the Site Management Plan, to be prepared upon completion of additional remedial action activities.
	Provide for attainment of Standards, Criteria, and Guidance for groundwater quality at the limits of the area of concern		Not achieved	Groundwater exceedances of Standards, Criteria, and Guidance exist in five overburden wells. Although the size of the groundwater plume has decreased between the June 2017 to the July 2020 sampling events, the current concentrations of hexavalent chromium in the source area are on the same order of magnitude as sampling events completed from July 2014 to July 2017.	
Building	Eliminate the potential for direct human or animal contact with the contaminated soil onsite and miscellaneous contaminated materials inside the Perfection Plating building	Emptying and disposal of plating and rinse tanks and drums used to store plating waste. Implementation of institutional controls limiting human access to the site and building.	Achieved	Although paint and concrete block samples collected in 2009 indicated that residual hexavalent chromium contamination is present on the walls of the building, site access is restricted to personnel with proper training and certification. Unauthorized access is prevented through ICs including locked exteriror doors to the former plating building and site security fencing.	The Perfection Plating building will be demolished and building materials will be disposed of offsite in accordance with the Amended ROD (NYSDEC 2018), the Basis of Design (EA 2019), and Remedial Action Scope of Work (EA 2020).

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Appendix A

SPDES Discharge Permit

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M E M O R A N D U M

TO: David Harrington, PE, Chief, Remedial Section A, Bureau E
FROM: Percival Miller, DOW, Bureau of Water Permits
SUBJECT: Perfection Plating, Site # 4-01-037
DRAINAGE BASIN: Lower Hudson River
DATE: May 7, 2020

In response to your request dated April 27, 2020, attached please find effluent limitations and monitoring requirements for the above noted remediation discharge.

The DOW does not have any regulatory authority over a discharge from a State, PRP, or Federal Superfund Site. DER will be responsible for ensuring compliance with the attached effluent limitations and monitoring requirements, and approval of all engineering submissions. Footnote 1 identifies the appropriate DER Section Chief as the place to send all effluent results, engineering submissions, and modification requests. The Regional Water Engineer should be kept appraised of the status of this discharge and, in accordance with the attached criteria, receive a copy of the effluent results for informational purposes.

If you have any questions, please call me at (518) 402-8120.

Attachment (Effluent Limitations and Monitoring Requirements)

cc: Derek Thorsland, R4 RWE (via email, w/attach)
Brian Baker, Section Chief, DOW (via email, w/attach)
BWRM Section Chief, DOW (w/attach)

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning **May 1, 2020** and lasting until **April 30, 2025** the discharges from the wastewater treatment facility at **Latitude 42° 43´ 24.11¨, Longitude -73° 41´ 40.58¨**, via the Watervliet Storm Sewer to the Hudson River, **Water Index Number (WIN) H-224**, Class C; shall be limited and monitored by the operator as specified below:

Outfall Number and Parameter	Discharge Limitations		Units	Minimum Monitoring Requirements	
	Monthly Avg.	Daily Max		Measurement Frequency	Sample Type
Outfall 001 - Treated Remediation Discharge:					
Flow	Monitor	Monitor	GPD	Continuous	Recorder
pH (Range)	6.0 – 9.0		SU	Monthly	Grab
Total Suspended Solids	Monitor	50	mg/l	Monthly	Grab
Oil & Grease	Monitor	15	mg/l	Monthly	Grab
Cyanide, Amendable	Monitor	1.1	mg/l	Monthly	Grab
Arsenic, Total	Monitor	0.15	mg/l	Monthly	Grab
Cadmium, Total	Monitor	0.03	mg/l	Monthly	Grab
Chromium, Hexavalent	Monitor	2.7	mg/l	Monthly	Grab
Copper	Monitor	0.5	mg/l	Monthly	Grab
Chromium, Total	Monitor	0.5	mg/l	Monthly	Grab
Iron, Total	Monitor	4.0	mg/l	Monthly	Grab
Lead, Total	Monitor	0.4	mg/l	Monthly	Grab
Nickel, Total	Monitor	1.3	mg/l	Monthly	Grab
Selenium, Total	Monitor	0.07	mg/l	Monthly	Grab
Zinc, Total	Monitor	0.4	mg/l	Monthly	Grab
1,2-Dichloroethylene	Monitor	0.003	mg/l	Monthly	Grab
Vinyl Chloride	Monitor	0.005	mg/l	Monthly	Grab

Additional Conditions:

1. Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective or design treatment system capacity. All monitoring data, engineering submissions and modification requests must be submitted to:

   David K. Harrington, PE, Chief
   Division of Environmental Remediation, Remedial Section A – Bureau E
   NYSDEC, 625 Broadway, Albany, New York 12233-7017, 518-402-9813.

   With a copy sent to:

   Regional Water Engineer, Region 4
   1130 West Westcott Road
   Schenectady, NY 12561
   derek.thorsland@dec.ny.gov
   518-357-2219

2. Only site generated wastewater is authorized for treatment and discharge.

3. Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

4. Both concentration (mg/l or µg/l) and mass loadings (lbs/day) must be reported to the Department for all parameters except flow and pH.

5. Any use of corrosion/scale inhibitors, biocidal-type compounds, or other water treatment chemicals used in the treatment process must be approved by the department prior to use.

6. This discharge and administration of this discharge must comply with the substantive requirements of 6NYCRR Part 750.

7. Samples and measurements to comply with the monitoring requirements specified above shall be taken from the treatment system effluent, prior to discharge into the Hudson River.

8. The minimum measurement frequency for all parameters, except Flow, shall be monthly, following a period of 8 consecutive weekly sampling events showing no exceedance of the stated discharge limitations. If a discharge limit for any parameter is exceeded, all parameters are then to be measured again on a weekly basis; until no exceedances are shown for four (4) consecutive sampling events then monthly monitoring may be resumed.

Site Description

The site is a State Superfund Site, for which a copy of the DER Remedial Investigation (RI) report may be obtained from the DER Project Manager, at (518) 402-9903. This permit equivalent includes a discharge location and) latitude and longitude coordinates. A location map is attached to the permit.

The name, telephone number, and email address of the responsible DER project manager to contact if there are questions or the need to borrow a copy of the RI report are: Samantha Salotto, Environmental Engineer, at 518-402-9903, samantha.salotto@dec.ny.gov. The DER contact/address where compliance monitoring data is to be sent. Samantha Salotto, 625 Broadway, Albany, NY 12233-7017.

Treatment System

Contaminated groundwater collected in a trench is pumped by a submersible pump to an aerator, at an average flow rate of 2.60 GPM (3,744 GPD). Gravity flow from the aerator enters a plate iron filter, for removal of suspended solids and oxidized iron. From the iron filter the (gravity) water flow is to a 90-gallon retention tank, where pH is adjusted to between 4.5 to 5.0. Water from the acid adjustment tank is transferred by a centrifugal pump to the anion exchangers, at an average flow rate of 2.60 GPM. When there is a breakthrough of hexavalent chromium (Cr VI), the first anion exchanger is removed and a fresh exchanger unit is put in its place: this allows the former second unit to be the first flow unit followed by the original third and the freshly installed unit. From the anion exchangers the water flows to a 90-gallon retention tank, where the pH is adjusted to between 6.4-6.7. The water then flows under gravity to a storm water catch basin. Discharges will be continuous for the duration of the project.

Term of Remedial Action

Source removal is planned for 2021. Treatment of the source at the Perfection Plating Site # 4-01-037 site is estimated to take 3-6 months. Groundwater monitoring will then continue afterwards, to evaluate effectiveness of the treatment, and to determine if continued operation of the treatment system will be necessary.
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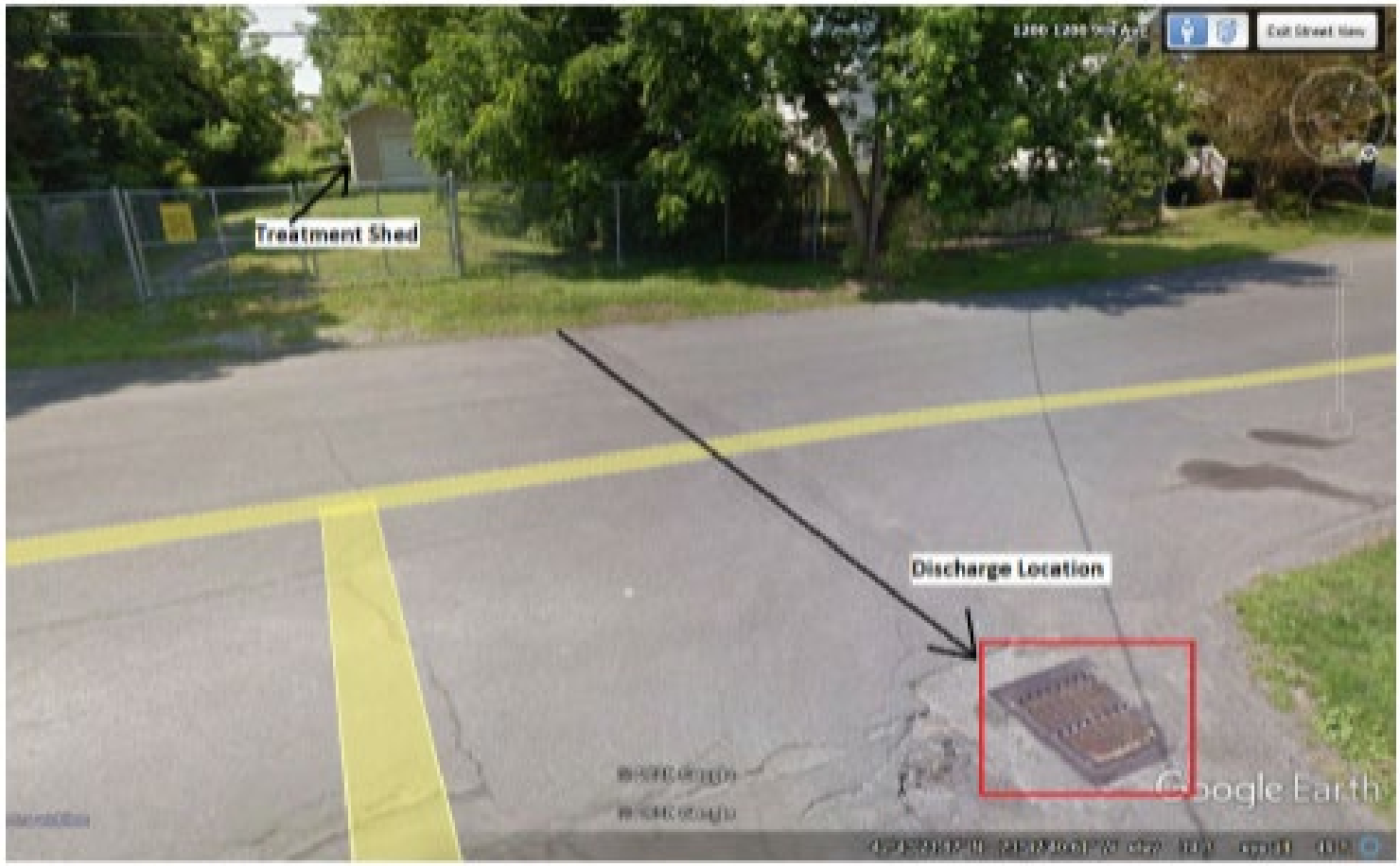
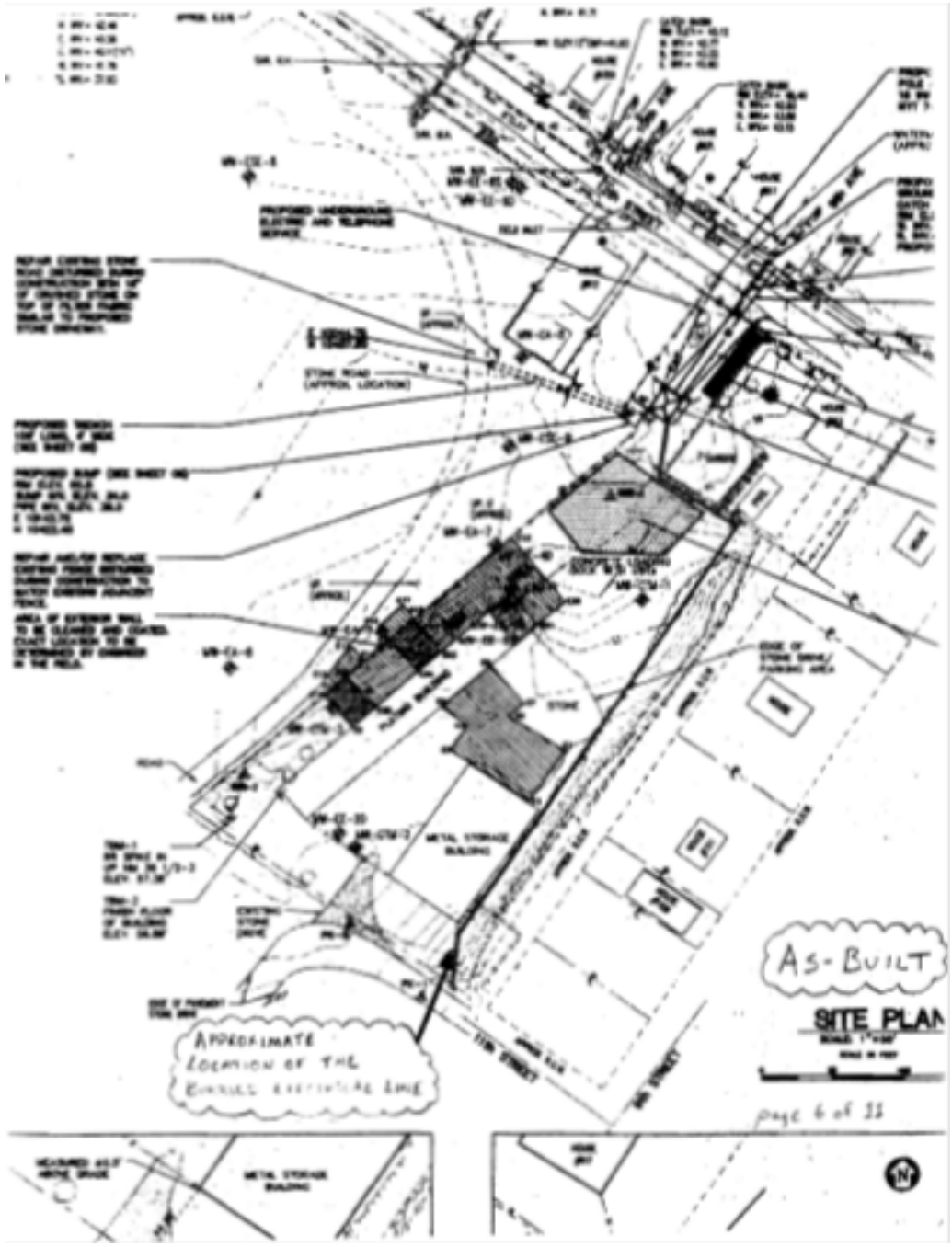
Perfection Plating Site # 4-01-037 – Discharge Location



Location - Perfection Plating Site No. 4-01-037

Perfection Plating – Site Plan

Perfection Plating, Site # 4-01-037



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Appendix B

Institutional Control/Engineering Control Certification Form

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Enclosure 1
Engineering Controls - Standby Consultant/Contractor Certification Form

Site Details **Box 1**

Site No. **401037**

Site Name Perfection Plating

Site Address: 911 11th Street Zip Code: 12189
City/Town: Watervliet
County: Albany
Site Acreage: 1.7

Reporting Period: July 30, 2017 to July 30, 2020

	YES	NO
1. Is the information above correct?	☒	☐
If NO, include handwritten above or on a separate sheet.		
2. To your knowledge has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☒
3. To your knowledge has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☒
4. To your knowledge 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. To your knowledge is the site currently undergoing development?	☐	☒

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? 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 contact the DEC PM regarding the development of a Corrective Measures Work Plan to address these issues.

Signature of Standby Consultant/Contractor Date

SITE NO. 401037

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
32.19-2-66	Charles H. Essepian	
		Monitoring Plan
		O&M Plan
		Monitoring Plan
		O&M Plan
		Landuse Restriction
		Soil Management Plan
		Site Management Plan

Adherence to the Deed restriction. Property cannot be used for residential or day care purposes.
Excavation below 1 foot depth is prohibited.
Adherence to the Site Management Plan.

32.81-1-6	Charles H. Essepian	
		Ground Water Use Restriction
		Soil Management Plan
		Landuse Restriction
		Building Use Restriction
		Monitoring Plan
		Site Management Plan
		O&M Plan
		IC/EC Plan

A deed restriction is in place that restricts the property from use for residential dwellings or daycare. N disturbance of soil below 1 foot. A SMP is also in place that reuires maintenance of a groundwater collection trench and groundwater moritoring.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
32.19-2-66	
	Groundwater Treatment System
	Fencing/Access Control
	Groundwater Treatment System
	Fencing/Access Control
	Groundwater Treatment System
	Groundwater Containment
	Fencing/Access Control

Groundwater collection trench
Groundwater treatment and discharge via SPDES equivalent in place.

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, including data and material prepared by previous contractors for the current certifying period, if any;

   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) nothing has occurred that would constitute a failure to comply with the Site Management Plan, or equivalent if no Site Management Plan exists.

YES	NO
☒	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and contact the DEC PM regarding the development of a Corrective Measures Work Plan to address these issues.

Signature of Standby Consultant/Contractor

Date

Box 6

IC/EC CERTIFICATIONS

Professional Engineer Signature

I certify that all information in Boxes 2 through 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 JAMES C. HAYWARD at EA ENGINEERING, P.C.
print name

269 WEST JEFFERSON ST.

SYRACUSE, NY 13202
(print business address)

am certifying as a Professional Engineer.

James C Hayward
Signature of Professional Engineer

Stamp (Required for PE)

Date 8/21/2020