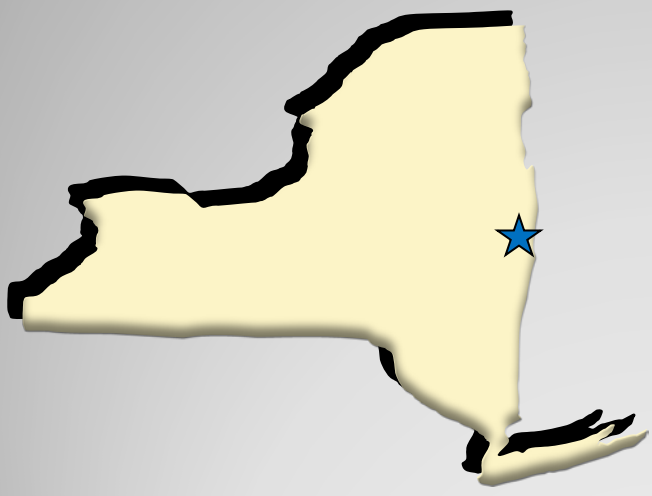
PERIODIC REVIEW REPORT
14 July 2011 – 14 July 2014

Valley Falls Dry Cleaner (442028)
Village of Valley Falls, Rensselaer County, New York



Prepared for:

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

Prepared by:

EA ENGINEERING, P.C. and Its Affiliate
EA SCIENCE and TECHNOLOGY

December 2014

Periodic Review Report
For Valley Falls Dry Cleaners Site (4-42-028)
Village of Valley Falls, New York

Prepared for

New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233

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December 2014
Revision: FINAL
EA Project No.: 14907.13

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1. EXECUTIVE SUMMARY

This Periodic Review Report (PRR) has been prepared to document the ongoing performance, effectiveness, and protectiveness of the selected remedy at the Valley Falls Dry Cleaners site as required by 6 New York Code of Rules and Regulations Part 375. The Valley Falls Dry Cleaners site (New York State Department of Environmental Conservation [NYSDEC] Site No. 4-42-028) is approximately 0.5 mi from the Hoosic River and is located within the incorporated village of Valley Falls, a small rural community on the Hoosic River in the town of Pittstown, Rensselaer County, New York (Figure 1).

The overall purpose of this report is to demonstrate that the remedy selected in the Record of Decision (ROD) is protecting groundwater and reducing the current contamination concentrations to levels which are protective of human health and the environment. A remedial action implemented in 1999 addressed on-site soil contamination/source control and included well replacement or treatment for private groundwater wells that were contaminated. A groundwater monitoring program was implemented in 2008 to demonstrate that natural attenuation was occurring and consisted of collecting groundwater samples from eight monitoring wells (Figure 2) every 15 months.

Three groundwater sampling events (July 2008, July 2009 and October 2010) were compared to the baseline groundwater samples collected in 1996 to determine if natural attenuation was occurring at the site. The data showed that natural attenuation was occurring offsite, but onsite groundwater concentrations were not being attenuated.

An ozone injection pilot study was implemented in 2012 to reduce contaminant concentrations in onsite groundwater. Based on the successful results of the 2012 pilot study, additional ozone injection was implemented in May 2014 and was ongoing at the time this PRR was prepared

In response to results obtained from a soil vapor intrusion (SVI) investigation completed in January 2006, an additional SVI investigation was completed in June 2008. Based on results from the June 2008 SVI investigation, soil vapor does not pose an issue for nearby residences

EA is certifying this report that monitored natural attenuation is being completed at the site. In addition ozone injection is currently being implemented at the site to help address contaminants in the onsite groundwater.

2. SITE OVERVIEW

The Valley Falls Dry Cleaners site is located approximately 0.5 mi from the Hoosic River and is located within the incorporated village of Valley Falls, a small rural community on the Hoosic River in the town of Pittstown, Rensselaer County, New York (Figure 1). The Valley Falls Dry Cleaners site is in a residential area where single family homes are serviced by private drinking water wells.

The site, the former Winchell Dry Cleaners property, consists of a relatively flat parcel of land and includes the residence at 11 Lyon Street (Figure 2). The site was operated as a dry cleaner facility from the 1940's to the mid 1970's. It is believed that the dry cleaning operation discharged perchloroethene (PCE) wastes directly onto the ground surface when operators washed lint filters in wash water which discharged into an on-site septic system. The present owners purchased the property as their family residence in 1978. In 1993, the owners demolished most of the deteriorated vacant dry cleaner building. All that remains of the dry cleaner building is the slab foundation; a small, deteriorated, underground storage tank that was part of the septic system; and a small section of the building which has been incorporated into a garage structure. The private drinking water well for the property is located under this structure; it is a bedrock well approximately 110-ft deep and test results have shown up to 47 parts per billion (ppb) of perchloroethene (PCE) (NYSDEC, 1996[1]). The most recent sampling event was completed on 6 October 2009. Analytical results from that event showed that PCE was detected at a concentration of 31 ppb.

In January 1992, the New York State Department of Health (NYSDOH) sampled nine private wells after it was notified of contamination at a private well in the village of Valley Falls. The results of the sampling analysis from one of the wells revealed that the concentration of PCE contamination exceeded the United States Environmental Protection Agency (USEPA) action level of 67 parts per billion (ppb). As a result, the Site was referred by the NYSDEC to the United States Environmental Protection Agency (EPA) for an emergency response action. The EPA installed granular activated carbon GAC filters and ultraviolet UV sterilization units at seven residences properties that had detections of PCE about the action levels. Currently, there are four residences with active GAC systems. In 2002, one GAC system was removed and a second GAC system was turned over to the property owner for self maintenance. A map showing the current active GAC locations is included as Figure 3.

The NYSDEC completed a Phase I assessment of the Site in June 1993 and the Site was listed on the NYS Registry as a Class 2 Inactive Hazardous Waste Disposal Site. A Class 2 Inactive Hazardous Waste Disposal Site is defined as a site which poses a significant threat to public health or the environment. The NYSDEC notified the USEPA that the NYSDEC would take over responsibility for the operation and maintenance of the carbon units at five residences with NYSDEC contractors conducting monitoring for three years on a semi-annual basis. With the exception of GAC monitoring, no further on-site field investigations were performed until

1 NYSDEC. 1996. Remedial Investigation Report.

September 1996 when the NYSDEC initiated an in-house remedial investigation/feasibility study (RI/FS). Groundwater sampling was performed in April 1996, and August 1996 to monitor the groundwater conditions as part of the site's operation and maintenance program. Based on an isopleth map generated from groundwater analytical results, the PCE plume was estimated to be approximately 686 ft long by 533 ft wide.

A Record of Decision (ROD) was issued for the site in February 1998. The selected remedy was implemented in the fall of 1999 and addressed the on-site soil contamination/source control and included contaminated well replacement or treatment. Approximately 75 yd^3 of impacted soils were excavated and disposed of at an off-site facility. The associated abandoned fuel tank, septic tank, underground piping, and a dry well were all decommissioned during soil removal activities. Individual drinking water wells that were impacted by site activities were replaced or provided with GAC or UV treatment systems. In March 2000, following the completion of the remedial activities, the site was reclassified from a Class 2 Inactive Hazardous Waste disposal site to a Class 4 site under Title 13 of the NYSDEC Law (Site Code # 4-42-028).

Long-term inspections of the GAC systems have been completed on a bi-annual basis. Based on current and historical analytical data concentrations from the bi-annual treatment system sampling reports, PCE concentrations remained consistent during sampling events from 1993 to 2009.

A long-term monitoring plan was implemented in 2008 to demonstrate that natural attenuation is occurring. The monitoring plan consists of water level gauging at 3-month intervals (i.e. quarterly), and groundwater sampling at 15-month intervals at eight monitoring wells. Site monitoring well sampling locations are detailed in Figure 2. Sampling events were conducted in July 2008, July 2009, and October 2010. Concentrations of PCE remained elevated above the NYSDEC Ambient Water Quality Standards (AWQS) of 5 µg/L in one monitoring well (MW-2S) and were consistent with historical data from April and August 1996. Based on the results of the October 2010 sampling event, the approximate size of the PCE plume was 100 ft long by 100 ft wide, decreasing by approximately 73 percent since the 1998 ROD. While natural attenuation appeared to be occurring off-site, onsite concentrations were not being attenuated. In 2012 an ozone injection pilot study was recommended to be performed onsite near MW-2S to help reduce groundwater concentrations of PCE constituents.

2.1 OZONE PILOT STUDY

Seven new wells associated with the ozone pilot study were installed at the site from January 21, 2013 to January 25, 2013, including three ozone injection wells (OZ-1, OZ-2, and OZ-3) and four monitoring wells (MP-1 to MP-4) (Figure 4). Well construction details for the ozone pilot study are summarized in Table 1. The ozone treatment system, including temporary electrical service, ozone injection well heads/lines, and the ozone system trailer, was installed in July 2013.

The ozone treatment system was operated from 9 July to 9 September 2013. Bi-weekly site visits were conducted to collect the following data:

- Treatment system injection rates (gas flow, ozone concentrations)
- Depth to water at each well location
- Pressure observations in the well field
- Water quality parameters: dissolved oxygen (DO), oxidation-reduction potential (ORP), turbidity, temperature, conductivity, and pH
- Dissolved ozone concentrations in monitoring points, where possible.

Groundwater samples were collected from wells prior to, during, and after implementation to study to evaluate the effectiveness of the injection.

2.1.1 Pilot Study Implementation

Ozone was initially injected at all three injection points (OZ-01, OZ-02, and OZ-03) on July 9, 2013. Shortly after treatment system startup/prove out was initiated, it appeared that injecting into OZ-01 would be sufficient to achieve the desired area of influence and, as a result, was the only ozone injection point utilized during the remainder of the pilot study. The use of the single injection point was also intended to facilitate data interpretation and reduce the potential for interference by other injection points. Based on treatment system injection rates and ozone concentrations, a total of 185.01 lbs of ozone was injected into OZ-01 over the course of the pilot study.

2.1.2 Groundwater Sampling

A total of five groundwater sampling events were performed in conjunction with the ozone pilot study:

- Baseline—February 18, 2013; 15 wells (8 previously existing and 7 newly installed)
- Process Round #1—July 25, 2013; 2 weeks after startup; 6 wells (MP-1 to MP-4, OZ-2, MW-2S)
- Process Round #2—August 22, 2013; 6 weeks after startup
- Completion of ozone injection—September 9, 2013
- Three months following completion of ozone injection—December 10, 2013

During the sampling events, water level measurements were taken from each monitoring well prior to sampling in order to prepare a groundwater contour map and evaluate groundwater flow direction. Water levels and groundwater elevations for each event are summarized on Table 2. Groundwater elevations for the baseline sampling event were plotted and contoured on a potentiometric surface map for both the overburden and bedrock aquifers (Figures 5A and 5B).

Monitoring wells were purged a minimum of three well volumes, until the well went dry, or until water quality parameters (pH, conductivity, oxygen reduction potential, temperature, dissolved oxygen, and turbidity) were stabilized. If the monitoring well was purged dry, the well was allowed to recharge before a sample was collected. Once groundwater parameters were stabilized, samples were collected, placed in a cooler with ice, and delivered to the lab to be analyzed for volatile organic compounds (VOCs) using USEPA method 8240B.

2.1.3 Pilot Study Baseline Groundwater Sampling Results

During the baseline sampling event, two monitoring wells had elevated concentrations of PCE (MW-2S, 160 µg/L; and MP-04, 20 µg/L respectively) over the AWQS of 5 µg/L. Of the seven newly installed wells at the site, MP-04 was the only well to reveal detections of chlorinated VOCs above the AQWS. As shown in Figure 6, the approximate size of the PCE plume as of February 2013 was approximately 40-ft long by 15-ft wide.

Data for PCE in MW-2S was comparable with historical data. Historical analytical data show concentrations of PCE ranging from 180 µg/L (April 1996) to 300 µg/L (July 2009). Available historical data are summarized in Table 3.

Previous analytical results revealed concentrations of PCE in MW-4S at concentrations up to 97 µg/L. Monitoring wells MW-3S and MW-3D revealed concentrations of PCE up to12 µg/L. Analytical data from February 2013 for monitoring wells MW-3D and MW-4S revealed no detections of PCE above the laboratory reporting limit.

TCE and DCE are both daughter products of PCE resulting from the reductive dehalogenation of chlorinated ethenes. When comparing the PCE concentrations in MW-2S (160 µg/L) to the daughter products (TCE 28 µg/L and DCE 17 µg/L), it appears that breakdown of PCE had become stagnant.

2.1.4 Post-Injection Groundwater Sampling Results

Based on a comparison between the baseline (February 2013) and the final (December 2013) sampling event, concentrations in all wells that had prior detections of PCE, DCE, or TCE were reduced as a result of ozone injection. Isopleth maps for each sampling event conducted during the pilot study are included in Figure 7 and summarized in Table 4.

Based on *in situ* water quality parameters and analytical data collected before, during, and after the pilot study; ozone injection was successful in decreasing the concentrations of PCE, DCE, and TCE. Post-injection sampling indicated that concentrations of PCE, DCE, and TCE in MW-2S decreased by 49, 12, and 64 percent, respectively, with PCE decreasing from 160 to 82 mg/L, DCE decreasing from 17 to 15 mg/L, and TCE decreasing from 28 to 10 mg/L. In addition, while concentrations in MW-2S have fluctuated historically, concentrations increasingly trended lower since the start of the pilot, with the exception of very low readings during the July 2013 event. These low readings were most likely due to mixing in the plume caused by aggressive ozone

injections (since the injection rate was increased to the maximum of 40 ft^3/hr during the month of July).

Based on the success of the ozone pilot study ozone injection was recommended to be performed during the 2014 field season.

2.2 CONTINUING OZONE REMEDIATION

A follow-up application of ozone was implemented in May 2014 in the same location as the 2013 pilot study. Two additional ozone injection wells (OZ-4 and OZ-5) were installed on 8 May 2014 to facilitate equal distribution of ozone. Ozone injection was initiated on 22 May 2014 and weekly visits are conducted to collect the following data:

- Treatment system injection rates (gas flow, ozone concentrations)
- Depth to water at each well location
- Pressure observations in the well field
- Water quality parameters: dissolved oxygen (DO), oxidation-reduction potential (ORP), turbidity, temperature, conductivity, and pH
- Dissolved ozone concentrations in monitoring points, where possible.

Groundwater sampling events were collected from wells in May 2014 prior to ozone injection, and are being conducted monthly throughout injection.

2.2.1 Groundwater Sampling

A total three groundwater sampling events have been performed in conjunction with the 2014 ozone application, with samples collected from six wells (MP-1 to MP-4, OZ-2, and MW-2S) using the same procedures as the 2013 pilot study groundwater sampling events:

- Baseline—7 May 2014
- Process Round #1—24 June 2014
- Process Round #2—21 July 2014.

Following completion of the 2014 ozone injections the analytical data will be evaluated to determine the effectiveness of the implementation.

3. REMEDY PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

3.1 INSTITUTIONAL CONTROLS/ENGINEERING CONTROLS CERTIFICATION PLAN REPORT

Although Institutional Controls (IC) and Engineering Controls (EC) are not listed in the February 1998 ROD and 2012 Site Management Plan for the site, the following IC/ECs have been applied:

- Installation, operation, and maintenance of GAC filters and UV treatment systems
- Environmental monitoring to determine effectiveness of monitored natural attenuation.

3.1.1 Institutional Controls/Engineering Controls Requirements and Compliance

Determination of compliance with the IC/ECs at the site is made based on the following criteria:

- The IC/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.

For the reporting period, EA certifies that the IC/ECs for this site are in compliance with the requirements stated above.

3.2 OPERATION AND MAINTENANCE PLAN COMPLIANCE REPORT

This report is being certified based on the compliance with the selected remedy, monitored natural attenuation. During the past two field seasons (2013 and 2014) ozone injections have been completed to accelerate reduction of contaminant concentrations in the onsite groundwater.

4. COST EVAULATION

The annual costs incurred were for the field activities, which included, but were not limited to, the following:

- Seven overburden wells, including three ozone injection wells and four monitoring points, were installed in the source area in February 2013 for implementation of the ozone pilot study. Two additional overburden ozone injection wells were installed on 8 May 2014 for implementation of additional ozone injection.

- Newly installed monitoring wells were developed following installation using surge and purge techniques.

- Four groundwater sampling events were conducted as part of the ozone pilot study in July, August, September, and December 2013, with samples collected from six wells (four monitoring points, ozone injection point OZ-2, and monitoring well MW-2S. Groundwater samples were analyzed for VOCs by USEPA Method 8260B.

- One groundwater monitoring summary report describing laboratory analytical results was prepared and submitted to the NYSDEC. Reported data and analysis were in tabular form and graphical form (e.g., figures with interpretive isopleths and temporal line graphs of contaminants of concern) characterizing the site. Reporting included Category B deliverables for laboratory data with an internal quality assurance/quality control report from the laboratory.

- Inspection of the ozone system throughout implementation of the ozone pilot study was completed on a bi-weekly basis.

- An ozone pilot study memo describing the effectiveness of the study and laboratory analytical results for groundwater sampling events was prepared and submitted to the NYSDEC. Reported data and analysis were in tabular form and graphical form (e.g., analytical results tables, figures with interpretive isopleths and temporal line graphs of water quality data).

- One baseline groundwater sampling event occurred in February 2014 at 15 monitoring wells ahead of additional ozone injection. One duplicate sample was also collected at OZ-2. Groundwater samples were analyzed for VOCs by USEPA Method 8260B.

- To date, four groundwater sampling events have been conducted as part of the continuing ozone remediation, with samples collected from six wells (four monitoring points, ozone injection point OZ-2, and monitoring well MW-2S) in May (baseline), June, and July, 2014. Groundwater samples were analyzed for VOCs by USEPA Method 8260B.

- Weekly inspections were conducted throughout implementation of the continuing ozone remediation

- Site management also included 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.

The total costs incurred at the site are tabulated below.

Phase	Effort	Labor Fee	Totals
Preliminary Activities	$13,278.26	$608.88	$13,887.14
Site Management Plan	$1,577.99	$110.46	$1,688.45
Ozone Pilot Study	$137,642.68	$3,146.18	$140,788.86
Groundwater Monitoring Plan	$24,968.95	$898.50	$25,867.45
Periodic Review Report	$185.02	$12.95	$197.97
Totals	**$177,652.90**	**$4,776.97**	**$182,429.87**

Five additional sampling events are projected during the remainder of 2014. At completion of the ozone injection, a memo describing the effectiveness of the ozone implementation will be prepared and submitted to the NYSDEC.

5. CONCLUSIONS / RECOMMENDATIONS

5.1 CONCLUSIONS

Concentrations of PCE in MW-2S have not fluctuated over the last 12 years. It is possible that a continuing source area of PCE is contributing to the concentrations of PCE in monitoring well MW-2S.

Based on review of current and historical data, it appears that minimal natural attenuation via biological processes is occurring on-site. However, the concentration of PCE and its daughter compounds has decreased to levels below the NYSDEC AWQS in off-site wells, suggesting that natural attenuation through dilution/dispersion has or is occurring in the off-site wells.

The extent of dissolved-phase PCE groundwater contamination appears to be decreasing based on the isopleth map provided in the 1998 ROD, which had the dimensions of 686-ft long by 533-ft wide, compared to the February 2013 isopleth size of 40-ft long by 15-ft wide. The areal extent of the isopleth has decreased by approximately 99 percent in that timeframe.

Based on *in situ* water quality parameters and analytical data collected before, during, and after the ozone pilot study; ozone injection was successful in decreasing the concentrations of PCE, DCE, and TCE. Concentrations of PCE, DCE, and TCE in MW-2S decreased by 49, 12, and 64 percent, respectively.

A second ozone injection and associated monitoring is currently on-going and is anticipated to be completed in December 2014. Four sampling events are projected during the remainder of 2014. Following completion of the remediation and a review of analytical data and results, a memo describing the effectiveness of the remediation will be prepared and submitted to the NYSDEC.

EA is certifying this report based on an assessment that the current monitoring plan and GAC point source system sampling were completed for this reporting period as required.

5.2 RECOMMENDATIONS

It is recommended that groundwater monitoring be continued, which should consist of the quarterly monitoring well gauging, and groundwater sampling events (at 15-month intervals).

Currently, natural attenuation is occurring downgradient of the site; however, concentrations of PCE in MW-2S, located at the source area, have remained constant over the last 12 years. Following a review of current and historical data, the following is recommended:

- Collection of monitored natural attenuation parameters is recommended at monitoring wells located upgradient of the former source area (MW-1D and MW-1S), on-site (MW-2S and MW-2D), and downgradient of the site (MW-3S, MW-3D, MW-4S, and MW-4D). Monitored natural attenuation parameters should include analysis for the following:

alkalinity, aromatic and chlorinated hydrocarbons (benzene, toluene, ethylbenzene, and total xylenes; trimethylbezene; isomers; chlorinated compounds), arsenic, chloride, conductivity, iron (II), hydrogen, methane, ethane, ethene, nitrates, ORP, oxygen, pH, sulfates, manganese, and total organic carbon.

- Review of onsite groundwater data (following completion of 2014 ozone injection activities) to assess effectiveness

- Based on a review of current site conditions, it is recommended that a PRR report be performed every 3 years.

Legend

★ Site Location

Miles

0 0.05 0.1 0.2

1 in = 0.1 miles

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VALLEY FALLS DRY CLEANERS SITE (4-42-028)
PERIODIC REVIEW REPORT
VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 1
SITE LOCATION MAP

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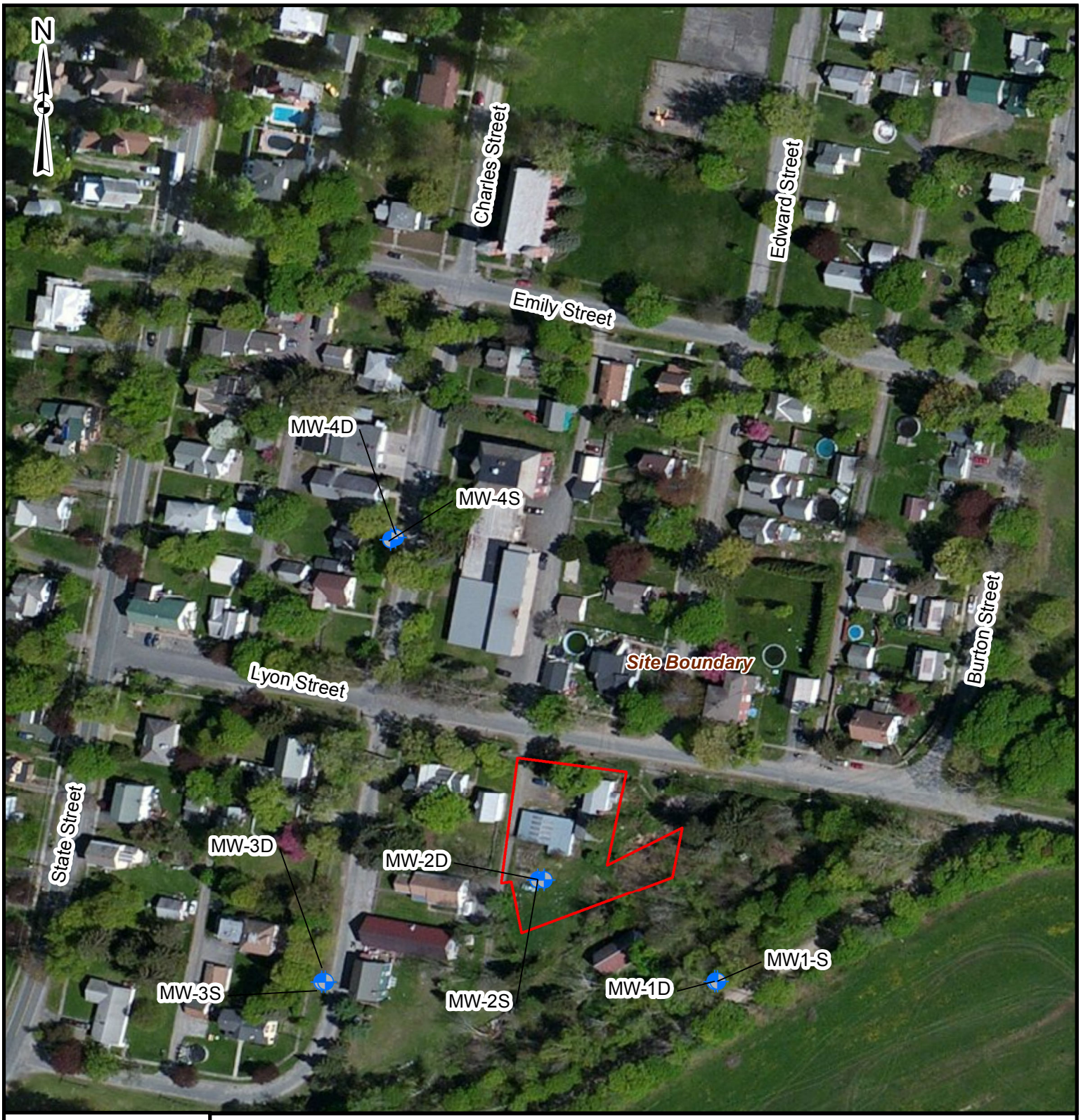

Legend

- Monitoring Well
- Valley Falls Site Parcel

Feet

0 75 150 300

1 in = 150 feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

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VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 2
SITE MAP

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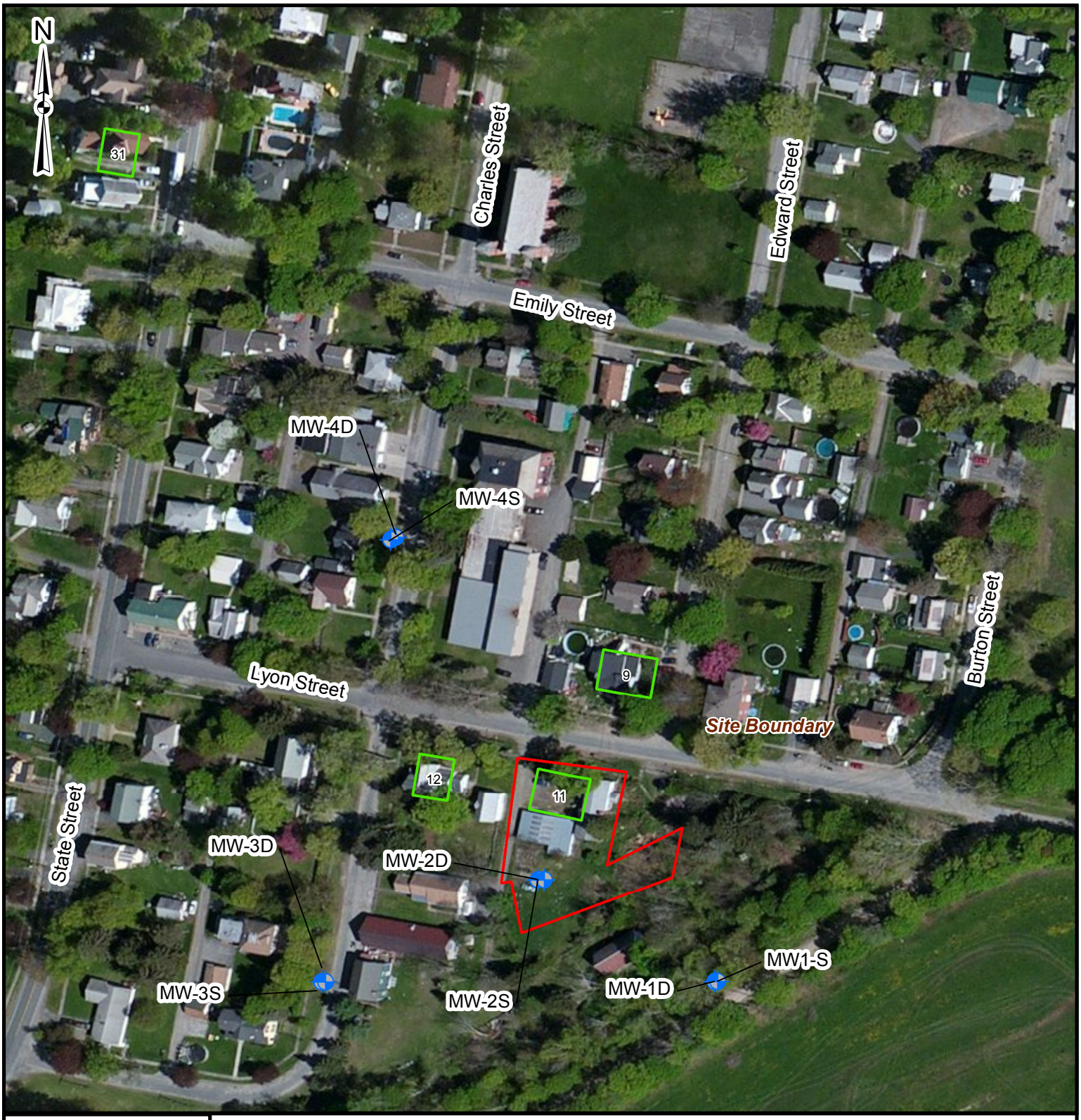

Legend

- Monitoring Well
- GAC Location
- Valley Falls Site Parcel

Feet

0 75 150 300

1 in = 150 feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

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VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 3
CURRENT GAC LOCATIONS

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VALLEY FALLS DRY CLEANERS SITE (4-42-028)
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VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 4
OZONE PILOT STUDY
WELL LOCATIONS

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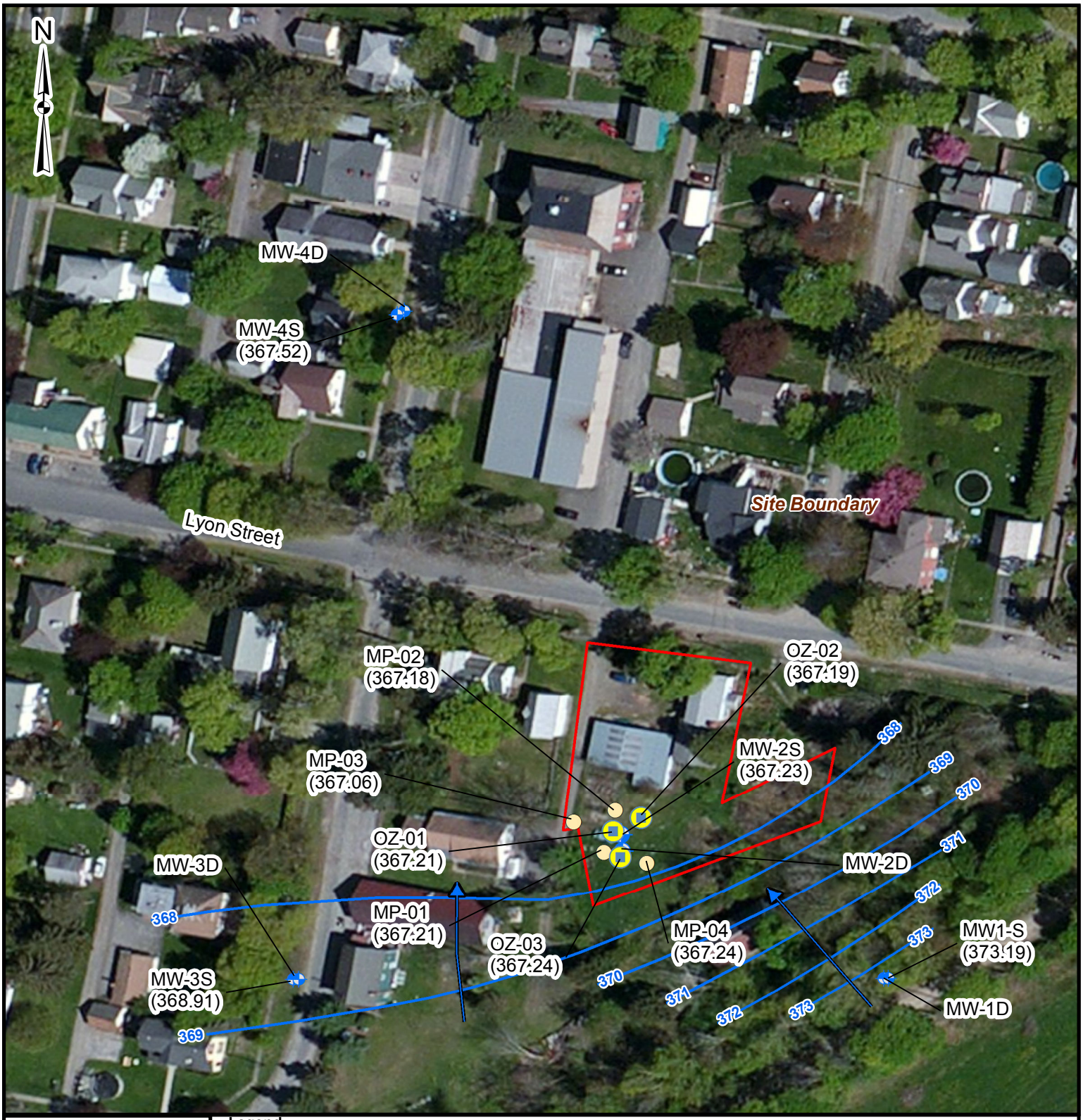

Legend

- Valley Falls Site Parcel
- Monitoring Point
- Monitoring Well
- Ozone Injection Point
- Groundwater Contour 1 ft
- Groundwater Flow Direction

Feet

0 50 100 200

1 in = 100 feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

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FIGURE 5A
INTERPRETED OVERBURDEN GROUNDWATER CONTOUR MAP
FEBRUARY 2013

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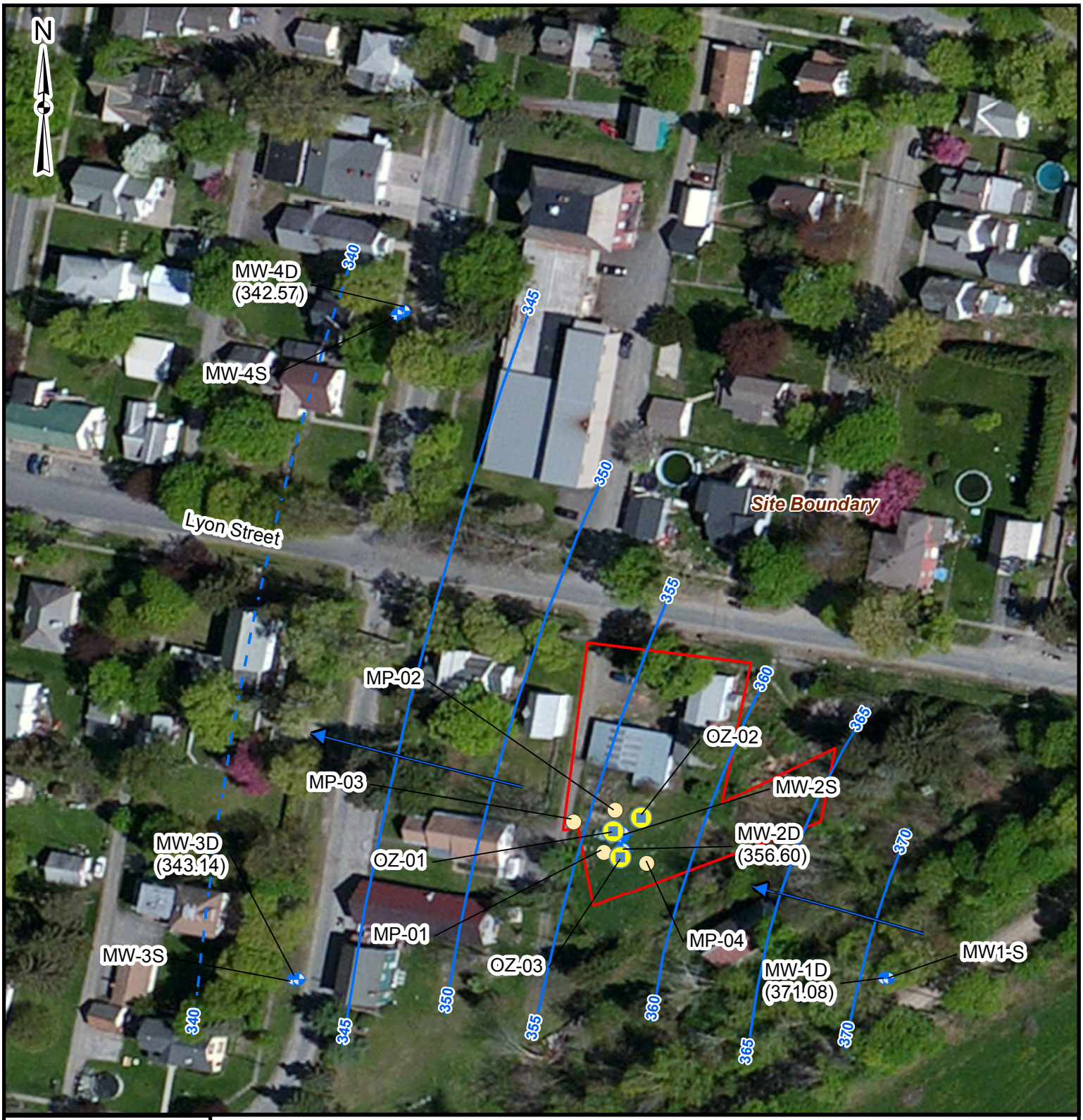

Legend

- Valley Falls Site Parcel
- Monitoring Point
- Monitoring Well
- Ozone Injection Point
- Bedrock Contour 5 ft
- Interpreted Bedrock Contour
- Groundwater Flow Direction

Feet

0 50 100 200

1 in = 100 feet

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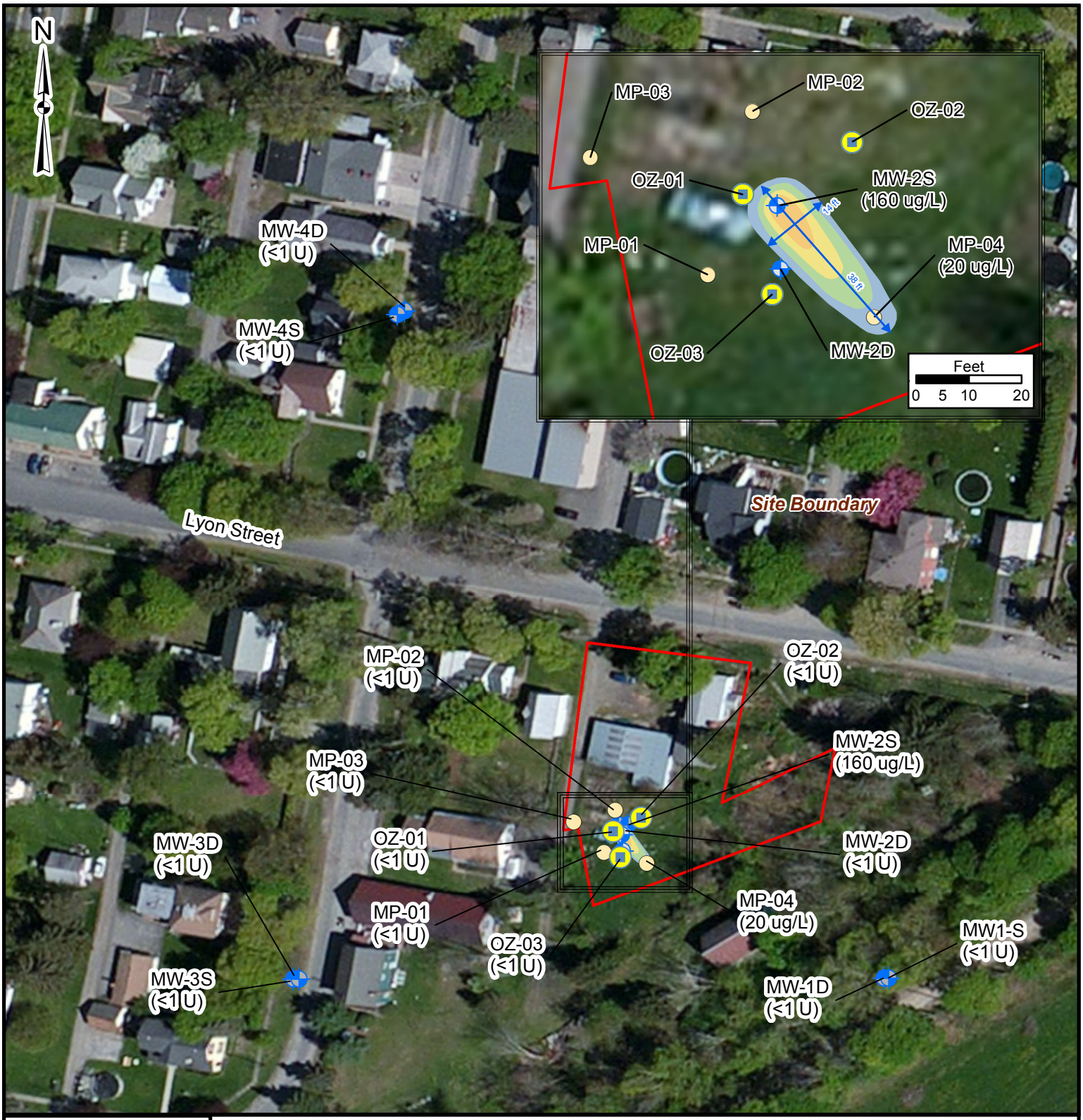
VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 5B
INTERPRETED BEDROCK
GROUNDWATER CONTOUR MAP
February 2013

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
JCH	ALK	ALK	JAV	AS SHOWN	DECEMBER 2014	14907.13	GIS/PROJECTS/ FIGURE2.MXD



Legend

- Valley Falls Site Parcel
- Monitoring Point
- Monitoring Well
- Ozone Injection Point

PCE Concentration (µg/L)

- 10
- 50
- 100
- 150

Feet
0 50 100 200
1 in = 100 feet

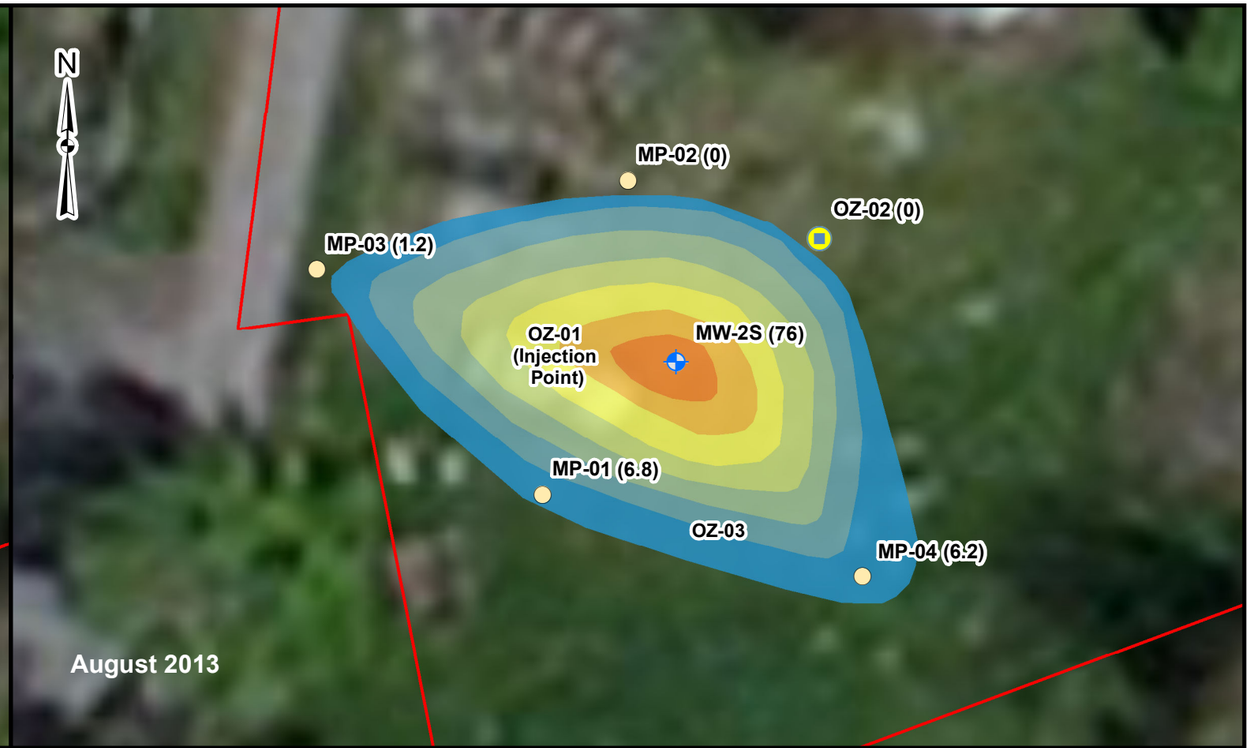
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User

EA Engineering, Science, and Technology, Inc.

VALLEY FALLS DRY CLEANERS SITE (4-42-028)
PERIODIC REVIEW REPORT
VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 6
PCE IN OVERBURDEN
FEBRUARY 2013

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
JCH	ALK	ALK	JAV	AS SHOWN	DECEMBER 2014	14907.13	GIS/PROJECTS/ FIGURE2.MXD



VALLEY FALLS DRY CLEANERS SITE (4-42-028)
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VILLAGE OF VALLEY FALLS, NEW YORK

FIGURE 7
OZONE PILOT STUDY
PCE CONTOUR MAPS

Feet
0 10 20 40
1 in = 15 feet

Legend

- Monitoring Point
- Monitoring Well
- Ozone Injection Point

Total VOC Concentration (µg/L)

5-10, 10-20, 20-30, 30-40, 40-50, 50-60, 60-100, 100-150, >150

JCH	DESIGNED BY: ALK	CREATED BY: ALK	CHECKED BY: JVU	PROJECT NO: 14907.13	DATE: SEPTEMBER 2014	SCALE: AS SHOWN	FILE NO: GIS/PROJECTS/ FIGURE7.MXD

TABLE 1 OZONE WELL CONSTRUCTION DETAILS

Well ID	Well Type	Installation Date	Northing	Easting	Ground Surface Elevation (ft AMSL)	Elevation Top of casing (ft AMSL)	Well Diameter (in.)	Total Depth (ft bgs)	Screened Interval (ft bgs)
OZ-1	Ozone Injection	January 2013	1482195.086	743586.364	375.25	374.52	2	23.5	21-23
OZ-2	Ozone Injection	January 2013	1482205.148	743607.083	375.32	374.82	2	22.0	20-22
OZ-3	Ozone Injection	January 2013	1482176.105	743591.902	375.41	374.94	2	23.5	21.5-23.5
OZ-4	Ozone Injection	May 2014	---	---	---	---	2	9.5	7.5-9.5
OZ-5	Ozone Injection	May 2014	---	---	---	---	2	8.9	8.9-6.9
MP-01	Ozone Monitoring Point	January 2013	1482179.843	743579.649	375.52	374.89	2	24.0	14-24
MP-02	Ozone Monitoring Point	January 2013	1482210.931	743588.104	375.36	375.36	2	22.3	12-22
MP-03	Ozone Monitoring Point	January 2013	1482202.129	743557.309	375.45	374.89	2	18.0	8-18
MP-04	Ozone Monitoring Point	January 2013	1482171.737	743611.321	375.39	374.90	2	23.5	13-23

NOTE: ID = Identification
AMSL = Above mean sea level
bgs = below ground surface
--- = No Construction Data Available.

Northing and Easting coordinates are in New York State Plane Coordinate System, Eastern Zone, NAD 83 (CORS 96) Datum
Vertical values are referenced to the North American Vertical Datum of 1988 (NAVD 88)
All survey values are in feet.

TABLE 2 GROUNDWATER TABLE GAUGING INFORMATION

Well Number	TOIC Elevation (ft/AMSL)	Groundwater Table Elevation (ft AMSL)							
		18-Feb-13	25-Jul-13	22-Aug-13	9-Sep-13	10-Dec-13	7-May-14	24-Jun-14	21-Jul-14
MW-1S	380.65	373.19	---	---	---	---	---	---	---
MW-1D	380.87	371.08	---	---	---	---	---	---	---
MW-2S	375.20	367.23	368.44	365.70	365.80	366.87	370.40	367.13	367.13
MW-2D	376.50	356.60	---	---	---	---	---	---	---
MW-3S	375.71	368.91	---	---	---	---	---	---	---
MW-3D	375.76	343.14	---	---	---	---	---	---	---
MW-4S	374.67	367.52	---	---	---	---	---	---	---
MW-4D	375.55	342.57	---	---	---	---	---	---	---
MP-1	374.89	367.21	359.16	362.69	360.28	366.93	369.94	359.55	359.55
MP-2	374.71	367.18	369.11	368.11	365.90	366.94	370.00	367.20	367.20
MP-3	374.89	367.06	368.16	365.57	365.57	366.89	370.24	367.07	367.07
MP-4	374.89	367.24	367.70	363.48	362.44	366.95	370.06	365.84	365.84
OZ-1	374.52	367.21	---	---	---	366.91	---	---	---
OZ-2	374.82	367.19	368.51	366.17	355.17	366.43	369.42	367.18	367.18
OZ-3	374.94	367.24	---	---	---	---	---	---	---
NOTE:	AMSL = Above mean sea level								

TABLE 3 HISTORICAL GROUNDWATER ANALYTICAL RESULTS

Parameter	MW-1SW	MW-1SE	MW-2S	MW-2D	MW-3S	MW-3D	MW-4S	MW-4D	NYSDEC Ambient Water Quality Standard Values (ppb)
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY METHOD 8260B (µg/L)									
APRIL 1996									
Cis-1,2-Dichloroethene	ND	ND	**40**	ND	ND	ND	ND	ND	5
Tetrachloroethene	ND	ND	**180**	ND	**12**	**12**	**90**	ND	5
Trichloroethene	ND	ND	**40**	ND	ND	ND	ND	ND	5
AUGUST 1996									
Cis-1,2-Dichloroethene	ND	ND	**78**	ND	NS	ND	**6**	ND	5
Tetrachloroethene	ND	ND	**230**	ND	NS	ND	**97 J**	2 J	5
Trichloroethene	ND	ND	**78**	ND	NS	ND	**6**	ND	5
JULY 2008									
Cis-1,2-Dichloroethene	ND	ND	**14**	ND	ND	ND	ND	NS	5
Tetrachloroethene	ND	ND	**220**	ND	3.3	ND	ND	NS	5
Trichloroethene	ND	ND	**28**	ND	ND	ND	ND	NS	5
JULY 2009									
Cis-1,2-Dichloroethene	ND	ND	**4.3**	ND	ND	ND	ND	NS	5
Tetrachloroethene	ND	ND	**300**	ND	**1.8**	ND	ND	NS	5
Trichloroethene	ND	ND	**10**	ND	ND	ND	ND	NS	5
OCTOBER 2010									
Cis-1,2-Dichloroethene	ND	ND	**59**	ND	ND	ND	ND	1	5
Tetrachloroethene	ND	ND	**60**	ND	ND	ND	ND	1	5
Trichloroethene	ND	ND	**11**	ND	ND	ND	ND	1	5
FEBRUARY 2013									
Cis-1,2-Dichloroethene	ND	ND	**17**	ND	ND	ND	ND	1	5
Tetrachloroethene	ND	ND	**160**	ND	ND	ND	ND	1	5
Trichloroethene	ND	ND	**28**	ND	ND	ND	ND	1	5

NOTE: NYSDEC = New York State Department of Environmental Conservation
ppb = Parts per billion.
µg/L = micrograms per liter
ND = The analyte was analyzed for, but was not detected above the sample reporting limit.
NS = Well was not sampled
J = Estimated Value
Bold values indicate an exceedance of NYSDEC Ambient Water Quality Standard

TABLE 4 OZONE INJECTION GROUNDWATER SAMPLING RESULTS

Analyte	MW-2S							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	**17**	1.5	**78**	**32**	**15**	3	3	**54**
Tetrachloroethene (PCE)	**160**	**35**	**76**	**150**	**82**	**92**	**140**	**150**
Trichloroethene (TCE)	**28**	**5.2**	**26**	**18**	**10**	**8**	**6.2**	**25**
Analyte	OZ-02							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Tetrachloroethene (PCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	**9.1**	(<1 U)
Trichloroethene (TCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Analyte	MP-01							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Tetrachloroethene (PCE)	(<1 U)	**5.3**	**6.8**	**6.6**	**2.3**	**11**	4.4	3.8
Trichloroethene (TCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Analyte	MP-2							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Tetrachloroethene (PCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Trichloroethene (TCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)
Analyte	MP-03							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	1.5	(<1 U)	(<1 U)
Tetrachloroethene (PCE)	(<1 U)	2.2	1.2	(<1 U)	(<1 U)	**33**	**850**	**250**
Trichloroethene (TCE)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	(<1 U)	**5.8**	(<1 U)
Analyte	MP-04							
	18-Feb-13	25-Jul-13	22-Aug-13	1-Oct-13	10-Dec-13	24-Jun-14	21-Jul-14	21-Aug-14
cis-1,2-Dichloroethene (DCE)	2.7	4.9	3.2	1.9	2.3	1.6	4.4	3.8
Tetrachloroethene (PCE)	**20**	**20**	**6.2**	**5.7**	**10**	**16**	**52**	**21**
Trichloroethene (TCE)	3.0	2.1	1.1	(<1 U)	(<1 U)	1.5	2.9	2.8

NOTE: NYSDEC = New York State Department of Environmental Conservation
All concentrations in micrograms per liter (µg/L)
(< U) = The analyte was analyzed for, but was not detected above the sample reporting limit.
Bold values indicate an exceedance of NYSDEC Ambient Water Quality Standard (5 µg/L for each analyte)

Appendix A

Institutional Control/Engineering Control Certification Form

Enclosure 1

Engineering Controls - Standby Consultant/Contractor Certification Form

Site Details **Box 1**

Site No. **442028**

Site Name Valley Falls Dry Cleaner

Site Address: 11 Lyon Street Zip Code: 12185
City/Town: Valley Falls
County: Rensselaer
Site Acreage: 1.2

Reporting Period: July 14, 2011 to July 14, 2014

	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? PRIVATE RESIDENCE (FORMER DRY CLEANING WAS DEMOLISHED IN 1993)	☒	☐
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. 442028

Box 3

Description of Institutional Controls

Parcel	Owner	Institutional Control
22.20-4-12	Theodore & Lois Chmielewski	
		Monitoring Plan

Box 4

Description of Engineering Controls

Parcel	Engineering Control
22.20-4-12	Point-of-Entry Water Treatment

Point of entry water treatment consisting of GAC systems. Monitoring for natural attenuation.

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

IC/EC CERTIFICATIONS

Box 6

Qualified Environmental Professional Signature

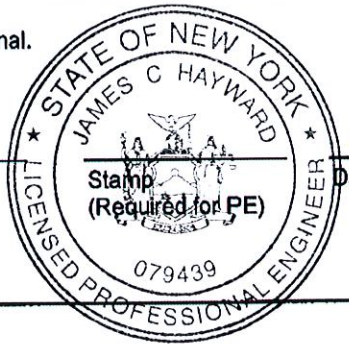
I certify that all information in Boxes 2 through 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I JAMES HAYWARD at 6712 BROOKLAWN PARKWAY
print name

SUITE 104

SYRACUSE, NY 13211
(print business address)

am certifying as a Qualified Environmental Professional.



James C. Hayward
Signature of Qualified Environmental Professional

Stamp (Required for PE)

12/2/2014
Date