First Half 2022 Semi-Annual Groundwater Monitoring Report
Patchogue Former MGP Site
NYSDEC Site No. 1-52-182
Village of Patchogue, Suffolk County, New York

Prepared for

National Grid USA, Hicksville, New York

September 9, 2022

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List of Abbreviations

BC	Brown and Caldwell Associates
BTEX	Benzene, Toluene, Ethylbenzene and Isomers of Xylene
DUSR	Data Usability Summary Report
ELAP	Environmental Laboratory Approval Program
FER	Final Engineering Report
ISS	In Situ Solidification
Lancaster	Eurofins Lancaster Laboratories Environmental
MGP	Manufactured Gas Plant
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NAPL	Non-Aqueous Phase Liquid
NYCRR	New York State Code of Rules and Regulations
NYSDEC	New York Department of Environmental Conservation
NYSDOH	New York State Department of Health
PAH	Polycyclic Aromatic Hydrocarbon
QA/QC	Quality Assurance/Quality Control
SIM	Selective Ion Monitoring
Site	Patchogue Former MGP Site
TOGS	Technical and Operational Guidance Series
µg/L	micrograms per liter
USEPA	United States Environmental Protection Agency

Section 1

Introduction

This Groundwater Monitoring Report documents the implementation and summarizes the results of the groundwater monitoring activities conducted during the first half of 2022 at the Patchogue Former Manufactured Gas Plant (MGP) Site (hereinafter referred to as the "Site"). This monitoring event is the ninth to be conducted after completion of remedy implementation in the fourth quarter 2019. The groundwater monitoring activities included the performance of water level measurements, non-aqueous phase liquid (NAPL) gauging and groundwater sampling activities.

The groundwater monitoring event and the preparation of this report are part of the long-term groundwater monitoring program being conducted at the Site in accordance with the "100% Remedial Design Report" (Brown and Caldwell Associates (BC), May 2019) as modified by subsequent email correspondence (during the period from January 7 to 16, 2020) between National Grid and the New York State Department of Environmental Conservation (NYSDEC). Remedial construction activities (including restoration) were completed in July 2020. This report has been prepared for submittal to the NYSDEC and includes the following:

- Description of the scope of the field activities, methods, and procedures
- Table summarizing the results of the water level measurements and the gauging for the presence of NAPL in the monitoring wells (Table 1)
- Table summarizing the analytical results for the groundwater samples obtained during the first half 2022 groundwater monitoring event including a comparison to the applicable groundwater quality criteria (Table 2)
- Comparison of data from this monitoring period to data from historical monitoring events (Tables 3 and 4)
- Discussion of the results and findings from the groundwater monitoring data
- A water table elevation contour map depicting the generalized direction of groundwater flow based on groundwater elevation data obtained from monitoring wells (Figure 1)
- Water quality trend plots for select constituents (Figures 2 through 6)
- Field Sampling Data Sheets (Appendix A)
- Laboratory Data Report (Appendix B)
- Data Validator Qualifications (Appendix C)
- Data Usability Summary Report (DUSR) (Appendix D)
- Evaluation of Potential Impact to River from Site Constituents in Groundwater – March, June, September, and December 2020 Data (Appendix E)
- Evaluation of Potential Impact to River from Increased pH Levels in Groundwater – December 2020 Data (Appendix F)

1.1 Background

This report presents the results and findings associated with the June 2022 groundwater monitoring event, which is the ninth such event conducted following implementation of the Site remedy. Groundwater conditions prior to remedy implementation are documented and discussed in previous groundwater monitoring reports dating back to 2009 and in the "Final Remedial Investigation Report for the Patchogue Former MGP Site" (Tetra Tech EC, Inc., December 2009). Remedial construction activities, which included in situ solidification (ISS) of MGP-related source materials and associated soils, were performed during the period from June through December 2019. Final Site restoration efforts were completed in the July of 2020. At the end of 2018, groundwater monitoring was suspended to allow for remedial construction activities. Several monitoring wells and piezometers were decommissioned prior to remedial construction activities to facilitate remedy implementation. These wells included MW-5, MW-6, MW-9S, MW-9D, and PZ-1A through PZ-4A. Each well/piezometer was decommissioned in accordance with NYSDEC's guidance document "CP-43: Groundwater Monitoring Well Decommissioning Policy". A description of the decommissioning activities, as well as field inspection logs and well decommissioning records were provided under separate cover in the "Final Engineering Report" (FER) (BC, February 2022).

Prior to resumption of groundwater monitoring following remedial construction activities, five monitoring well couplets (MW-10S/D through MW-14S/D) were installed in January 2020 to facilitate performance of a long-term groundwater monitoring program at the Site. These additions to the well network were installed in accordance with the "100% Remedial Design Report" (BC, May 2019) and as modified by subsequent email correspondence (during the period from January 7 to 16, 2020) between National Grid and the NYSDEC. These wells are supplemental to existing wells MW-1, MW-3, and well couplets MW-4S/D, MW-7S/D, and MW-8S/D, which serve as Site perimeter monitoring locations. The well couplets installed in January 2020 were selected to provide additional well coverage for post-remediation groundwater quality monitoring at locations positioned around the ISS mass, and at locations between the ISS mass and the Patchogue River. The screens of the monitoring wells provide coverage across the vertical extent of the ISS mass. Monitoring well construction logs for the well couplets installed in January 2020 were provided in Appendix C of the "Site Management Plan" (BC, February 2022).

Groundwater monitoring prior to remedy implementation was conducted on a semi-annual basis; however, the sampling frequency was temporarily increased to quarterly to evaluate the effectiveness of the remedy for Calendar Years 2020 and 2021. Following completion of eight quarters of post-remediation monitoring and evaluation of the data, National Grid proposed several modifications to the long-term post-remedial groundwater monitoring program for the Site for review and approval by the NYSDEC. Specifically, based on the results of the 2020 and 2021 quarterly monitoring activities, the following modifications were proposed in the Fourth Quarter 2021 Groundwater Monitoring Report (BC, March 2022):

- **Elimination of deeper monitoring wells from groundwater monitoring program:** Monitoring of the deep groundwater (8 well locations) is no longer warranted. Eight quarters of groundwater sampling have been conducted since completion of remedy implementation. MGP-related constituents were not detected or detected at very low levels (below New York State Class GA groundwater quality criteria) in the deep groundwater wells during these eight sampling events.
- **Removal of methyl tertiary-butyl ether from analyte list:** This non MGP-related constituent has only been detected several times dating back to 2011 at very low concentrations below its Class GA Criterion at a single location (MW-8S) and thus, removal of this constituent from the analyte list was recommended.

- **Changing the frequency of groundwater monitoring from quarterly to semi-annually:** Tables 3 and 4 of the above-referenced report provide historical total benzene, toluene, ethylbenzene, and isomers of xylene (BTEX) compounds and total polycyclic aromatic hydrocarbon (PAH) concentration data, respectively, and based on a review of the 2020 and 2021 data in these tables, it is evident that the concentrations of more mobile constituents (i.e., BTEX compounds) increased shortly after completion of the remedy followed by increases in concentrations of less mobile PAH compounds in wells downgradient of the ISS mass. The BTEX concentrations have decreased throughout Calendar Years 2020 and 2021, while the PAH concentrations appear to have plateaued and are anticipated to decrease following this plateau. Sampling on a semi-annual basis is adequate for assessing groundwater quality conditions at the Site.

The NYSDEC approved the above-recommended modifications in an email dated April 13, 2022, with the exception of, allowing the removal of deep monitoring well locations MW-12D and MW-13D from the monitoring program. Monitoring of both shallow and deep groundwater downgradient of the ISS monolith at these two monitoring well locations will continue as part of the semi-annual groundwater monitoring events.

Section 2

Scope of Work

Field activities for the first half 2022 semi-annual groundwater monitoring were conducted by BC from June 14 through June 16, 2022. The activities conducted during this monitoring event are described below. Locations of the monitoring wells and staff gauges referenced below are depicted on Figure 1.

Prior to groundwater sampling, water level measurements and NAPL gauging was performed in the monitoring wells associated with the Site. The level of the Patchogue River was measured during the June 2022 sampling event from surface water elevation control point SG-1. Water level measurements and NAPL gauging were conducted using an electronic oil/water interface probe; measurements were made to the nearest 0.01 foot.

Groundwater sampling was conducted at 12 monitoring wells (MW-1, MW-3, MW-4S, MW-7S, MW-8S, MW-10S, MW-11S, MW-14S; and well couplets MW-12S/D and MW-13S/D) following the water level and NAPL gauging activities using low-flow purging and sampling techniques in accordance with the United States Environmental Protection Agency (USEPA) protocol (USEPA, July 1996, Revised September 2017). Samples were submitted to Eurofins Lancaster Laboratories Environmental (Lancaster) located in Lancaster, Pennsylvania. Lancaster is certified (Certification No. 10670) through the New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP).

The groundwater samples were analyzed for: BTEX compounds using USEPA SW-846 Method 8260C, and PAHs using USEPA SW-846 Method 8270D. The selective ion monitoring (SIM) component of the 8270 analysis was also performed on the samples to obtain lower detection limits for certain PAH compounds. The groundwater samples were also analyzed in the field for pH, specific conductivity, temperature, turbidity, oxidation-reduction potential, and dissolved oxygen (see Appendix A for field data sheets).

The laboratory report from Lancaster is provided in Appendix B. Laboratory analytical data were provided to BC in electronic form by Lancaster and have been incorporated into the environmental database maintained by BC for the Site.

In addition to the samples described above, quality assurance/quality control (QA/QC) samples were also collected. The QA/QC samples included: trip blanks (one per cooler containing samples for BTEX analysis), a field duplicate, and an equipment blank. Also, extra sample volume was collected from one location to provide for matrix spike/matrix spike duplicate (MS/MSD) analysis. The trip blank sample was analyzed for BTEX only. The other QA/QC samples were analyzed for BTEX and PAHs.

The groundwater analytical data packages were validated by Jaclyn Lauer of BC. Ms. Lauer's qualifications and experience as a data validator are included in Appendix C. A DUSR was prepared for the groundwater data packages (see Appendix D). Overall, the analytical data for the groundwater monitoring were determined to be usable for the intended purposes; however, a few results (i.e., BTEX data for sidegradient well MW-7S) were rejected (for not meeting headspace preservation requirements) during the validation process. As noted in the DUSR, some data was qualified as follows:

- Holding times were achieved for all analyses with the exception of MW-3-20220616. Sample MW-3 was re-analyzed two times outside of hold time to achieve surrogate results within control limits. The first two analyses are used for comparison purposes and are not reportable. The final analysis is used for reporting purposes and is qualified as estimated, J/UJ.

Section 3

Results and Findings

3.1 Water Level Data

Table 1 provides the water level data and calculated water elevations from the June 14, 2022 measurements. Figure 1 illustrates the elevation contours of the water table based on these data. The contours were developed using water level elevation data from the shallow monitoring wells (i.e., those with screens that straddle, or are just below, the water table) considered representative of the water table, and the staff gauges in the Patchogue River. The groundwater elevation (hydraulic head) values for the wells screened in deeper intervals are also posted for reference on Figure 1. The water table is relatively shallow and is typically positioned in the fill that overlies the native alluvial deposits and outwash deposits and that overlies the ISS mass. The water table contours indicate that lateral groundwater flow is from the northwest to the south and southeast across the Site toward the Patchogue River.

3.2 NAPL Gauging

Table 1 presents the results of the NAPL gauging conducted in the monitoring wells associated with the Site during the June 2022 groundwater monitoring event. NAPL was not identified in any of the Site monitoring wells during the June 14, 2022 gauging activities.

3.3 Groundwater Quality Data

Table 2 provides the results of the laboratory analyses of the groundwater samples collected during the June 2022 monitoring event and a comparison of the data to the New York State Class GA groundwater quality criteria (i.e., New York State Codes, Rules and Regulations (NYCRR) Part 703 groundwater standards for Class GA water (groundwater) or, for constituents with no standard, the corresponding guidance value from Division of Water Technical and Operational Guidance Series (TOGS) 1.1.1). Comparisons of total BTEX and total PAH concentrations from this sampling event to previous sampling events are provided as Tables 3 and 4, respectively.

Groundwater samples were collected from the 12 monitoring wells listed in Table 2 from June 14 to June 16, 2022 and submitted to the laboratory for analysis of BTEX and PAHs. At wells MW-3, MW-4S, MW-11S, and MW-13S, concentrations of acenaphthene (MW-3, MW-4S, and MW-11S), benzene (MW-13S), and naphthalene (MW-3 and MW-13S) were detected at concentrations above the Class GA groundwater quality criteria. These constituents are considered site related and potentially mobile in groundwater. The presence of these constituents in groundwater at these locations is an expected result of the disturbance of the subsurface during implementation of the ISS, and the elevated concentrations are expected to decrease with time. In these wells, one or more the following PAH compounds were also detected at concentrations above Class GA groundwater quality criteria: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene. As discussed further below in this section, these PAHs have very low aqueous solubilities, and their detection may not represent constituents that are mobile in groundwater.

Prior to remediation in the area downgradient of the MGP-related source materials, these constituents were either not detected or detected at concentrations below Class GA groundwater quality criteria in the

wells that were in place prior to remedy implementation. Overall, the concentrations have decreased somewhat since post-remediation monitoring was initiated in March 2020 (see constituent concentration trend plots presented as Figures 2 through 6) and are anticipated to further decrease with time and will be evaluated during subsequent monitoring events.

As described above in Section 3.1, groundwater flow is from the northwest to the south and southeast across the Site toward the Patchogue River. The concentrations of some of the constituents that were detected and potentially mobile in the dissolved phase (benzene and ethylbenzene) were below applicable surface water quality criteria listed in the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004) that are applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). Therefore, they do not have the potential to impact surface water quality in the Patchogue River. However, the concentration of one or more of the following seven constituents were detected above their respective applicable surface water quality criteria in downgradient monitoring wells proximal to the river (MW-3 and MW-4S): acenaphthene, benzo(a)anthracene, benzo(a)pyrene, fluorene, naphthalene, phenanthrene, and pyrene. Although it was not anticipated that these constituent concentrations would impact surface water quality if they discharged to the river, and that some of these compounds have very low aqueous solubilities and thus low potential for migration (i.e., benzo(a)anthracene and benzo(a)pyrene – see discussion at end of this section), a mass flux analysis was previously conducted (provided in Appendix E) to assess the potential for discharge of Site-related constituents in shallow groundwater to impact water quality in the Patchogue River. The evaluation was conducted by estimating the rate at which a mass of Site-related constituents dissolved in groundwater may be contributing to the surface water in the Patchogue River (i.e., the mass flux of constituents from groundwater to surface water). Based on the analysis, it was determined that the estimated concentrations of acenaphthene, benzo(a)anthracene, benzo(a)pyrene, fluorene, naphthalene, phenanthrene, and pyrene in the river water resulting from the discharge of groundwater from the Site were below applicable surface water quality criteria. The details of these constituent mass flux analyses are presented in Appendix E; the results are summarized below.

The concentrations of acenaphthene, benzo(a)anthracene, benzo(a)pyrene, fluorene, naphthalene, phenanthrene, and pyrene in the June 2022 samples were similar (within the same order of magnitude) to those in the 2020 samples, yet the concentrations appear to be either stabilizing or trending downwards (see groundwater quality trend plots for select constituents presented as Figures 2 through 6). Since the estimated concentrations of these seven constituents in surface water, as derived from the previous mass flux analyses, were below applicable surface water criteria, based on the mass flux analyses using the 2020 data (see Appendix E), an additional estimation of concentrations of these constituents in the river is not necessary. Based on the evaluation conducted, Site-related constituents in shallow groundwater do not impact surface water quality in the Patchogue River.

In addition to the above-described detections at wells MW-3, MW-4S, MW-11S, and MW-13S, PAH compounds were also detected in samples collected from monitoring wells MW-7S, MW-8S, MW-12S, and MW-12D at low concentrations (i.e., at or slightly above the laboratory method detection limit), but above the Class GA groundwater quality criteria, during the June 2022 monitoring event. The PAH compounds that were identified in the groundwater samples from these sampling locations at concentrations above the Class GA groundwater quality criteria include one or more of the following five compounds: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene. These PAH compounds have very low aqueous solubilities, are not readily mobile in groundwater, and are unlikely to have migrated from the on-Site source area. The criteria that were exceeded for four of these five PAHs are unpromulgated guidance values rather than 6 NYCRR Part 703 standards. The criteria for the fifth PAH, benzo(a)pyrene, is a Part 703 standard. The standard for benzo(a)pyrene is “non-detect” and the guidance value for the other four PAHs, 0.002 micrograms per

liter (µg/L), is approximately an order of magnitude below the method detection limit. Therefore, any detection of these compounds in groundwater will result in an exceedance. The detection of these constituents in the monitoring locations is likely related to the disturbance of fine or colloid sized particles during purging or sampling activities. These particles are derived from within the well or the soil adjacent to the well that become suspended into the water column of the well as a result of disturbance during purging and sampling activities.

As discussed in previous monitoring reports, following implementation of the remedy, pH levels in two wells downgradient of and proximal to the ISS mass were found to have pH levels above the Class GA criteria range of 6.5 to 8.5. Specifically, after remedy implementation, monitoring data showed that the pH level in MW-3 began to increase above levels from prior to remedy implementation (typically ±6.9), up to levels as high as 11.09. Also, samples from well MW-13S, installed at the end of remedy implementation, showed an increase in pH levels, up to levels as high as 9.88. The increased pH levels are considered a potential effect from implementation of ISS in the area and are anticipated to decrease to pre-remedy levels with time (i.e., as ISS mass continues to fully cure). Due to the low permeability of the ISS mass, the flux of groundwater in the area immediately downgradient of the ISS mass (proximal to well locations MW-3 and MW-13S) is greatly reduced. This is consistent with the findings from the groundwater flow model developed during the remedial design). Thus, the rate at which the groundwater with an elevated hydroxide ion concentration (i.e., elevated pH) is flushed from this area is expected to be very low. The presence of new asphalt pavement over this area likely further contributes to the reduction in flushing due to decreased infiltration of precipitation. This, coupled with the uncertainty regarding the timeframe over which the Portland-cement-based ISS material can generate elevated pH levels in close proximity to the ISS mass. The pH levels at these two locations have been generally declining since they reached their maximum values in April 2021 (MW-13S) and September 2021 (MW-3). Although the increased pH levels in groundwater are not anticipated to impact surface water quality in the Patchogue River, similar to the evaluations conducted for certain PAHs dissolved in groundwater to potentially effect surface water quality, an analysis was previously conducted to evaluate the potential for the increased pH levels to effect surface water quality in the river. The details of this pH mass flux analysis are presented in Appendix F. Since the pH levels measured in MW-3 and MW-13S in June 2022 are within an order of magnitude or less to the levels measured in December 2020 and the estimated pH level in surface water (based on the December 2020 field measurements) was below applicable surface water criteria, an additional estimation of the pH level in the river is not necessary. Based on the evaluation conducted, the increased pH levels in shallow groundwater do not impact surface water quality in the Patchogue River.

Section 4

Summary and Conclusions

The following is a summary of the findings and conclusions associated with the June 2022 groundwater monitoring event.

- NAPL was not identified in any of the Site monitoring wells during the June 2022 gauging activities.
- Consistent with other monitoring events conducted after remedy implementation, concentrations of one or more of the following constituents: acenaphthene, benzene and naphthalene were detected at concentrations above the Class GA groundwater quality criteria in wells MW-3, MW-4S, and MW-13S. The presence of these Site-related constituents is an expected result of the disturbance of the subsurface during implementation of the ISS. Overall, these concentrations have decreased somewhat since post-remediation monitoring was initiated in March 2020 and are anticipated to further decrease with time and will be evaluated during subsequent monitoring events.
- The concentrations of Site-related constituents detected in groundwater at the Site are not impacting surface water quality in the Patchogue River based on an evaluation of the mass flux of constituents in groundwater to the river.
- Increased pH levels in groundwater immediately downgradient of the ISS mass are considered a potential effect from implementation of ISS in the area. The pH levels have slowly decreased since the initiation of post-remediation monitoring and are anticipated to further decrease to pre-remedy levels with time. The increased pH levels measured in groundwater at the Site are not impacting surface water quality in the Patchogue River based on a mass flux analysis.

Section 5

References

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Tables

TABLE 1
WATER ELEVATIONS AND NAPL MONITORING DATA
FIRST HALF 2022 SEMI-ANNUAL GROUNDWATER MONITORING EVENT
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

		6/14/2022			
Location ID	Top of Casing Elevation (ft., NAVD)	Depth to Water (ft., BTOC)	Water Elevation (ft., NAVD)	Depth to NAPL (ft., BTOC)	Total Depth of Well (ft., BTOC)
MW-1	11.47	5.75	5.72	NI	15.17
MW-3	5.56	1.65	3.91	NI	10.09
MW-4S	7.97	4.66	3.31	NI	12.24
MW-4D	7.79	4.42	3.37	NI	26.65
MW-7S	8.45	4.30	4.15	NI	12.40
MW-7D	8.31	4.16	4.15	NI	28.11
MW-8S	5.01	0.69	4.32	NI	--
MW-8D	4.99	0.66	4.33	NI	25.07
MW-10S	5.77	1.01	4.76	NI	15.55
MW-10D	5.73	0.99	4.74	NI	25.39
MW-11S	5.02	0.79	4.23	NI	13.75
MW-11D	5.14	0.92	4.22	NI	23.57
MW-12S	4.99	1.40	3.59	NI	13.93
MW-12D	4.92	1.32	3.60	NI	23.88
MW-13S	4.98	1.32	3.66	NI	13.29
MW-13D	4.96	1.30	3.66	NI	23.95
MW-14S	4.86	0.85	4.01	NI	12.62
MW-14D	4.82	0.89	3.93	NI	22.03
SG-1	5.38	3.83	1.55	NA	NA
SG-2	5.25	--	--	NA	NA

Notes:
NAVD - North American Vertical Datum 1988
ft. - Feet
BTOC - Below Top of Casing
NA - Not Applicable
NI - NAPL not Indicated by Oil/Water Interface Probe
-- - Not measured
MW - monitoring well
SG - staff gauge

TABLE 2
GROUNDWATER ANALYTICAL RESULTS
FIRST HALF 2022 SEMI-ANNUAL GROUNDWATER MONITORING EVENT
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Constituent	Class GA Groundwater Criteria TOGS 1.1.1 Guidance	NYS Part 703 Standard	Units	Loc ID / Date	MW-1 6/14/2022	MW-3 6/16/2022	MW-3 (Dup) 6/16/2022	MW-4S 6/16/2022	MW-7S 6/15/2022	MW-8S 6/15/2022	MW-10S 6/14/2022	MW-11S 6/15/2022	MW-12S 6/15/2022	MW-12D 6/15/2022	MW-13S 6/16/2022	MW-13D 6/16/2022	MW-14S 6/14/2022
Volatile Organic Compounds (VOCs)																	
BTEX Compounds																	
Benzene	NE	1	µg/L		0.30 U	0.62 J	0.55 J	0.30 U	0.31 J	0.30 U	0.30 U	0.90 J	0.30 U	0.30 U	**1.30**	0.30 U	0.30 U
Toluene	NE	5	µg/L		0.40 U	2.10	1.60	0.40 U	0.40 UR	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.91 J	0.40 U	0.40 U
Ethylbenzene	NE	5	µg/L		0.20 U	0.7 J	0.7 J	0.20 U	0.20 UR	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.52 J	0.20 U	0.20 U
Xylenes, Total	NE	NE	µg/L		0.40 U	1.8	1.2	0.40 U	0.40 UR	0.40 U	0.40 U	0.89 J	0.40 U	0.40 U	1.00	0.40 U	0.40 U
Total BTEX[a]	NE	NE	µg/L		ND	3.90	2.80	ND	0.31	ND	ND	1.79	ND	ND	3.73	ND	ND
Semi-Volatile Organic Compounds (SVOCs)																	
Polycyclic Aromatic Hydrocarbons (PAHs)																	
Acenaphthene	20	NE	µg/L		0.010 U	**33 J**	**33**	**30**	0.160	0.16	0.010 U	**49**	0.048 J	0.015 J	18.0	0.010 U	0.61
Acenaphthylene	NE	NE	µg/L		0.010 U	4.0 J	4.2	0.01 U	0.037 J	0.010 U	0.010 U	0.9	0.010 U	0.010 U	0.72	0.010 U	0.021 J
Anthracene	50	NE	µg/L		0.010 U	1.8 J	1.6	0.23	0.091	0.010 U	0.010 U	2.6	0.011 J	0.018 J	1.7	0.010 U	0.026 J
Benzo(a)anthracene	0.002	NE	µg/L		0.010 U	**0.79 J**	**0.72**	**0.019 J**	**0.075**	**0.035 J**	0.010 U	**1.50**	**0.014 J**	**0.016 J**	**0.27**	0.010 U	**0.013 J**
Benzo(a)pyrene	NE	0	µg/L		0.010 U	0.100 UJ	0.010 U	**0.014 J**	**0.047 J**	**0.026 J**	0.010 U	**0.56**	0.010 U	**0.011 J**	**0.013 J**	0.010 U	**0.013 J**
Benzo(b)fluoranthene	0.002	NE	µg/L		0.010 U	0.100 UJ	**0.011 J**	**0.029 J**	**0.059**	**0.046 J**	0.010 U	**1.10**	**0.014 J**	**0.016 J**	**0.020 J**	0.010 U	**0.012 J**
Benzo(g,h,i)perylene	NE	NE	µg/L		0.010 U	0.100 UJ	0.010 U	0.012 J	0.037 J	0.025 J	0.010 U	0.55	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Benzo(k)fluoranthene	0.002	NE	µg/L		0.010 U	0.100 UJ	0.010 U	**0.012 J**	**0.059**	**0.017 J**	0.010 U	**0.36**	**0.011 J**	0.010 U	0.010 U	0.010 U	0.010 U
Chrysene	0.002	NE	µg/L		0.010 U	**0.42 J**	**0.40**	**0.015 J**	**0.062**	**0.042 J**	0.010 U	**1.60**	**0.013 J**	**0.017 J**	**0.18**	0.010 U	**0.015 J**
Dibenzo(a,h)anthracene	NE	NE	µg/L		0.020 U	0.200 UJ	0.020 U	0.020 U	0.050 J	0.020 U	0.020 U	0.100	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Fluoranthene	50	NE	µg/L		0.010 U	14 J	14	4.1	0.087	0.068	0.010 U	7.5	0.020 J	0.041 J	2.1	0.011 J	0.027 J
Fluorene	50	NE	µg/L		0.011 J	9 J	10	8.4	0.130	0.010 U	0.010 U	3.5	0.017 J	0.028 J	3.5	0.010 U	0.120
Indeno(1,2,3-cd)pyrene	0.002	NE	µg/L		0.020 U	0.200 UJ	0.020 U	0.020 U	**0.046 J**	**0.025 J**	0.020 U	**0.51**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Naphthalene	10	NE	µg/L		0.030 U	**84 J**	**84**	0.030 U	0.150	0.030 U	0.030 U	3.4	0.030 U	0.030 U	**36**	0.030 U	0.300
Phenanthrene	50	NE	µg/L		0.030 U	11 J	11	0.10	0.130	0.088	0.030 U	1.90	0.030 U	0.075	3.5	0.030 U	0.100
Pyrene	50	NE	µg/L		0.010 U	16 J	18	5.8	0.092	0.079	0.010 J	12.0	0.037 J	0.044 J	2.2	0.013 J	0.034 J
Total PAHs[b]	NE	NE	µg/L		0.011	174	177	49	1.31	0.61	0.010	87	0.185	0.281	68	0.024	1.29

Notes:
BTEX - benzene, toluene, ethylbenzene and isomers of xylene.
TOGS - Technical and Operational Guidance Series
U - The analyte was analyzed for, but was not detected above the sample reporting limit. Value shown is representative of method detection limit for the analyzed constituent.
J - Estimated concentration. The result is below the reporting limit but above the method detection limit.
R - Rejected concentration. The result can be used for comparison puproses to historical data only.
µg/L - micrograms per liter
ND - Not detected.
NE - Not established.
(a) - To calculate total BTEX concentration, a value of zero is used for non-detect values.
(b) - To calculate total PAH concentration, a value of zero is used for non-detect values.

TABLE 3
SUMMARY OF HISTORICAL BTEX CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total BTEX Concentrations (µg/L) [a]													
	Monitoring Well													
	MW-1	MW-2S	MW-2D	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D
Mar-08	0	0	0	0	3.4	0	1016	57	NS	NS	NS	NS	NS	NS
Jul-08	NS	0	0	0	0	0	678	0	0	0	0	0	0	0
Mar-09	0	0	0	0	0	0	975	0	0	1	0	0	0	0
Sep-09	0	0	0	0	0	0	1257	1	0	0	0	0	0	0
Mar-10	0	0	0	0	0	0	637	2	0	9	0	0	0	0
Sep-10	0	0	0	0	0	0	NS	0	0	0	0	0	27	0
Jan-11	1.7	0	0	0	0	0	NS	NS	0	0	0	0	1	0
Apr-11	0	0	0	0	0	0	NS	NS	0	0	0	0	0	0
Aug-11	0	0	0	0	0	0	NS	NS	0	0	0	0	0	0
Nov-11	0	0	0	0	0	0	NS	NS	0	0	0	0	0	0
Feb-12	0	0	0	0	0	0	NS	NS	0	0	0	0	0	0
May-12	0	0	0	0	0	0	NS	NS	0	0	0	0	0	0
Nov-12	0	-- [b]	-- [a]	0	12	0	NS	NS	1	0	0	0	NS	NS
Jun-13	0	-- [b]	-- [b]	0	0.8	0	NS	NS	0.7	0	0	0	0	NS
Dec-13	0	-- [b]	-- [b]	NS	0	0	NS	NS	0.8	0	0	0	NS	NS
Jun-14	0	-- [b]	-- [b]	0	0	0	NS	NS	0.8	0	0	0	NS	NS
Dec-14	0	-- [b]	-- [b]	0	0	0	NS	NS	1.3	0	0	0	0	0
Jun-15	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Dec-15	0	-- [b]	-- [b]	0	0	0	NS	NS	0.5	0	0	0	0	0
Jun-16	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Dec-16	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Jun-17	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Dec-17	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Jun-18	0	-- [b]	-- [b]	0	0	0	NS	0	0	0	0	0	0	0
Dec-18	0	-- [b]	-- [b]	0	0	0	NS	NS	0	0	0	0	0	0
Mar-20	0	-- [b]	-- [b]	35	4.3	0	-- [c]	-- [c]	0.4	0	0	0	-- [c]	-- [c]
Jun-20	0	-- [b]	-- [b]	18	2	0	-- [c]	-- [c]	0	0	0	0	-- [c]	-- [c]
Sep-20	0	-- [b]	-- [b]	20	2	0	-- [c]	-- [c]	0.4	0	0	0	-- [c]	-- [c]
Dec-20	0	-- [b]	-- [b]	19	1	0	-- [c]	-- [c]	0	0	0	0	-- [c]	-- [c]

TABLE 3
SUMMARY OF HISTORICAL BTEX CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total BTEX Concentrations (µg/L) [a]													
	Monitoring Well													
	MW-1	MW-2S	MW-2D	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D
Mar-21	0	-- [b]	-- [b]	10.2	0.6	0	-- [c]	-- [c]	0.3	0	0	0	-- [c]	-- [c]
Jun-21	0	-- [b]	-- [b]	8.4	0.7	0	-- [c]	-- [c]	0.34	0	0	0	-- [c]	-- [c]
Sep-21	0	-- [b]	-- [b]	8.7	1.0	0	-- [c]	-- [c]	0	0	0	0	-- [c]	-- [c]
Dec-21	0	-- [b]	-- [b]	12	0.3	0	-- [c]	-- [c]	0.31	0	0	0	-- [c]	-- [c]
Jun-22	0	-- [b]	-- [b]	3.9	0	NS	-- [c]	-- [c]	0.31	NS	0	NS	-- [c]	-- [c]
Minimum	0	0	0	0	0	0	637	0	0	0	0	0	0	0
Maximum	1.7	0	0	35	12	0	1257	57	1.3	9.0	0	0	27	0
Mean	0.1	0	0	4.1	0.8	0	913	8.6	0.22	0.3	0	0	1.3	0

Notes:
BTEX - Benzene, toluene, ethylbenzene and isomers of xylene
µg/L - micrograms per liter
NS - Not sampled.
NI - Monitoring well or piezometer not installed at time of sampling.
(a) - To calculate total BTEX concentration, a value of zero is used for non-detect values.
(b) - Monitoring well was decommissioned on 6/4/12 as part of the Utility Corridor Construction activities. See "Construction Completion Report, Utility Corridor Work Plan Implementation" (BC, December 2012).
(c) - Monitoring well/piezometer was decommissioned on 6/13/19 as part of pre-remedial construction activities in accordance with the "Remedial Design Report (100% Submittal)" (BC, May 2019) and "CP-43: Groundwater Monitoring Well Decommissioning Policy" (NYSDEC, November 2009).

TABLE 3
SUMMARY OF HISTORICAL BTEX CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total BTEX Concentrations (µg/L) [a]										
	Monitoring Well/Piezometer										
	MW-10S	MW-10D	MW-11S	MW-11D	MW-12S	MW-12D	MW-13S	MW-13D	MW-14S	MW-14D	PZ-4A
Mar-08	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jul-08	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Mar-09	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Sep-09	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Mar-10	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Sep-10	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jan-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Apr-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Aug-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Nov-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Feb-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
May-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Nov-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jun-13	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Dec-13	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jun-14	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	0
Dec-14	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-15	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-15	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-16	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-16	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-17	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-17	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-18	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-18	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Mar-20	0	0	4	0	0	0	37	0	0	0	-- [c]
Jun-20	0	0	2.7	0	0	0	25	0	0.73	0	-- [c]
Sep-20	0	0	1.9	0	0	0	26	0	0	0	-- [c]
Dec-20	0	0	0	0	0	0	6.9	0	0	0	-- [c]

TABLE 3
SUMMARY OF HISTORICAL BTEX CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total BTEX Concentrations (µg/L) [a]										
	Monitoring Well/Piezometer										
	MW-10S	MW-10D	MW-11S	MW-11D	MW-12S	MW-12D	MW-13S	MW-13D	MW-14S	MW-14D	PZ-4A
Mar-21	0	0	1.3	0	0	0	4	0	0	0	-- [c]
Jun-21	0.22	0	1.6	0	0	0	5.3	0	0	0	-- [c]
Sep-21	0	0	0	0	0	0	3.9	0	0	0	-- [c]
Dec-21	0	0	1.9	0	0	0	0	0	0	0	-- [c]
Jun-22	0	NS	1.8	NS	0	0	3.7	0	0	NS	-- [c]
Minimum	0	0	0	0	0	0	0	0	0	0	0
Maximum	0.22	0	4.0	0	0	0	37	0	0.73	0	0
Mean	0.02	0	1.7	0	0	0	12	0	0.1	0	0

Notes:
BTEX - Benzene, toluene, ethylbenzene and isomers of xylene
µg/L - micrograms per liter
NS - Not sampled.
NI - Monitoring well or piezometer not installed at time of sampling.
(a) - To calculate total BTEX concentration, a value of zero is used for non-detect values.
(b) - Monitoring well was decommissioned on 6/4/12 as part of the Utility Corridor Construction activities. See "Construction Completion Report, Utility Corridor Work Plan Implementation" (BC, December 2012).
(c) - Monitoring well/piezometer was decommissioned on 6/13/19 as part of pre-remedial construction activities in accordance with the "Remedial Design

TABLE 4
SUMMARY OF HISTORICAL PAH CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total PAH Concentrations (µg/L) [a]													
	Monitoring Well													
	MW-1	MW-2S	MW-2D	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D
Mar-08	0	0	0	0.76	0.6	4.3	1774	214	NS	NS	NS	NS	NS	NS
Jul-08	NS	0.7	0	0	8	0	1799	154	0	0.47	0	0	12	0
Mar-09	0	0	0	0	0	0	2730	0	0	0	0	0	0	0
Sep-09	0	0	0	0	0	0	3373	1	0	0	0	0	0	0
Mar-10	0	0	0	0	0	39	2390	17	0	0	22	0	2	0
Sep-10	0	0	0	128	0	6	NS	14	0	0	11	0	396	0
Jan-11	22	0	0	17	0	12	NS	NS	0	0	6	0	42	5
Apr-11	0	0	0	6	0	20	NS	NS	0	0	0	0	9	0
Aug-11	0	0	0.1	14	0.1	0	NS	NS	0	0	0.4	0	16	1.2
Nov-11	0	0	0.2	10	0.4	0	NS	NS	0	0	0.8	0.2	8	3.4
Feb-12	0.2	0	0	6	0.6	4	NS	NS	0.1	0	0.6	0	5	2.9
May-12	0.4	0.1	0.6	5	0	5.8	NS	NS	0.1	0.3	1	0	6	2.8
Nov-12	0.1	-- [b]	-- [b]	5.6	0.4	11.7	NS	NS	2.5	2.6	0.8	1.2	NS	NS
Jun-13	0.8	-- [b]	-- [b]	NS	0.3	3.7	NS	NS	1.3	0.4	0.4	0.6	2	NS
Dec-13	0	-- [b]	-- [b]	NS	0	2.5	NS	NS	0.8	0.4	0.3	0	NS	NS
Jun-14	0	-- [b]	-- [b]	2.2	0.9	0	NS	NS	0.8	0.3	0.2	0	NS	NS
Dec-14	0.1	-- [b]	-- [b]	1.2	0.4	0	NS	NS	3	0	0.1	0	21	0.3
Jun-15	0	-- [b]	-- [b]	1.1	0.9	0	NS	NS	0.9	0	0.3	0	10	0.3
Dec-15	0	-- [b]	-- [b]	0	0	0	NS	NS	0.9	0	0	0	3.9	0
Jun-16	0	-- [b]	-- [b]	1.9	0.8	0	NS	NS	2.5	0	0	0	5.9	0
Dec-16	0	-- [b]	-- [b]	0.02	0	0.1	NS	NS	0	0	0	0	5.5	0.07
Jun-17	0	-- [b]	-- [b]	2.0	0.5	0	NS	NS	1	0	0	0	3.2	0
Dec-17	0	-- [b]	-- [b]	0.53	0	0.031	NS	NS	0	0.11	0	0.017	6.0	0.14
Jun-18	0	-- [b]	-- [b]	3.1	1.1	0.010	NS	53	0.02	0.01	0.08	0.09	7.4	0.55
Dec-18	0.31	-- [b]	-- [b]	1.5	1.2	0.080	NS	NS	0.08	0.05	0.10	0.13	7.9	1.0
Mar-20	0	-- [b]	-- [b]	20	17	0.21	-- [c]	-- [c]	0.32	0	0.09	0	-- [c]	-- [c]
Jun-20	0	-- [b]	-- [b]	179	37	0	-- [c]	-- [c]	0.14	0	0.11	0	-- [c]	-- [c]
Sep-20	0	-- [b]	-- [b]	336	41	0	-- [c]	-- [c]	0	0	0.21	0	-- [c]	-- [c]
Dec-20	0	-- [b]	-- [b]	333	33	0	-- [c]	-- [c]	0	0	0.14	0	-- [c]	-- [c]

TABLE 4
SUMMARY OF HISTORICAL PAH CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total PAH Concentrations (µg/L) [a]													
	Monitoring Well													
	MW-1	MW-2S	MW-2D	MW-3	MW-4S	MW-4D	MW-5	MW-6	MW-7S	MW-7D	MW-8S	MW-8D	MW-9S	MW-9D
Mar-21	0	-- [b]	-- [b]	172	24.2	0	-- [c]	-- [c]	0.26	0	0.11	0.043	-- [c]	-- [c]
Jun-21	0	-- [b]	-- [b]	177	68.1	0	-- [c]	-- [c]	0.18	0	0.20	0	-- [c]	-- [c]
Sep-21	0.1	-- [b]	-- [b]	223	16.4	0	-- [c]	-- [c]	0.07	0	0.18	0.111	-- [c]	-- [c]
Dec-21	0.011	-- [b]	-- [b]	234	40	0.011	-- [c]	-- [c]	0.140	0.039	0.512	0.219	-- [c]	-- [c]
Jun-22	0.011	-- [b]	-- [b]	177	49	NS	-- [c]	-- [c]	1.3	NS	0.61	NS	-- [c]	-- [c]
Min	0	0	0	0	0	0	1774	0	0	0	0	0	0	0
Max	22	0.7	0.6	336	68	39	3373	214	3.0	2.6	22	1.2	396	5
Mean	0.7	0.067	0.1	64	10	3.3	2413	65	0.50	0.15	1.4	0.082	27	0.88

Notes:
PAH - Polycyclic aromatic hydrocarbons
µg/L - micrograms per liter
NS - Not sampled.
NI - Monitoring Well or piezometer not installed at time of sampling.
(a) - To calculate total PAH concentration, a value of zero is used for non-detect values.
(b) - Monitoring well was decommissioned on 6/4/12 as part of the Utility Corridor Construction activities. See "Construction Completion Report, Utility Corridor Work Plan Implementation" (Brown and Caldwell, December 2012).
(c) - Monitoring well/piezometer was decommissioned on 6/13/19 as part of pre-remedial construction activities in accordance with the "Remedial Design Report (100% Submittal)" (BC, May 2019) and "CP-43: Groundwater Monitoring Well Decommissioning Policy" (NYSDEC, November 2009).

TABLE 4
SUMMARY OF HISTORICAL PAH CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Sampling Date	Total PAH Concentrations (µg/L) [a]										
	Monitoring Well/Piezometer										
	MW-10S	MW-10D	MW-11S	MW-11D	MW-12S	MW-12D	MW-13S	MW-13D	MW-14S	MW-14D	PZ-4A
Mar-08	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jul-08	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Mar-09	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Sep-09	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Mar-10	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Sep-10	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jan-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Apr-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Aug-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Nov-11	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Feb-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
May-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Nov-12	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jun-13	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Dec-13	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI
Jun-14	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	0.3
Dec-14	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-15	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-15	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-16	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-16	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-17	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-17	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Jun-18	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Dec-18	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NS
Mar-20	0.3	0.3	96	1.5	14	0	188	0.1	0.5	0.04	-- [c]
Jun-20	0	0	63	0	0	0	394	0.11	1.8	0	-- [c]
Sep-20	0	0	127	0	0	0	467	0	0.12	0	-- [c]
Dec-20	0	0	6.8	0	0.17	0	182	0	1.7	0	-- [c]

TABLE 4
SUMMARY OF HISTORICAL PAH CONCENTRATIONS
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

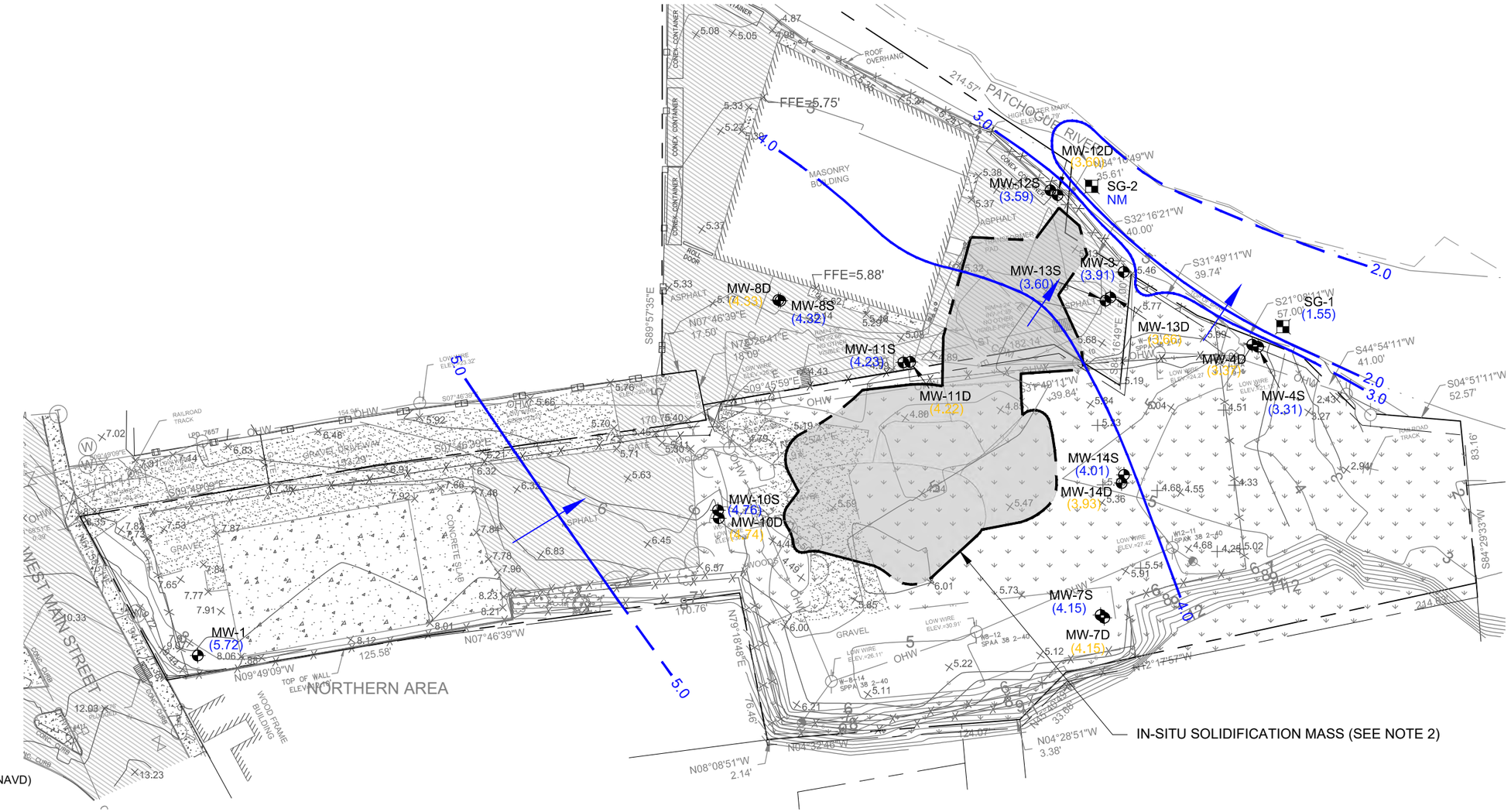
Sampling Date	Total PAH Concentrations (µg/L) [a]										
	Monitoring Well/Piezometer										
	MW-10S	MW-10D	MW-11S	MW-11D	MW-12S	MW-12D	MW-13S	MW-13D	MW-14S	MW-14D	PZ-4A
Mar-21	0	0	78	0	0.012	0	187	0.037	1.0	0	-- [c]
Jun-21	0.016	0.036	79	0.15	0	0	284	0.042	0.055	0.047	-- [c]
Sep-21	0.122	0.052	2	0	0	0	140	0.046	0.277	0	-- [c]
Dec-21	0.127	0	63	0.033	0.010	0.011	37	0.046	0.244	0.297	-- [c]
Jun-22	0.010	NS	87	NS	0.185	0.281	68	0.024	1.29	NS	-- [c]
Min	0	0	2.0	0	0	0	37	0	0.055	0	0.3
Max	0.3	0.3	127	1.5	14	0.281	467	0.11	1.8	0.297	0.3
Mean	0.064	0.049	67	0.21	1.6	0.0324	216	0.045	0.81	0.048	0.3

Notes:
PAH - Polycyclic aromatic hydrocarbons
µg/L - micrograms per liter
NS - Not sampled.
NI - Monitoring well or piezometer not installed at time of sampling.
(a) - To calculate total PAH concentration, a value of zero is used for non-detect values.
(b) - Monitoring well was decommissioned on 6/4/12 as part of the Utility Corridor Construction activities. See "Construction Completion Report, Utility Corridor Work Plan Implementation" (Brown and Caldwell, December 2012).
(c) - Monitoring well/piezometer was decommissioned on 6/13/19 as part of pre-remedial construction activities in accordance with the "Remedial Design Report (100% Submittal)" (BC, May 2019) and "CP-43: Groundwater Monitoring Well Decommissioning Policy" (NYSDEC, November 2009).

Figures

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAUGE LOCATION
- 4 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (4.76) — GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE) OR RIVER LEVEL FROM STAFF GAUGE (FT., NAVD).
- (4.74) — GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- NM — NOT MEASURED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

NOTES:

1. BASE MAP DEVELOPED BASED ON DRAWING PREPARED BY MJ ENGINEERING AND LAND SURVEYING, P.C. DATED NOVEMBER 30, 2017.
2. TOP OF ISS MASS IS POSITIONED APPROXIMATELY 4 FEET BELOW GRADE.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: August 23, 2022

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

WATER TABLE ELEVATION CONTOUR MAP
JUNE 14, 2022

FIGURE

1

153021

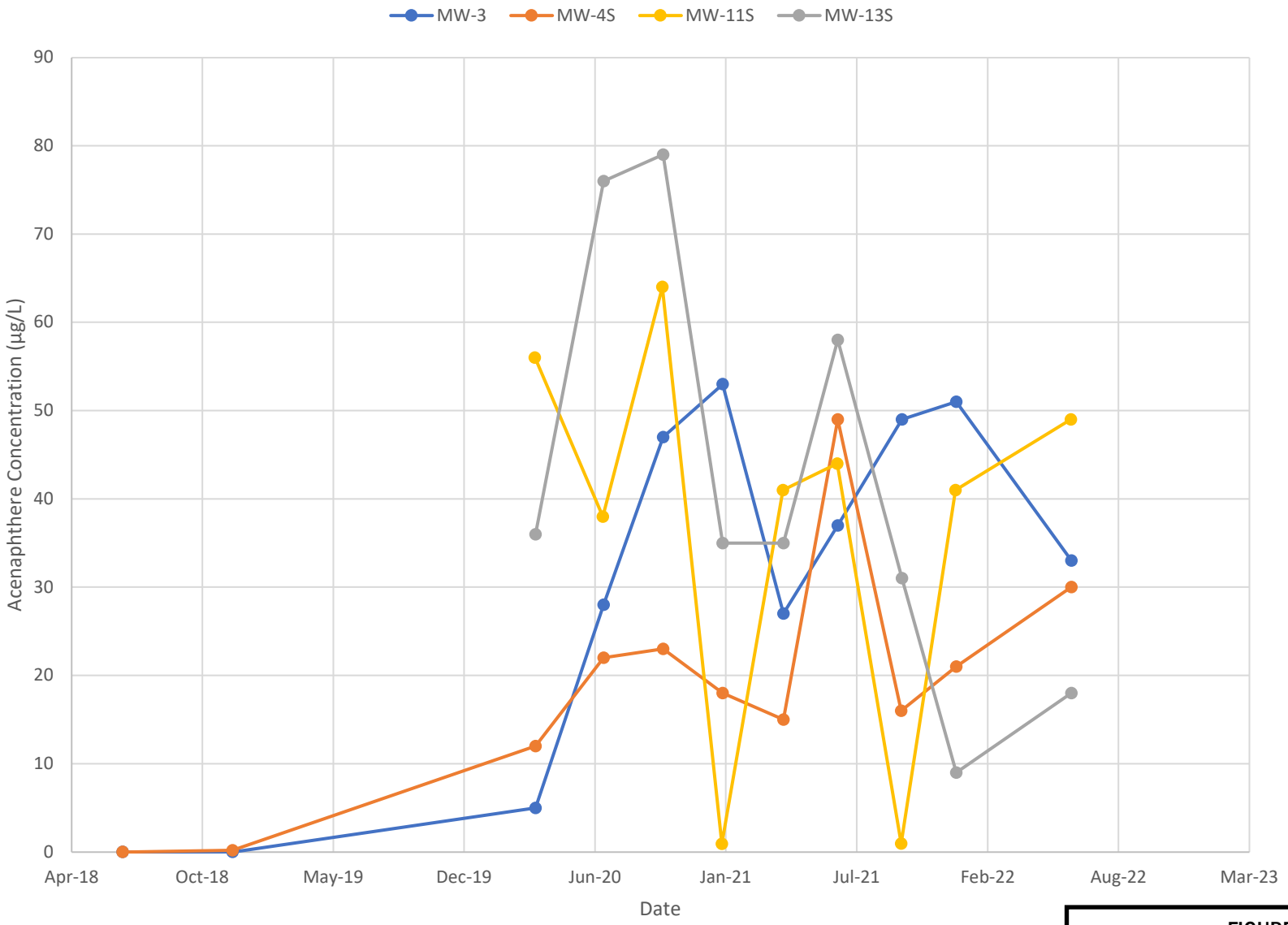


FIGURE 2

GROUNDWATER QUALITY TREND PLOT - ACENAPHTHENE

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Brown AND Caldwell

153021

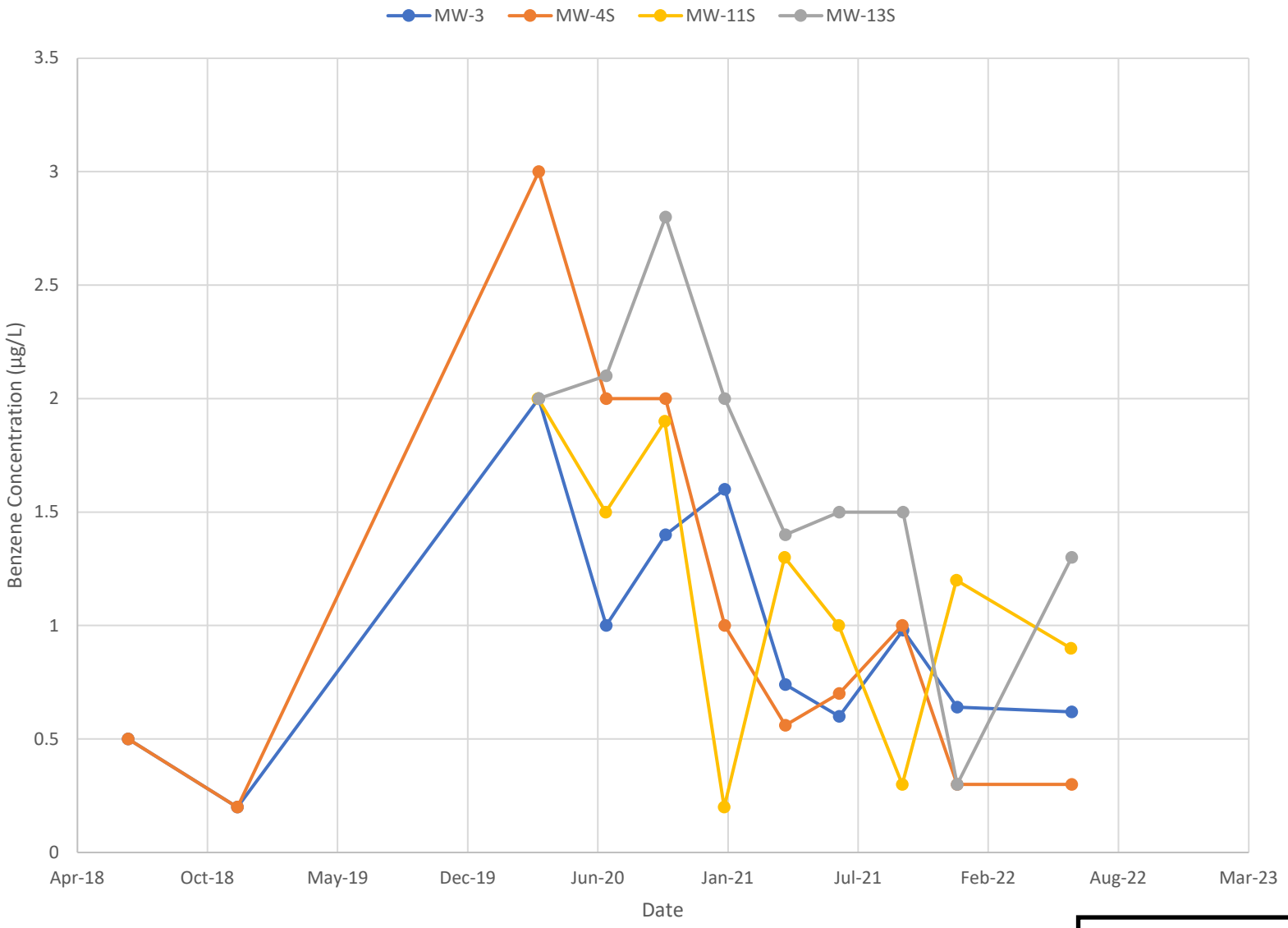


FIGURE 3

GROUNDWATER QUALITY TREND PLOT - BENZENE

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Brown AND Caldwell

153021

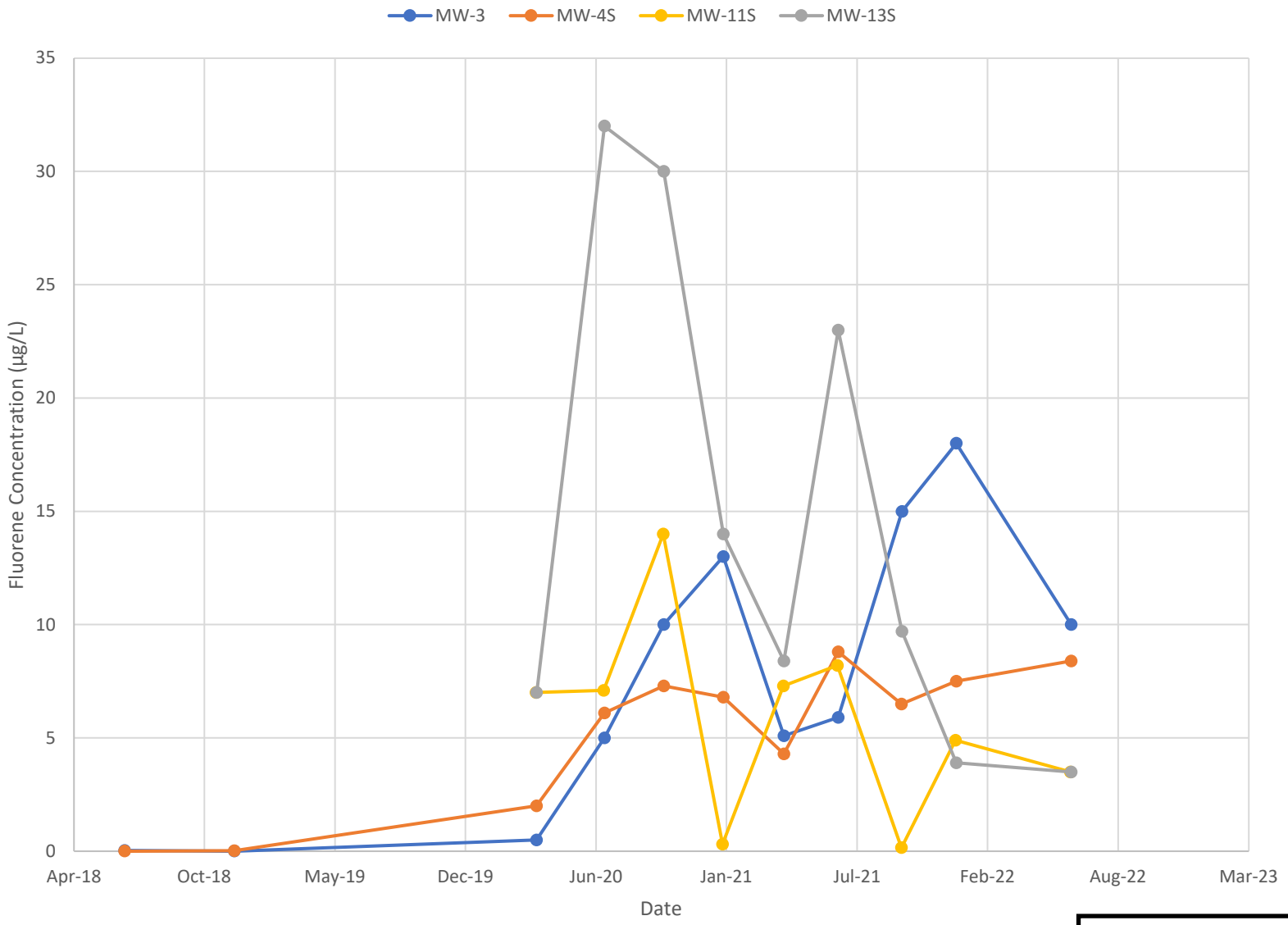


FIGURE 4

GROUNDWATER QUALITY TREND PLOT – FLUORENE

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Brown AND Caldwell

153021

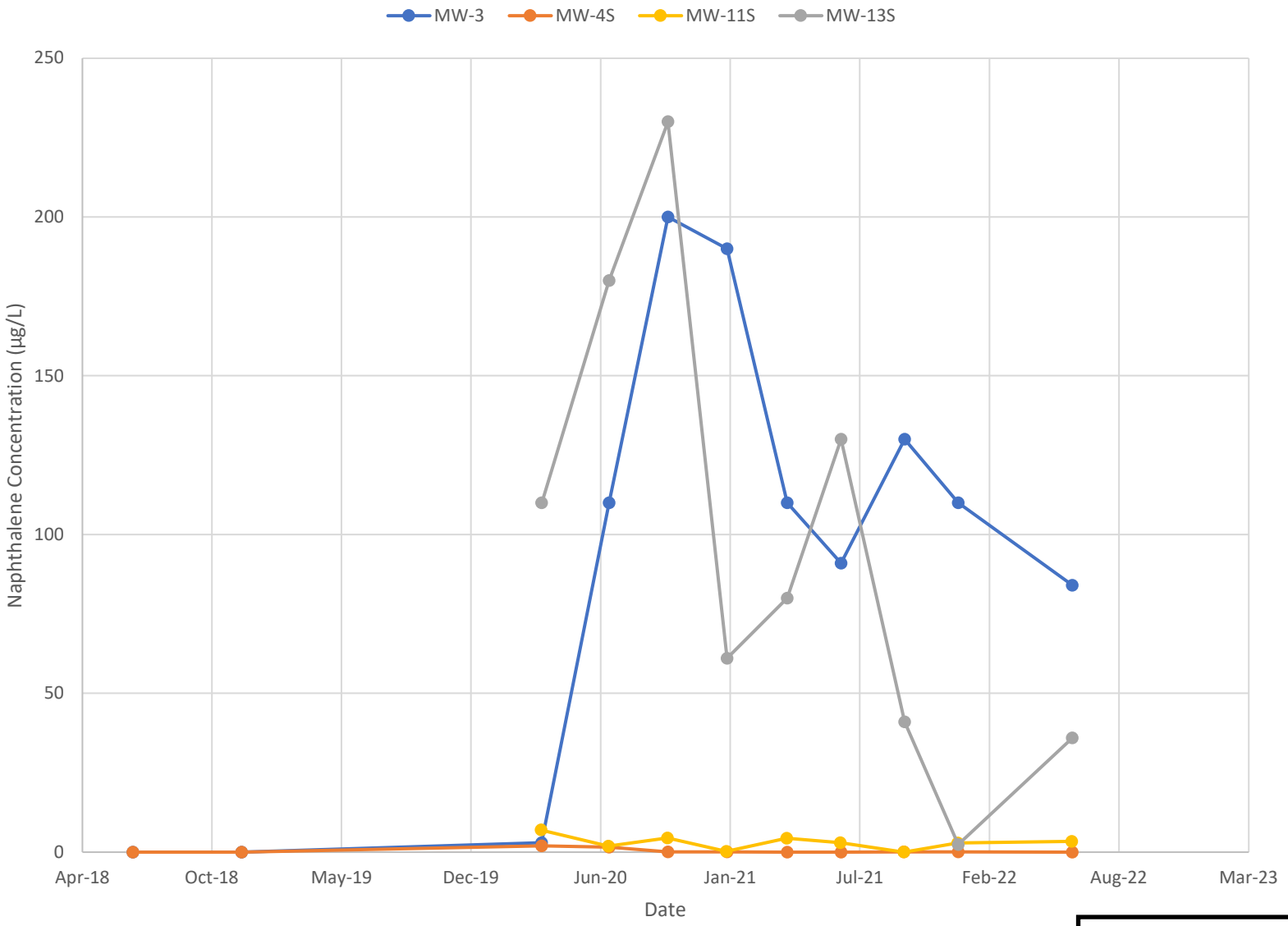


FIGURE 5

GROUNDWATER QUALITY TREND PLOT – NAPHTHALENE

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Brown AND Caldwell

153021

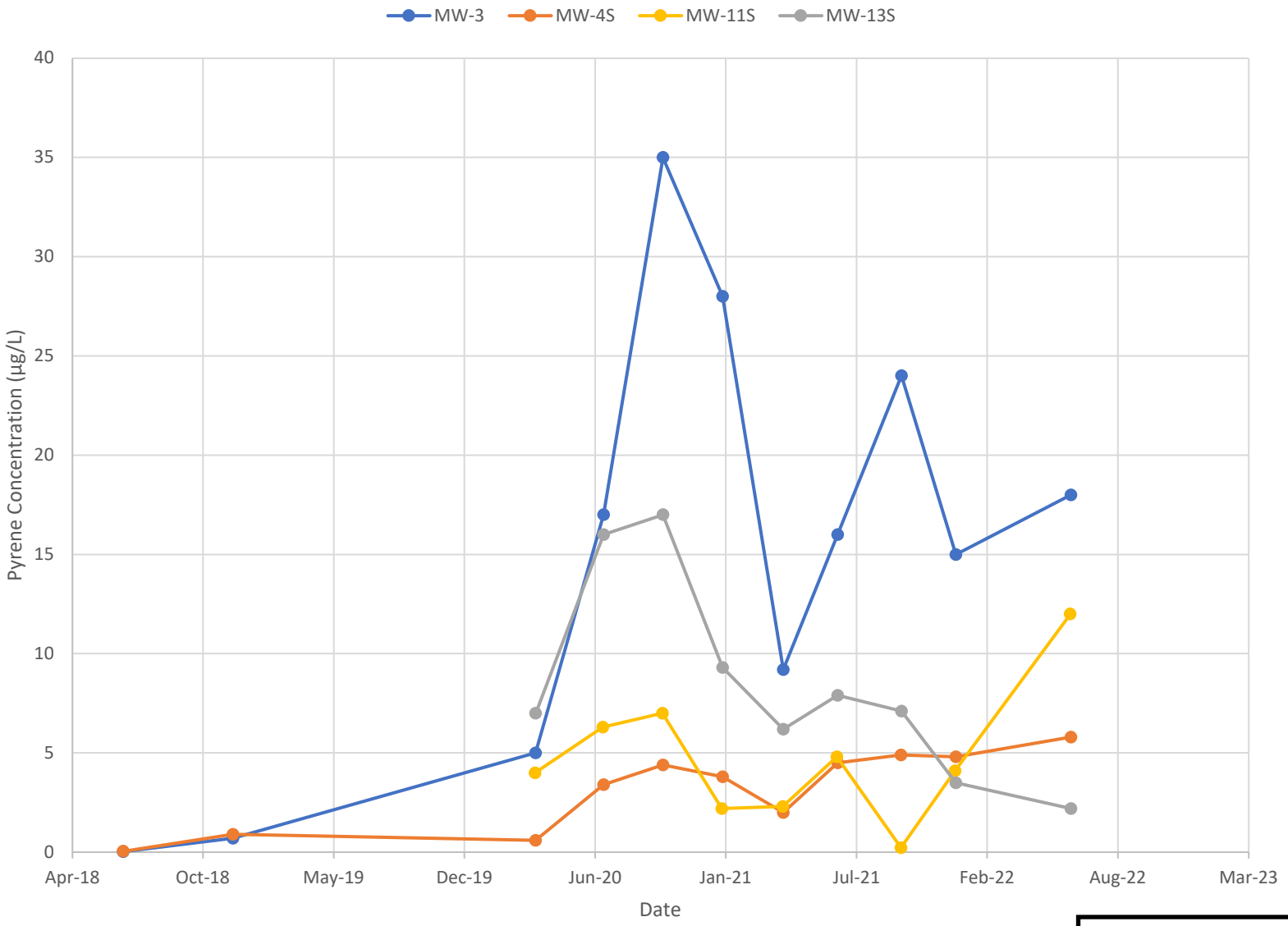


FIGURE 6

GROUNDWATER QUALITY TREND PLOT – PYRENE

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Brown AND Caldwell

Appendix A: Field Sampling Data Sheets

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023

LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name:	Patchogue MGP	Project Number:	153021
Client:	BC	Date:	06/14/22
Personnel:	AFV/SFJ	Well ID:	MW-1
Purge/Sample Depth:	~12'	Sample ID:	MW-1-20220614

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
13:33 pm	5.94	19.96	1.46	1.72	3.4	60	5.94	275	
13:36	6.20	18.32	1.52	1.07	2.6	30	5.94		
13:39	6.32	17.09	1.54	0.59	3.1	-12	5.94		
13:42	6.33	16.74	1.55	0.85	2.3	-26	5.94		
13:45	6.34	16.65	1.57	0.96	2.2	-35	5.94		
13:48	6.34	16.50	1.59	1.01	2.1	-41	5.94		
13:51	6.33	16.44	1.61	1.10	1.3	-46	5.94		
13:54	6.32	16.38	1.62	1.04	1.0	-48	5.99		
13:57	6.30	16.26	1.65	1.04	0.5	-51	5.94		
14:00	6.31	16.27	1.65	1.84	0.5	-51	5.94	✓	
14:03	6.28	16.25	1.68	1.36	0.4	-55	5.94		
14:06	C	O	C	C	F	C	T-		
	MW	-1-	2022	0614					

6/14/22

Certified Sample Information:
Time of Sample: 14:06 Analyst Signature: Sandra Jones

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 110P071KU Serial No. Handheld: JAHR34MD
Calibration Date/Time: 06/14/22

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-1
Sample I.D.: MW-1-20220614 (if different from well no.)

Project: Patchogue MGP
Personnel: AFV/SFJ

Date: 06/14/22 Time: 13:33
Weather: Sunny Air Temp.: 76°F

WELL DATA:

Casing Diameter: 4" ☐ Stainless Steel ☒ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2" ☐ Stainless Steel ☐ Galv. Steel ☒ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: _____ ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☒ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☐ Yes ☒ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☒ Yes ☐ No
Does Weep Hole adequately drain well head? ☒ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☒ Yes ☐ No
Is Padlock Functional? ☒ Yes ☐ No ☐ NA Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☒ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☒ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☒ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 275 ml/min Elapsed Time: 30 min Volume Pumped: 2.75 gallons
Was well Evacuated? ☐ Yes ☐ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☒ Prepared Off-Site ☐ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☒ Stainless Steel
Tubing/Rope: ☐ Teflon® ☒ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☒ Prepared Off-Site ☐ Field Cleaned
Metals samples field filtered? ☐ Yes ☒ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 06/14/22

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Lakehouse MGP
Client: BC J
Personnel: AFV/SFT
Purge/Sample Depth: 12 ft

Project Number: 153021
Date: 6/14/2022
Well ID: MW-105
Sample ID: MW-105-20220614

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
14:33	6.44	18.81	0.288	2.25	76.7	-64	1.01	250	
14:36	6.46	16.72	0.280	2.54	34.5	-61	1.01		
14:39	6.43	16.12	0.279	2.81	31.7	-63	1.01		
14:42	6.42	15.82	0.281	Bille	30.8	-68	1.01		
14:45	6.43	15.71	0.280	3.31	32.4	-72	1.01		
14:48	6.40	15.58	0.280	3.27	27.9	-75	1.01		
14:51	6.39	15.49	0.280	3.43	24.3	-75	1.01		
14:54	6.39	15.40	0.281	3.81	20.6	-77	1.01		
14:57	6.39	15.35	0.280	3.67	17.4	-78	1.01		
15:00	6.35	15.25	0.281	3.93	13.3	-79	1.01		
15:03	6.35	15.22	0.281	3.72	12.1	-80	1.01		
15:06	COLLECTED MW-105-20220614								

Certified Sample Information:
Time of Sample: 15:06
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba - U52
Serial No. Unit: U0P071KV
Serial No. Handheld: JAHE34MO
Calibration Date/Time: 06/14/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-10S
Sample I.D.: MW-10S-20220614 (if different from well no.)

Project: Patchogue MGP
Personnel: AFV/SFJ

Date: 6/14/22 Time: 14:33
Weather: Sunny Air Temp.: 78

WELL DATA:

Casing Diameter: 8 in ☐ Stainless Steel ☑ Steel ☐ PVC ☐ Teflon® ☐ Other: ____
Intake Diameter: 2 in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 1.01 ft Bottom of Well: 15.55 ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☑ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 250 mL/min Elapsed Time: 30 min Volume Pumped: 2.5 gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☑ Prepared Off-Site ☐ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel
Tubing/Rope: ☐ Teflon® ☑ Polyethylene
SAMPLING EQUIPMENT: ☐ Dedicated ☑ Prepared Off-Site ☐ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: [signature] Date: 06/14/2022

Brown AND Caldwell
2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Parkwayne MGP
Client: BC
Personnel: AFV/SFJ
Purge/Sample Depth: ~9
Project Number: 153021
Date: 6/15/2022
Well ID: MW-75
Sample ID: MW-75-20220615

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
08:29	6.65	17.70	0.641	4.58	122	-68	4.46	250	
08:32	6.69	16.85	0.642	6.33	86.4	-83	4.46		
08:35	6.69	16.31	0.643	7.58	54.2	-101	4.46		
08:38	6.68	16.16	0.643	7.93	41.9	-106	4.46		
08:41	6.67	16.06	0.643	8.40	29.6	-109	4.46		
08:44	6.66	15.96	0.643	8.70	20.9	-115	4.46		
08:47	6.65	15.92	0.643	8.91	19.3	-117	4.46		
08:50	6.64	15.91	0.644	9.02	14.9	-119	4.46		
08:53	6.64	15.89	0.643	9.26	12.5	-121	4.46		
08:56	6.63	15.88	0.642	8.96	10.9	-123	4.46		
08:59	6.64	15.86	0.640	8.99	9.9	-125	4.52		
09:02	COLLECT MW-75-20220615								

Certified Sample Information:
Time of Sample: 09:02
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba - U52
Serial No. Unit: U0P07IKU
Serial No. Handheld: JAHR34MO
Calibration Date/Time: 6/15/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-75
Sample I.D.: (if different from well no.)

Project: Patchogue
Personnel: AFV/SFJ

Date: 6/15/2022 Time: 08:29
Weather: Sunny Air Temp.: 71 °F

WELL DATA:

Casing Diameter: 4" ☐ Stainless Steel ☒ Steel ☐ PVC ☐ Teflon® ☐ Other:
Intake Diameter: 2" ☐ Stainless Steel ☐ Galv. Steel ☒ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 4.35 ft Bottom of Well: ft
DATUM: ☐ Top of Protective Casing ☒ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☒ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☒ Yes ☐ No
Does Weep Hole adequately drain well head? ☒ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☒ Yes ☐ No
Is Padlock Functional? ☒ Yes ☐ No ☐ NA Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☒ Yes ☐ No
VOLUME OF WATER: Standing in well: To be purged:

PURGE DATA:

METHOD: ☐ Bailer, Size: ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

MATERIALS: (Pump/Bailer): ☐ Teflon® ☒ Stainless Steel ☐ PVC ☐ Other:
(Tubing/Rope): ~~☒ Teflon®~~ AFV ☒ Polyethylene ☐ Polypropylene ☐ Other:

Pumping Rate: 250 mL/min Elapsed Time: 30 Volume Pumped: 2.5 gallons
Was well Evacuated? ☐ Yes ☒ No Number of Well Volumes Removed:
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other:

MATERIALS: (Pump/Bailer): ☐ Teflon® ☒ Stainless Steel
(Tubing/Rope): ☐ Teflon® ☒ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned
Metals samples field filtered? ☐ Yes ☒ No Method:
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☒ No ☐ Yes Name:
MS/MSD : ☒ No ☐ Yes Name:

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: Date: 06/15/22

Brown AND Caldwell
2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023

LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Paterson MGP
Project Number: 153021
Client: BC
Date: 6/15/2022
Personnel: AFV/SFJ
Well ID: MW-14S
Purge/Sample Depth: ~9.5'
Sample ID: MW-14S-20220615

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
09:28	6.63	20.52	0.561	1.61	27.2	26	1.01	275	
09:31	6.45	19.75	0.566	0.95	20.6	25	1.01		
09:34	6.41	19.60	0.566	0.81	18.1	25	1.01		
09:37	6.39	19.46	0.564	0.70	11.4	28	1.01		
09:40	6.38	19.41	0.562	0.65	8.2	30	1.01		
09:43	6.39	19.31	0.560	0.60	6.2	34	1.01		
09:46	6.38	19.23	0.559	0.57	4.0	35	1.01		
09:49	6.39	19.17	0.558	0.51	4.2	*37	1.02		
09:52	6.36	19.14	0.557	0.48	4.3	38	1.02		
09:55	6.36	19.10	0.555	0.48	3.4	38	1.02		
09:58	6.35	19.07	0.554	0.45	3.2	40	1.02		
10:01	COLLECT MW-14S-20220615								

Certified Sample Information:
Time of Sample: 10:01
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: U0P07JKV
Serial No. Handheld: JAHR34MO
Calibration Date/Time: 6/15/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-145
Sample I.D.: (If different from well no.)

Project: Paterson MGP
Personnel: AFV/SFJ

Date: 6/15/22 Time: 09:28
Weather: Sunny Air Temp.: 73°F

WELL DATA:

Casing Diameter: 8 in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other: ____
Intake Diameter: 2 in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 0.95 ft Bottom of Well: ____ ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: ____ To be purged: ____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: ____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: ____
(Tubing/Rope): ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: ____

Pumping Rate: 275 mL/min Elapsed Time: 30 min Volume Pumped: 2.75 Gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: ____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: ____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel
(Tubing/Rope): ☐ Teflon® ☑ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: ____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: ____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: ____
MS/MSD : ☐ No ☑ Yes Name: MW-145-20220615 (MS/MSD)

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: ____ Date: 06/15/2022

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Parkway MGP
Client: BC
Personnel: AFV / SFJ
Purge/Sample Depth: ~10.5'

Project Number: 153021
Date: 6/15/2022
Well ID: MW-12S
Sample ID: MW-12S-20220615

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
10:53	6.48	20.52	0.320	2.70	64.4	133	1.43	225	
10:56	6.50	18.48	0.329	3.19	41.5	131	1.43		
10:59	6.49	17.72	0.341	3.34	26.7	123	1.43		
11:02	6.47	17.75	0.345	3.60	23.0	114	1.43		
11:05	6.48	17.77	0.342	4.98	16.8	106	1.43		
11:08	6.48	18.25	0.340	9.73	16.7	92	1.43		
11:11	6.48	18.08	0.343	8.55	13.6	84	1.43		
11:14	6.46	18.06	0.343	4.29	13.0	78	1.44		
11:17	6.48	18.14	0.343	9.42	13.4	69	1.44		
11:20	6.47	17.99	0.345	9.29	12.0	66	1.44		
11:23	6.48	17.92	0.345	8.87	11.3	61	1.44		
11:26	COLLECT MW-12S-20220615							✓	

Certified Sample Information:
Time of Sample: 11:26
Analyst Signature: Sonya Jones

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 40P07HKV
Serial No. Handheld: JAHR34MQ
Calibration Date/Time: 6/15/22

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-12S
Sample I.D.: MW-12S - 20220615 (if different from well no.)

Project: Patchogue MGP
Personnel: AFV/SFJ

Date: 6/15/22 Time: 10:53
Weather: Sunny/Light Clouds Air Temp.: 75°F

WELL DATA:

Casing Diameter: 8 in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other:
Intake Diameter: 2 in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 1.47 ft Bottom of Well: ____ ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 225 ml/min Elapsed Time: 30 min Volume Pumped: 2.25 gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel
Tubing/Rope: ☐ Teflon® ☑ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☐ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 6/15/22

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name:	Patchogue MGP	Project Number:	153021
Client:	BC	Date:	6/15/22
Personnel:	AFV/SFJ	Well ID:	MW-12D
Purge/Sample Depth:	~21'	Sample ID:	MW-12D-20220615

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
11:33	5.52	17.22	0.539	1.20	9.4	126	1.32	200	
11:36	5.07	16.77	0.532	0.52	5.2	157	1.32		
11:39	5.02	16.67	0.536	0.39	4.1	165	1.32		
11:42	4.99	16.59	0.537	0.35	2.8	170	1.32		
11:45	4.97	16.55	0.537	0.30	1.6	173	1.32		
11:48	4.94	16.55	0.537	0.28	1.0	175	1.34		
11:51	4.95	16.54	0.537	0.27	0.8	175	1.34		
11:54	4.92	16.50	0.537	0.25	0.5	177	1.35		
11:57	4.92	16.52	0.537	0.26	0.4	178	1.36		
12:00	4.91	16.51	0.536	0.24	0.2	179	1.36		
12:03	4.91	16.49	0.536	0.24	0.2	180	1.36	↓	
12:06	COLLECT MW-12D-20220615								

Certified Sample Information:
Time of Sample: 12:06 Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 10P07HKV Serial No. Handheld: JAHR34M0
Calibration Date/Time: 6/15/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-12D
Sample I.D.: MW-12D-20220615 (if different from well no.)

Project: Patchogue
Personnel: AFV/SFJ

Date: 06/15/22 Time: _____
Weather: Sunny Air Temp.: 74°F

WELL DATA:

Casing Diameter: 8" ☐ Stainless Steel ☒ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2" ☐ Stainless Steel ☐ Galv. Steel ☒ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 1.32 ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☒ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☒ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☒ Yes ☐ No
Does Weep Hole adequately drain well head? ☒ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☒ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☒ NA Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☒ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☒ Stainless Steel ☐ PVC ☐ Other: _____
(Tubing/Rope): ☐ Teflon® ☒ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 200mL/min Elapsed Time: 30min Volume Pumped: 2Gallons
Was well Evacuated? ☐ Yes ☒ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☒ Stainless Steel
(Tubing/Rope): ☐ Teflon® ☒ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned
Metals samples field filtered? ☐ Yes ☒ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☒ No ☐ Yes Name: _____
MS/MSD : ☒ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 6/15/22

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Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Lockheed MGP
Project Number: 153021
Client: BC
Date: 6/15/22
Personnel: AFV/SFJ
Well ID: MW-85
Purge/Sample Depth: ~6.5'
Sample ID: MW-85-20220615

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
13:46	5.96	20.56	0.394	1.12	33.3	119	0.84	300	
13:49	6.06	18.04	0.403	0.61	51.7	64	0.80		
13:52	6.10	17.46	0.413	0.58	58.6	43	0.75		
13:55	6.12	17.27	0.416	0.61	72.6	29	0.75		
13:58	6.12	17.22	0.418	0.62	78.1	21	0.74		
14:01	6.13	17.19	0.420	0.68	59.7	16	0.74		
14:04	6.14	17.04	0.422	0.74	36.7	11	0.74		
14:07	6.12	16.93	0.423	0.96	26.1	7	0.75		
14:10	6.13	16.92	0.423	0.93	15.5	4	0.75		
14:13	6.13	16.94	0.423	0.92	12.2	2	0.75		
14:16	6.12	16.84	0.423	0.99	9.6	0	0.75	↓	
14:19	Coll EQ	MW-	85-	20220615					

Certified Sample Information:
Time of Sample: 14:19
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 610P071KU
Serial No. Handheld: JAHR34M0
Calibration Date/Time: 6/15/22

Are low-flow parameters subject to field lab certification? ☐ Yes ☑ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-85
Sample I.D.: MW-85-20220615 (if different from well no.)

Project: Patchogue MGP
Personnel: AFV/SFJ

Date: 6/15/22 Time: 13:40
Weather: Sunny Air Temp.: 72°F

WELL DATA:

Casing Diameter: 8in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 0.69 ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☐ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☑ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 300 ml/min Elapsed Time: 30 min Volume Pumped: 3 gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel
Tubing/Rope: ☐ Teflon® ☑ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: [signature] Date: 06/15/22

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Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Parkwayne MGP
Client: BC
Personnel: AFV/SFJ
Purge/Sample Depth: ~11

Project Number: 153021
Date: 6/15/22
Well ID: MW-115
Sample ID: MW-115-20220615

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
14:33	6.16	21.24	0.434	1.84	287	-7	0.84	175	
14:36	6.30	19.97	0.459	1.70	202	-23	0.84		
14:39	6.32	20.29	0.464	2.02	156	-35	0.84		
14:42	6.33	20.42	0.467	2.24	138	-40	0.85		
14:45	6.33	20.60	0.468	2.42	130	-45	0.85		
14:48	6.35	20.57	0.466	2.60	109	-49	0.85		
14:51	6.35	20.55	0.466	2.68	95.9	-51	0.82		
14:54	6.35	20.58	0.466	2.68	79.1	-54	0.82		
14:57	6.36	20.27	0.466	2.71	68.2	-55	0.82		
15:00	6.36	19.79	0.466	2.58	46.5	-57	0.82		
15:03	6.36	19.58	0.468	2.66	39.0	-58	0.82		
15:06	COLLECT MW-115-20220615								

Certified Sample Information:
Time of Sample: 15:06
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 110P07KU
Serial No. Handheld: JAHR34MO
Calibration Date/Time: 06/15/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☑ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

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Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-11S
Sample I.D.: MW-11S-20220615 (If different from well no.)

Project: Patchogue MGP
Personnel: AFV / SFJ

Date: 06/15/22 Time: 14:33
Weather: Sunny Air Temp.: 72

WELL DATA:

Casing Diameter: 8in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 0.79 ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 175 ml/min Elapsed Time: 30 min Volume Pumped: 1.75 gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel
Tubing/Rope: ☐ Teflon® ☑ Polyethylene
SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 6/15/22

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2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Parkingue ARAP
Client: BC
Personnel: AFV/SFT
Purge/Sample Depth: ~10'
Project Number: 153021
Date: 6/16/2022
Well ID: MW-4S
Sample ID: MW-4S-20220616

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
07:36	6.96	17.01	0.534	1.93	522	-5	4.88	300	
07:39	6.96	14.97	0.543	2.48	277	-96	4.89		
07:42	6.96	14.62	0.543	3.11	162	-108	4.96		
07:45	6.97	14.50	0.543	3.47	135	-114	4.92		
07:48	6.96	14.41	0.543	3.79	94.6	-120	4.92		
07:51	6.95	14.36	0.542	4.11	61.0	-125	4.92		
07:54	6.94	14.32	0.542	4.33	57.6	-126	4.93		
07:57	6.95	14.28	0.542	4.55	40.7	-130	4.92		
08:00	6.93	14.24	0.541	4.71	29.6	-132	4.92		
08:03	6.93	14.22	0.541	4.79	28.2	-132	4.92		
08:06	6.92	14.22	0.541	5.01	19.5	-134	4.92		
08:09	COLLECT	MW-4S-20220616							

Certified Sample Information:
Time of Sample: 08:09
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 40PD71KU
Serial No. Handheld: 34HR34MO
Calibration Date/Time: 6/16/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

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Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-45

Sample I.D.: MW-45-20220606 (if different from well no.)

Project: Parkwood MGP

Personnel: AFV/SFJ

Date: 6/16/22 Time: 07:36

Weather: Overcast Air Temp.: 66

WELL DATA:

Casing Diameter: 4in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other: _____

Intake Diameter: 2in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock

DEPTH TO : Static Water Level: 4.85 ft Bottom of Well: _____ ft

DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:

CONDITION: Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No

Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No

Does Weep Hole adequately drain well head? ☑ Yes ☐ No

Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No

Is Padlock Functional? ☑ Yes ☐ No ☐ NA Is Inner Casing Intact? ☑ Yes ☐ No

Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No

VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____

(Tubing/Rope): ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 300mL/min Elapsed Time: 30min Volume Pumped: 3 gallons

Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____

PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump ☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel

(Tubing/Rope): ☐ Teflon® ☑ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

Metals samples field filtered? ☐ Yes ☑ No Method: _____

APPEARANCE: ☐ Clear ☐ Turbid ☑ Color: brownish ☐ Contains Immiscible Liquid

FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____

MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 06/16/22

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Patterson MGP
Client: BC
Personnel: AFV / SFJ
Purge/Sample Depth: ~11.5'

Project Number: 153021
Date: 6/16/2022
Well ID: MW-3
Sample ID: MW-3-20220616

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
08:18	9.32	16.82	0.505	5.41	39.6	-197	1.77	250	
08:21	9.71	16.57	0.515	2.68	6.9	-225	1.76		
08:24	9.92	16.45	0.529	1.73	4.4	-235	1.75		
08:27	10.03	16.41	0.535	1.44	4.0	-238	1.75		
08:30	10.11	16.37	0.546	0.95	3.7	-241	1.75		
08:33	10.13	16.35	0.548	0.81	3.7	-242	1.75		
08:36	10.14	16.34	0.552	0.63	3.5	-242	1.75		
08:39	10.18	16.31	0.559	0.57	3.4	-244	1.175		
08:42	10.18	16.31	0.560	0.47	3.2	-242	1.75		
08:45	10.19	16.29	0.564	0.44	3.2	-243	1.75		
08:48	10.19	16.28	0.565	0.38	3.3	-241	1.75		
08:51	COLLECT	MW-3-20220616							

Certified Sample Information:
Time of Sample: 08:51
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 110P07K11
Serial No. Handheld: JAHR34M0
Calibration Date/Time: 6/16/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☒ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-3
Sample I.D.: MW-3-20220616 (If different from well no.)

Project: Patchogue MGP
Personnel: AFV JSFT

Date: 6/16/22 Time: 0818
Weather: Overcast / Rain Air Temp.: 66°F

WELL DATA:

Casing Diameter: 8in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 1.69 ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☐ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
(Tubing/Rope): ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 200 ml/min Elapsed Time: 30 min Volume Pumped: 2.5 gallons
Was well Evacuated? ☐ Yes ☑ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: (Pump/Bailer): ☐ Teflon® ☑ Stainless Steel (Tubing/Rope): ☐ Teflon® ☑ Polyethylene
SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☐ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☐ No ☑ Yes Name: DUP-20220616
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 6/16/22

Brown AND Caldwell

2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023
LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Patchogue MGP
Client: BC
Personnel: AFV/SFJ
Purge/Sample Depth: ~10'

Project Number: 153021
Date: 6/14/22
Well ID: MW-13S
Sample ID: MW-13S-20220614

Actual Time	Certified Parameters: pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)	ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
09:07	8.01	18.17	0.518	7.51	22.9	-115	1.39	250	
09:10	8.07	18.18	0.509	8.37	17.4	-101	1.39		
09:13	8.13	18.18	0.506	6.16	17.7	-93	1.39		
09:16	8.29	18.20	0.463	4.57	18.5	-81	1.39		
09:19	8.31	18.18	0.487	7.82	12.7	-72	1.39		
09:22	8.36	18.19	0.484	8.79	12.7	-63	1.39		
09:25	8.45	18.20	0.488	7.97	12.4	-51	1.39		
09:28	8.48	18.21	0.475	8.31	11.7	-42	1.39		
09:31	8.53	18.19	0.474	8.02	10.6	-27	1.39		
09:34	8.57	18.16	0.471	8.14	10.4	-20	1.39		
09:37	8.62	18.17	0.468	7.99	9.4	-25	1.39		
09:40	COLLECT	MW-	13S-	20220614					

Certified Sample Information:
Time of Sample: 0940
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 10P071KV
Serial No. Handheld: JAHR34M0
Calibration Date/Time: 6/14/22

Are low-flow parameters subject to field lab certification? ☐ Yes ☑ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-135

Sample I.D.: MW-135-20220616 (if different from well no.)

Project: Raritan MRP

Personnel: AFW/SFJ

Date: 6/16/22 Time: 9:07

Weather: Overcast/Rain Air Temp.: 66

WELL DATA:

Casing Diameter: 8in ☑ Stainless Steel ☐ Steel ☐ PVC ☐ Teflon® ☐ Other:

Intake Diameter: 2in ☐ Stainless Steel ☐ Galv. Steel ☑ PVC ☐ Teflon® ☐ Open rock

DEPTH TO : Static Water Level: 1.32 ft Bottom of Well: ____ ft

DATUM: ☐ Top of Protective Casing ☑ Top of Well Casing ☐ Other:

CONDITION:
Is Well clearly labeled? ☑ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☑ Yes ☐ No
Does Weep Hole adequately drain well head? ☑ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☑ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☑ NA Is Inner Casing Intact? ☑ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☑ Yes ☐ No

VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☑ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 250 ml/min Elapsed Time: 30 min Volume Pumped: 2.5 gallons
Was well Evacuated? ☑ Yes ☐ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☑ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☑ Stainless Steel
Tubing/Rope: ☐ Teflon® ☑ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☑ Field Cleaned
Metals samples field filtered? ☐ Yes ☑ No Method: _____
APPEARANCE: ☑ Clear ☐ Turbid ☐ Color: _____ ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☑ No ☐ Yes Name: _____
MS/MSD : ☑ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 6/16/22

Brown AND Caldwell
2 Park Way, Upper Saddle River, NJ 07458
Phone: (201) 574-4700 Fax: (201) 236-1607

NJ FIELD LAB ID# 02023

LOW-FLOW GROUNDWATER FIELD DATA SHEET

Project Name: Patchogue MGP
Client: BC
Personnel: AFV/SFJ
Purge/Sample Depth: ~21'

Project Number: 153021
Date: 06/16/22
Well ID: MW-13D
Sample ID: MW-13D-20220616

Actual Time	Certified Parameters					ORP (mV)	DTW (ft)	Pumping Rate (mL/min)	Comments
	pH	Temp (°C)	Cond (mS/cm)	DO (mg/L)	Turbidity (NTU)				
09:51	7.31	17.65	0.370	1.19	104	53	1.32	250	
09:54	6.36	17.25	0.369	0.52	90.3	69	1.32		
09:57	6.07	17.11	0.364	0.39	85.0	76	1.32		
10:00	5.91	17.02	0.361	0.35	73.5	84	1.32		
10:03	5.79	16.98	0.357	0.32	66.8	96	1.32		
10:06	5.71	16.96	0.355	0.30	62.7	96	1.32		
10:09	5.66	16.97	0.355	0.28	41.8	99	1.32		
10:12	5.63	16.96	0.355	0.28	33.5	103	1.32		
10:15	5.61	16.98	0.355	0.26	39.1	105	1.32		
10:18	5.61	16.96	0.356	0.28	37.4	105	1.32		
10:21	5.61	16.64	0.356	0.27	31.8	106	1.32		
10:24	COLLECT	MW-13D-20220616							

Certified Sample Information:
Time of Sample: 11:24
Analyst Signature:

Instrument Data:
Manufacturer/Model: Horiba U-52
Serial No. Unit: 110P071KV
Serial No. Handheld: JAHR34MO
Calibration Date/Time: 6/16/2022

Are low-flow parameters subject to field lab certification? ☐ Yes ☑ No (not required for CERCLA sites or sites outside of NJ)

If yes, low-flow data must be accompanied by a completed "Field Calibration Record, Horiba U-52" form or equivalent.

Brown AND Caldwell

Upper Saddle River, NJ Office

LOW-FLOW GROUNDWATER SAMPLING FIELD DATA

Well Number: MW-13D
Sample I.D.: MW-13D-20220616 (if different from well no.)

Project: Patchogue MGP
Personnel: AFV / SFJ

Date: 06/16/22 Time: 09:51
Weather: Cloudy / Rainy Air Temp.: C.6

WELL DATA:

Casing Diameter: 8" ☐ Stainless Steel ☒ Steel ☐ PVC ☐ Teflon® ☐ Other: _____
Intake Diameter: 2" ☐ Stainless Steel ☐ Galv. Steel ☒ PVC ☐ Teflon® ☐ Open rock
DEPTH TO : Static Water Level: 1.34 ft Bottom of Well: _____ ft
DATUM: ☐ Top of Protective Casing ☒ Top of Well Casing ☐ Other:
CONDITION: Is Well clearly labeled? ☒ Yes ☐ No Is well clean to bottom? ☐ Yes ☐ No
Is Prot. Casing/Surface Mount in Good Cond.? (not bent or corroded) ☐ Yes ☐ No
Does Weep Hole adequately drain well head? ☒ Yes ☐ No
Is Concrete Pad Intact? (not cracked or frost heaved) ☒ Yes ☐ No
Is Padlock Functional? ☐ Yes ☐ No ☒ NA Is Inner Casing Intact? ☐ Yes ☐ No
Is Inner Casing Properly Capped and Vented? ☒ Yes ☐ No
VOLUME OF WATER: Standing in well: _____ To be purged: _____

PURGE DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Centrifugal Pump ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☒ Stainless Steel ☐ PVC ☐ Other: _____
Tubing/Rope: ☐ Teflon® ☒ Polyethylene ☐ Polypropylene ☐ Other: _____

Pumping Rate: 250 mL/min Elapsed Time: 30 min Volume Pumped: 2.5 gallons
Was well Evacuated? ☐ Yes ☒ No Number of Well Volumes Removed: _____
PURGING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned

SAMPLING DATA:

METHOD: ☐ Bailer, Size: ____ ☒ Bladder Pump ☐ 2" Submersible Pump ☐ 4" Submersible Pump
☐ Syringe Sampler ☐ Peristaltic Pump ☐ Inertial Lift Pump ☐ Other: _____

MATERIALS: Pump/Bailer: ☐ Teflon® ☒ Stainless Steel
Tubing/Rope: ☐ Teflon® ☒ Polyethylene

SAMPLING EQUIPMENT: ☐ Dedicated ☐ Prepared Off-Site ☒ Field Cleaned
Metals samples field filtered? ☐ Yes ☒ No Method: _____
APPEARANCE: ☐ Clear ☐ Turbid ☑ Color: Cloudy brown ☐ Contains Immiscible Liquid
FIELD DETERMINATIONS: See attached form for field parameter data.

DUP : ☒ No ☐ Yes Name: _____
MS/MSD: ☒ No ☐ Yes Name: _____

I certify that this sample was collected and handled in accordance with applicable regulatory and project protocols.

Signature: _____ Date: 06/16/22

Appendix B: Laboratory Reports

Brown AND Caldwell | LABORATORY DATA VERIFICATION AND VALIDATION FORM

1. PROJECT INFORMATION

Date: 07/18/2022

Report Number: 410-88035-1 **Project Name/Client:** Remediation Services / NG Patchogue

Project Number: 153021 **Laboratory:** Eurofins Lancaster

Project Manager: Keith Bogatch **Sampler(s):** Antonio Velazquez

2. SAMPLE INFORMATION

Purpose of Sampling: Q1 2022 Groundwater Sampling **Sample Date(s):** 06/14,15,16/2022

Total number of samples: 15

13	Groundwater		Drinking Water		Soil		Air	1	Field Blank	1	Trip Blank
	Surface Water		Wastewater		Sediment		Soil Gas		Equipment Blank		Other

Analyses Requested: 16 PAHs (8270D); BTEX (8260C)

Laboratory Limit Requested: RL, MDL

Method Detection Limit (MDL), Reporting Limit (RL), Practical Quantitation Limit (PQL), etc.)

3. DATA VERIFICATION

☑ Yes ☐ No ☐ NA **Was the Chain of Custody intact (missing signatures, samples, dates/times, etc.)?**
Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were custody seals intact on sample bottles and/or coolers as necessary?**
Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were cooler temperatures within the acceptable range per method requirements?**
Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were samples physically and chemically preserved properly (headspace, pH, etc.)?**
Notes: Comment 1

☑ Yes ☐ No ☐ NA **Was the case narrative included, if applicable?**
Notes: Comment 2

☑ Yes ☐ No ☐ NA **Were all samples labeled, analyzed, and reported correctly?**
If no, call lab immediately to verify. Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were all samples extracted and/or analyzed within method holding time?**
Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were appropriate analytes and methods reported?**
Notes: No issues to report

☐ Yes ☐ No ☑ NA **Were soil and/or sediment concentrations reported as dry weight?**
If no, call PM and lab immediately to verify. Notes: None

☐ Yes ☐ No ☑ NA **If analyzed for the following analytes, were the following true for all analytes?**

☐ Yes ☐ No ☑ NA TOC > DOC ☐ Yes ☐ No ☑ NA Total Metals > Dissolved Metals

☐ Yes ☐ No ☑ NA COD > BOD ☐ Yes ☐ No ☑ NA TKN > Organic Nitrogen or Ammonia

If no, call lab immediately to verify. Notes: None

☑ Yes ☐ No ☐ NA **Were MDLs, PQLs, RLs, and/or dilution factors appropriate?**
If no, call lab immediately to verify. Notes: No issues to report

☑ Yes ☐ No ☐ NA **For J-flag reports, were all target analytes below the PQL/RL appropriately qualified?**
If no, call lab immediately to verify. Notes: No issues to report

☑ Yes ☐ No ☐ NA **Were any field duplicates collected?**
Notes: Comment 3

Initials: TAO

Brown AND Caldwell | LABORATORY DATA VERIFICATION AND VALIDATION FORM

4. DATA VALIDATION (Refer to data verification and validation guidelines, as applicable) **Report No:** 410-88035-1

☐ Yes ☑ No **Were surrogate recoveries within acceptable control limits?**
Notes: Comment 4

☑ Yes ☐ No **Were equipment, field, trip, and/or laboratory blanks free of target analyte detections?**
Notes: No issues to report

☑ Yes ☐ No **Were any laboratory control samples (LCS) or blank spikes (BS) reported?**
Notes: No issues to report

☑ Yes ☐ No **Were any matrix spikes/matrix spike duplicates (MS/MSD) reported for project samples?**
Notes: No issues to report

☐ Yes ☑ No **Were any laboratory duplicates reported for project samples?**
Notes: None

☐ Yes ☑ No **Was further laboratory QC provided? (serial dilutions, calibration or internal standards, etc.)**
Notes: None

5. COMMENTS AND SUMMARY OF ACTIONS (Attach additional pages if necessary) ☐ **There were no comments for this report.**

Comment 1: Sample MW-7S-20220615 was noted with headspace upon analysis greater than 6mm for VOCs (Method 8260). Associated sample detections are qualified as estimated, J, and non-detections are qualified as rejected, R, reason code 9.

Comment 2: Sample MW-3-20220616 was reanalyzed outside of holding time on 06-28-2022 and 06-29-2022 and received acceptable surrogate results. Reanalyzed results are reported in the DVEDD with 'reportable_result' column filled with 'No'.

Comment 3: DUP-20220616 is the sample duplicate for MW-3-20220616. All RPDs were within control limits with the exception of Ethylbenzene, Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Chrysene, Fluoranthene, Fluorene, Naphthalene, Phenanthrene, and Pyrene. Parent and duplicate concentrations for associated analytes are qualified as estimated, J, reason code 8. See page 3 for details.

Comment 4: The surrogates 1-methylnaphthalene-d10 and fluoranthene-d10 percent recoveries for sample MW-3-20220616 were above control limits for the base/neutral fraction. Associated sample detections are qualified as estimated, J, reason code 3H. Associated sample non-detections are not qualified.

Terry ONeill
Signature of Data Validator(s)

Reviewer Initials

Initials: TAO

LABORATORY DATA VERIFICATION AND VALIDATION

Sample Duplicate Comparison

PROJECT INFORMATION

Report Number:	410-88035-1	Project Name/Client:	Remediation Services / NG Patchogue
Project Number:	153021	Laboratory:	Eurofins Lancaster
Project Manager:	Keith Bogatch	Task/Purpose of Sampling:	Antonio Velazquez

SAMPLE INFORMATION

Parent Sample ID:	MW-3-20220616	Date/Time:	6/16/22 8:51	Matrix:	WG
Duplicate Sample ID:	DUP-20220616	Date/Time:	6/16/22 8:51	Matrix:	WG

Analytes	Unit	Analytical Results[a]		Relative Percent Difference (RPD) Comparison		Method Detection Limit (MDL) Comparison (If Needed)					Actions Required
		MW-3-20220616	DUP-20220616	RPD	Water: RPD > 20%? Soil: RPD > 30%?	MW-3-20220616		DUP-20220616		If RPD > Control Limit: Is either sample conc. ≥ 5X MDL?	
						MDL	5x MDL	MDL	5x MDL		
Benzene	UG/L	0.62	0.55	12%	NO	0.30	1.5	0.30	1.5		No further action required
Ethylbenzene	UG/L	2.1	1.6	27%	YES	0.40	2.0	0.40	2.0	YES	Qualify detects/non-detects as estimated, J/UJ
Toluene	UG/L	0.73	0.65	12%	NO	0.20	1.0	0.20	1.0		No further action required
Xylenes, total	UG/L	1.8	1.2	40%	YES	0.40	2.0	0.40	2.0	NO	No further action required
Acenaphthene	UG/L	0.71	33	192%	YES	0.010	0.050	0.10	0.50	YES	Qualify detects/non-detects as estimated, J/UJ
Acenaphthylene	UG/L	0.14	4.2	187%	YES	0.010	0.050	0.010	0.050	YES	Qualify detects/non-detects as estimated, J/UJ
Anthracene	UG/L	0.35	1.6	128%	YES	0.010	0.050	0.010	0.050	YES	Qualify detects/non-detects as estimated, J/UJ
Benzo(a)anthracene	UG/L	0.27	0.72	91%	YES	0.010	0.050	0.010	0.050	YES	Qualify detects/non-detects as estimated, J/UJ
Benzo(b)fluoranthene	UG/L	*0.010*	0.011	10%	YES	0.010	0.050	0.010	0.050	NO	No further action required
Chrysene	UG/L	0.14	0.40	96%	YES	0.010	0.050	0.010	0.050	YES	Qualify detects/non-detects as estimated, J/UJ
Fluoranthene	UG/L	3.3	14	124%	YES	0.010	0.050	0.10	0.50	YES	Qualify detects/non-detects as estimated, J/UJ
Fluorene	UG/L	0.63	9.7	176%	YES	0.010	0.050	0.010	0.050	YES	Qualify detects/non-detects as estimated, J/UJ
Naphthalene	UG/L	0.14	84	199%	YES	0.030	0.15	0.30	1.5	YES	Qualify detects/non-detects as estimated, J/UJ
Phenanthrene	UG/L	1.8	11	144%	YES	0.030	0.15	0.30	1.5	YES	Qualify detects/non-detects as estimated, J/UJ
Pyrene	UG/L	3.7	18	132%	YES	0.010	0.050	0.10	0.50	YES	Qualify detects/non-detects as estimated, J/UJ

[a]Results in red text and italics were below reporting limits. Values are reporting limits for comparison purposes only.

Relative Percent Difference (RPD) is a quantitative indicator of quality assurance and quality control (QA/QC) for repeated measurements (i.e. duplicates) where the outcome is expected to be the same. It is calculated using the following equation:

$$RPD = \left| \frac{x_1 - x_2}{(x_1 + x_2)/2} \right| \times 100$$

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Lancaster Laboratories Environment Testing, LLC
2425 New Holland Pike
Lancaster, PA 17601
Tel: (717)656-2300

Laboratory Job ID: 410-88035-1
Client Project/Site: Patchogue, NY
Revision: 1

For:
Brown and Caldwell
500 North Franklin Turnpike
Suite 306
Ramsey, New Jersey 07446

Attn: Mr. James L Marolda

Barb Weyandt

Authorized for release by:
6/30/2022 12:40:04 PM

Barbara Weyandt, Project Manager
(717)556-7264
Barbara.Weyandt@et.eurofinsus.com

Analytical test results meet all requirements of the associated regulatory program (e.g., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis. Data qualifiers are applied to note exceptions. Noncompliant quality control (QC) is further explained in narrative comments.
· QC results that exceed the upper limits and are associated with non-detect samples are qualified but further narration is not required since the bias is high and does not change a non-detect result. Further narration is also not required with QC blank detection when the associated sample concentration is non-detect or more than ten times the level in the blank.
· Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD is performed, unless otherwise specified in the method.
· Surrogate and/or isotope dilution analyte recoveries (if applicable) which are outside of the QC window are confirmed unless attributed to a dilution or otherwise noted in the narrative.
Regulated compliance samples (e.g. SDWA, NPDES) must comply with the associated agency requirements/permits.

Measurement uncertainty values, as applicable, are available upon request.

Test results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff. Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as "analyze immediately" and tested in the laboratory are not performed within 15 minutes of collection.

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Barb Weyandt

Barbara Weyandt
Project Manager
6/30/2022 12:40:05 PM

Table of Contents

Definitions/Glossary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
cn	Refer to Case Narrative for further detail
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
cn	Refer to Case Narrative for further detail
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
S1-	Surrogate recovery exceeds control limits, low biased.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
1C	Result is from the primary column on a dual-column method.
2C	Result is from the confirmation column on a dual-column method.
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Job ID: 410-88035-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

Narrative

Job Narrative
410-88035-1

Revision
The report being provided is a revision of the original report sent on 6/30/2022. The report (revision 1) is being revised due to: change client ID MW-105 to MW-10S.

Receipt
The samples were received on 6/17/2022 10:41 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperatures of the 2 coolers at receipt time were 0.9º C and 2.0º C.

Receipt Exceptions
The COC lists 2 containers, but 4 containers were received at the lab,
Trip Blank-20220616 (410-88035-15)

GC/MS VOA
Method 8260D: The method requirement for no headspace was not met. The following volatile sample was analyzed with headspace in the sample container(s): MW-7S-20220615 (410-88035-4).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270E SIM: Surrogate recovery for the following sample was outside control limits: MW-3-20220616 (410-88035-11).
Re-extraction and/or re-analysis was performed outside of holding time with acceptable results.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Detection Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Client Sample ID: MW-1-20220614 — Lab Sample ID: 410-88035-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluorene	0.011	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-10S-20220614 — Lab Sample ID: 410-88035-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Pyrene	0.010	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: FB-20220614 — Lab Sample ID: 410-88035-3

No Detections.

Client Sample ID: MW-7S-20220615 — Lab Sample ID: 410-88035-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.31	J cn	1.0	0.30	ug/L	1		8260D	Total/NA
Acenaphthene	0.16		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthylene	0.037	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	0.091		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.075		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.047	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.059		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[g,h,i]perylene	0.037	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[k]fluoranthene	0.059		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.062		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Dibenz(a,h)anthracene	0.050	J	0.051	0.020	ug/L	1		8270E SIM	Total/NA
Fluoranthene	0.087		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	0.13		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Indeno[1,2,3-cd]pyrene	0.046	J	0.051	0.020	ug/L	1		8270E SIM	Total/NA
Naphthalene	0.15		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Phenanthrene	0.13		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	0.092		0.051	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-14S-20220615 — Lab Sample ID: 410-88035-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.61		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthylene	0.021	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	0.026	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.013	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.013	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.012	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.015	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	0.027	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	0.12		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Naphthalene	0.30		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Phenanthrene	0.10		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	0.034	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-12S-20220615 — Lab Sample ID: 410-88035-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.048	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	0.011	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.014	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-12S-20220615 (Continued) — Lab Sample ID: 410-88035-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzo[b]fluoranthene	0.014	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[k]fluoranthene	0.011	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.013	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	0.020	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	0.017	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Pyrene	0.037	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-12D-20220615 — Lab Sample ID: 410-88035-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.015	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	0.018	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.016	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.011	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.016	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.017	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	0.041	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	0.028	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Phenanthrene	0.075		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	0.044	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-8S-20220615 — Lab Sample ID: 410-88035-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Acenaphthene	0.16		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.035	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.026	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.046	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[g,h,i]perylene	0.025	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[k]fluoranthene	0.017	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.042	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	0.068		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Indeno[1,2,3-cd]pyrene	0.025	J	0.051	0.020	ug/L	1		8270E SIM	Total/NA
Phenanthrene	0.088		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	0.079		0.051	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-11S-20220615 — Lab Sample ID: 410-88035-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.90	J	1.0	0.30	ug/L	1		8260D	Total/NA
Xylenes, Total	0.89	J	1.0	0.40	ug/L	1		8260D	Total/NA
Acenaphthylene	0.94		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	2.6		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	1.5		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.56		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	1.1		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[g,h,i]perylene	0.55		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[k]fluoranthene	0.36		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	1.6		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Dibenz(a,h)anthracene	0.10		0.051	0.020	ug/L	1		8270E SIM	Total/NA
Fluoranthene	7.5		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	3.5		0.051	0.010	ug/L	1		8270E SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-11S-20220615 (Continued) — Lab Sample ID: 410-88035-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Indeno[1,2,3-cd]pyrene	0.51		0.051	0.020	ug/L	1		8270E SIM	Total/NA
Naphthalene	3.4		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Phenanthrene	1.9		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Acenaphthene - DL	49		0.51	0.10	ug/L	10		8270E SIM	Total/NA
Pyrene - DL	12		0.51	0.10	ug/L	10		8270E SIM	Total/NA

Client Sample ID: MW-4S-20220616 — Lab Sample ID: 410-88035-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Anthracene	0.23		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.019	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.014	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.029	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[g,h,i]perylene	0.012	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[k]fluoranthene	0.012	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.015	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	4.1		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	8.4		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Phenanthrene	0.10		0.071	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	5.8		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthene - DL	30		0.50	0.10	ug/L	10		8270E SIM	Total/NA

Client Sample ID: MW-3-20220616 — Lab Sample ID: 410-88035-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.62	J	1.0	0.30	ug/L	1		8260D	Total/NA
Ethylbenzene	2.1		1.0	0.40	ug/L	1		8260D	Total/NA
Toluene	0.73	J	1.0	0.20	ug/L	1		8260D	Total/NA
Xylenes, Total	1.8		1.0	0.40	ug/L	1		8260D	Total/NA
Acenaphthene	0.71	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthylene	0.14	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	0.35	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.27	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.14	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	3.3	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	0.63	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Naphthalene	0.14	cn	0.070	0.030	ug/L	1		8270E SIM	Total/NA
Phenanthrene	1.8	cn	0.070	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	3.7	cn	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: MW-13S-20220616 — Lab Sample ID: 410-88035-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	1.3		1.0	0.30	ug/L	1		8260D	Total/NA
Ethylbenzene	0.91	J	1.0	0.40	ug/L	1		8260D	Total/NA
Toluene	0.52	J	1.0	0.20	ug/L	1		8260D	Total/NA
Xylenes, Total	1.0		1.0	0.40	ug/L	1		8260D	Total/NA
Acenaphthylene	0.72		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	1.7		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.27		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]pyrene	0.013	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.020	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-13S-20220616 (Continued) — Lab Sample ID: 410-88035-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chrysene	0.18		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluoranthene	2.1		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	3.5		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Phenanthrene	3.5		0.070	0.030	ug/L	1		8270E SIM	Total/NA
Pyrene	2.2		0.050	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthene - DL	18		0.25	0.050	ug/L	5		8270E SIM	Total/NA
Naphthalene - DL	36		0.35	0.15	ug/L	5		8270E SIM	Total/NA

Client Sample ID: MW-13D-20220616 — Lab Sample ID: 410-88035-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Fluoranthene	0.011	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA
Pyrene	0.013	J	0.050	0.010	ug/L	1		8270E SIM	Total/NA

Client Sample ID: DUP-20220616 — Lab Sample ID: 410-88035-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Benzene	0.55	J	1.0	0.30	ug/L	1		8260D	Total/NA
Ethylbenzene	1.6		1.0	0.40	ug/L	1		8260D	Total/NA
Toluene	0.65	J	1.0	0.20	ug/L	1		8260D	Total/NA
Xylenes, Total	1.2		1.0	0.40	ug/L	1		8260D	Total/NA
Acenaphthylene	4.2		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Anthracene	1.6		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[a]anthracene	0.72		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Benzo[b]fluoranthene	0.011	J	0.051	0.010	ug/L	1		8270E SIM	Total/NA
Chrysene	0.40		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Fluorene	9.7		0.051	0.010	ug/L	1		8270E SIM	Total/NA
Acenaphthene - DL	33		0.51	0.10	ug/L	10		8270E SIM	Total/NA
Fluoranthene - DL	14		0.51	0.10	ug/L	10		8270E SIM	Total/NA
Naphthalene - DL	84		0.71	0.30	ug/L	10		8270E SIM	Total/NA
Phenanthrene - DL	11		0.71	0.30	ug/L	10		8270E SIM	Total/NA
Pyrene - DL	18		0.51	0.10	ug/L	10		8270E SIM	Total/NA

Client Sample ID: Trip Blank-20220616 — Lab Sample ID: 410-88035-15

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample ID: MW-1-20220614

Lab Sample ID: 410-88035-1

Date Collected: 06/14/22 14:06

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/26/22 20:16	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/26/22 20:16	1
Toluene	ND		1.0	0.20	ug/L			06/26/22 20:16	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/26/22 20:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*06/26/22 20:16*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*06/26/22 20:16*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*		*06/26/22 20:16*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*06/26/22 20:16*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Chrysene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 12:54	1
Fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Fluorene	**0.011**	**J**	0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 12:54	1
Naphthalene	ND		0.070	0.030	ug/L		06/21/22 09:44	06/22/22 12:54	1
Phenanthrene	ND		0.070	0.030	ug/L		06/21/22 09:44	06/22/22 12:54	1
Pyrene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 12:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*54*		*10 - 110*	*06/21/22 09:44*	*06/22/22 12:54*	*1*
1-Methylnaphthalene-d10 (Surr)	*62*		*36 - 111*	*06/21/22 09:44*	*06/22/22 12:54*	*1*
Fluoranthene-d10 (Surr)	*77*		*47 - 128*	*06/21/22 09:44*	*06/22/22 12:54*	*1*

Client Sample ID: MW-10S-20220614

Lab Sample ID: 410-88035-2

Date Collected: 06/14/22 15:06

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/26/22 20:38	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/26/22 20:38	1
Toluene	ND		1.0	0.20	ug/L			06/26/22 20:38	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/26/22 20:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*		*06/26/22 20:38*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*06/26/22 20:38*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*		*06/26/22 20:38*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/26/22 20:38*	*1*

Client Sample ID: MW-10S-20220614

Date Collected: 06/14/22 15:06
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-2

Matrix: Ground Water

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Chrysene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 13:16	1
Fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Fluorene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 13:16	1
Naphthalene	ND		0.071	0.030	ug/L		06/21/22 09:44	06/22/22 13:16	1
Phenanthrene	ND		0.071	0.030	ug/L		06/21/22 09:44	06/22/22 13:16	1
Pyrene	**0.010**	**J**	0.050	0.010	ug/L		06/21/22 09:44	06/22/22 13:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*74*		*10 - 110*	*06/21/22 09:44*	*06/22/22 13:16*	*1*
1-Methylnaphthalene-d10 (Surr)	*73*		*36 - 111*	*06/21/22 09:44*	*06/22/22 13:16*	*1*
Fluoranthene-d10 (Surr)	*85*		*47 - 128*	*06/21/22 09:44*	*06/22/22 13:16*	*1*

Client Sample ID: FB-20220614

Date Collected: 06/14/22 15:45
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-3

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/26/22 19:09	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/26/22 19:09	1
Toluene	ND		1.0	0.20	ug/L			06/26/22 19:09	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/26/22 19:09	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*		*06/26/22 19:09*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*06/26/22 19:09*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*		*06/26/22 19:09*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*06/26/22 19:09*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Acenaphthylene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Anthracene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Benzo[a]anthracene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Benzo[a]pyrene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Benzo[b]fluoranthene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Benzo[g,h,i]perylene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Benzo[k]fluoranthene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Chrysene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Dibenz(a,h)anthracene	ND		0.051	0.020	ug/L		06/21/22 09:44	06/22/22 13:38	1

Client Sample ID: FB-20220614

Date Collected: 06/14/22 15:45
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-3
Matrix: Water

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Fluorene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1
Indeno[1,2,3-cd]pyrene	ND		0.051	0.020	ug/L		06/21/22 09:44	06/22/22 13:38	1
Naphthalene	ND		0.071	0.030	ug/L		06/21/22 09:44	06/22/22 13:38	1
Phenanthrene	ND		0.071	0.030	ug/L		06/21/22 09:44	06/22/22 13:38	1
Pyrene	ND		0.051	0.010	ug/L		06/21/22 09:44	06/22/22 13:38	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*85*		*10 - 110*	*06/21/22 09:44*	*06/22/22 13:38*	*1*
1-Methylnaphthalene-d10 (Surr)	*75*		*36 - 111*	*06/21/22 09:44*	*06/22/22 13:38*	*1*
Fluoranthene-d10 (Surr)	*87*		*47 - 128*	*06/21/22 09:44*	*06/22/22 13:38*	*1*

Client Sample ID: MW-7S-20220615

Date Collected: 06/15/22 09:02
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-4
Matrix: Ground Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.31**	**J cn** J, RC:9	1.0	0.30	ug/L			06/26/22 21:00	1
Ethylbenzene	ND	cn R, RC:9	1.0	0.40	ug/L			06/26/22 21:00	1
Toluene	ND	cn R, RC:9	1.0	0.20	ug/L			06/26/22 21:00	1
Xylenes, Total	ND	cn R, RC:9	1.0	0.40	ug/L			06/26/22 21:00	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*	*cn*	*80 - 120*		*06/26/22 21:00*	*1*
4-Bromofluorobenzene (Surr)	*100*	*cn*	*80 - 120*		*06/26/22 21:00*	*1*
Dibromofluoromethane (Surr)	*101*	*cn*	*80 - 120*		*06/26/22 21:00*	*1*
Toluene-d8 (Surr)	*100*	*cn*	*80 - 120*		*06/26/22 21:00*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.16**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Acenaphthylene	**0.037**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Anthracene	**0.091**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Benzo[a]anthracene	**0.075**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Benzo[a]pyrene	**0.047**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Benzo[b]fluoranthene	**0.059**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Benzo[g,h,i]perylene	**0.037**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Benzo[k]fluoranthene	**0.059**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Chrysene	**0.062**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Dibenz(a,h)anthracene	**0.050**	**J**	0.051	0.020	ug/L		06/22/22 09:57	06/24/22 10:10	1
Fluoranthene	**0.087**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Fluorene	**0.13**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1
Indeno[1,2,3-cd]pyrene	**0.046**	**J**	0.051	0.020	ug/L		06/22/22 09:57	06/24/22 10:10	1
Naphthalene	**0.15**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:10	1
Phenanthrene	**0.13**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:10	1
Pyrene	**0.092**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*80*		*10 - 110*	*06/22/22 09:57*	*06/24/22 10:10*	*1*
1-Methylnaphthalene-d10 (Surr)	*78*		*36 - 111*	*06/22/22 09:57*	*06/24/22 10:10*	*1*

Client Sample ID: MW-7S-20220615

Lab Sample ID: 410-88035-4

Date Collected: 06/15/22 09:02
Matrix: Ground Water
Date Received: 06/17/22 10:41

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Fluoranthene-d10 (Surr)	*91*		*47 - 128*	*06/22/22 09:57*	*06/24/22 10:10*	*1*

Client Sample ID: MW-14S-20220615

Lab Sample ID: 410-88035-5

Date Collected: 06/15/22 10:01
Matrix: Ground Water
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/26/22 21:23	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/26/22 21:23	1
Toluene	ND		1.0	0.20	ug/L			06/26/22 21:23	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/26/22 21:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*06/26/22 21:23*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*06/26/22 21:23*	*1*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*06/26/22 21:23*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*06/26/22 21:23*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.61**		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Acenaphthylene	**0.021**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Anthracene	**0.026**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Benzo[a]anthracene	**0.013**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Benzo[a]pyrene	**0.013**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Benzo[b]fluoranthene	**0.012**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Chrysene	**0.015**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/22/22 09:57	06/24/22 09:05	1
Fluoranthene	**0.027**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Fluorene	**0.12**		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/22/22 09:57	06/24/22 09:05	1
Naphthalene	**0.30**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 09:05	1
Phenanthrene	**0.10**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 09:05	1
Pyrene	**0.034**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 09:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*77*		*10 - 110*	*06/22/22 09:57*	*06/24/22 09:05*	*1*
1-Methylnaphthalene-d10 (Surr)	*81*		*36 - 111*	*06/22/22 09:57*	*06/24/22 09:05*	*1*
Fluoranthene-d10 (Surr)	*96*		*47 - 128*	*06/22/22 09:57*	*06/24/22 09:05*	*1*

Client Sample ID: MW-12S-20220615

Lab Sample ID: 410-88035-6

Date Collected: 06/15/22 11:26
Matrix: Ground Water
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/28/22 00:19	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/28/22 00:19	1

Client Sample ID: MW-12S-20220615

Lab Sample ID: 410-88035-6
Date Collected: 06/15/22 11:26
Matrix: Ground Water
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Toluene	ND		1.0	0.20	ug/L			06/28/22 00:19	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/28/22 00:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*06/28/22 00:19*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*06/28/22 00:19*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*06/28/22 00:19*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*06/28/22 00:19*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.048**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Anthracene	**0.011**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Benzo[a]anthracene	**0.014**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Benzo[b]fluoranthene	**0.014**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Benzo[k]fluoranthene	**0.011**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Chrysene	**0.013**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/22/22 09:57	06/24/22 10:31	1
Fluoranthene	**0.020**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Fluorene	**0.017**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/22/22 09:57	06/24/22 10:31	1
Naphthalene	ND		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:31	1
Phenanthrene	ND		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:31	1
Pyrene	**0.037**	**J**	0.050	0.010	ug/L		06/22/22 09:57	06/24/22 10:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*58*		*10 - 110*	*06/22/22 09:57*	*06/24/22 10:31*	*1*
1-Methylnaphthalene-d10 (Surr)	*73*		*36 - 111*	*06/22/22 09:57*	*06/24/22 10:31*	*1*
Fluoranthene-d10 (Surr)	*86*		*47 - 128*	*06/22/22 09:57*	*06/24/22 10:31*	*1*

Client Sample ID: MW-12D-20220615

Lab Sample ID: 410-88035-7
Date Collected: 06/15/22 12:06
Matrix: Ground Water
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/28/22 00:44	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/28/22 00:44	1
Toluene	ND		1.0	0.20	ug/L			06/28/22 00:44	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/28/22 00:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*06/28/22 00:44*	*1*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*06/28/22 00:44*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*06/28/22 00:44*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*06/28/22 00:44*	*1*

Client Sample ID: MW-12D-20220615

Lab Sample ID: 410-88035-7

Date Collected: 06/15/22 12:06

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.015**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Acenaphthylene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Anthracene	**0.018**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Benzo[a]anthracene	**0.016**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Benzo[a]pyrene	**0.011**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Benzo[b]fluoranthene	**0.016**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Benzo[g,h,i]perylene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Benzo[k]fluoranthene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Chrysene	**0.017**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Dibenz(a,h)anthracene	ND		0.051	0.020	ug/L		06/22/22 09:57	06/24/22 10:53	1
Fluoranthene	**0.041**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Fluorene	**0.028**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1
Indeno[1,2,3-cd]pyrene	ND		0.051	0.020	ug/L		06/22/22 09:57	06/24/22 10:53	1
Naphthalene	ND		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:53	1
Phenanthrene	**0.075**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 10:53	1
Pyrene	**0.044**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 10:53	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*66*		*10 - 110*	*06/22/22 09:57*	*06/24/22 10:53*	*1*
1-Methylnaphthalene-d10 (Surr)	*74*		*36 - 111*	*06/22/22 09:57*	*06/24/22 10:53*	*1*
Fluoranthene-d10 (Surr)	*87*		*47 - 128*	*06/22/22 09:57*	*06/24/22 10:53*	*1*

Client Sample ID: MW-8S-20220615

Lab Sample ID: 410-88035-8

Date Collected: 06/15/22 14:19

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/28/22 01:10	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/28/22 01:10	1
Toluene	ND		1.0	0.20	ug/L			06/28/22 01:10	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/28/22 01:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*06/28/22 01:10*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*06/28/22 01:10*	*1*
Dibromofluoromethane (Surr)	*97*		*80 - 120*		*06/28/22 01:10*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*06/28/22 01:10*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.16**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Acenaphthylene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Anthracene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Benzo[a]anthracene	**0.035**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Benzo[a]pyrene	**0.026**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Benzo[b]fluoranthene	**0.046**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Benzo[g,h,i]perylene	**0.025**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Benzo[k]fluoranthene	**0.017**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Chrysene	**0.042**	**J**	0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Dibenz(a,h)anthracene	ND		0.051	0.020	ug/L		06/22/22 09:57	06/24/22 11:15	1

Client Sample ID: MW-8S-20220615

Lab Sample ID: 410-88035-8

Date Collected: 06/15/22 14:19

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	**0.068**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Fluorene	ND		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1
Indeno[1,2,3-cd]pyrene	**0.025**	**J**	0.051	0.020	ug/L		06/22/22 09:57	06/24/22 11:15	1
Naphthalene	ND		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 11:15	1
Phenanthrene	**0.088**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 11:15	1
Pyrene	**0.079**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*74*		*10 - 110*	*06/22/22 09:57*	*06/24/22 11:15*	*1*
1-Methylnaphthalene-d10 (Surr)	*74*		*36 - 111*	*06/22/22 09:57*	*06/24/22 11:15*	*1*
Fluoranthene-d10 (Surr)	*87*		*47 - 128*	*06/22/22 09:57*	*06/24/22 11:15*	*1*

Client Sample ID: MW-11S-20220615

Lab Sample ID: 410-88035-9

Date Collected: 06/15/22 15:06

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.90**	**J**	1.0	0.30	ug/L			06/28/22 01:36	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/28/22 01:36	1
Toluene	ND		1.0	0.20	ug/L			06/28/22 01:36	1
Xylenes, Total	**0.89**	**J**	1.0	0.40	ug/L			06/28/22 01:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*		*06/28/22 01:36*	*1*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*		*06/28/22 01:36*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*06/28/22 01:36*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*06/28/22 01:36*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	**0.94**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Anthracene	**2.6**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Benzo[a]anthracene	**1.5**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Benzo[a]pyrene	**0.56**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Benzo[b]fluoranthene	**1.1**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Benzo[g,h,i]perylene	**0.55**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Benzo[k]fluoranthene	**0.36**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Chrysene	**1.6**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Dibenz(a,h)anthracene	**0.10**		0.051	0.020	ug/L		06/22/22 09:57	06/24/22 11:36	1
Fluoranthene	**7.5**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Fluorene	**3.5**		0.051	0.010	ug/L		06/22/22 09:57	06/24/22 11:36	1
Indeno[1,2,3-cd]pyrene	**0.51**		0.051	0.020	ug/L		06/22/22 09:57	06/24/22 11:36	1
Naphthalene	**3.4**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 11:36	1
Phenanthrene	**1.9**		0.071	0.030	ug/L		06/22/22 09:57	06/24/22 11:36	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*82*		*10 - 110*	*06/22/22 09:57*	*06/24/22 11:36*	*1*
1-Methylnaphthalene-d10 (Surr)	*77*		*36 - 111*	*06/22/22 09:57*	*06/24/22 11:36*	*1*
Fluoranthene-d10 (Surr)	*92*		*47 - 128*	*06/22/22 09:57*	*06/24/22 11:36*	*1*

Client Sample ID: MW-11S-20220615

Lab Sample ID: 410-88035-9

Date Collected: 06/15/22 15:06

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**49**		0.51	0.10	ug/L		06/22/22 09:57	06/24/22 11:58	10
Pyrene	**12**		0.51	0.10	ug/L		06/22/22 09:57	06/24/22 11:58	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*86*		*10 - 110*	*06/22/22 09:57*	*06/24/22 11:58*	*10*
1-Methylnaphthalene-d10 (Surr)	*80*		*36 - 111*	*06/22/22 09:57*	*06/24/22 11:58*	*10*
Fluoranthene-d10 (Surr)	*94*		*47 - 128*	*06/22/22 09:57*	*06/24/22 11:58*	*10*

Client Sample ID: MW-4S-20220616

Lab Sample ID: 410-88035-10

Date Collected: 06/16/22 08:09

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/28/22 02:02	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/28/22 02:02	1
Toluene	ND		1.0	0.20	ug/L			06/28/22 02:02	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/28/22 02:02	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*06/28/22 02:02*	*1*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*06/28/22 02:02*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 120*		*06/28/22 02:02*	*1*
Toluene-d8 (Surr)	*105*		*80 - 120*		*06/28/22 02:02*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Anthracene	**0.23**		0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Benzo[a]anthracene	**0.019**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Benzo[a]pyrene	**0.014**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Benzo[b]fluoranthene	**0.029**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Benzo[g,h,i]perylene	**0.012**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Benzo[k]fluoranthene	**0.012**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Chrysene	**0.015**	**J**	0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/23/22 09:00	06/26/22 22:26	1
Fluoranthene	**4.1**		0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Fluorene	**8.4**		0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/23/22 09:00	06/26/22 22:26	1
Naphthalene	ND		0.071	0.030	ug/L		06/23/22 09:00	06/26/22 22:26	1
Phenanthrene	**0.10**		0.071	0.030	ug/L		06/23/22 09:00	06/26/22 22:26	1
Pyrene	**5.8**		0.050	0.010	ug/L		06/23/22 09:00	06/26/22 22:26	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*73*		*10 - 110*	*06/23/22 09:00*	*06/26/22 22:26*	*1*
1-Methylnaphthalene-d10 (Surr)	*75*		*36 - 111*	*06/23/22 09:00*	*06/26/22 22:26*	*1*
Fluoranthene-d10 (Surr)	*85*		*47 - 128*	*06/23/22 09:00*	*06/26/22 22:26*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**30**		0.50	0.10	ug/L		06/23/22 09:00	06/26/22 22:48	10

Client Sample ID: MW-4S-20220616

Lab Sample ID: 410-88035-10

Date Collected: 06/16/22 08:09

Matrix: Ground Water

Date Received: 06/17/22 10:41

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*72*		*10 - 110*	*06/23/22 09:00*	*06/26/22 22:48*	*10*
1-Methylnaphthalene-d10 (Surr)	*79*		*36 - 111*	*06/23/22 09:00*	*06/26/22 22:48*	*10*
Fluoranthene-d10 (Surr)	*95*		*47 - 128*	*06/23/22 09:00*	*06/26/22 22:48*	*10*

Client Sample ID: MW-3-20220616

Lab Sample ID: 410-88035-11

Date Collected: 06/16/22 08:51

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.62**	**J**	1.0	0.30	ug/L			06/28/22 02:28	1
Ethylbenzene	**2.1**	J, RC:8	1.0	0.40	ug/L			06/28/22 02:28	1
Toluene	**0.73**	**J**	1.0	0.20	ug/L			06/28/22 02:28	1
Xylenes, Total	**1.8**		1.0	0.40	ug/L			06/28/22 02:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*06/28/22 02:28*	*1*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*		*06/28/22 02:28*	*1*
Dibromofluoromethane (Surr)	*93*		*80 - 120*		*06/28/22 02:28*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*06/28/22 02:28*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**0.71**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Acenaphthylene	**0.14**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Anthracene	**0.35**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Benzo[a]anthracene	**0.27**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Benzo[a]pyrene	ND	cn	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Benzo[b]fluoranthene	ND	cn	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Benzo[g,h,i]perylene	ND	cn	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Benzo[k]fluoranthene	ND	cn	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Chrysene	**0.14**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Dibenz(a,h)anthracene	ND	cn	0.050	0.020	ug/L		06/23/22 15:50	06/24/22 17:46	1
Fluoranthene	**3.3**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Fluorene	**0.63**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1
Indeno[1,2,3-cd]pyrene	ND	cn	0.050	0.020	ug/L		06/23/22 15:50	06/24/22 17:46	1
Naphthalene	**0.14**	**cn** J, RC:3L,8	0.070	0.030	ug/L		06/23/22 15:50	06/24/22 17:46	1
Phenanthrene	**1.8**	**cn** J, RC:3L,8	0.070	0.030	ug/L		06/23/22 15:50	06/24/22 17:46	1
Pyrene	**3.7**	**cn** J, RC:3L,8	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 17:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*36*	*cn*	*10 - 110*	*06/23/22 15:50*	*06/24/22 17:46*	*1*
1-Methylnaphthalene-d10 (Surr)	*0.5*	*S1- cn*	*36 - 111*	*06/23/22 15:50*	*06/24/22 17:46*	*1*
Fluoranthene-d10 (Surr)	*28*	*S1- cn*	*47 - 128*	*06/23/22 15:50*	*06/24/22 17:46*	*1*

Client Sample ID: MW-13S-20220616

Lab Sample ID: 410-88035-12

Date Collected: 06/16/22 09:40

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**1.3**		1.0	0.30	ug/L			06/27/22 23:37	1

Client Sample ID: MW-13S-20220616

Date Collected: 06/16/22 09:40
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-12

Matrix: Ground Water

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Ethylbenzene	0.91	J	1.0	0.40	ug/L			06/27/22 23:37	1
Toluene	0.52	J	1.0	0.20	ug/L			06/27/22 23:37	1
Xylenes, Total	1.0		1.0	0.40	ug/L			06/27/22 23:37	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*80 - 120*		*06/27/22 23:37*	*1*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*06/27/22 23:37*	*1*
Dibromofluoromethane (Surr)	*117*		*80 - 120*		*06/27/22 23:37*	*1*
Toluene-d8 (Surr)	*94*		*80 - 120*		*06/27/22 23:37*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	0.72		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Anthracene	1.7		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Benzo[a]anthracene	0.27		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Benzo[a]pyrene	0.013	J	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Benzo[b]fluoranthene	0.020	J	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Chrysene	0.18		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 18:08	1
Fluoranthene	2.1		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Fluorene	3.5		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 18:08	1
Phenanthrene	3.5		0.070	0.030	ug/L		06/23/22 15:50	06/24/22 18:08	1
Pyrene	2.2		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*71*		*10 - 110*	*06/23/22 15:50*	*06/24/22 18:08*	*1*
1-Methylnaphthalene-d10 (Surr)	*62*		*36 - 111*	*06/23/22 15:50*	*06/24/22 18:08*	*1*
Fluoranthene-d10 (Surr)	*75*		*47 - 128*	*06/23/22 15:50*	*06/24/22 18:08*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	18		0.25	0.050	ug/L		06/23/22 15:50	06/26/22 19:33	5
Naphthalene	36		0.35	0.15	ug/L		06/23/22 15:50	06/26/22 19:33	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*69*		*10 - 110*	*06/23/22 15:50*	*06/26/22 19:33*	*5*
1-Methylnaphthalene-d10 (Surr)	*82*		*36 - 111*	*06/23/22 15:50*	*06/26/22 19:33*	*5*
Fluoranthene-d10 (Surr)	*88*		*47 - 128*	*06/23/22 15:50*	*06/26/22 19:33*	*5*

Client Sample ID: MW-13D-20220616

Date Collected: 06/16/22 10:24
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-13

Matrix: Ground Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/27/22 23:59	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/27/22 23:59	1
Toluene	ND		1.0	0.20	ug/L			06/27/22 23:59	1

Client Sample ID: MW-13D-20220616

Lab Sample ID: 410-88035-13
Matrix: Ground Water
Date Collected: 06/16/22 10:24
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Xylenes, Total	ND		1.0	0.40	ug/L			06/27/22 23:59	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*80 - 120*		*06/27/22 23:59*	*1*
4-Bromofluorobenzene (Surr)	*85*		*80 - 120*		*06/27/22 23:59*	*1*
Dibromofluoromethane (Surr)	*117*		*80 - 120*		*06/27/22 23:59*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*06/27/22 23:59*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Anthracene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Chrysene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 18:30	1
Fluoranthene	**0.011**	**J**	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Fluorene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 18:30	1
Naphthalene	ND		0.071	0.030	ug/L		06/23/22 15:50	06/24/22 18:30	1
Phenanthrene	ND		0.071	0.030	ug/L		06/23/22 15:50	06/24/22 18:30	1
Pyrene	**0.013**	**J**	0.050	0.010	ug/L		06/23/22 15:50	06/24/22 18:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*71*		*10 - 110*	*06/23/22 15:50*	*06/24/22 18:30*	*1*
1-Methylnaphthalene-d10 (Surr)	*67*		*36 - 111*	*06/23/22 15:50*	*06/24/22 18:30*	*1*
Fluoranthene-d10 (Surr)	*85*		*47 - 128*	*06/23/22 15:50*	*06/24/22 18:30*	*1*

Client Sample ID: DUP-20220616

Lab Sample ID: 410-88035-14
Matrix: Ground Water
Date Collected: 06/16/22 00:00
Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	**0.55**	**J**	1.0	0.30	ug/L			06/28/22 00:21	1
Ethylbenzene	**1.6**	J, RC:8	1.0	0.40	ug/L			06/28/22 00:21	1
Toluene	**0.65**	**J**	1.0	0.20	ug/L			06/28/22 00:21	1
Xylenes, Total	**1.2**		1.0	0.40	ug/L			06/28/22 00:21	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*80 - 120*		*06/28/22 00:21*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*06/28/22 00:21*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 120*		*06/28/22 00:21*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*06/28/22 00:21*	*1*

Client Sample ID: DUP-20220616

Lab Sample ID: 410-88035-14

Date Collected: 06/16/22 00:00

Matrix: Ground Water

Date Received: 06/17/22 10:41

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	**4.2**	J, RC:8	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Anthracene	**1.6**	J, RC:8	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Benzo[a]anthracene	**0.72**	J, RC:8	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Benzo[a]pyrene	ND		0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Benzo[b]fluoranthene	**0.011**	**J**	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Benzo[g,h,i]perylene	ND		0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Benzo[k]fluoranthene	ND		0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Chrysene	**0.40**	J, RC:8	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Dibenz(a,h)anthracene	ND		0.051	0.020	ug/L		06/23/22 15:50	06/26/22 19:55	1
Fluorene	**9.7**	J, RC:8	0.051	0.010	ug/L		06/23/22 15:50	06/26/22 19:55	1
Indeno[1,2,3-cd]pyrene	ND		0.051	0.020	ug/L		06/23/22 15:50	06/26/22 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*79*		*10 - 110*	*06/23/22 15:50*	*06/26/22 19:55*	*1*
1-Methylnaphthalene-d10 (Surr)	*74*		*36 - 111*	*06/23/22 15:50*	*06/26/22 19:55*	*1*
Fluoranthene-d10 (Surr)	*100*		*47 - 128*	*06/23/22 15:50*	*06/26/22 19:55*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	**33**	J, RC:8	0.51	0.10	ug/L		06/23/22 15:50	06/26/22 20:16	10
Fluoranthene	**14**	J, RC:8	0.51	0.10	ug/L		06/23/22 15:50	06/26/22 20:16	10
Naphthalene	**84**	J, RC:8	0.71	0.30	ug/L		06/23/22 15:50	06/26/22 20:16	10
Phenanthrene	**11**	J, RC:8	0.71	0.30	ug/L		06/23/22 15:50	06/26/22 20:16	10
Pyrene	**18**	J, RC:8	0.51	0.10	ug/L		06/23/22 15:50	06/26/22 20:16	10

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*78*		*10 - 110*	*06/23/22 15:50*	*06/26/22 20:16*	*10*
1-Methylnaphthalene-d10 (Surr)	*99*		*36 - 111*	*06/23/22 15:50*	*06/26/22 20:16*	*10*
Fluoranthene-d10 (Surr)	*98*		*47 - 128*	*06/23/22 15:50*	*06/26/22 20:16*	*10*

Client Sample ID: Trip Blank-20220616

Lab Sample ID: 410-88035-15

Date Collected: 06/16/22 00:00

Matrix: Water

Date Received: 06/17/22 10:41

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/27/22 21:47	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/27/22 21:47	1
Toluene	ND		1.0	0.20	ug/L			06/27/22 21:47	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/27/22 21:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*80 - 120*		*06/27/22 21:47*	*1*
4-Bromofluorobenzene (Surr)	*86*		*80 - 120*		*06/27/22 21:47*	*1*
Dibromofluoromethane (Surr)	*115*		*80 - 120*		*06/27/22 21:47*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*06/27/22 21:47*	*1*

Surrogate Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Ground Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-120)	(80-120)	(80-120)
410-88035-1	MW-1-20220614	101	102	101	101
410-88035-2	MW-10S-20220614	98	99	99	100
410-88035-4	MW-7S-20220615	99 cn	100 cn	101 cn	100 cn
410-88035-5	MW-14S-20220615	100	99	102	100
410-88035-5 MS	MW-14S-20220615 (MS)	98	98	99	100
410-88035-5 MSD	MW-14S-20220615 (MSD)	97	98	99	100
410-88035-6	MW-12S-20220615	100	105	96	103
410-88035-7	MW-12D-20220615	100	104	95	104
410-88035-8	MW-8S-20220615	100	103	97	103
410-88035-9	MW-11S-20220615	94	105	94	103
410-88035-10	MW-4S-20220616	96	104	93	105
410-88035-11	MW-3-20220616	95	103	93	103
410-88035-12	MW-13S-20220616	114	88	117	94
410-88035-13	MW-13D-20220616	112	85	117	95
410-88035-14	DUP-20220616	111	91	118	96

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
		DCA	BFB	DBFM	TOL
Lab Sample ID	Client Sample ID	(80-120)	(80-120)	(80-120)	(80-120)
410-88035-3	FB-20220614	99	102	101	102
410-88035-15	Trip Blank-20220616	109	86	115	95
LCS 410-269508/4	Lab Control Sample	95	100	98	101
LCS 410-269899/4	Lab Control Sample	97	103	98	103
LCS 410-269950/4	Lab Control Sample	103	94	106	101
LCSD 410-269899/5	Lab Control Sample Dup	94	103	98	104
LCSD 410-269950/5	Lab Control Sample Dup	104	95	105	101
MB 410-269508/6	Method Blank	95	100	99	102
MB 410-269899/7	Method Blank	99	104	95	103
MB 410-269950/7	Method Blank	108	86	113	95

Surrogate Legend

DCA = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
DBFM = Dibromofluoromethane (Surr)
TOL = Toluene-d8 (Surr)

Surrogate Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Ground Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	BAPd12 (10-110)	MNPd10 (36-111)	FLN10 (47-128)
410-88035-1	MW-1-20220614	54	62	77
410-88035-2	MW-10S-20220614	74	73	85
410-88035-4	MW-7S-20220615	80	78	91
410-88035-5	MW-14S-20220615	77	81	96
410-88035-5 MS	MW-14S-20220615 (MS)	81	75	95
410-88035-5 MSD	MW-14S-20220615 (MSD)	82	77	92
410-88035-6	MW-12S-20220615	58	73	86
410-88035-7	MW-12D-20220615	66	74	87
410-88035-8	MW-8S-20220615	74	74	87
410-88035-9	MW-11S-20220615	82	77	92
410-88035-9 - DL	MW-11S-20220615	86	80	94
410-88035-10	MW-4S-20220616	73	75	85
410-88035-10 - DL	MW-4S-20220616	72	79	95
410-88035-11	MW-3-20220616	36 cn	0.5 S1-cn	28 S1- cn
410-88035-12	MW-13S-20220616	71	62	75
410-88035-12 - DL	MW-13S-20220616	69	82	88
410-88035-13	MW-13D-20220616	71	67	85
410-88035-14	DUP-20220616	79	74	100
410-88035-14 - DL	DUP-20220616	78	99	98

Surrogate Legend

BAPd12 = Benzo(a)pyrene-d12 (Surr)
MNPd10 = 1-Methylnaphthalene-d10 (Surr)
FLN10 = Fluoranthene-d10 (Surr)

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Matrix: Water — **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)		
Lab Sample ID	Client Sample ID	BAPd12 (10-110)	MNPd10 (36-111)	FLN10 (47-128)
410-88035-3	FB-20220614	85	75	87
LCS 410-267627/2-A	Lab Control Sample	87	71	82
LCS 410-268442/2-A	Lab Control Sample	91	74	96
LCS 410-268735/2-A	Lab Control Sample	87	73	85
LCSD 410-268442/3-A	Lab Control Sample Dup	89	69	93
MB 410-267627/1-A	Method Blank	83	73	81
MB 410-268442/1-A	Method Blank	75	72	78
MB 410-268735/1-A	Method Blank	93	82	91

Surrogate Legend

BAPd12 = Benzo(a)pyrene-d12 (Surr)
MNPd10 = 1-Methylnaphthalene-d10 (Surr)
FLN10 = Fluoranthene-d10 (Surr)

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 410-269508/6
Matrix: Water
Analysis Batch: 269508

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/26/22 18:46	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/26/22 18:46	1
Toluene	ND		1.0	0.20	ug/L			06/26/22 18:46	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/26/22 18:46	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*06/26/22 18:46*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*06/26/22 18:46*	*1*
Dibromofluoromethane (Surr)	*99*		*80 - 120*		*06/26/22 18:46*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*06/26/22 18:46*	*1*

Lab Sample ID: LCS 410-269508/4
Matrix: Water
Analysis Batch: 269508

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	20.0	19.9		ug/L		99	80 - 120
Ethylbenzene	20.0	18.6		ug/L		93	80 - 120
Toluene	20.0	19.5		ug/L		97	80 - 120
Xylenes, Total	60.0	53.0		ug/L		88	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*101*		*80 - 120*

Lab Sample ID: 410-88035-5 MS
Matrix: Ground Water
Analysis Batch: 269508

Client Sample ID: MW-14S-20220615 (MS)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene	ND		20.0	22.1		ug/L		110	80 - 120
Ethylbenzene	ND		20.0	20.4		ug/L		102	80 - 120
Toluene	ND		20.0	21.0		ug/L		105	80 - 120
Xylenes, Total	ND		60.0	58.1		ug/L		97	80 - 120

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: 410-88035-5 MSD
Matrix: Ground Water
Analysis Batch: 269508

Client Sample ID: MW-14S-20220615 (MSD)
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene	ND		20.0	21.3		ug/L		107	80 - 120	3	30
Ethylbenzene	ND		20.0	19.8		ug/L		99	80 - 120	3	30
Toluene	ND		20.0	20.6		ug/L		103	80 - 120	2	30
Xylenes, Total	ND		60.0	56.6		ug/L		94	80 - 120	3	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Lab Sample ID: MB 410-269899/7
Matrix: Water
Analysis Batch: 269899

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/27/22 17:50	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/27/22 17:50	1
Toluene	ND		1.0	0.20	ug/L			06/27/22 17:50	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/27/22 17:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*		*06/27/22 17:50*	*1*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*		*06/27/22 17:50*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*06/27/22 17:50*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*06/27/22 17:50*	*1*

Lab Sample ID: LCS 410-269899/4
Matrix: Water
Analysis Batch: 269899

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Benzene			20.0	21.0		ug/L		105	80 - 120		
Ethylbenzene			20.0	20.4		ug/L		102	80 - 120		
Toluene			20.0	20.0		ug/L		100	80 - 120		
Xylenes, Total			60.0	58.5		ug/L		98	80 - 120		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 410-269899/5
Matrix: Water
Analysis Batch: 269899

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene			20.0	21.0		ug/L		105	80 - 120	0	30
Ethylbenzene			20.0	20.6		ug/L		103	80 - 120	1	30
Toluene			20.0	20.2		ug/L		101	80 - 120	1	30
Xylenes, Total			60.0	59.1		ug/L		99	80 - 120	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: MB 410-269950/7
Matrix: Water
Analysis Batch: 269950

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		1.0	0.30	ug/L			06/27/22 21:23	1
Ethylbenzene	ND		1.0	0.40	ug/L			06/27/22 21:23	1
Toluene	ND		1.0	0.20	ug/L			06/27/22 21:23	1
Xylenes, Total	ND		1.0	0.40	ug/L			06/27/22 21:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*80 - 120*		*06/27/22 21:23*	*1*
4-Bromofluorobenzene (Surr)	*86*		*80 - 120*		*06/27/22 21:23*	*1*
Dibromofluoromethane (Surr)	*113*		*80 - 120*		*06/27/22 21:23*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*06/27/22 21:23*	*1*

Lab Sample ID: LCS 410-269950/4
Matrix: Water
Analysis Batch: 269950

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzene			20.0	18.9		ug/L		95	80 - 120
Ethylbenzene			20.0	17.8		ug/L		89	80 - 120
Toluene			20.0	18.3		ug/L		91	80 - 120
Xylenes, Total			60.0	54.3		ug/L		91	80 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*
Dibromofluoromethane (Surr)	*106*		*80 - 120*
Toluene-d8 (Surr)	*101*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 410-269950/5
Matrix: Water
Analysis Batch: 269950

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzene			20.0	18.4		ug/L		92	80 - 120	3	30
Ethylbenzene			20.0	17.4		ug/L		87	80 - 120	2	30
Toluene			20.0	18.1		ug/L		90	80 - 120	1	30
Xylenes, Total			60.0	53.8		ug/L		90	80 - 120	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 120*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*
Dibromofluoromethane (Surr)	*105*		*80 - 120*
Toluene-d8 (Surr)	*101*		*80 - 120*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 410-267627/1-A
Matrix: Water
Analysis Batch: 267929

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 267627

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Chrysene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 06:23	1
Fluoranthene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Fluorene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/21/22 09:44	06/22/22 06:23	1
Naphthalene	ND		0.070	0.030	ug/L		06/21/22 09:44	06/22/22 06:23	1
Phenanthrene	ND		0.070	0.030	ug/L		06/21/22 09:44	06/22/22 06:23	1
Pyrene	ND		0.050	0.010	ug/L		06/21/22 09:44	06/22/22 06:23	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*83*		*10 - 110*	*06/21/22 09:44*	*06/22/22 06:23*	*1*
1-Methylnaphthalene-d10 (Surr)	*73*		*36 - 111*	*06/21/22 09:44*	*06/22/22 06:23*	*1*
Fluoranthene-d10 (Surr)	*81*		*47 - 128*	*06/21/22 09:44*	*06/22/22 06:23*	*1*

Lab Sample ID: LCS 410-267627/2-A
Matrix: Water
Analysis Batch: 267929

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267627

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Acenaphthene			1.00	0.730		ug/L		73	42 - 120		
Acenaphthylene			1.00	0.717		ug/L		72	49 - 120		
Anthracene			1.00	0.793		ug/L		79	54 - 121		

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: LCS 410-267627/2-A
Matrix: Water
Analysis Batch: 267929

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 267627

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Benzo[a]anthracene	1.00	0.877		ug/L		88	61 - 122
Benzo[a]pyrene	1.00	0.808		ug/L		81	60 - 120
Benzo[b]fluoranthene	1.00	0.952		ug/L		95	58 - 122
Benzo[g,h,i]perylene	1.00	0.749		ug/L		75	50 - 120
Benzo[k]fluoranthene	1.00	0.871		ug/L		87	57 - 128
Chrysene	1.00	0.794		ug/L		79	55 - 123
Dibenz(a,h)anthracene	1.00	0.793		ug/L		79	50 - 121
Fluoranthene	1.00	0.830		ug/L		83	61 - 123
Fluorene	1.00	0.796		ug/L		80	55 - 120
Indeno[1,2,3-cd]pyrene	1.00	0.868		ug/L		87	47 - 143
Naphthalene	1.00	0.626		ug/L		63	20 - 120
Phenanthrene	1.00	0.789		ug/L		79	59 - 120
Pyrene	1.00	0.721		ug/L		72	46 - 122

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*87*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*71*		*36 - 111*
Fluoranthene-d10 (Surr)	*82*		*47 - 128*

Lab Sample ID: 410-88035-5 MS
Matrix: Ground Water
Analysis Batch: 268849

Client Sample ID: MW-14S-20220615 (MS)
Prep Type: Total/NA
Prep Batch: 267981

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	0.61		1.01	1.35		ug/L		74	42 - 120
Acenaphthylene	0.021	J	1.01	0.871		ug/L		84	49 - 120
Anthracene	0.026	J	1.01	0.965		ug/L		93	54 - 121
Benzo[a]anthracene	0.013	J	1.01	0.971		ug/L		95	61 - 122
Benzo[a]pyrene	0.013	J	1.01	0.806		ug/L		78	60 - 120
Benzo[b]fluoranthene	0.012	J	1.01	0.888		ug/L		87	58 - 122
Benzo[g,h,i]perylene	ND		1.01	0.710		ug/L		70	50 - 120
Benzo[k]fluoranthene	ND		1.01	0.902		ug/L		89	57 - 128
Chrysene	0.015	J	1.01	0.861		ug/L		84	55 - 123
Dibenz(a,h)anthracene	ND		1.01	0.784		ug/L		77	50 - 121
Fluoranthene	0.027	J	1.01	1.00		ug/L		97	61 - 123
Fluorene	0.12		1.01	1.00		ug/L		88	55 - 120
Indeno[1,2,3-cd]pyrene	ND		1.01	0.792		ug/L		78	47 - 143
Naphthalene	0.30		1.01	1.03		ug/L		73	20 - 120
Phenanthrene	0.10		1.01	0.935		ug/L		82	59 - 120
Pyrene	0.034	J	1.01	0.920		ug/L		88	46 - 122

Surrogate	*MS %Recovery*	*MS Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*81*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*75*		*36 - 111*
Fluoranthene-d10 (Surr)	*95*		*47 - 128*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM) (Continued)

Lab Sample ID: 410-88035-5 MSD
Matrix: Ground Water
Analysis Batch: 268849

Client Sample ID: MW-14S-20220615 (MSD)
Prep Type: Total/NA
Prep Batch: 267981

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acenaphthene	0.61		1.01	1.35		ug/L		73	42 - 120	0	30
Acenaphthylene	0.021	J	1.01	0.902		ug/L		87	49 - 120	4	30
Anthracene	0.026	J	1.01	0.963		ug/L		93	54 - 121	0	30
Benzo[a]anthracene	0.013	J	1.01	1.02		ug/L		100	61 - 122	5	30
Benzo[a]pyrene	0.013	J	1.01	0.820		ug/L		80	60 - 120	2	30
Benzo[b]fluoranthene	0.012	J	1.01	0.913		ug/L		89	58 - 122	3	30
Benzo[g,h,i]perylene	ND		1.01	0.691		ug/L		69	50 - 120	3	30
Benzo[k]fluoranthene	ND		1.01	0.926		ug/L		92	57 - 128	3	30
Chrysene	0.015	J	1.01	0.886		ug/L		86	55 - 123	3	30
Dibenz(a,h)anthracene	ND		1.01	0.764		ug/L		76	50 - 121	3	30
Fluoranthene	0.027	J	1.01	0.987		ug/L		95	61 - 123	2	30
Fluorene	0.12		1.01	1.05		ug/L		92	55 - 120	4	30
Indeno[1,2,3-cd]pyrene	ND		1.01	0.769		ug/L		76	47 - 143	3	30
Naphthalene	0.30		1.01	1.08		ug/L		77	20 - 120	4	30
Phenanthrene	0.10		1.01	0.933		ug/L		82	59 - 120	0	30
Pyrene	0.034	J	1.01	0.996		ug/L		95	46 - 122	8	30

Surrogate	*MSD %Recovery*	*MSD Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*82*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*77*		*36 - 111*
Fluoranthene-d10 (Surr)	*92*		*47 - 128*

Lab Sample ID: MB 410-268442/1-A
Matrix: Water
Analysis Batch: 268849

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 268442

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Anthracene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Chrysene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/23/22 09:00	06/24/22 06:12	1
Fluoranthene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Fluorene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/23/22 09:00	06/24/22 06:12	1
Naphthalene	ND		0.070	0.030	ug/L		06/23/22 09:00	06/24/22 06:12	1
Phenanthrene	ND		0.070	0.030	ug/L		06/23/22 09:00	06/24/22 06:12	1
Pyrene	ND		0.050	0.010	ug/L		06/23/22 09:00	06/24/22 06:12	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*75*		*10 - 110*	*06/23/22 09:00*	*06/24/22 06:12*	*1*
1-Methylnaphthalene-d10 (Surr)	*72*		*36 - 111*	*06/23/22 09:00*	*06/24/22 06:12*	*1*
Fluoranthene-d10 (Surr)	*78*		*47 - 128*	*06/23/22 09:00*	*06/24/22 06:12*	*1*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: LCS 410-268442/2-A
Matrix: Water
Analysis Batch: 268849

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 268442

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Acenaphthene			1.00	1.01		ug/L		101	42 - 120		
Acenaphthylene			1.00	1.09		ug/L		109	49 - 120		
Anthracene			1.00	1.18		ug/L		118	54 - 121		
Benzo[a]anthracene			1.00	1.17		ug/L		117	61 - 122		
Benzo[a]pyrene			1.00	1.06		ug/L		106	60 - 120		
Benzo[b]fluoranthene			1.00	1.09		ug/L		109	58 - 122		
Benzo[g,h,i]perylene			1.00	0.945		ug/L		94	50 - 120		
Benzo[k]fluoranthene			1.00	1.11		ug/L		111	57 - 128		
Chrysene			1.00	1.04		ug/L		104	55 - 123		
Dibenz(a,h)anthracene			1.00	1.02		ug/L		102	50 - 121		
Fluoranthene			1.00	1.18		ug/L		118	61 - 123		
Fluorene			1.00	1.11		ug/L		111	55 - 120		
Indeno[1,2,3-cd]pyrene			1.00	1.05		ug/L		105	47 - 143		
Naphthalene			1.00	1.02		ug/L		102	20 - 120		
Phenanthrene			1.00	1.09		ug/L		109	59 - 120		
Pyrene			1.00	1.14		ug/L		114	46 - 122		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*91*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*74*		*36 - 111*
Fluoranthene-d10 (Surr)	*96*		*47 - 128*

Lab Sample ID: LCSD 410-268442/3-A
Matrix: Water
Analysis Batch: 268849

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 268442

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Acenaphthene			1.00	1.03		ug/L		103	42 - 120	2	30
Acenaphthylene			1.00	1.07		ug/L		107	49 - 120	1	30
Anthracene			1.00	1.15		ug/L		115	54 - 121	3	30
Benzo[a]anthracene			1.00	1.18		ug/L		118	61 - 122	1	30
Benzo[a]pyrene			1.00	1.07		ug/L		107	60 - 120	1	30
Benzo[b]fluoranthene			1.00	1.12		ug/L		112	58 - 122	2	30
Benzo[g,h,i]perylene			1.00	0.999		ug/L		100	50 - 120	6	30
Benzo[k]fluoranthene			1.00	1.13		ug/L		113	57 - 128	2	30
Chrysene			1.00	1.04		ug/L		104	55 - 123	0	30
Dibenz(a,h)anthracene			1.00	1.06		ug/L		106	50 - 121	4	30
Fluoranthene			1.00	1.16		ug/L		116	61 - 123	2	30
Fluorene			1.00	1.09		ug/L		109	55 - 120	1	30
Indeno[1,2,3-cd]pyrene			1.00	1.12		ug/L		112	47 - 143	6	30
Naphthalene			1.00	1.00		ug/L		100	20 - 120	2	30
Phenanthrene			1.00	1.07		ug/L		107	59 - 120	2	30
Pyrene			1.00	1.14		ug/L		114	46 - 122	0	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*89*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*69*		*36 - 111*
Fluoranthene-d10 (Surr)	*93*		*47 - 128*

Method: 8270E SIM - Semivolatile Organic Compounds (GC/MS SIM)

Lab Sample ID: MB 410-268735/1-A
Matrix: Water
Analysis Batch: 268864

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 268735

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Acenaphthylene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Anthracene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Benzo[a]anthracene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Benzo[a]pyrene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Benzo[b]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Benzo[g,h,i]perylene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Benzo[k]fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Chrysene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Dibenz(a,h)anthracene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 07:14	1
Fluoranthene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Fluorene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1
Indeno[1,2,3-cd]pyrene	ND		0.050	0.020	ug/L		06/23/22 15:50	06/24/22 07:14	1
Naphthalene	ND		0.070	0.030	ug/L		06/23/22 15:50	06/24/22 07:14	1
Phenanthrene	ND		0.070	0.030	ug/L		06/23/22 15:50	06/24/22 07:14	1
Pyrene	ND		0.050	0.010	ug/L		06/23/22 15:50	06/24/22 07:14	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Benzo(a)pyrene-d12 (Surr)	*93*		*10 - 110*	*06/23/22 15:50*	*06/24/22 07:14*	*1*
1-Methylnaphthalene-d10 (Surr)	*82*		*36 - 111*	*06/23/22 15:50*	*06/24/22 07:14*	*1*
Fluoranthene-d10 (Surr)	*91*		*47 - 128*	*06/23/22 15:50*	*06/24/22 07:14*	*1*

Lab Sample ID: LCS 410-268735/2-A
Matrix: Water
Analysis Batch: 268864

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 268735

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Acenaphthene	1.00	0.866		ug/L		87	42 - 120
Acenaphthylene	1.00	0.933		ug/L		93	49 - 120
Anthracene	1.00	0.940		ug/L		94	54 - 121
Benzo[a]anthracene	1.00	1.02		ug/L		102	61 - 122
Benzo[a]pyrene	1.00	0.946		ug/L		95	60 - 120
Benzo[b]fluoranthene	1.00	1.08		ug/L		108	58 - 122
Benzo[g,h,i]perylene	1.00	1.02		ug/L		102	50 - 120
Benzo[k]fluoranthene	1.00	0.973		ug/L		97	57 - 128
Chrysene	1.00	0.913		ug/L		91	55 - 123
Dibenz(a,h)anthracene	1.00	1.11		ug/L		111	50 - 121
Fluoranthene	1.00	0.987		ug/L		99	61 - 123
Fluorene	1.00	0.986		ug/L		99	55 - 120
Indeno[1,2,3-cd]pyrene	1.00	1.16		ug/L		116	47 - 143
Naphthalene	1.00	0.783		ug/L		78	20 - 120
Phenanthrene	1.00	0.935		ug/L		94	59 - 120
Pyrene	1.00	0.903		ug/L		90	46 - 122

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Benzo(a)pyrene-d12 (Surr)	*87*		*10 - 110*
1-Methylnaphthalene-d10 (Surr)	*73*		*36 - 111*
Fluoranthene-d10 (Surr)	*85*		*47 - 128*

GC/MS VOA

Analysis Batch: 269508

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-1	MW-1-20220614	Total/NA	Ground Water	8260D	
410-88035-2	MW-10S-20220614	Total/NA	Ground Water	8260D	
410-88035-3	FB-20220614	Total/NA	Water	8260D	
410-88035-4	MW-7S-20220615	Total/NA	Ground Water	8260D	
410-88035-5	MW-14S-20220615	Total/NA	Ground Water	8260D	
MB 410-269508/6	Method Blank	Total/NA	Water	8260D	
LCS 410-269508/4	Lab Control Sample	Total/NA	Water	8260D	
410-88035-5 MS	MW-14S-20220615 (MS)	Total/NA	Ground Water	8260D	
410-88035-5 MSD	MW-14S-20220615 (MSD)	Total/NA	Ground Water	8260D	

Analysis Batch: 269899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-6	MW-12S-20220615	Total/NA	Ground Water	8260D	
410-88035-7	MW-12D-20220615	Total/NA	Ground Water	8260D	
410-88035-8	MW-8S-20220615	Total/NA	Ground Water	8260D	
410-88035-9	MW-11S-20220615	Total/NA	Ground Water	8260D	
410-88035-10	MW-4S-20220616	Total/NA	Ground Water	8260D	
410-88035-11	MW-3-20220616	Total/NA	Ground Water	8260D	
MB 410-269899/7	Method Blank	Total/NA	Water	8260D	
LCS 410-269899/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 410-269899/5	Lab Control Sample Dup	Total/NA	Water	8260D	

Analysis Batch: 269950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-12	MW-13S-20220616	Total/NA	Ground Water	8260D	
410-88035-13	MW-13D-20220616	Total/NA	Ground Water	8260D	
410-88035-14	DUP-20220616	Total/NA	Ground Water	8260D	
410-88035-15	Trip Blank-20220616	Total/NA	Water	8260D	
MB 410-269950/7	Method Blank	Total/NA	Water	8260D	
LCS 410-269950/4	Lab Control Sample	Total/NA	Water	8260D	
LCSD 410-269950/5	Lab Control Sample Dup	Total/NA	Water	8260D	

GC/MS Semi VOA

Prep Batch: 267627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-1	MW-1-20220614	Total/NA	Ground Water	3510C	
410-88035-2	MW-10S-20220614	Total/NA	Ground Water	3510C	
410-88035-3	FB-20220614	Total/NA	Water	3510C	
MB 410-267627/1-A	Method Blank	Total/NA	Water	3510C	
LCS 410-267627/2-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 267929

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-1	MW-1-20220614	Total/NA	Ground Water	8270E SIM	267627
410-88035-2	MW-10S-20220614	Total/NA	Ground Water	8270E SIM	267627
410-88035-3	FB-20220614	Total/NA	Water	8270E SIM	267627
MB 410-267627/1-A	Method Blank	Total/NA	Water	8270E SIM	267627
LCS 410-267627/2-A	Lab Control Sample	Total/NA	Water	8270E SIM	267627

GC/MS Semi VOA

Prep Batch: 267981

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-4	MW-7S-20220615	Total/NA	Ground Water	3510C	
410-88035-5	MW-14S-20220615	Total/NA	Ground Water	3510C	
410-88035-6	MW-12S-20220615	Total/NA	Ground Water	3510C	
410-88035-7	MW-12D-20220615	Total/NA	Ground Water	3510C	
410-88035-8	MW-8S-20220615	Total/NA	Ground Water	3510C	
410-88035-9 - DL	MW-11S-20220615	Total/NA	Ground Water	3510C	
410-88035-9	MW-11S-20220615	Total/NA	Ground Water	3510C	
410-88035-5 MS	MW-14S-20220615 (MS)	Total/NA	Ground Water	3510C	
410-88035-5 MSD	MW-14S-20220615 (MSD)	Total/NA	Ground Water	3510C	

Prep Batch: 268442

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-10 - DL	MW-4S-20220616	Total/NA	Ground Water	3510C	
410-88035-10	MW-4S-20220616	Total/NA	Ground Water	3510C	
MB 410-268442/1-A	Method Blank	Total/NA	Water	3510C	
LCS 410-268442/2-A	Lab Control Sample	Total/NA	Water	3510C	
LCSD 410-268442/3-A	Lab Control Sample Dup	Total/NA	Water	3510C	

Prep Batch: 268735

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-11	MW-3-20220616	Total/NA	Ground Water	3510C	
410-88035-12 - DL	MW-13S-20220616	Total/NA	Ground Water	3510C	
410-88035-12	MW-13S-20220616	Total/NA	Ground Water	3510C	
410-88035-13	MW-13D-20220616	Total/NA	Ground Water	3510C	
410-88035-14 - DL	DUP-20220616	Total/NA	Ground Water	3510C	
410-88035-14	DUP-20220616	Total/NA	Ground Water	3510C	
MB 410-268735/1-A	Method Blank	Total/NA	Water	3510C	
LCS 410-268735/2-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 268849

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-4	MW-7S-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-5	MW-14S-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-6	MW-12S-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-7	MW-12D-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-8	MW-8S-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-9	MW-11S-20220615	Total/NA	Ground Water	8270E SIM	267981
410-88035-9 - DL	MW-11S-20220615	Total/NA	Ground Water	8270E SIM	267981
MB 410-268442/1-A	Method Blank	Total/NA	Water	8270E SIM	268442
LCS 410-268442/2-A	Lab Control Sample	Total/NA	Water	8270E SIM	268442
LCSD 410-268442/3-A	Lab Control Sample Dup	Total/NA	Water	8270E SIM	268442
410-88035-5 MS	MW-14S-20220615 (MS)	Total/NA	Ground Water	8270E SIM	267981
410-88035-5 MSD	MW-14S-20220615 (MSD)	Total/NA	Ground Water	8270E SIM	267981

Analysis Batch: 268864

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-11	MW-3-20220616	Total/NA	Ground Water	8270E SIM	268735
410-88035-12	MW-13S-20220616	Total/NA	Ground Water	8270E SIM	268735
410-88035-13	MW-13D-20220616	Total/NA	Ground Water	8270E SIM	268735
MB 410-268735/1-A	Method Blank	Total/NA	Water	8270E SIM	268735
LCS 410-268735/2-A	Lab Control Sample	Total/NA	Water	8270E SIM	268735

QC Association Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

GC/MS Semi VOA

Analysis Batch: 269470

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-10	MW-4S-20220616	Total/NA	Ground Water	8270E SIM	268442
410-88035-10 - DL	MW-4S-20220616	Total/NA	Ground Water	8270E SIM	268442
410-88035-12 - DL	MW-13S-20220616	Total/NA	Ground Water	8270E SIM	268735
410-88035-14	DUP-20220616	Total/NA	Ground Water	8270E SIM	268735
410-88035-14 - DL	DUP-20220616	Total/NA	Ground Water	8270E SIM	268735

Prep Batch: 269908

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-11 - RE	MW-3-20220616	Total/NA	Ground Water	3510C	
410-88035-11 - REDL	MW-3-20220616	Total/NA	Ground Water	3510C	
MB 410-269908/1-A	Method Blank	Total/NA	Water	3510C	
LCS 410-269908/2-A	Lab Control Sample	Total/NA	Water	3510C	

Analysis Batch: 270056

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-11 - RE	MW-3-20220616	Total/NA	Ground Water	8270E SIM	269908
MB 410-269908/1-A	Method Blank	Total/NA	Water	8270E SIM	269908
LCS 410-269908/2-A	Lab Control Sample	Total/NA	Water	8270E SIM	269908

Analysis Batch: 270487

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
410-88035-11 - REDL	MW-3-20220616	Total/NA	Ground Water	8270E SIM	269908

Lab Chronicle

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Client Sample ID: MW-1-20220614
Date Collected: 06/14/22 14:06
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-1
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269508	06/26/22 20:16	TQ4J	ELLE
Total/NA	Prep	3510C			267627	06/21/22 09:44	XPN5	ELLE
Total/NA	Analysis	8270E SIM		1	267929	06/22/22 12:54	UJM0	ELLE

Client Sample ID: MW-10S-20220614
Date Collected: 06/14/22 15:06
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-2
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269508	06/26/22 20:38	TQ4J	ELLE
Total/NA	Prep	3510C			267627	06/21/22 09:44	XPN5	ELLE
Total/NA	Analysis	8270E SIM		1	267929	06/22/22 13:16	UJM0	ELLE

Client Sample ID: FB-20220614
Date Collected: 06/14/22 15:45
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269508	06/26/22 19:09	TQ4J	ELLE
Total/NA	Prep	3510C			267627	06/21/22 09:44	XPN5	ELLE
Total/NA	Analysis	8270E SIM		1	267929	06/22/22 13:38	UJM0	ELLE

Client Sample ID: MW-7S-20220615
Date Collected: 06/15/22 09:02
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-4
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269508	06/26/22 21:00	TQ4J	ELLE
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 10:10	UJM0	ELLE

Client Sample ID: MW-14S-20220615
Date Collected: 06/15/22 10:01
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-5
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269508	06/26/22 21:23	TQ4J	ELLE
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 09:05	UJM0	ELLE

Client Sample ID: MW-12S-20220615
Date Collected: 06/15/22 11:26
Date Received: 06/17/22 10:41

Lab Sample ID: 410-88035-6
Matrix: Ground Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 00:19	UKAD	ELLE

Lab Chronicle

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Client Sample ID: MW-12S-20220615
Lab Sample ID: 410-88035-6
Date Collected: 06/15/22 11:26
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 10:31	UJM0	ELLE

Client Sample ID: MW-12D-20220615
Lab Sample ID: 410-88035-7
Date Collected: 06/15/22 12:06
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 00:44	UKAD	ELLE
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 10:53	UJM0	ELLE

Client Sample ID: MW-8S-20220615
Lab Sample ID: 410-88035-8
Date Collected: 06/15/22 14:19
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 01:10	UKAD	ELLE
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 11:15	UJM0	ELLE

Client Sample ID: MW-11S-20220615
Lab Sample ID: 410-88035-9
Date Collected: 06/15/22 15:06
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 01:36	UKAD	ELLE
Total/NA	Prep	3510C			267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	268849	06/24/22 11:36	UJM0	ELLE
Total/NA	Prep	3510C	DL		267981	06/22/22 09:57	DFX4	ELLE
Total/NA	Analysis	8270E SIM	DL	10	268849	06/24/22 11:58	UJM0	ELLE

Client Sample ID: MW-4S-20220616
Lab Sample ID: 410-88035-10
Date Collected: 06/16/22 08:09
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 02:02	UKAD	ELLE
Total/NA	Prep	3510C			268442	06/23/22 09:00	DFX4	ELLE
Total/NA	Analysis	8270E SIM		1	269470	06/26/22 22:26	UJM0	ELLE
Total/NA	Prep	3510C	DL		268442	06/23/22 09:00	DFX4	ELLE
Total/NA	Analysis	8270E SIM	DL	10	269470	06/26/22 22:48	UJM0	ELLE

Client Sample ID: MW-3-20220616
Lab Sample ID: 410-88035-11
Date Collected: 06/16/22 08:51
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269899	06/28/22 02:28	UKAD	ELLE
Total/NA	Prep	3510C	RE		269908	06/27/22 15:58	QJZ6	ELLE
Total/NA	Analysis	8270E SIM	RE	1	270056	06/28/22 13:52	UJM0	ELLE
Total/NA	Prep	3510C	REDL		269908	06/27/22 15:58	QJZ6	ELLE
Total/NA	Analysis	8270E SIM	REDL	10	270487	06/29/22 05:31	UJM0	ELLE
Total/NA	Prep	3510C			268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM		1	268864	06/24/22 17:46	SJ89	ELLE

Client Sample ID: MW-13S-20220616
Lab Sample ID: 410-88035-12
Date Collected: 06/16/22 09:40
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269950	06/27/22 23:37	Y6ZN	ELLE
Total/NA	Prep	3510C	DL		268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM	DL	5	269470	06/26/22 19:33	UJM0	ELLE
Total/NA	Prep	3510C			268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM		1	268864	06/24/22 18:08	SJ89	ELLE

Client Sample ID: MW-13D-20220616
Lab Sample ID: 410-88035-13
Date Collected: 06/16/22 10:24
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269950	06/27/22 23:59	Y6ZN	ELLE
Total/NA	Prep	3510C			268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM		1	268864	06/24/22 18:30	SJ89	ELLE

Client Sample ID: DUP-20220616
Lab Sample ID: 410-88035-14
Date Collected: 06/16/22 00:00
Matrix: Ground Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269950	06/28/22 00:21	Y6ZN	ELLE
Total/NA	Prep	3510C			268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM		1	269470	06/26/22 19:55	UJM0	ELLE
Total/NA	Prep	3510C	DL		268735	06/23/22 15:50	QJZ6	ELLE
Total/NA	Analysis	8270E SIM	DL	10	269470	06/26/22 20:16	UJM0	ELLE

Client Sample ID: Trip Blank-20220616
Lab Sample ID: 410-88035-15
Date Collected: 06/16/22 00:00
Matrix: Water
Date Received: 06/17/22 10:41

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	269950	06/27/22 21:47	Y6ZN	ELLE

Lab Chronicle

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Accreditation/Certification Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
A2LA	Dept. of Defense ELAP	1.01	11-30-22
A2LA	ISO/IEC 17025	0001.01	11-30-22
Alaska	State	PA00009	06-30-22
Alaska (UST)	State	17-027	02-28-23
Arizona	State	AZ0780	03-12-23
Arkansas DEQ	State	88-0660	08-10-22
California	State	2792	11-30-22
Colorado	State	PA00009	06-30-22
Connecticut	State	PH-0746	06-30-23
DE Haz. Subst. Cleanup Act (HSCA)	State	019-006 (PA cert)	01-31-23
Delaware (DW)	State	N/A	01-31-23
Florida	NELAP	E87997	06-30-22
Georgia (DW)	State	C048	01-31-23
Hawaii	State	N/A	01-31-23
Illinois	NELAP	200027	01-31-23
Iowa	State	361	03-02-22 *
Kansas	NELAP	E-10151	10-31-22
Kentucky (DW)	State	KY90088	12-31-22
Kentucky (UST)	State	1.01	11-30-22
Kentucky (WW)	State	KY90088	01-01-23
Louisiana	NELAP	02055	06-30-22
Maine	State	2019012	03-12-23
Maryland	State	100	06-30-23
Massachusetts	State	M-PA009	06-30-22
Michigan	State	9930	01-31-23
Minnesota	NELAP	042-999-487	12-31-22
Missouri	State	450	01-31-25
Montana (DW)	State	0098	01-01-23
Montana (UST)	State	<cert No.>	02-01-23
Nebraska	State	NE-OS-32-17	01-31-23
New Hampshire	NELAP	2730	01-10-23
New Jersey	NELAP	PA011	06-30-22
New York	NELAP	10670	04-01-23
North Carolina (DW)	State	42705	07-31-22
North Carolina (WW/SW)	State	521	12-31-22
North Dakota	State	R-205	01-31-23
Oklahoma	NELAP	R-205	08-31-22
Oregon	NELAP	PA200001	09-11-22
PALA	Canada	1978	09-16-24
Pennsylvania	NELAP	36-00037	01-31-23
Rhode Island	State	LAO00338	12-30-22
South Carolina	State	89002	01-31-23
Tennessee	State	02838	01-31-23
Texas	NELAP	T104704194-21-40	08-31-22
USDA	US Federal Programs	P330-19-00197	07-03-22
Vermont	State	VT - 36037	10-28-22
Virginia	NELAP	460182	06-15-23
Washington	State	C457	04-11-23
West Virginia (DW)	State	9906 C	12-31-22
West Virginia DEP	State	055	07-31-22

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Accreditation/Certification Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Laboratory: Eurofins Lancaster Laboratories Environment Testing, LLC (Continued)

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Wyoming	State	8TMS-L	01-31-23
Wyoming (UST)	A2LA	1.01	11-30-22

Method Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Method	Method Description	Protocol	Laboratory
8260D	Volatile Organic Compounds by GC/MS	SW846	ELLE
8270E SIM	Semivolatile Organic Compounds (GC/MS SIM)	SW846	ELLE
3510C	Liquid-Liquid Extraction (Separatory Funnel)	SW846	ELLE
5030C	Purge and Trap	SW846	ELLE

Protocol References:

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

ELLE = Eurofins Lancaster Laboratories Environment Testing, LLC, 2425 New Holland Pike, Lancaster, PA 17601, TEL (717)656-2300

Sample Summary

Client: Brown and Caldwell
Project/Site: Patchogue, NY

Job ID: 410-88035-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
410-88035-1	MW-1-20220614	Ground Water	06/14/22 14:06	06/17/22 10:41
410-88035-2	MW-10S-20220614	Ground Water	06/14/22 15:06	06/17/22 10:41
410-88035-3	FB-20220614	Water	06/14/22 15:45	06/17/22 10:41
410-88035-4	MW-7S-20220615	Ground Water	06/15/22 09:02	06/17/22 10:41
410-88035-5	MW-14S-20220615	Ground Water	06/15/22 10:01	06/17/22 10:41
410-88035-6	MW-12S-20220615	Ground Water	06/15/22 11:26	06/17/22 10:41
410-88035-7	MW-12D-20220615	Ground Water	06/15/22 12:06	06/17/22 10:41
410-88035-8	MW-8S-20220615	Ground Water	06/15/22 14:19	06/17/22 10:41
410-88035-9	MW-11S-20220615	Ground Water	06/15/22 15:06	06/17/22 10:41
410-88035-10	MW-4S-20220616	Ground Water	06/16/22 08:09	06/17/22 10:41
410-88035-11	MW-3-20220616	Ground Water	06/16/22 08:51	06/17/22 10:41
410-88035-12	MW-13S-20220616	Ground Water	06/16/22 09:40	06/17/22 10:41
410-88035-13	MW-13D-20220616	Ground Water	06/16/22 10:24	06/17/22 10:41
410-88035-14	DUP-20220616	Ground Water	06/16/22 00:00	06/17/22 10:41
410-88035-15	Trip Blank-20220616	Water	06/16/22 00:00	06/17/22 10:41

Eurofins Lancaster Laboratories Environme
2425 New Holland Pike
Lancaster, PA 17601
Phone: 717-656-2300 Fax: 717-656-2681

Chain of Custody Record

eurofins Environment Testing America

410-88035 Chain of Custody

Client Information	Sampler: AFV/SFJ	Lab PM: Weyandt, Barbara A	OC No: 0-58284-5955.1
Client Contact: Mr. James Marolda	Phone:	E-Mail: Barbara.Weyandt@et.eurofinsus.com	NY — Page 1 of 2
Company: Brown and Caldwell	PWSID:	Analysis Requested	Job #:
Address: 500 North Franklin Turnpike Suite 306	Due Date Requested:		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
City: Ramsey	TAT Requested (days): Standard		
State, Zip: NJ, 07446	Compliance Project: Δ Yes Δ No		
Phone: 201-574-4713(Tel)	PO #: 153201		Other:
Email: jmarolda@brwncald.com	WO #:		
Project Name: Patchogue, NY	Project #: 41002571		
Site: Patchogue MGP	SSOW#:		

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	8270D_SIM - 16 PAHs	8260C - BTEX	Total Number of containers	Special Instructions/Note:
MW-1-20220614	6/14/22	1406	G	GW	N	N	X	X		
MW-10S-20220614	↓	1506	G	GW	N	N	X	X		
FB-20220614	↓	1545	G	DI	N	N	X	X		
MW-7S-20220615	6/15/22	0902	G	GW	N	N	X	X		
MW-14S-20220615 (MS/MSD)	↓	1001	G	GW	N	Y	X	X		MS/MSD
MW-12S-20220615	↓	1126	G	GW	N	N	X	X		
MW-12D-20220615	↓	1206	G	GW	N	N	X	X		
MW-8S-20220615	↓	1419	G	GW	N	N	X	X		
MW-11S-20220615	↓	1506	G	GW	N	N	X	X		
MW-4S-20220616	6/16/22	0809	G	GW	N	N	X	X		
MW-3-20220616	↓	0851	G	GW	N	N	X	X		

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify) NYSDEC CAT B

Special Instructions/QC Requirements: EQUIS EDD

Empty Kit Relinquished by:		Date:		Time:		Method of Shipment:	
Relinquished by:		Date/Time: 6/16/22 1100	Company: Eurofins	Received by:		Date/Time:	Company
Relinquished by: Antonio Velazquez		Date/Time: 6/16/22 1545	Company: BC	Received by:		Date/Time:	Company
Relinquished by:		Date/Time:	Company:	Received by:		Date/Time: 617-22 1041	Company: ECLS

Custody Seals Intact: Δ Yes Δ No — Custody Seal No.: 145024, 145025

Cooler Temperature(s) °C and Other Remarks: 0.9 - 2.0

Ver: 06/08/2021

Eurofins Lancaster Laboratories Environme
2425 New Holland Pike
Lancaster, PA 17601
Phone: 717-656-2300 Fax: 717-656-2681

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: AFV/SFJ	Lab PM: Weyandt, Barbara A	Carrier Tracking No(s):	COC No: 410-58284-5955.2
Client Contact: Mr. James Marolda	Phone:	E-Mail: Barbara.Weyandt@et.eurofinsus.com	State of Origin: NY	Page: Page 2 of 2
Company: Brown and Caldwell	PWSID:			Job #:
Address: 500 North Franklin Turnpike Suite 306	Due Date Requested:			
City: Ramsey	TAT Requested (days): Standard			
State, Zip: NJ, 07446	Compliance Project: Δ Yes Δ No			
Phone: 201-574-4713(Tel)	PO #: 153201			
Email: jmarolda@brwncald.com	WO #:			
Project Name: Patchogue, NY	Project #: 41002571			
Site: Patchogue MGP	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Preservation Code	Filtered Sample (Y/N)	8270D_SIM - 16 PAHs	8260C - BTEX	Total Number of containers	Special Instructions/Note:
MW-13S-20220616	6/16/22	0940	G	GW	N	N	X	X		
MW-13D-20220616		1024	G	GW	N	N	X	X		
DUP-20220616		9999	G	GW	N	N	X	X		
TripBlank-20220616		TB	TB	TB	N	N		X	2	8260C - BTEX

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological	☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested: I, II, III, IV, Other (specify) NYSDEC CAT B	Special Instructions/QC Requirements: BC EQuIS EDD

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by	Date/Time	Company	Received by	Date/Time	Company
1	Antonio Velazquez	06/16/22 1545	BC			
2						
3					6-17-22 1041	EDS

Custody Seals Intact: Δ Yes Δ No
Custody Seal No.: 145024, 145025
Cooler Temperature(s) °C and Other Remarks: 0.9-2.0

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Brown and Caldwell

Job Number: 410-88035-1

Login Number: 88035
List Number: 1
Creator: Metzger, Katherine A

List Source: Eurofins Lancaster Laboratories Environment Testing, LLC

Question	Answer	Comment
The cooler's custody seal is intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable (</=6C, not frozen).	True	
Cooler Temperature is recorded.	True	
WV: Container Temperature is acceptable (</=6C, not frozen).	N/A	
WV: Container Temperature is recorded.	N/A	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses.	True	
Is the Field Sampler's name present on COC?	True	
Sample custody seals are intact.	True	
VOA sample vials do not have headspace >6mm in diameter (none, if from WV)?	True	

Appendix C: Data Validator Qualifications

Jaclyn Lauer, P.E. S.C.

Experience Summary

Jaclyn Lauer started at Brown and Caldwell in the Columbia, SC office working with infrastructure, GIS, and condition asset management for municipal water and wastewater entities including sewer system evaluation studies. She then moved to the Atlanta, GA office where she worked many private sector clients and gained experience in data evaluation and assessment, compliance and permitting, project management, local limits evaluation studies, and database management. Ms. Lauer now works remotely in Lander, WY on many projects nationwide. In addition, she has led treatability laboratory studies and assisted in compliance reporting for a wide variety of clients. While at Clemson, she worked in the environmental laboratory for two years.

Assignment

Senior Engineer

Education

B.S. Environmental Engineering, Clemson University 2013

M.S. Environmental Engineering, Clemson University 2014

Clemson, SC

Registration

P.E., South Carolina #34670

Experience

5 years

Joined Firm

2014

Relevant Expertise

- *Data Evaluation*
- *Data Validation*
- *Data Usability*
- *Compliance and Permitting*
- *Infrastructure*
- *Water/wastewater Process Design*
- *GIS*
- *Field Work*
- *Mobile Data Collection*

Memberships

- *American Water Works Association (AWWA)*

Trainings

- *HAZWOPER 40 Hour*
- *Confined Space Certified*
- *Industrial Hygiene Health and Safety Certified*
- *Wetland Delineation Certified*

Publications

- *Lauer, Jaclyn, "The Use of Oxidants for NDMA Precursor Deactivation in Wastewater Treatment" (2014). All Theses. Paper 1905. http://tigerprints.clemson.edu/all_theses/1905*

Data Validation and Verification, Nationwide

Multiple On-going projects. Provides data validation for level I through IV laboratory reports including air, surface water, groundwater, soil, and soil gas samples. Verification, usability, and lab data management are provided for specialized projects. Provides training and mentorship to mid-level employees for data analysis. Trainings specifically for Organics and Inorganics along with PFAS and Explosives.

Environmental

Various Sampling, Multiple Clients, GA, FL, AL, OH, and SC

Field Scientist and Field Manager. Duties involve the sampling of air, surface water, groundwater, and subsurface at both hazardous and non-hazardous waste sites for biological, chemical, and physical parameters, and the coordination and safety of said sampling events. Conducted daily health and safety meetings discussing potential hazards of each site and summarizing health and safety plans to internal staff and external subcontractors. Field methods for collecting subsurface samples have included direct push drilling, hollow-stem augering, and various groundwater sampling techniques.

Ordot Landfill Closure, Guam

Project Engineer. Responsibilities include aiding in laboratory management. This includes sample orders, report validation, database management, and data usability. Also, assisted in establishing background concentrations and calculations. [2018 to present]

Vulcan Project Management, Georgia

Project Engineer. Responsibilities include aiding in on-call services for Vulcan for compliance and permitting, Stormwater, site surveying, and environmental assessments. [2016 to present]

Project Manager. Worked for the Vulcan Stockbridge Facility in Stockbridge, Georgia on a movie set to help develop an environmentally safe way to remove fake snow from the quarry pit. Responsibilities include managing the cleanup team and project and working with Vulcan and the client, Marvel, to ensure the product was removed and reused. [2017]

Project Engineer. Responsibilities include updating all SWPPPs for each plant in the state of Georgia. This included updating maps and reports, site inspections, and dye testing. [2017]

Walmart Environmental Site Inspections, Multiple Locations, Southeastern United States

Site Inspector. Responsibilities include Nightly auditing for ongoing construction at Walmart across the Southeast. Audits included interior and

exterior environmental, health, and safety inspections working with the site's general contractor. [2016 to 2017]

Groundwater Sampling, Former Manufactured Gas Plant, Confidential Client, Jacksonville, Florida

Project Engineer. Sampling of the groundwater for chemical and physical parameters, and the coordination safety of sampling events, and LNAPL and DNAPL delineation. Conducted daily health and safety meetings discussing potential hazards of each site and summarizing HASPs to internal staff and external subcontractors. Field methods included using peristaltic pumping to effectively collect samples.

Wetland Delineations and Stream Assessments, Multiple Locations, Southeastern United States

Project Manager. Conducted routine delineations of wetlands on properties ranging from 1 to 880 acres utilizing U.S. Army Corps of Engineers (USACE) protocols. Multiple project sites located in Georgia, Tennessee, South Carolina, Alabama, and Florida. [2017–Present]

Well Development, Groundwater Investigation, Oversight, Soil Investigation and Vapor Intrusion Sampling, Confidential Client, Covington, Georgia

Project Engineer. Well development of both on site and residential monitoring wells using field methods that include peristaltic pumping, geo-sub pumping, and waterra pumping. Conducted vapor intrusion sampling in residential houses using Summa canisters, interacting with residents. [KM Fountain Inn SC Environmental,

HMTF Site Closure, University of Georgia, Athens, Georgia

Project Engineer. Collected soil samples with a hand auger, following careful sample collection methods and decontamination methods. Provided oversight for decontamination and cleanup of facility then verified with wipe sampling following sample collection methods. Helped draft the closure report and aided in quality control of the laboratory data. Provided follow up sampling and decontamination including wipe and soil sampling. [2016 to present]

Industrial Water Reuse

Start-Up and Compliance Services, Confidential Pharmaceutical Client, Georgia

Process Engineer. Jaclyn provided on-demand regulatory compliance support and WWTP start-up services and a Covington, Georgia pharmaceutical facility. This includes creation and updates to the Standard Operating Procedure, and preparation of an O&M manual and operator training for the wastewater pretreatment system, designed and constructed by BC. Jaclyn spent time onsite performing inspections and aiding facility operators.

Reclaimed Water POTW, Confidential Refinery, Texas

Process Engineer. Conducted a study to consider using 4 MGD of POTW effluent from the city's WWTP. Responsibilities include the assessment for the addition of disinfection at the refinery including types of disinfection, location, and design. Additionally, designed and performed bench scale breakpoint chlorination and THM formation study to assess the chlorine demand and formation of THM in the effluent POTW. The main task for disinfection with chlorine is to combat peak day ammonia (5 ppm) bleed through from the POTW needs to be treated to <0.1 ppm and control water quality from the city's POTW. [BC Project # 146640]

Municipal Wastewater

Calculation and Evaluation of Local Limits, Fulton County Department of Public Works, Cherokee County Water & Sewer Authority, and Dekalb County Department of Watershed Management, Georgia

Project Engineer. Performed all data gathering, calculations, and regulatory review of the local limits developed for the wastewater treatment facilities in Dekalb, Fulton, and Cherokee Counties. For Fulton County, Local limits were individually developed for Johns Creek, Big Creek, and Camp Creek to review the old limits for industrial pretreatment. For Dekalb County, reviewed industrial and commercial data to determine source of FOG and developed recommendations to address sewer corrosion. For Cherokee County, reviewed scenarios for anticipated growth and calculated local limits that would allow for such growth.

City of Flagstaff, Local Limits Development and Pretreatment Program Assessment

Project Engineer. Conducted an interim Industrial Pretreatment Local Limits Evaluation to assess current limits for BOD and TSS to determine whether the City could accommodate additional industrial wastewater from breweries. Developed recommendations for future limits to protect the City's facilities but not limits industrial users.

HRSD WO7.6 Regionalized Rehab Program, HRSD, Virginia Beach, Virginia

Project Engineer. Responsibilities includes development of rehabilitation scopes, cost estimates, post-rehab I/I reduction estimates, and adjustment of hydrologic parameters in selected rehabilitation catchments in the HRSD service area. The Hampton Roads Sanitation District (HRSD) has taken regional responsibility to implement the EPA/Virginia DEQ mandated wet weather management plan (RWWMP), including identification and rehabilitation of cost-effective inflow/infiltration sources [BC Project # 146162]

Rocky Branch Basin SSES, City of Columbia, Columbia, South Carolina

Project Engineer. Responsibilities include providing technical engineering support to the City of Columbia for a Sewer System Evaluation Study (SSES) of a portion of the City's sanitary sewer system to identify problems that may lead to sanitary sewer overflows (SSOs). This includes investigations that are intended to identify structural, operations and maintenance, and infiltration and inflow (I/I) related problems. A full update to the City of Columbia's GIS will be provided at the end of the assessment. The intent of this project is to meet the requirements of the Continuing Sewer Assessment Program (CSAP) and the Infrastructure Rehabilitation Program (IRP) which are components of the Consent Decree under which the City is performing this work.

Appendix D: Data Usability Summary Report

DATA USABILITY SUMMARY REPORT
PATCHOGUE FORMER MGP SITE

Client: Brown and Caldwell, Albany, New York
SDGs: 410-88035-1
Laboratory: Eurofins Lancaster Laboratories, Lancaster, Pennsylvania
Site: Patchogue, NY
Date: August 1, 2022

Client Sample ID	Laboratory Sample ID	Matrix
MW-1-20220614	410-88035-1	Groundwater
MW-10S-20220614	410-88035-2	Groundwater
FB-20220614	410-88035-3	Water
MW-7S-20220615	410-88035-4	Groundwater
MW-14S-20220615	410-88035-5	Groundwater
MW-12S-20220615	410-88035-6	Groundwater
MW-12D-20220615	410-88035-7	Groundwater
MW-8S-20220615	410-88035-8	Groundwater
MW-11S-20220615	410-88035-9	Groundwater
MW-4S-20220616	410-88035-10	Groundwater
MW-3-20220616	410-88035-11	Groundwater
MW-13S-20220616	410-88035-12	Groundwater
MW-13D-20220616	410-88035-13	Groundwater
DUP-20220616	410-88035-14	Groundwater
TripBlank-20220616	410-88035-15	Trip Blank

Data validation was performed on the analytical data for fifteen (15) samples collected on June 14 through 16, 2022 by Brown and Caldwell associates at the Patchogue Site in New York. The samples were analyzed under the Environmental Protection Agency (USEPA) "Volatile Organic Compounds by Gas Chromatography/ Mass Spectrometry (GC/MS), SW-846 Method 8020C", August 2006, "Test Methods for Evaluating Solid Wastes, SW-846 Method 8270D (SIM), February 2007" and "Test Methods for Evaluating Solid Wastes, SW-846 Method 3510C, Rev 3", December 1996. Specific method references are as follows:

Analysis	*Method References*
Volatile Organic Compounds (VOCs)	USEPA SW-846 SW8260C
Semi Volatile Organic Compounds (SVOCs)	USEPA SW-846 SW8270D

The data have been validated according to the protocols and quality control (QC) requirements of the analytical methods and the USEPA Region II Data Review Standard Operating Procedures (SOPs) as follows:

- SOP Number HW-34a, Revision 0, July 2015, Trace Volatile Data Validation;

- SOP Number HW-35a, Revision 0, June 2015, Semi-volatile Data Validation; and
- The reviewer's professional judgment.

The following items/criteria were reviewed for this report:

- Data Completeness
- Holding times and sample preservation
- Field Duplicate Accuracy
- Internal Standard Area and RT
- Surrogates
- Laboratory Control Sample (LCS) recoveries
- Matric Spike and Matrix Spike Duplicate Samples
- Method and field blank contamination
- Initial and continuing calibration summaries
- Compound Quantitation
- Reporting Limits
- Sample comments and Quality Control Summaries

Overall Usability Issues:

Overall, the data is acceptable for the intended purposes. Analytical issues were found with headspace preservation, duplicate comparisons, and surrogate recoveries. Associated sample results are appropriately qualified and are usable for intended purpose, with the exception of sample MW-7S-20220615 in the VOA vials which had some rejections for not meeting headspace preservation requirements. Although the data are rejected, the data can be used for comparison purposes since results align with historical data.

Holding Times

- Holding times were achieved for all analyses with the exception of MW-3-20220616. Sample MW-3 was re-analyzed two times outside of hold time to achieve surrogate results within control limits. The first two analyses are used for comparison purposes and are not reportable. The final analysis is used for reporting purposes and is qualified as estimated, J/UJ, reason code 1.

Field Duplicate Accuracy

- One duplicate was collected for this dataset. DUP-20220616 is the sample duplicate for MW-3-20220616. All relative percent differences were within control limits with the exception of total xylenes. Since parent and duplicate results are less than five times the method detection limits, no qualification is required.

Internal Standard Areas

- All samples exhibited acceptable internal standard values.

Surrogates

- All samples exhibited acceptable surrogate recovery values except for sample MW-3-20220616 for the initial analysis. The initial analysis is not reportable and no qualification is required.

Laboratory Control Samples

- All laboratory control samples and laboratory control sample duplicated exhibited acceptable recovery values and relative percent differences.

Matric Spike and Matrix Spike Duplicate (MS/MSD) Samples

- The MS/MSD samples were analyzed on MW-14S-20200616, and percent recoveries are within acceptable limits.

Method, Trip, and Field Blanks

- The method blanks were free of contamination.
- The trip blank was free of contamination.
- The field blank was free of contamination.

Initial Calibration

- All recoveries and/or correlation coefficient criteria were met.

Continuing Calibration

- All Percent Drift criteria were met.
- All recoveries and/or correlation coefficient criteria were met.

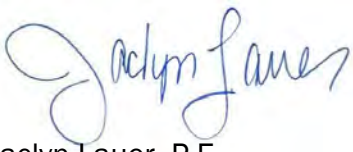
Compound Quantitation

- All sample detections detected above the MDL and below the RL are appropriately qualified as estimated, J, by the laboratory.

Reporting Limits

- Samples MW-11S-20220615, MW-4S-20220616, MW-13S-20220616, and DUP-20220616 were diluted due to elevated SVOC concentrations. Elevated reporting limits are provided.
- All other laboratory reporting limits were met.

Please contact the undersigned if you have any questions or need further information.

Signed:  Dated: August 1, 2022

Jaclyn Lauer, P.E.
Senior Staff Engineer and Validator
Brown and Caldwell

Signed:  Dated: August 1, 2022

Corey Strauss
Senior Staff Geologist and Validator
Brown and Caldwell

Data Qualifiers

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

UJ = The analyte was not detected above the sample reporting limit; and the reporting limit is approximate.

U = The analyte was analyzed for but was not detected above the method detection limit.

R = The sample results is rejected due to serious deficiencies. The presence or absence of the analyte cannot be verified.

Reason Codes

1	Holding time violation
2	Method blank contamination
3	Surrogate recovery
4	MS/MSD recovery
5	MS/MSD precision outside limits
6	LCS recovery
7	Field blank contamination
8	Field duplicate precision outside limits
9	Other deficiencies (including cooler temperature)
A	Absence of supporting QC
S	ICV, CCV or column performance check problem
Y	Initial and continuing calibration blank problem
M	Interference check samples problem
O	Post digestion spike outside of 85-115%
F	MSA correlation coefficient <0.995, or MSA not done
G	Serial dilution problem
K	DFTPP or BFB tuning problem
Q	Initial calibration problem
X	Internal standard recovery problem
V	Second source standard calibration verification problem
L	Low bias
Z	Retention time problem
N	Counting time error (radionuclide chemistry)
W	Detector instability (radionuclide chemistry)
C	Co-elution of compounds
E	Value exceeds linear calibration range
I	Interferences present during analysis
T	Trace level compound, poor quantitation
P	1C/2C precision outside limits
B	LCS/LCSD precision outside limits
D	Lab Dup/Rep precision outside limits
H	High bias

Appendix E: Evaluation of Potential Impact to River from Site Constituents in Groundwater – 2020 Data

Appendix F

Evaluation of Potential Impact to River from Site Constituents in Groundwater Patchogue Former MGP Site Patchogue, New York

As described in the First Quarter 2020 Groundwater Monitoring Report, some potentially MGP-related constituents were detected in the shallow groundwater (i.e., the upper ±18 feet) in the vicinity of the ISS mass during the first groundwater monitoring event following implementation of the site remedy. It is expected these constituents are a result of the short-term disturbance of the subsurface that occurred during implementation of the ISS and, their presence is temporary. Shallow groundwater generally flows from northwest to the south and southeast across the Site toward the Patchogue River (see Figure F-1 for a depiction of shallow groundwater flow). The concentrations of most of the constituents that were detected and potentially mobile in the dissolved phase in groundwater (benzene, ethylbenzene, xylenes and naphthalene) were below surface water quality criteria listed in the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004) that are applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). Therefore, they do not have the potential to impact the river. However, the concentration in groundwater of three potentially mobile constituents (acenaphthene, fluorene and pyrene) were slightly above their respective applicable surface water quality criteria. Although it was not anticipated that these constituent concentrations would result in an impact to surface water quality if they discharged to the river, the following analysis was conducted to confirm this.

An analysis was conducted to assess the potential for discharge of site-related constituents in shallow groundwater to impact water quality in the Patchogue River. The evaluation was conducted by estimating the rate at which a mass of site-related constituents, dissolved in groundwater, may be contributing to the surface water in the Patchogue River (i.e., the mass flux of constituents from groundwater to surface water). This approach is consistent with that described in the document entitled "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf = \Sigma C_i q_i A_i$$

Where: mf = total mass flux of dissolved constituent from the source (µg/sec)

C_i = concentration of the constituent (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec)

where: $q_i = Ki$, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (cm^2)

where: $A_i = (L)(b)$, with L=width of constituent plume perpendicular to flow and b=plume thickness

In applying this evaluation to the Site, an estimate of mass flux of a constituent (in µg/sec) was calculated shallow groundwater. The mass flux for the shallow groundwater was calculated across a cross-sectional flow area positioned at the downgradient side of the former MGP site, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line). The vertical dimension of the flow area is equal to the plume thickness (b) within the shallow groundwater. The horizontal dimension of the flow area, L, is equal to the width of the constituent plume, which is based on the isoconcentration contours developed from the results of the March 2020 sampling event (see Figures F-2 through F-4). The concentration of site constituents in the Patchogue River resulting from groundwater discharge was estimated using the following equation:

$$C_R = mf_{sgw}/D_R$$

Where: C_R = Concentration of constituent in the river (µg/L)

mf_{sgw} = Mass flux to the river from shallow groundwater (µg/s)

D_R = Patchogue River volumetric flow (L/s)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in river water concentration estimates that are biased high. These assumptions are as follows:

- The hydraulic gradient (i) of groundwater is variable across the Site and thus, the highest hydraulic gradient value was used in the calculation. The larger the value of i, the greater the calculated value of mass flux.
- The plume thickness (b) was estimated conservatively by using the distance from the top of the water table to the top of the well screen of a deeper well at a well couplet, yet the actual plume thickness may be somewhat less, as site constituents were either not detected or detected at very low levels in the deeper wells positioned adjacent to the river. The larger the value of b, the greater the calculated value of mass flux.
- The river volumetric flow value used to calculate in river concentrations (11.2 ft^3/s or 317 L/s) was derived using a 7Q10 flow analysis (the lowest 7-day average flow that occurs, on average, once every 10 years) for the period April 1, 1958 through March 31, 1968 using data from a USGS river gauging station proximal the Site (USGS 01306000, Patchogue River at Patchogue New York). Thus, it was assumed for this estimate that the flow rate in the river is equal to that during periods of very low flow, and the lower the assumed river flow, the greater the estimated concentration in the river water. For comparison, the mean river flow rate at the same river gauging location using data from 1945 to 1976 is 20.4 ft^3/s (579 L/s). Table F-1 provides the data used to determine the 7Q10 flow in the Patchogue River. Attachment F-1 presents the data plotted on log probability paper and the resultant 7Q10 flow value.

To screen for potential impacts to the river, the estimated concentrations of acenaphthene, fluorene and pyrene were developed using the above-described method and compared to the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004). Listed in the table below are standards and guidance values for acenaphthene, fluorene and pyrene that are applicable to the various classes of fresh water.

Fresh Surface Water Standards and Guidance Values

Substance	Water Class (per 6NYCRR Part 701)	Standard (µg/l)	Guidance Value (µg/l)	Protection for:
Acenaphthene	A, A-S, AA, AA-S, B, C	--	5.3	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	48	Fish survival
	A, A-S, AA, AA-S	20	--	Aesthetics
Fluorene	A, A-S, AA, AA-S	--	50	Drinking water source
	A, A-S, AA, AA-S, B, C	--	0.54	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	4.8	Fish survival
Pyrene	A, A-S, AA, AA-S	--	50	Drinking water source
	A, A-S, AA, AA-S, B, C	--	4.6	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	42	Fish survival

Attachments F-2 through F-4 contain the calculations and results for each of these constituents. The estimated concentrations in the Patchogue River resulting from site groundwater impacts are as follows:

- Acenaphthene = 0.0033 µg/L
- Fluorene = 0.00050 µg/L
- Pyrene = 0.00127 µg/L

These conservatively-estimated (i.e., biased high) concentrations are three orders of magnitude below the surface water standards and guidance values listed above, including the lowest standard applicable to Class C surface waters. Also, the estimated concentration of fluorene is below the analytical laboratory detection limits for this constituent. Based on the evaluation conducted, site-related constituents in shallow groundwater do not impact surface water quality in the Patchogue River.

Tables

TABLE F-1
SUMMARY OF DATA USED TO CALCULATE 7Q10 FLOW IN PATCHOGUE RIVER
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Water Year[(1)]	Low Flow (ft^3/s)	Rank	Probability
1961	20.1	1	0.091
1958	19.1	2	0.182
1960	16.9	3	0.273
1962	16.6	4	0.364
1959	16.0	5	0.455
1967	14.4	6	0.545
1964	13.6	7	0.636
1965	12.9	8	0.727
1963	12.4	9	0.818
1966	11.1	10	0.909

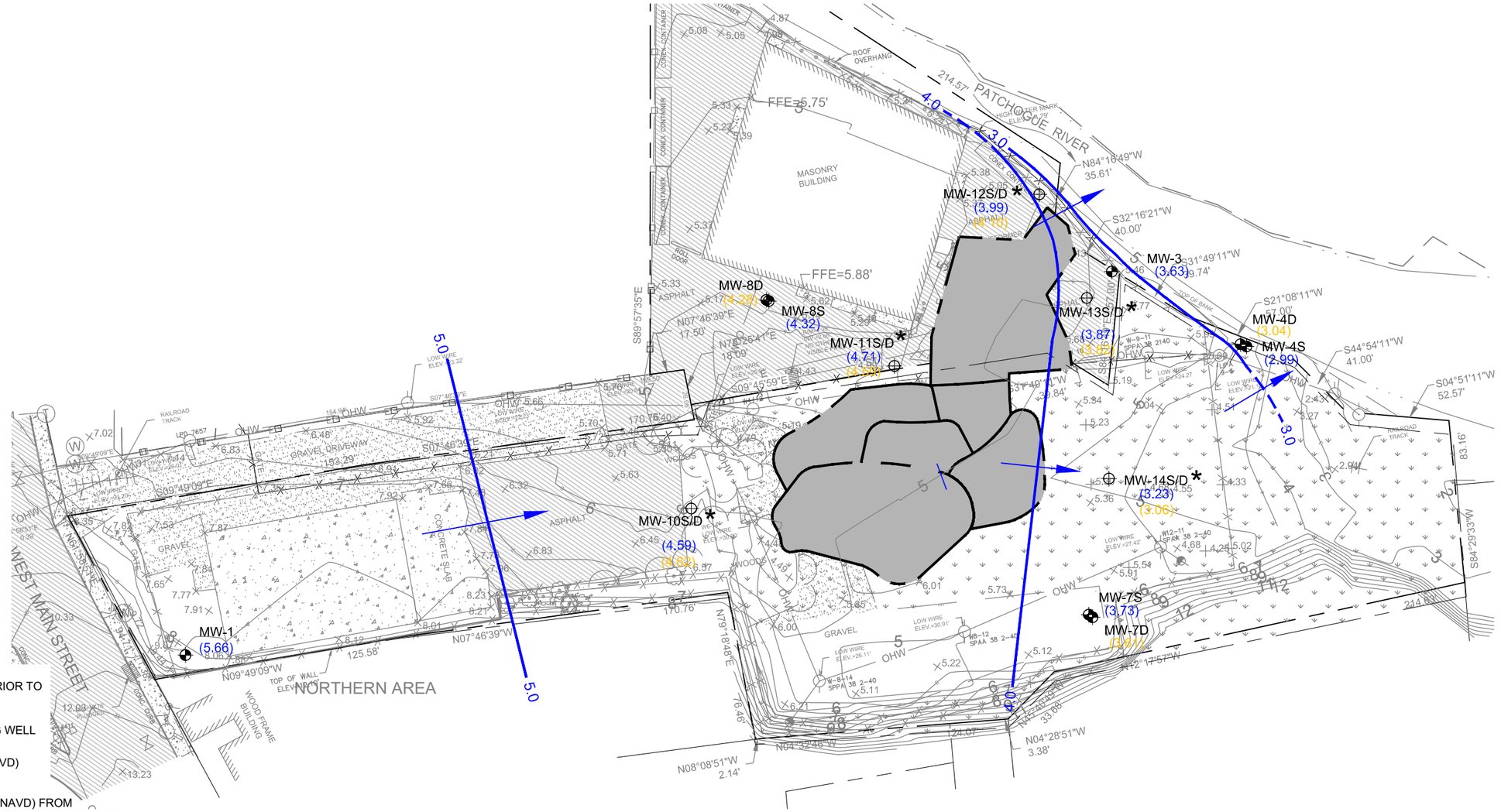
Notes:
(1) - 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through 3/31/1968.

ft^3/s - cubic feet per second

Figures

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- x x FENCE
- 10 TOPOGRAPHIC CONTOUR
- MONITORING WELL INSTALLED PRIOR TO REMEDIATION
- POST-REMEDIATION MONITORING WELL
- 4 WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (3.87) GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE)
- (3.06) GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- * HORIZONTAL LOCATION AND POSTED GROUNDWATER ELEVATION DATA IS APPROXIMATE, AS SURVEYING OF WELLS WILL BE PERFORMED FOLLOWING COMPLETION OF FINAL SITE RESTORATION ACTIVITIES.

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: May 6, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

WATER TABLE ELEVATION CONTOUR MAP MARCH 17, 2020

FIGURE

F-1

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL INSTALLED PRIOR TO REMEDIATION
- POST-REMEDIATION MONITORING WELL
- 4 — WATER TABLE CONTOUR (FT., NAVD) - MARCH 17, 2020 DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 1 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L)
- 12 — ACENAPHTHENE CONCENTRATION IN GROUNDWATER (µg/L) - MARCH 2020
- J — ESTIMATED CONCENTRATION
- ND — NOT DETECTED

LINE OF CROSS-SECTIONAL AREA FOR MASS FLUX ESTIMATE

MW-1 ND

MW-3 5

MW-4D 0.01J

MW-4S 12

MW-7D ND

MW-7S 0.08

MW-8D ND

MW-8S 0.09

MW-10S/D ND ND

MW-11S/D 56 0.06

MW-12S/D 0.10 ND

MW-13S/D 36 ND

MW-14S/D 0.4 ND

PATCHOGUE RIVER

WEST MAIN STREET

NORTHERN AREA

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: May 6, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

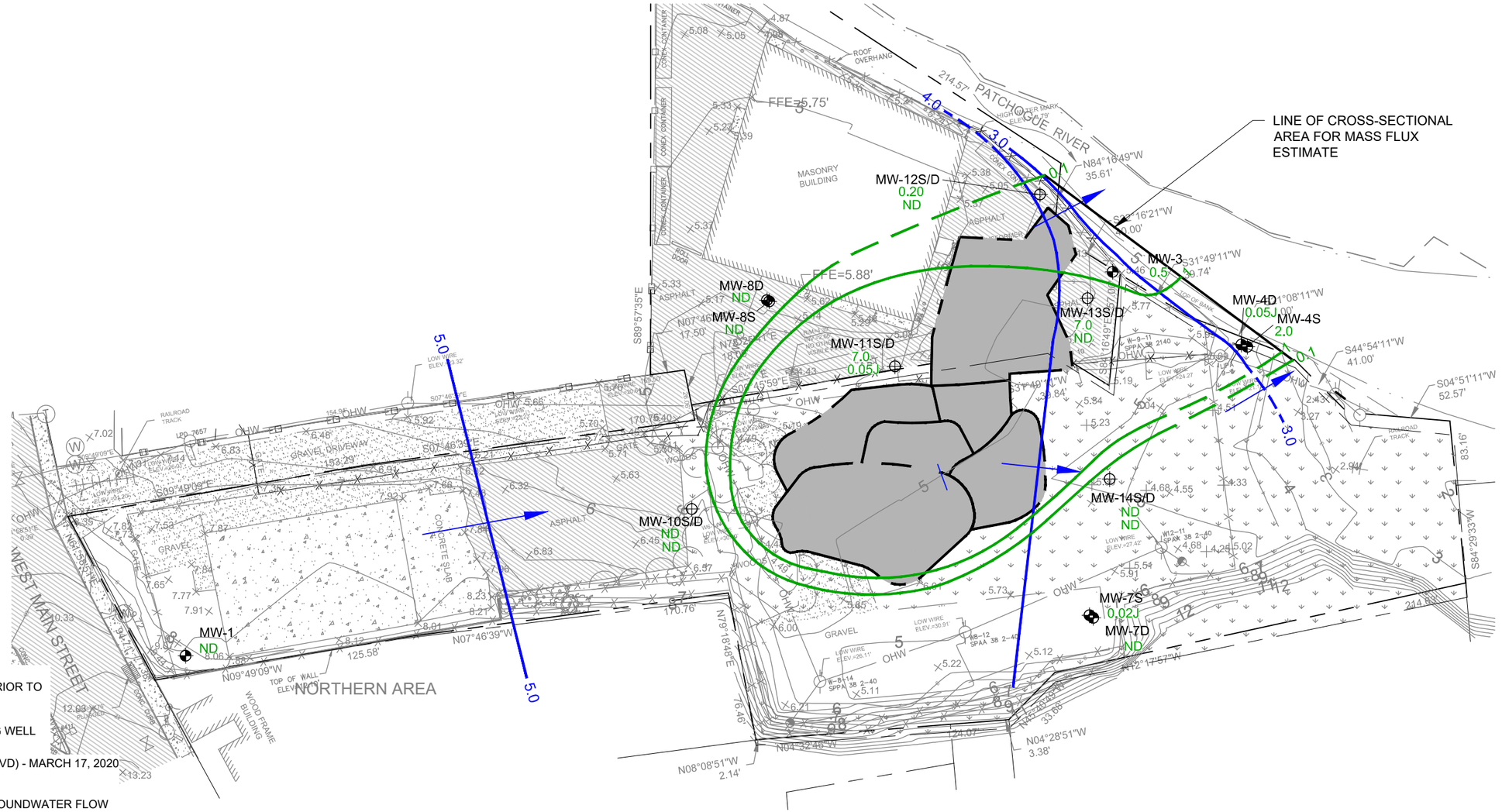
ACENAPHTHENE IN GROUNDWATER MARCH 2020

FIGURE

F-2

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL INSTALLED PRIOR TO REMEDIATION
- POST-REMEDIATION MONITORING WELL
- 4 — WATER TABLE CONTOUR (FT., NAVD) - MARCH 17, 2020 DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 1 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L)
- 0.5 — FLUORENE CONCENTRATION IN GROUNDWATER (µg/L) - MARCH 2020
- J — ESTIMATED CONCENTRATION
- ND — NOT DETECTED

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: May 6, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

FLUORENE IN GROUNDWATER MARCH 2020

FIGURE

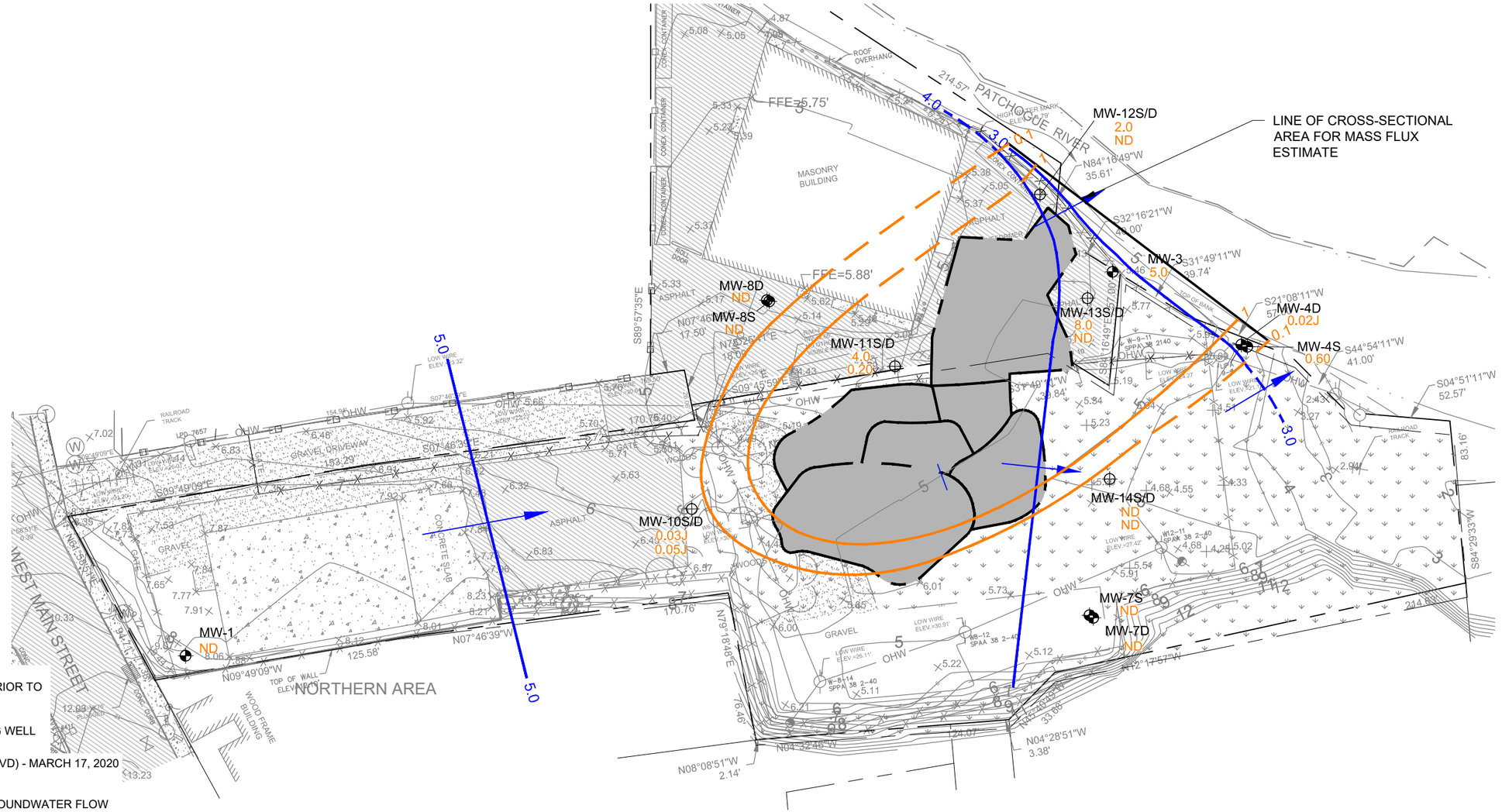
F-3

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL INSTALLED PRIOR TO REMEDIATION
- POST-REMEDIATION MONITORING WELL
- WATER TABLE CONTOUR (FT., NAVD) - MARCH 17, 2020 DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L)
- PYRENE CONCENTRATION IN GROUNDWATER (µg/L) - MARCH 2020
- ESTIMATED CONCENTRATION
- NOT DETECTED



NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: May 6, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

PYRENE IN GROUNDWATER MARCH 2020

FIGURE

F-4

Attachments

probability x 2 log cycles

RECURRENCE INTERVAL (yrs)

1.1 2 5 10

99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01

11.2 ft³/s

YEARLY 7 CONSECUTIVE DAY FLOW (ft³/s)

0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99

PROBABILITY OF LARGER FLOW (%)

ATTACHMENT F-2
MASS FLUX CALCULATIONS - ACENAPHTHENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Acenaphthene (March 2020) **Figure No.** See Figure F-2

$mf = kiA * C$

Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

						Contour Interval	Geomean	Segment Length	Segment Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	0.1			
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	1	0.32	36	18
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours	10	3.16	90	18
L =	36	ft =	1097.28	cm	Length of segment between selected contours [C]	12	10.95	45	18
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	1.5E-02	µg/s	4.8E-01	g/yr	0.00105 lbs/yr				

1-10 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	3.16	µg/L =	0.003162278	µg/cm^3	Geometric mean concentration between selected contours
L =	90	ft =	2743.2	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	3.8E-01	µg/s	1.2E+01	g/yr	0.0262 lbs/yr

10-12 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	10.95	µg/L =	0.010954451	µg/cm^3	Geometric mean concentration between selected contours
L =	45	ft =	1371.6	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	6.5E-01	µg/s	2.1E+01	g/yr	0.045 lbs/yr
mf_{sgw} =	1	µg/s	33	g/yr	0.1 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.0033 µg/L

ATTACHMENT F-3
MASS FLUX CALCULATIONS - FLUORENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Fluorene (March 2020) **Figure No.** See Figure F-3

$mf = kiA * C$

Where:
- mf = mass flux, µg/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, $cm^{2\,(L * b)}$
- C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	**Contour Interval**	**Geomean**
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	0.1	
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours	1	0.32
L =	90	ft =	2743.2	cm	Length of segment between selected contours [C]	2	1.41
b =	18	ft =	548.64	cm	Saturated thickness		

Segment Length	**Thickness**
90	18
65	18

mf =	3.8E-02	µg/s	1.2E+00	g/yr	0.00262 lbs/yr

1-2 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	1.41	µg/L =	0.001414214	µg/cm^3	Geometric mean concentration between selected contours
L =	65	ft =	1981.2	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness

mf =	1.2E-01	µg/s	3.8E+00	g/yr	0.0085 lbs/yr
mf_{sgw} =	0	µg/s	5	g/yr	0.0 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
- D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
- mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.00050 µg/L

ATTACHMENT F-4
MASS FLUX CALCULATIONS - PYRENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Pyrene (March 2020) **Figure No.** See Figure F-4

$mf = kiA * C$

Where:
- mf = mass flux, µg/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, $cm^{2\,(L * b)}$
- C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

								Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells			0.1			
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours			1	0.32	38	18
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours			5	2.24	130	18
L =	38	ft =	1158.24	cm	Length of segment between selected contours [C]						
b =	18	ft =	548.64	cm	Saturated thickness						
mf =	1.6E-02	µg/s	5.0E-01	g/yr	0.00111	lbs/yr					

1-5 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells		
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours		
C=	2.24	µg/L =	0.002236068	µg/cm^3	Geometric mean concentration between selected contours		
L =	130	ft =	3962.4	cm	Length of segment between selected contours [C]		
b =	18	ft =	548.64	cm	Saturated thickness		
mf =	3.9E-01	µg/s	1.2E+01	g/yr	0.0268	lbs/yr	
mf_{sgw} =	0	µg/s	13	g/yr	0.0	lbs/yr	

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
- D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
- mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.00127 µg/L

Appendix G

Evaluation of Potential Impact to River from Site Constituents in Groundwater Patchogue Former MGP Site Patchogue, New York

As described in the Second Quarter 2020 Groundwater Monitoring Report, some potentially MGP-related constituents were detected in the shallow groundwater (i.e., the upper ±18 feet) in the vicinity of the ISS mass during the second groundwater monitoring event following implementation of the site remedy. It is expected these constituents are a result of the disturbance of the subsurface that occurred during implementation of the ISS and, their presence is temporary. Shallow groundwater generally flows from northwest to the south and southeast across the Site toward the Patchogue River (see Figure G-1 for a depiction of shallow groundwater flow). The concentrations of most of the constituents that were detected and potentially mobile in the dissolved phase in groundwater (benzene and ethylbenzene) were below surface water quality criteria listed in the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004) that are applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). Therefore, they do not have the potential to impact the water quality in the river. However, the concentration in groundwater of four potentially mobile constituents (acenaphthene, fluorene, naphthalene and pyrene) were above their respective applicable surface water quality criteria. Although it was not anticipated that these constituent concentrations would result in an impact to surface water quality if they discharged to the river, a mass flux analysis was conducted to confirm this. The concentrations of acenaphthene, fluorene and pyrene in the June 2020 samples were similar (within the same order of magnitude) to those in the March 2020 samples. Since the estimated surface water concentrations of these three constituents based on the mass flux analysis using the March 2020 data (see Appendix F) were three orders of magnitude below applicable surface water criteria, an additional estimation of concentrations of these constituents in the river is not necessary, and the analysis discussed herein was conducted for naphthalene only.

An analysis was conducted to assess the potential for discharge of naphthalene in shallow groundwater to impact water quality in the Patchogue River. The evaluation was conducted by estimating the rate at which a mass of naphthalene, dissolved in groundwater, may be contributing to the surface water in the Patchogue River (i.e., the mass flux of constituents from groundwater to surface water). This approach is consistent with that described in the document entitled "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf=\Sigma\ C_i q_i A_i$$

Where: mf = total mass flux of dissolved constituent from the source (µg/sec)

C_i = concentration of the constituent (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec)

where: $q_i=Ki$, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (figure cm^2)

where: $A_i=(L)(b)$, with L=width of constituent plume perpendicular to flow and b=plume thickness

In applying this evaluation to the Site, an estimate of mass flux of a constituent (in µg/sec) was calculated for shallow groundwater. The mass flux for the shallow groundwater was calculated across a cross-sectional flow area positioned at the downgradient side of the former MGP site, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line). The vertical dimension of the flow area is equal to the plume thickness (b) within the shallow groundwater. The horizontal dimension of the flow area, L, is equal to the width of the constituent plume, which is based on the isoconcentration contours developed from the results of the June 2020 sampling event (see Figure G-2). The concentration of site constituents in the Patchogue River resulting from groundwater discharge was estimated using the following equation:

$$C_R=mf_{sgw}/D_R$$

Where: C_R = Concentration of constituent in the river (µg/L)

mf_{sgw} = Mass flux to the river from shallow groundwater (µg/s)

D_R = Patchogue River volumetric flow (L/s)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in river water concentration estimates that are biased high. These assumptions are as follows:

- The hydraulic gradient (i) of groundwater is variable across the Site and thus, the highest hydraulic gradient value was used in the calculation. The larger the value of i, the greater the calculated value of mass flux.
- The plume thickness (b) was estimated conservatively by using the distance from the top of the water table to the top of the well screen of a deeper well at a well couplet, yet the actual plume thickness may be somewhat less, as site constituents were either not detected or detected at very low levels in the deeper wells positioned adjacent to the river. The larger the value of b, the greater the calculated value of mass flux.
- The river volumetric flow value used to calculate in river concentrations (11.2 ft^3/s or 317 L/s) was derived using a 7Q10 flow analysis (the lowest 7-day average flow that occurs, on average, once every 10 years) for the period April 1, 1958 through March 31, 1968 using data from a USGS river gauging station proximal the Site (USGS 01306000, Patchogue River at Patchogue New York). Thus, it was assumed for this estimate that the flow rate in the river is equal to that during periods of very low flow, and the lower the assumed river flow, the greater the estimated concentration in the river water. For comparison, the mean river flow rate at the same river gauging location using data from 1945 to 1976 is 20.4 ft^3/s (579 L/s). Table G-1 provides the data used to determine the 7Q10 flow in the Patchogue River. Attachment G-1 presents the data plotted on log probability paper and the resultant 7Q10 flow value.

To screen for potential impacts to the river, the estimated concentration of naphthalene was calculated using the above-described method and compared to the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004). Listed in the table below are standards and guidance values for naphthalene that are applicable to the various classes of fresh water.

Fresh Surface Water Standards and Guidance Values

Substance	Water Class (per 6NYCRR Part 701)	Standard (µg/l)	Guidance Value (µg/l)	Protection for:
Naphthalene	A, A-S, AA, AA-S, B, C	--	13	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	110	Fish survival
	A, A-S, AA, AA-S	10	--	Aesthetics

Attachment G-2 contains the calculations and results for this constituent. The estimated concentration of naphthalene in the Patchogue River resulting from site groundwater impacts is 0.0197 µg/L. This conservatively-estimated (i.e., biased high) concentration is three orders of magnitude below the surface water standards and guidance values listed above, including the lowest standard applicable to Class C surface waters. Also, the estimated concentration is below the analytical laboratory detection limits for this constituent. Based on the evaluation conducted, site-related constituents in shallow groundwater do not impact surface water quality in the Patchogue River.

Tables

TABLE G-1
SUMMARY OF DATA USED TO CALCULATE 7Q10 FLOW IN PATCHOGUE RIVER
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Water Year[(1)]	Low Flow (ft^3/s)	Rank	Probability
1961	20.1	1	0.091
1958	19.1	2	0.182
1960	16.9	3	0.273
1962	16.6	4	0.364
1959	16.0	5	0.455
1967	14.4	6	0.545
1964	13.6	7	0.636
1965	12.9	8	0.727
1963	12.4	9	0.818
1966	11.1	10	0.909

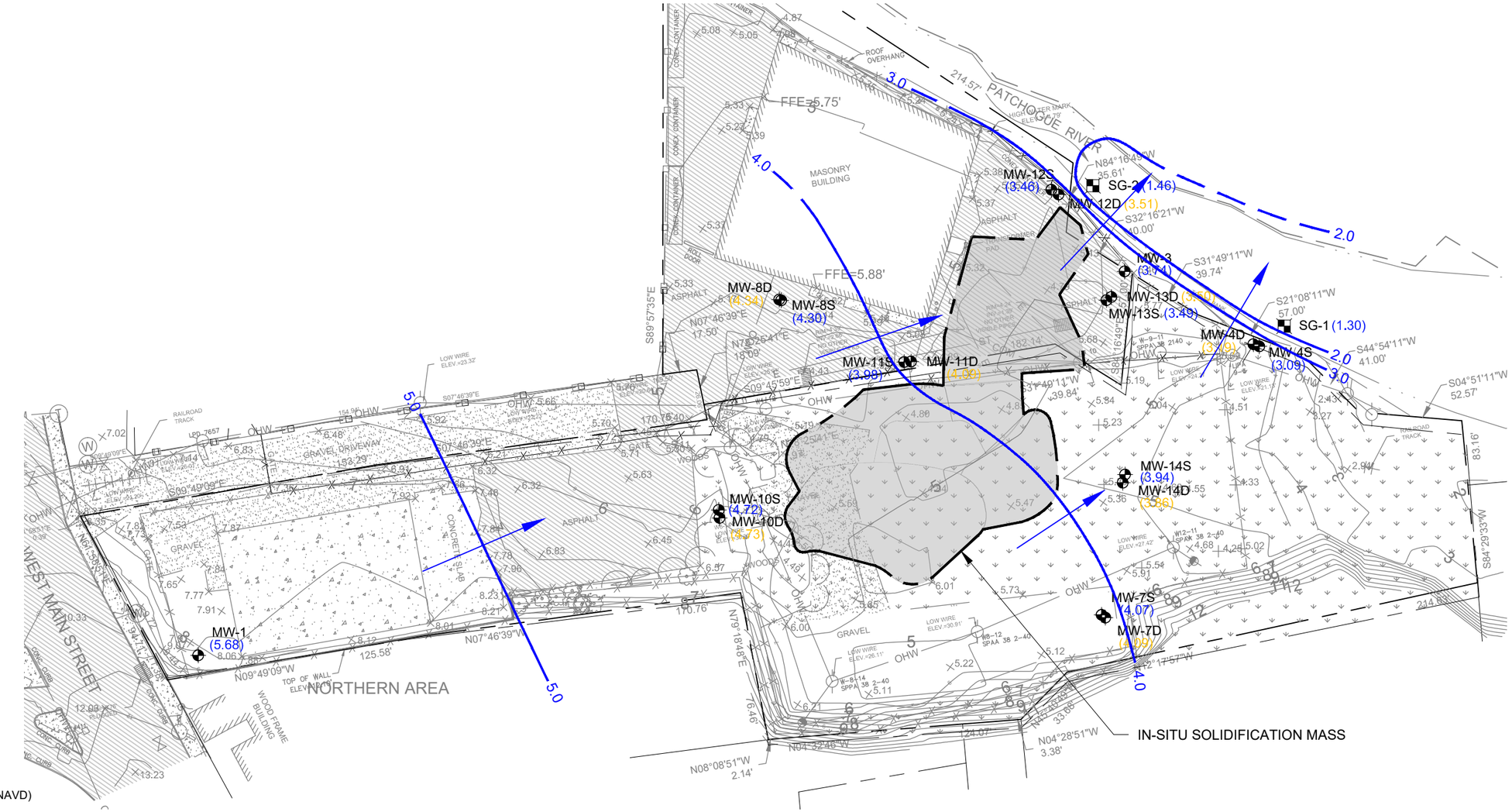
Notes:
(1) - 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through 3/31/1968.

ft^3/s - cubic feet per second

Figures

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (4.30) — GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE) OR RIVER LEVEL FROM STAFF GAUGE (FT., NAVD).
- (4.34) — GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: July 29, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

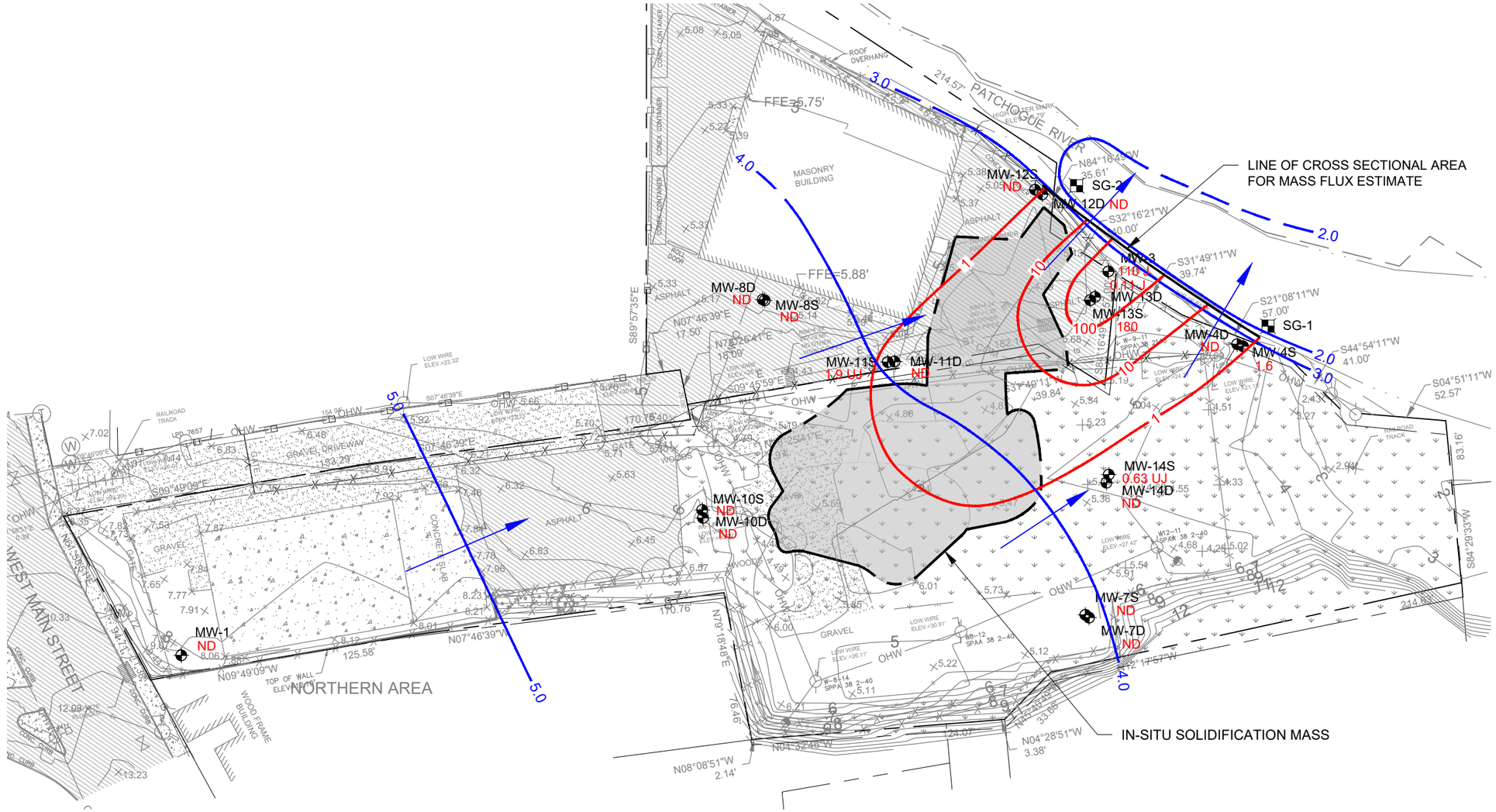
WATER TABLE ELEVATION CONTOUR MAP
JUNE 29, 2020

FIGURE

G-1

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 10 — ISOCONCENTRATION CONTOUR. LOGARITHMIC CONTOUR INTERVAL (µg/L)
- 1.6 — NAPHTHALENE CONCENTRATION IN GROUNDWATER (µg/L) - JUNE 2020
- J — ESTIMATED CONCENTRATION
- ND — NOT DETECTED

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: September 11, 2020

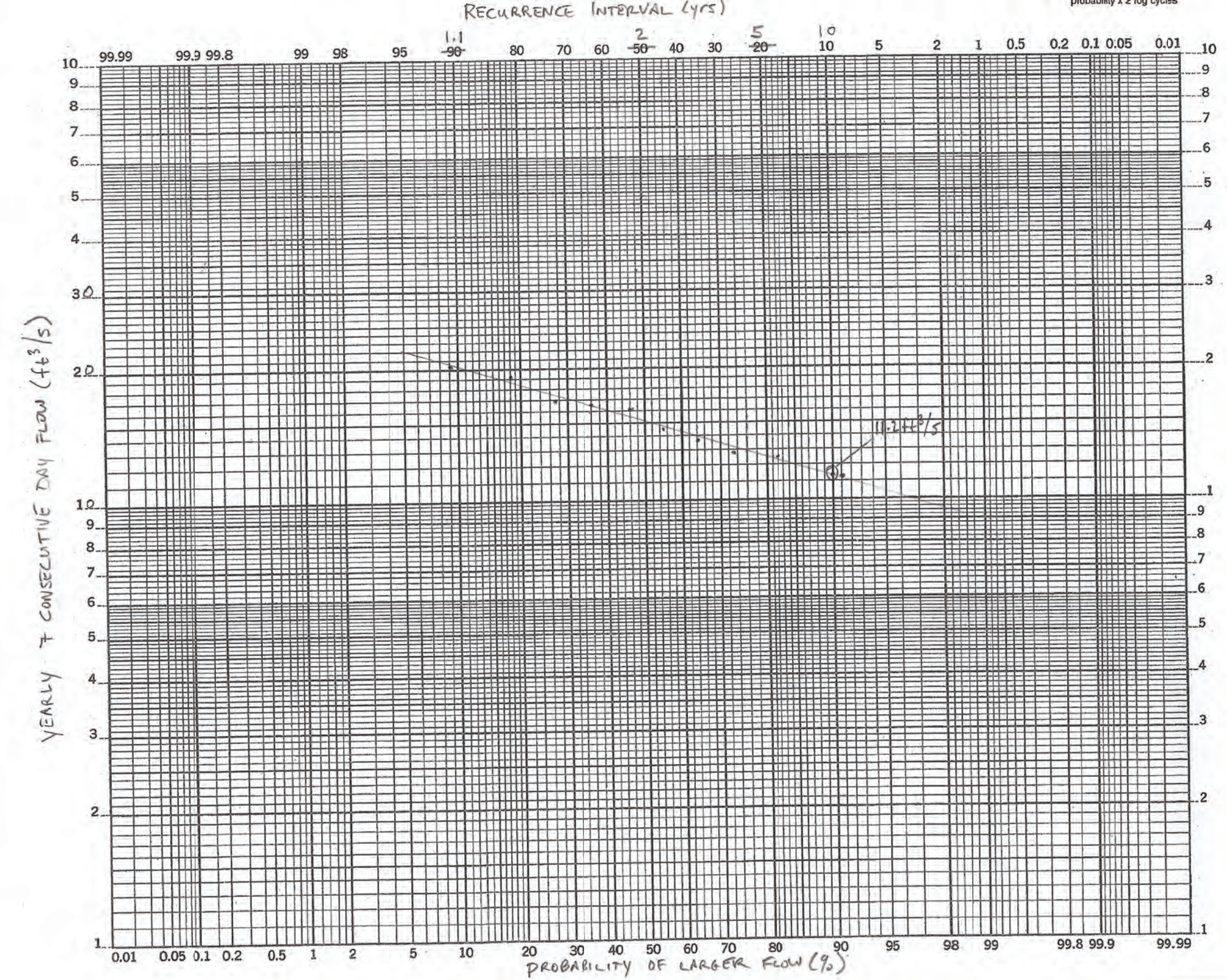
NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

NAPHTHALENE IN GROUNDWATER JUNE 2020

FIGURE

G-2

Attachments


RECURRENCE INTERVAL (yrs)
1.1
2
5
10
99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01
YEARLY 7 CONSECUTIVE DAY FLOW (ft³/s)
11.2 ft³/s
0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99
PROBABILITY OF LARGER FLOW (%)

ATTACHMENT G-2
MASS FLUX CALCULATIONS - NAPHTHALENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Naphthalene (June 2020) **Figure No.** See Figure G-2

$mf = kiA * C$

Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=$µg/cm^3$

Shallow Groundwater Flux

1-10 Contour

						Contour Interval	Geomean	Segment Length	Segment Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells				
i =	0.014	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	1			
C=	3.16	µg/L =	0.00316	$µg/cm^3$	Geometric mean concentration between selected contours	10	3.16	66	18
L =	66	ft =	2011.68	cm	Length of segment between selected contours [C]	100	31.62	32	18
b =	18	ft =	548.64	cm	Saturated thickness	110	104.88	30	18
mf =	3.0E-01	µg/s	9.4E+00	g/yr	0.02070 lbs/yr				

10-100 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.014	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	31.62	µg/L =	0.0316	$µg/cm^3$	Geometric mean concentration between selected contours
L =	32	ft =	975.36	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	1.4E+00	µg/s	4.6E+01	g/yr	0.1003 lbs/yr

100-110 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.014	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	104.88	µg/L =	0.105	$µg/cm^3$	Geometric mean concentration between selected contours
L =	30	ft =	914.4	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	4.5E+00	µg/s	1.4E+02	g/yr	0.312 lbs/yr
mf_{sgw} =	6	µg/s	197	g/yr	0.4 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.0197 µg/L

Appendix E

Evaluation of Potential Impact to River from Site Constituents in Groundwater Patchogue Former MGP Site Patchogue, New York

As described in the Third Quarter 2020 Groundwater Monitoring Report, some potentially MGP-related constituents were detected in the shallow groundwater (i.e., the upper ±18 feet) in the vicinity of the ISS mass during the first groundwater monitoring event following implementation of the site remedy. It is expected these constituents are a result of the short-term disturbance of the subsurface that occurred during implementation of the ISS and, their presence is temporary. Shallow groundwater generally flows from northwest to the south and southeast across the Site toward the Patchogue River (see Figure E-1 for a depiction of shallow groundwater flow). The concentrations of most of the constituents that were detected and potentially mobile in the dissolved phase in groundwater (benzene and ethylbenzene) were below surface water quality criteria listed in the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004) that are applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). Therefore, they do not have the potential to impact the river. However, the concentration of six constituents (acenaphthene, benzo(a)anthracene, fluorene, naphthalene, phenanthrene and pyrene) were detected above their respective applicable surface water quality criteria in downgradient monitoring wells proximal to the river (MW-3 and MW-4S). Although it was not anticipated that these constituent concentrations would result in an impact to surface water quality if they discharged to the river, the following analysis was conducted to confirm this. The concentrations of acenaphthene and naphthalene in the September 2020 samples were similar (within the same order of magnitude) to those in the March and June 2020 samples. Since the estimated surface water concentrations of these two constituents based on the mass flux analysis using the March and June 2020 data were three orders of magnitude below applicable surface water criteria, an additional estimation of concentrations of these constituents in the river is not necessary. However, due to increased concentrations of benzo(a)anthracene, fluorene, phenanthrene and pyrene in MW-3, an additional analysis was conducted for these constituents.

An analysis was conducted to assess the potential for discharge of site-related constituents in shallow groundwater to impact water quality in the Patchogue River. The evaluation was conducted by estimating the rate at which a mass of site-related constituents, dissolved in groundwater, may be contributing to the surface water in the Patchogue River (i.e., the mass flux of constituents from groundwater to surface water). This approach is consistent with that described in the document entitled "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf = \Sigma C_i q_i A_i$$

Where: mf = total mass flux of dissolved constituent from the source (µg/sec)

C_i = concentration of the constituent (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec)

where: q_i=Ki, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (cm^2)

where: A_i=(L)(b), with L=width of constituent plume perpendicular to flow and b=plume thickness

In applying this evaluation to the Site, an estimate of mass flux of a constituent (in µg/sec) was calculated shallow groundwater. The mass flux for the shallow groundwater was calculated across a cross-sectional flow area positioned at the downgradient side of the former MGP site, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line). The vertical dimension of the flow area is equal to the plume thickness (b) within the shallow groundwater. The horizontal dimension of the flow area, L, is equal to the width of the constituent plume, which is based on the isoconcentration contours developed from the results of the September 2020 sampling event (see Figures E-2 through E-5). The concentration of site constituents in the Patchogue River resulting from groundwater discharge was estimated using the following equation:

$$C_R = mf_{sgw}/D_R$$

Where: C_R = Concentration of constituent in the river (µg/L)

mf_{sgw} = Mass flux to the river from shallow groundwater (µg/s)

D_R = Patchogue River volumetric flow (L/s)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in river water concentration estimates that are biased high. These assumptions are as follows:

- The hydraulic gradient (i) of groundwater is variable across the Site and thus, the highest hydraulic gradient value was used in the calculation. The larger the value of i, the greater the calculated value of mass flux.
- The plume thickness (b) was estimated conservatively by using the distance from the top of the water table to the top of the well screen of a deeper well at a well couplet, yet the actual plume thickness may be somewhat less, as site constituents were either not detected or detected at very low levels in the deeper wells positioned adjacent to the river. The larger the value of b, the greater the calculated value of mass flux.
- The river volumetric flow value used to calculate in river concentrations (11.2 ft^3/s or 317 L/s) was derived using a 7Q10 flow analysis (the lowest 7-day average flow that occurs, on average, once every 10 years) for the period April 1, 1958 through March 31, 1968 using data from a USGS river gauging station proximal the Site (USGS 01306000, Patchogue River at Patchogue New York). Thus, it was assumed for this estimate that the flow rate in the river is equal to that during periods of very low flow, and the lower the assumed river flow, the greater the estimated concentration in the river water. For comparison, the mean river flow rate at the same river gauging location using data from 1945 to 1976 is 20.4 ft^3/s (579 L/s). Table F-1 provides the data used to determine the 7Q10 flow in the Patchogue River. Attachment F-1 presents the data plotted on log probability paper and the resultant 7Q10 flow value.

To screen for potential impacts to the river, the estimated concentrations of benzo(a)anthracene, fluorene, phenanthrene and pyrene were developed using the above-described method and compared to the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004). Listed in the table below are standards and guidance values for benzo(a)anthracene, fluorene, phenanthrene and pyrene that are applicable to Class C Fresh Water (no standards have been developed for these compounds).

Class C Fresh Surface Water Standards and Guidance Values

Substance	Water Class (per 6NYCRR Part 701)	Standard (µg/l)	Guidance Value (µg/l)	Protection for:
Benzo(a)anthracene	A, A-S, AA, AA-S, B, C	--	0.03	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	0.23	Fish survival
Fluorene	A, A-S, AA, AA-S, B, C	--	0.54	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	4.8	Fish survival
Phenanthrene	A, A-S, AA, AA-S, B, C	--	5.0	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	45	Fish survival
Pyrene	A, A-S, AA, AA-S, B, C	--	4.6	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	42	Fish survival

Attachments E-2 through E-5 contain the calculations and results for each of these constituents. The estimated concentrations in the Patchogue River resulting from site groundwater impacts are as follows:

- Benzo(a)anthracene = 0.0008 µg/L
- Fluorene = 0.003 µg/L
- Phenanthrene = 0.001 µg/L
- Pyrene = 0.007 µg/L

These conservatively-estimated (i.e., biased high) concentrations are below the surface water standards and guidance values listed above, including the lowest standard applicable to Class C surface waters. Also, the estimated concentrations are below the analytical laboratory detection limits for these constituents. Based on the evaluation conducted, site-related constituents in shallow groundwater do not impact surface water quality in the Patchogue River.

Tables

TABLE E-1
SUMMARY OF DATA USED TO CALCULATE 7Q10 FLOW IN PATCHOGUE RIVER
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Water Year[(1)]	Low Flow (ft^3/s)	Rank	Probability
1961	20.1	1	0.091
1958	19.1	2	0.182
1960	16.9	3	0.273
1962	16.6	4	0.364
1959	16.0	5	0.455
1967	14.4	6	0.545
1964	13.6	7	0.636
1965	12.9	8	0.727
1963	12.4	9	0.818
1966	11.1	10	0.909

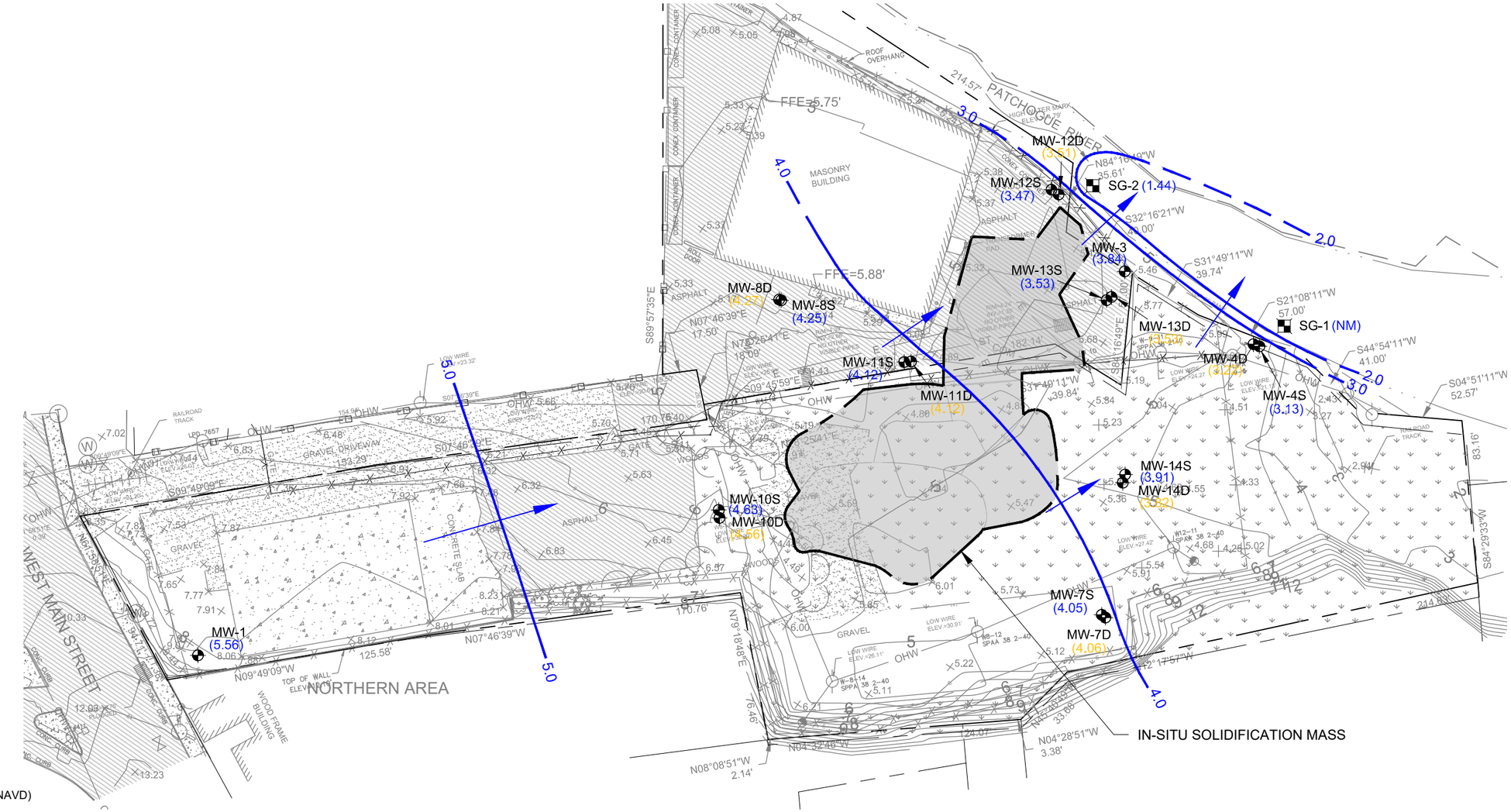
Notes:
(1) - 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through 3/31/1968.

ft^3/s - cubic feet per second

Figures

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (4.30) — GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE) OR RIVER LEVEL FROM STAFF GAUGE (FT., NAVD).
- (4.34) — GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: July 29, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

WATER TABLE ELEVATION CONTOUR MAP SEPTEMBER, 2020

FIGURE

E-1

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) - SEPTEMBER 28, 2020 - DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 2.4 — BENZO(a)ANTHRACENE CONCENTRATION IN GROUNDWATER (µg/L) - SEPTEMBER 2020
- ND — NOT DETECTED
- J — ESTIMATED CONCENTRATION
- 1 — ISOCONCENTRATION CONTOUR. LOGARITHMIC CONTOUR INTERVAL (µg/L).

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

LINE OF CROSS-SECTIONAL AREA FOR MASS FLUX ESTIMATE

IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

Brown AND Caldwell	SCALE: 1" = 60' 153021 DATE: November 17, 2020	NATIONAL GRID PATCHOGUE FORMER MGP SITE VILLAGE OF PATCHOGUE, NEW YORK	BENZO(a)ANTHRACENE IN GROUNDWATER (µg/L) SEPTEMBER 2020	FIGURE E-2

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) - SEPTEMBER 28, 2020 - DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 10 — FLUORENE CONCENTRATION IN GROUNDWATER (µg/L) - SEPTEMBER 2020
- ND — NOT DETECTED
- 10 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L).

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

LINE OF CROSS-SECTIONAL AREA FOR MASS FLUX ESTIMATE

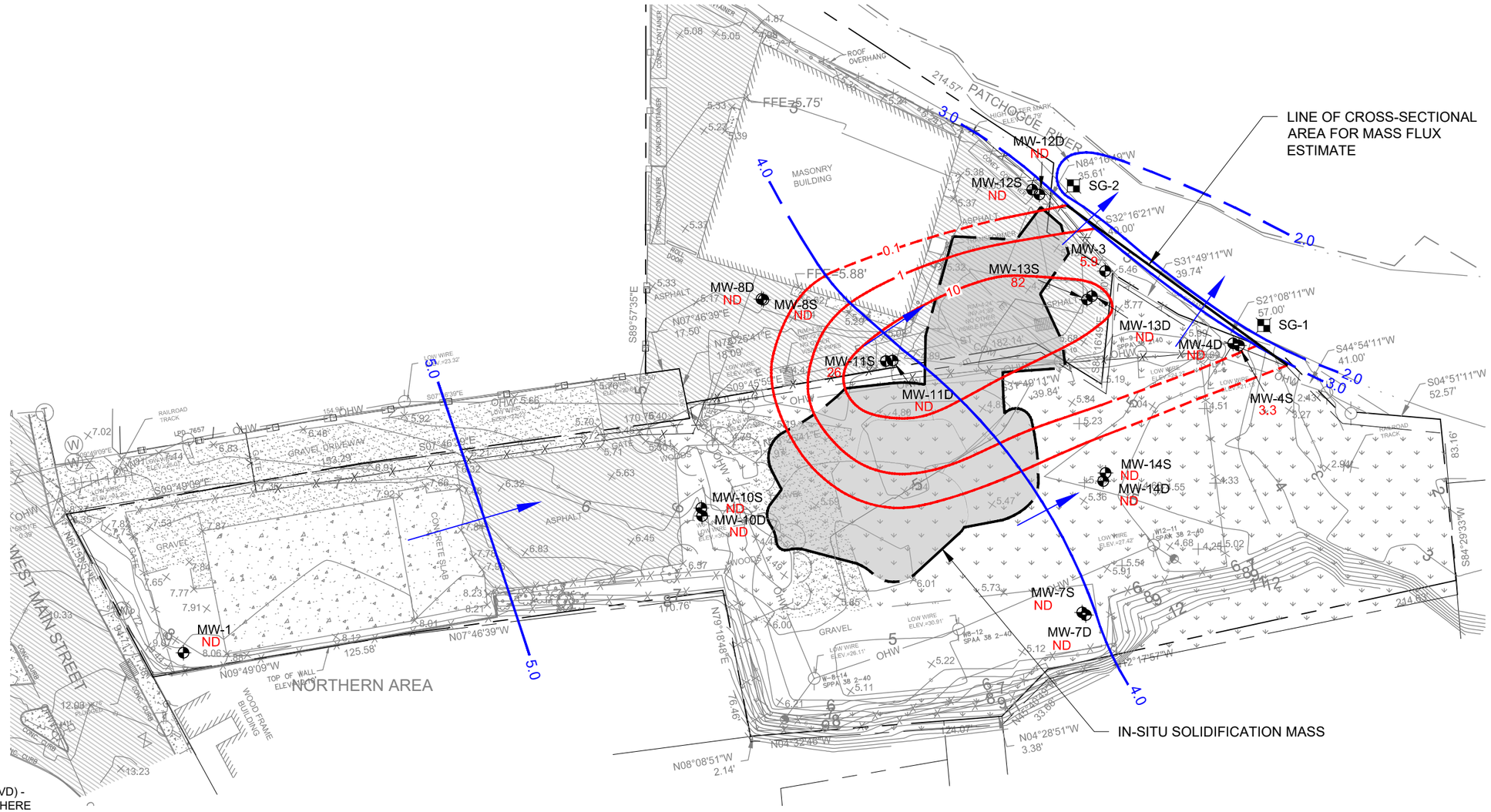
IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

Brown AND Caldwell	SCALE: 1" = 60' 153021 DATE: November 17, 2020	NATIONAL GRID PATCHOGUE FORMER MGP SITE VILLAGE OF PATCHOGUE, NEW YORK	FLUORENE IN GROUNDWATER (µg/L) SEPTEMBER 2020	FIGURE E-3

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) - SEPTEMBER 28, 2020 - DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 5.9 — PHENANTHRENE CONCENTRATION IN GROUNDWATER (µg/L) - SEPTEMBER 2020
- ND — NOT DETECTED
- 10 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L).

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: November 17, 2020

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

PHENANTHRENE IN GROUNDWATER (µg/L) SEPTEMBER 2020

FIGURE

E-4

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) - SEPTEMBER 28, 2020 - DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW
- 17 — PYRENE CONCENTRATION IN GROUNDWATER (µg/L) - SEPTEMBER 2020
- ND — NOT DETECTED
- 10 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L).

NOTES:

1. BASE MAP INFORMATION OBTAINED FROM TETRA TECH EC, INC. DRAWING ENTITLED "CONCEPTUAL SITE MODEL", DATED DECEMBER 17, 2008.

LINE OF CROSS-SECTIONAL AREA FOR MASS FLUX ESTIMATE

IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

Brown AND Caldwell	SCALE: 1" = 60' 153021 DATE: November 17, 2020	NATIONAL GRID PATCHOGUE FORMER MGP SITE VILLAGE OF PATCHOGUE, NEW YORK	PYRENE IN GROUNDWATER (µg/L) SEPTEMBER 2020	FIGURE E-5

Attachments

probability x 2 log cycles

RECURRENCE INTERVAL (yrs)

1.1 2 5 10

99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01

11.2 ft³/s

YEARLY 7 CONSECUTIVE DAY FLOW (ft³/s)

0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99

PROBABILITY OF LARGER FLOW (%)

ATTACHMENT E-2
MASS FLUX CALCULATIONS - BENZO(A)ANTHRACENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Benzon(a)anthracene (September 2020) **Figure No.** See Figure E-2

mf = kiA * C
Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\ (L * b)}$
C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

						Contour Interval		Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells		Geomean		
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	0.1			
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours	1	0.32	34	18
L =	34	ft =	1036.32	cm	Length of segment between selected contours [C]	4.8	2.19	80	18
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	1.4E-02	µg/s	4.5E-01	g/yr	0.00099 lbs/yr				

1-4.8 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	2.19	µg/L =	0.00219089	µg/cm^3	Geometric mean concentration between selected contours
L =	80	ft =	2438.4	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	2.3E-01	µg/s	7.3E+00	g/yr	0.0161 lbs/yr
mf_{sgw} =	0.25	µg/s	7.8	g/yr	0.017 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.0008 µg/L

ATTACHMENT E-3
MASS FLUX CALCULATIONS - FLUORENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Fluorene (September 2020) **Figure No.** See Figure E-3

mf = kiA * C
Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

						Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	0.1			
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	1	0.32	32	18
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours	10	3.16	46	18
L =	32	ft =	975.36	cm	Length of segment between selected contours [C]	10	10.00	60	18
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	1.3E-02	µg/s	4.2E-01	g/yr	0.00093 lbs/yr				

1-10 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	3.16	µg/L =	0.003162278	µg/cm^3	Geometric mean concentration between selected contours
L =	46	ft =	1402.08	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	1.9E-01	µg/s	6.1E+00	g/yr	0.0134 lbs/yr

10-10 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	10.00	µg/L =	0.01	µg/cm^3	Geometric mean concentration between selected contours
L =	60	ft =	1828.8	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	8.0E-01	µg/s	2.5E+01	g/yr	0.0552 lbs/yr
mf_{sgw} =	1.0	µg/s	32	g/yr	0.070 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.003 µg/L

ATTACHMENT E-4
MASS FLUX CALCULATIONS - PHENANTHRENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Phenanthrene (September 2020) **Figure No.** See Figure E-4

mf = kiA * C
Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

						Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	0.1			
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	1	0.32	38	18
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours	5.9	2.43	107	18
L =	38	ft =	1158.24	cm	Length of segment between selected contours [C]				
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	1.6E-02	µg/s	5.0E-01	g/yr	0.00111 lbs/yr				

1-5.9 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	2.43	µg/L =	0.002428992	µg/cm^3	Geometric mean concentration between selected contours
L =	107	ft =	3261.36	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	3.4E-01	µg/s	1.1E+01	g/yr	0.0239 lbs/yr
mf_{sgw} =	0.36	µg/s	11	g/yr	0.025 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.001 µg/L

ATTACHMENT E-5
MASS FLUX CALCULATIONS - PYRENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Pyrene (September 2020) **Figure No.** See Figure E-5

mf = kiA * C
Where:
mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=$µg/cm^3$

Shallow Groundwater Flux

0.1-1 Contour

							Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells		0.1			
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours		1	0.32	19	18
C=	0.316227766	µg/L =	0.000316228	$µg/cm^3$	Geometric mean concentration between selected contours		10	3.16	45	18
L =	19	ft =	579.12	cm	Length of segment between selected contours [C]		35	18.71	85	18
b =	18	ft =	548.64	cm	Saturated thickness					
mf =	8.0E-03	µg/s	2.5E-01	g/yr	0.00055	lbs/yr				

1-10 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	
C=	3.16	µg/L =	0.003162278	$µg/cm^3$	Geometric mean concentration between selected contours	
L =	45	ft =	1371.6	cm	Length of segment between selected contours [C]	
b =	18	ft =	548.64	cm	Saturated thickness	
mf =	1.9E-01	µg/s	6.0E+00	g/yr	0.0131	lbs/yr

1-35 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	
i =	0.013	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	
C=	18.71	µg/L =	0.018708287	$µg/cm^3$	Geometric mean concentration between selected contours	
L =	85	ft =	2590.8	cm	Length of segment between selected contours [C]	
b =	18	ft =	548.64	cm	Saturated thickness	
mf =	2.1E+00	µg/s	6.7E+01	g/yr	0.1464	lbs/yr
mf_{sgw} =	2.3	µg/s	73	g/yr	0.16	lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.007 µg/L

Appendix E

Evaluation of Potential Impact to River from Site Constituents in Groundwater Patchogue Former MGP Site Patchogue, New York

As described in the Fourth Quarter 2020 Groundwater Monitoring Report, some potentially MGP-related constituents were detected in the shallow groundwater (i.e., the upper ±18 feet) in the vicinity of the ISS mass during the December 2020 sampling event. It is expected these constituents are a result of the short-term disturbance of the subsurface that occurred during implementation of the ISS and, their presence is temporary. Shallow groundwater generally flows from northwest to the south and southeast across the Site toward the Patchogue River (see Figure E-1 for a depiction of shallow groundwater flow). The concentrations of some of the constituents that were detected and potentially mobile in the dissolved phase in groundwater (benzene and ethylbenzene) were below surface water quality criteria listed in the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004) that are applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). Therefore, they do not have the potential to impact the river. However, the concentration of one or more of seven constituents -- acenaphthene, benzo(a)anthracene, benzo(a)pyrene, fluorene, naphthalene, phenanthrene, and pyrene -- were detected above their respective applicable surface water quality criteria in downgradient monitoring wells proximal to the river (MW-3 and MW-4S). Although it was not anticipated that these constituent concentrations would result in an impact to surface water quality if they discharged to the river, the following analysis was conducted to confirm this. The concentrations of acenaphthene, benzo(a)anthracene, fluorene, naphthalene, and pyrene in the December 2020 samples were similar (within the same order of magnitude) to those in the March, June, and September 2020 samples. Since the estimated surface water concentrations of these five constituents based on the mass flux analyses using the March, June, and September 2020 data were below applicable surface water criteria, an additional estimation of concentrations of these constituents in the river is not necessary. However, due to increased concentrations of benzo(a)pyrene and phenanthrene in MW-3 in the December 2020 samples, an additional analysis was conducted for these constituents.

An analysis was conducted to assess the potential for discharge of site-related constituents in shallow groundwater to impact water quality in the Patchogue River. Noteworthy is that including benzo(a)pyrene in this evaluation is a very conservative measure in that benzo(a)pyrene has a very low aqueous solubility, is not readily mobile in groundwater, and is unlikely to have migrated from the on-Site source area, Moreover, the detection of this constituent in the monitoring locations is likely related to the disturbance of fine or colloid sized particles during purging or sampling activities. These particles are derived from within the well or the soil adjacent to the well that become suspended into the water column of the well as a result of disturbance during purging and sampling activities.

The evaluation was conducted by estimating the rate at which a mass of site-related constituents, dissolved in groundwater, may be contributing to the surface water in the Patchogue River (i.e., the mass flux of constituents from groundwater to surface water). This approach is consistent with that described

in the document entitled "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf=\Sigma C_i q_i A_i$$

Where: mf = total mass flux of dissolved constituent from the source (µg/sec)

C_i = concentration of the constituent (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec)

where: $q_i=Ki$, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (cm^2)

where: $A_i=(L)(b)$, with L=width of constituent plume perpendicular to flow and b=plume thickness

In applying this evaluation to the Site, an estimate of mass flux of a constituent (in µg/sec) was calculated for shallow groundwater. The mass flux for the shallow groundwater was calculated across a cross-sectional flow area positioned at the downgradient side of the former MGP site, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line). The vertical dimension of the flow area is equal to the plume thickness (b) within the shallow groundwater. The horizontal dimension of the flow area, L, is equal to the width of the constituent plume, which is based on the isoconcentration contours developed from the results of the December 2020 sampling event (see Figures E-2 and E-3). The concentration of site constituents in the Patchogue River resulting from groundwater discharge was estimated using the following equation:

$$C_R=mf_{sgw}/D_R$$

Where: C_R = Concentration of constituent in the river (µg/L)

mf_{sgw} = Mass flux to the river from shallow groundwater (µg/s)

D_R = Patchogue River volumetric flow (L/s)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in river water concentration estimates that are biased high. These assumptions are as follows:

- The hydraulic gradient (i) of groundwater is variable across the Site and thus, the highest hydraulic gradient value was used in the calculation. The larger the value of i, the greater the calculated value of mass flux.
- The plume thickness (b) was estimated conservatively by using the distance from the top of the water table to the top of the well screen of a deeper well at a well couplet, yet the actual plume thickness may be somewhat less, as site constituents were either not detected or detected at very low levels in the deeper wells positioned adjacent to the river. The larger the value of b, the greater the calculated value of mass flux.
- The river volumetric flow value used to calculate in river concentrations (11.2 ft^3/s or 317 L/s) was derived using a 7Q10 flow analysis (the lowest 7-day average flow that occurs, on average, once every 10 years) for the period April 1, 1958 through March 31, 1968 using data from a USGS river gauging station proximal the Site (USGS 01306000, Patchogue River at Patchogue New York). Thus, it was assumed for this estimate that the flow rate in the river is equal to that during periods of very low flow, and the lower the assumed river flow, the greater the estimated concentration in the river water. For comparison, the mean river flow rate at the same river gauging location using data from 1945 to 1976 is 20.4 ft^3/s (579 L/s). Table E-1 provides the data used to determine the 7Q10 flow

in the Patchogue River. Attachment E-1 presents the data plotted on log probability paper and the resultant 7Q10 flow value.

To screen for potential impacts to the river, the estimated concentrations of benzo(a)pyrene and phenanthrene were calculated using the above-described method and compared to the New York State Ambient Water Quality Standards and Guidance Values (NYSDEC, June 1998 with Addenda dated April 2000 and June 2004). Listed in the table below are standards and guidance values for benzo(a)pyrene and phenanthrene that are applicable to Class C Fresh Water (no standards have been developed for these compounds).

Class C Fresh Surface Water Standards and Guidance Values

Substance	Water Class (per 6NYCRR Part 701)	Standard (µg/l)	Guidance Value (µg/l)	Protection for:
Benzo(a)pyrene	A, A-S, AA, AA-S, B, C, D	--	0.0012	Human Consumption of Fish
Phenanthrene	A, A-S, AA, AA-S, B, C	--	5.0	Fish propagation
	A, A-S, AA, AA-S, B, C, D	--	45	Fish survival

Attachments E-2 and E-3 contain the calculations and results for each of these constituents. The estimated concentrations in the Patchogue River resulting from site groundwater impacts are as follows:

- Benzo(a)pyrene = 0.00008 µg/L
- Phenanthrene = 0.025 µg/L

These conservatively estimated (i.e., biased high) concentrations are below the surface water guidance values listed above, including the lowest guidance value applicable to Class C surface waters. Also, the estimated concentrations are below the analytical laboratory detection limits for these constituents. Based on the evaluation conducted, site-related constituents in shallow groundwater do not impact surface water quality in the Patchogue River.

Tables

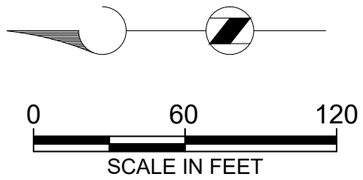
TABLE E-1
SUMMARY OF DATA USED TO CALCULATE 7Q10 FLOW IN PATCHOGUE RIVER
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

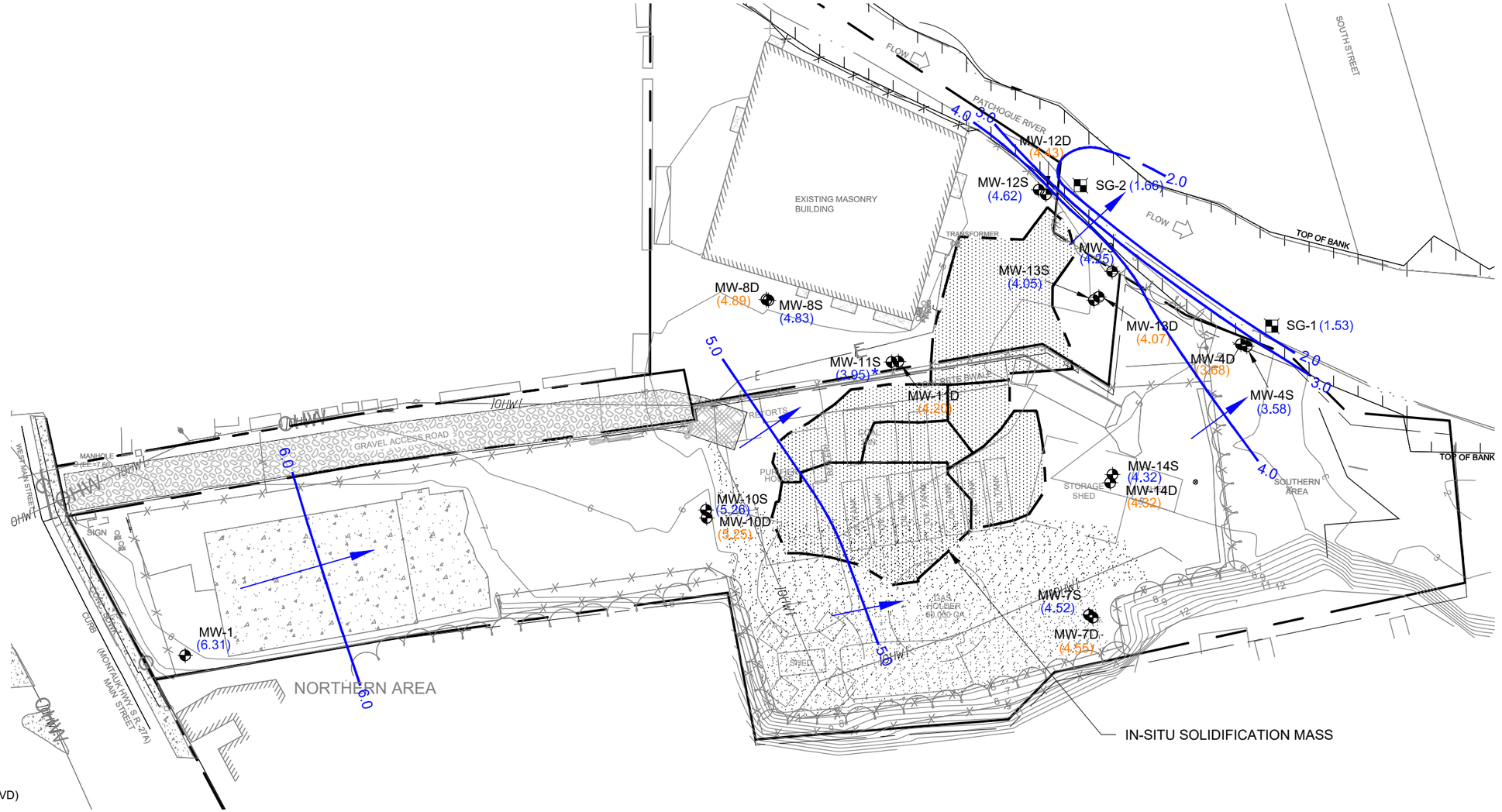
Water Year[(1)]	Low Flow (ft^3/s)	Rank	Probability
1961	20.1	1	0.091
1958	19.1	2	0.182
1960	16.9	3	0.273
1962	16.6	4	0.364
1959	16.0	5	0.455
1967	14.4	6	0.545
1964	13.6	7	0.636
1965	12.9	8	0.727
1963	12.4	9	0.818
1966	11.1	10	0.909

Notes:
(1) - 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through 3/31/1968.

ft^3/s - cubic feet per second

Figures





LEGEND:

- PROPERTY LINE
- FENCE
- 10 — TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (4.30) GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE) OR RIVER LEVEL FROM STAFF GAUGE (FT., NAVD).
- (4.34) GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: February 2021

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

WATER TABLE ELEVATION CONTOUR MAP
DECEMBER 28, 2020

FIGURE

E-1

Path: C:\users\asantiago\bcpwld0901435 File Name: FIG-1-(GW_Contours_December-2020) Plot Date: February 5, 2021 4:04 PM Cadd User: Alan Santiago

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- 10 TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 0.1 ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L) - DECEMBER 2020
- 0.10 J BENZO(A)PYRENE CONCENTRATION IN GROUNDWATER (µg/L) - DECEMBER 2020
- ND NOT DETECTED
- J ESTIMATED CONCENTRATION
- 4.0 WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

LINE OF CROSS-SECTIONAL AREA USED FOR MASS FLUX ESTIMATE

IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

SOUTHERN AREA

MW-1 ND

MW-2 ND

MW-3 0.40 J

MW-4S ND

MW-4D ND

MW-7S ND

MW-7D ND

MW-8S ND

MW-8D ND

MW-10S ND

MW-10D ND

MW-11S 0.16 J

MW-11D ND

MW-12S ND

MW-12D ND

MW-13S ND

MW-13D ND

MW-14S ND

MW-14D ND

SG-1

SG-2

Brown AND Caldwell	SCALE: 1" = 60' 153021 DATE: January 2021	NATIONAL GRID PATCHOGUE FORMER MGP SITE VILLAGE OF PATCHOGUE, NEW YORK	BENZO(A)PYRENE IN GROUNDWATER DECEMBER, 2020	FIGURE E-2

Path: C:\users\asantiagobcpw\d0901435 File Name: BenzoApyrene_December2020 Plot Date: February 8, 2021 12:34 PM Cadd User: Alan Santiago

0 60 120

SCALE IN FEET

LEGEND:

- PROPERTY LINE
- FENCE
- 10 — TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 1 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L) - DECEMBER 2020
- 0.74 — PHENANTHRENE CONCENTRATION IN GROUNDWATER (µg/L) - DECEMBER 2020
- ND — NOT DETECTED
- J — ESTIMATED CONCENTRATION
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

LINE OF CROSS-SECTIONAL AREA USED FOR MASS FLUX ESTIMATE

IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

SOUTHERN AREA

MW-1 ND

MW-8D ND

MW-8S ND

MW-10S ND

MW-10D ND

MW-11S 0.74

MW-11D ND

MW-12D ND

MW-12S ND

MW-13S 45

MW-13D ND

MW-14S ND

MW-14D ND

MW-4D ND

MW-4S 0.15 J

MW-7S ND

MW-7D ND

SG-1

SG-2

PATCHOGUE RIVER

WEST MAIN STREET

SOUTH STREET

TOP OF BANK

FFE=5.75'

FFE=5.88'

MASONRY BUILDING

EXISTING MASONRY BUILDING

WOOD FRAME BUILDING

GRAVEL DRIVEWAY/ACCESS ROAD

CONCRETE SLAB

ASPHALT

GRAVEL

RAILROAD TRACK

Path: C:\users\asantiago\bcpw\d0901435 File Name: Phenanthrene_December2020 Plot Date: February 8, 2021 12:33 PM Cadd User: Alan Santiago

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: January 2021

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

PHENANTHRENE IN GROUNDWATER (µg/L)
DECEMBER, 2020

FIGURE

E-3

Attachments

probability x 2 log cycles

RECURRENCE INTERVAL (yrs)

1.1 2 5 10

99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01

11.2 ft³/s

YEARLY 7 CONSECUTIVE DAY FLOW (ft³/s)

0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99

PROBABILITY OF LARGER FLOW (%)

ATTACHMENT E-2
MASS FLUX CALCULATIONS - BENZO(A)PYRENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Benzo(a)pyrene (December 2020) **Figure No.** See Figure E-2

$mf = kiA * C$

Where:
- mf = mass flux, µg/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, $cm^{2\,(L * b)}$
- C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-0.1 Contour

						Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	0.1			
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours				
C=	0.1	µg/L =	0.0001	µg/cm^3	Geometric mean concentration between selected contours	0.1	0.10	16	18
L =	16	ft =	487.68	cm	Length of segment between selected contours [C]				
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	2.5E-02	µg/s	7.7E-01	g/yr	0.00170 lbs/yr				
mf_{sgw} =	0.02450	µg/s	0.773	g/yr	0.00170 lbs/yr				

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
- D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
- mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.00008 µg/L

ATTACHMENT E-3
MASS FLUX CALCULATIONS - PHENANTHRENE
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

Phenanthrene (December 2020) **Figure No.** See Figure E-3

$mf = kiA * C$

Where:
- mf = mass flux, µg/s
- k = hydraulic conductivity, cm/s
- I = hydraulic gradient, dimensionless
- A = cross-sectional area, $cm^{2\,(L * b)}$
- C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

0.1-1 Contour

							Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells		0.1			
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours					
C=	0.316227766	µg/L =	0.000316228	µg/cm^3	Geometric mean concentration between selected contours		1	0.32	35	18
L =	35	ft =	1066.8	cm	Length of segment between selected contours [C]		10	3.16	67	18
b =	18	ft =	548.64	cm	Saturated thickness		13	11.40	26	18
mf =	1.7E-01	µg/s	5.3E+00	g/yr	0.01176	lbs/yr				

1-10 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	
C=	3.16	µg/L =	0.003162278	µg/cm^3	Geometric mean concentration between selected contours	
L =	67	ft =	2042.16	cm	Length of segment between selected contours [C]	
b =	18	ft =	548.64	cm	Saturated thickness	
mf =	3.2E+00	µg/s	1.0E+02	g/yr	0.2251	lbs/yr

10-13 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	
C=	11.40	µg/L =	0.011401754	µg/cm^3	Geometric mean concentration between selected contours	
L =	26	ft =	792.48	cm	Length of segment between selected contours [C]	
b =	18	ft =	548.64	cm	Saturated thickness	
mf =	4.5E+00	µg/s	1.4E+02	g/yr	0.3150	lbs/yr
mf_{sgw} =	7.95	µg/s	251	g/yr	0.552	lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
- D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
- mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 0.025 µg/L

Appendix F: Evaluation of Potential Impact to River from Increased pH Levels in Groundwater – December 2020 Data

Appendix G

Evaluation of Potential Impact to River from Increased pH Levels in Groundwater
Patchogue Former MGP Site
Patchogue, New York

As described in the Fourth Quarter 2020 Groundwater Monitoring Report, elevated pH levels were measured in the shallow groundwater (i.e., the upper ±18 feet) in the vicinity of the ISS mass during the December 2020 groundwater sampling activities. The increased pH levels are considered a potential effect from implementation of ISS in the area and it is anticipated that the pH will decrease to pre-remedy levels with time (i.e., as ISS mass continues to fully cure). Shallow groundwater generally flows from northwest to the south and southeast across the Site toward the Patchogue River (see Figure G-1 for a depiction of shallow groundwater flow).

The pH levels measured at MW-3 and MW-13S in December 2020 were 10.46 and 9.60, respectively, which is above the acceptable range for pH levels applicable to the Patchogue River (the portion of the Patchogue River proximal to the Site is classified as a Class C water body per 6 NYCRR Part 897). In accordance with 6 NYCRR Part 703.3, pH shall not be less than 6.5 nor more than 8.5 in Class C water bodies. Although it was not anticipated that the increased pH levels would result in an impact to surface water quality if they discharged to the river, the following analysis was conducted to confirm this.

An analysis was conducted to assess the potential for discharge of shallow groundwater with elevated pH levels to impact water quality in the Patchogue River. The evaluation was conducted by estimating the rate at which a mass of hydroxide (OH^-), dissolved in groundwater, may be contributing to the surface water in the Patchogue River (i.e., the mass flux of hydroxide from groundwater to surface water). This approach is consistent with that described in the document entitled "Groundwater Remediation Strategies Tool" (American Petroleum Institute Publication 4730, December 2003). The equation for calculating the mass flux of a constituent is:

$$mf = \Sigma C_i q_i A_i$$

Where: mf = total mass flux of dissolved hydroxide from the source (µg/sec)

C_i = concentration of the hydroxide ion (µg/mL=µg/cm^3)

q_i = specific discharge through the flow area (cm/sec)

where: q_i=Ki, with K= hydraulic conductivity (cm/sec) and i=hydraulic gradient (cm/cm)

A_i = flow area perpendicular to flow (cm^2)

where: A_i=(L)(b), with L=width of constituent plume perpendicular to flow and b=plume thickness

In applying this evaluation to the Site, an estimate of the mass flux of hydroxide (in µg/sec) was calculated for shallow groundwater. The mass flux for the shallow groundwater was calculated across a cross-sectional flow area positioned at the downgradient side of the former MGP site, aligned perpendicular to groundwater flow (which in this case is typically parallel or sub-parallel to the shore line). The vertical dimension of the flow area is equal to the plume thickness (b) within the shallow

groundwater. The horizontal dimension of the flow area, L, is equal to the width of the hydroxide plume, which is based on the isoconcentration contours developed from the results of the December 2020 sampling event (see Figure G-2). The concentration of hydroxide in the Patchogue River resulting from groundwater discharge was estimated using the following equation:

$$C_R = mf_{sgw}/D_R$$

Where: C_R = Concentration of hydroxide in the river (µg/L)

mf_{sgw} = Mass flux to the river from shallow groundwater (µg/s)

D_R = Patchogue River volumetric flow (L/s)

To address some of the uncertainties in this evaluation, conservative assumptions were made in the above-described calculations which result in river water concentration estimates that are biased high. These assumptions are as follows:

- The hydraulic gradient (i) of groundwater is variable across the Site and thus, the highest hydraulic gradient value was used in the calculation. The larger the value of i, the greater the calculated value of mass flux.
- The plume thickness (b) was estimated conservatively by using the distance from the top of the water table to the top of the well screen of a deeper well at a well couplet, yet the actual plume thickness may be somewhat less, as site constituents were either not detected or detected at very low levels in the deeper wells positioned adjacent to the river. The larger the value of b, the greater the calculated value of mass flux.
- The river volumetric flow value used to calculate in river concentrations (11.2 ft^3/s or 317 L/s) was derived using a 7Q10 flow analysis (the lowest 7-day average flow that occurs, on average, once every 10 years) for the period April 1, 1958 through March 31, 1968 using data from a USGS river gauging station proximal the Site (USGS 01306000, Patchogue River at Patchogue New York). Thus, it was assumed for this estimate that the flow rate in the river is equal to that during periods of very low flow, and the lower the assumed river flow, the greater the estimated concentration in the river water. For comparison, the mean river flow rate at the same river gauging location using data from 1945 to 1976 is 20.4 ft^3/s (579 L/s). Table G-1 provides the data used to determine the 7Q10 flow in the Patchogue River. Attachment G-1 presents the data plotted on log probability paper and the resultant 7Q10 flow value.
- The mass flux estimate assumes that there is no pH buffering capacity in the river water; the buffering capacity would resist change to pH in the river water due to contributions of higher pH groundwater.

To screen for potential impacts to the river, the estimated concentration of hydroxide was calculated using the above-described method and then converted back to pH to compare to water quality standards for pH per NYCRR Part 703 Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations. Attachment G-2 contains the calculations and results for the analysis performed. The estimated concentration of hydroxide in the Patchogue River resulting from site groundwater impacts is 3.67 µg/L, which equates to a pH level of 7.45. For comparison, water quality data was obtained from a USGS river gauging station proximal to the Site (USGS 01306000, Patchogue River at Patchogue New York) for the period May 6, 1966 to August 12, 1996; pH levels measured at this station during this period ranged from 5.3 to 8.4 and had a median of 6.8. This median pH value was accounted for in the mass flux estimate. Specifically, the median pH of 6.8 in the Patchogue River, which equates to a hydroxide ion concentration of 1.07 µg/L was added to the estimated hydroxide ion concentration in the river contributed by site groundwater to reflect hydroxide conditions already present in the surface water. The conservatively-estimated (i.e., biased high) pH level of 7.45 is above the median level measured in

the river, which may be a result of the increased pH levels in shallow groundwater adjacent to the river; however, it is within the acceptable range for pH levels in Class C water bodies in accordance with 6 NYCRR Part 703.3 (i.e., pH shall not be less than 6.5 nor more than 8.5). Based on the evaluation conducted, the increased pH levels in shallow groundwater do not impact surface water quality in the Patchogue River.

Tables

TABLE G-1
SUMMARY OF DATA USED TO CALCULATE 7Q10 FLOW IN PATCHOGUE RIVER
PATCHOGUE FORMER MGP SITE
PATCHOGUE, NEW YORK

Water Year[(1)]	Low Flow (ft^3/s)	Rank	Probability
1961	20.1	1	0.091
1958	19.1	2	0.182
1960	16.9	3	0.273
1962	16.6	4	0.364
1959	16.0	5	0.455
1967	14.4	6	0.545
1964	13.6	7	0.636
1965	12.9	8	0.727
1963	12.4	9	0.818
1966	11.1	10	0.909

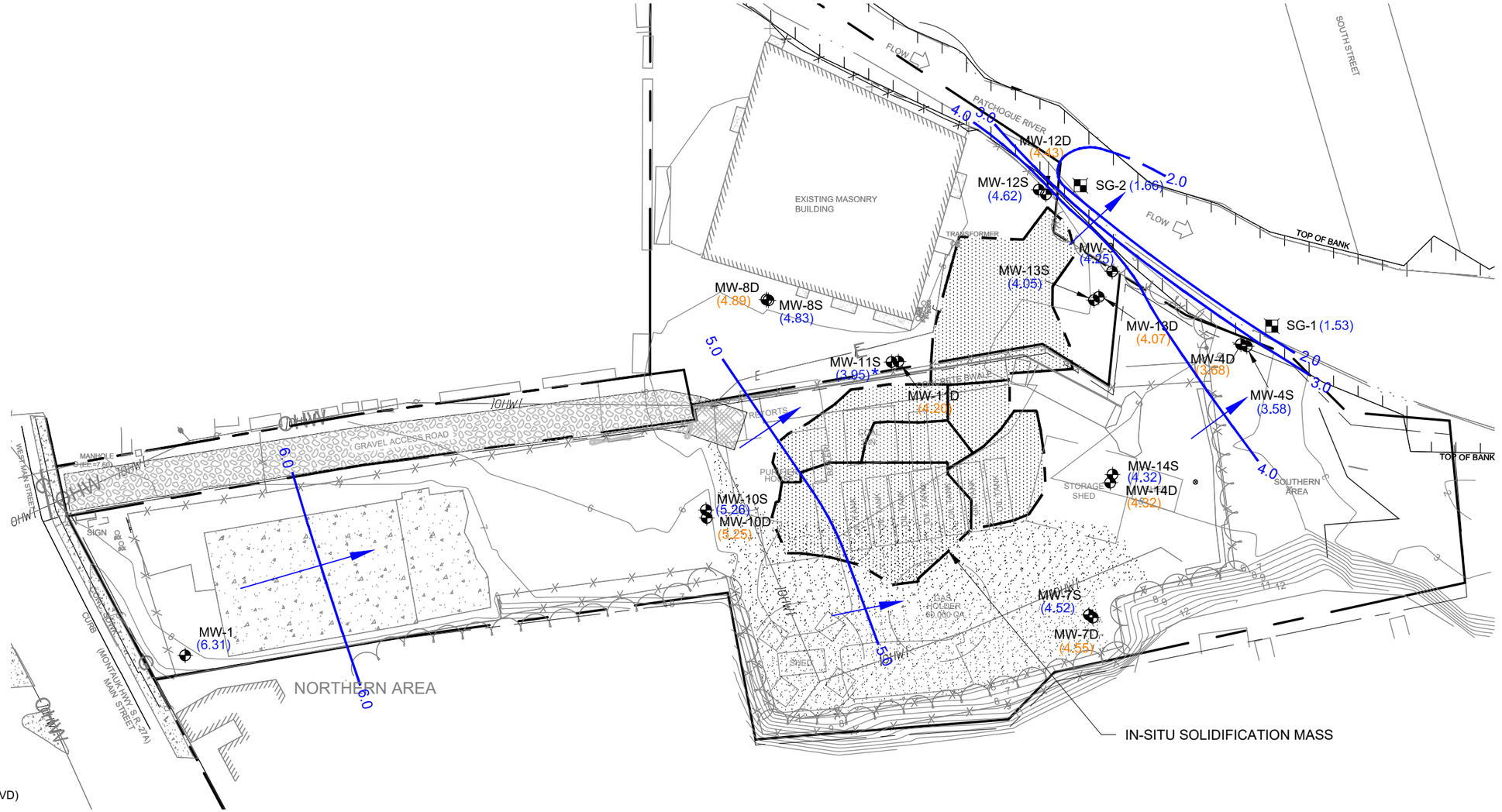
Notes:
(1) - 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through 3/31/1968.

ft^3/s - cubic feet per second

Figures

0 60 120

SCALE IN FEET



LEGEND:

- PROPERTY LINE
- FENCE
- 10 TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 4.0 WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- (4.30) GROUNDWATER ELEVATION (FT., NAVD) FROM SHALLOW MONITORING WELL (SCREENED ACROSS OR CLOSE TO WATER TABLE) OR RIVER LEVEL FROM STAFF GAUGE (FT., NAVD).
- (4.34) GROUNDWATER ELEVATION (FT., NAVD) FROM DEEP MONITORING WELL (SCREENED BELOW WATER TABLE). VALUE NOT USED FOR CONTOURING.
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

Brown AND Caldwell

SCALE: 1" = 60'

153021

DATE: February 2021

NATIONAL GRID
PATCHOGUE FORMER MGP SITE
VILLAGE OF PATCHOGUE, NEW YORK

WATER TABLE ELEVATION CONTOUR MAP
DECEMBER 28, 2020

FIGURE

G-1

0 60 120

SCALE IN FEET

LINE OF CROSS-SECTIONAL AREA USED FOR MASS FLUX ESTIMATE

IN-SITU SOLIDIFICATION MASS

NORTHERN AREA

SOUTHERN AREA

LEGEND:

- PROPERTY LINE
- FENCE
- 10 — TOPOGRAPHIC CONTOUR
- MONITORING WELL LOCATION
- STAFF GAGE LOCATION
- 10 — ISOCONCENTRATION CONTOUR (DASHED WHERE INFERRED). LOGARITHMIC CONTOUR INTERVAL (µg/L) - DECEMBER 2020
- 0.65 — HYDROXIDE CONCENTRATION IN GROUNDWATER (µg/L) - DECEMBER 2020
- 4.0 — WATER TABLE CONTOUR (FT., NAVD) DASHED WHERE INFERRED
- GENERALIZED DIRECTION OF GROUNDWATER FLOW

Brown AND Caldwell	SCALE: 1" = 60' 153021 DATE: January 2021	NATIONAL GRID PATCHOGUE FORMER MGP SITE VILLAGE OF PATCHOGUE, NEW YORK	HYDROXIDE(OH-) IN GROUNDWATER (µg/L) DECEMBER, 2020	FIGURE G-2

Path: C:\users\asantiago\bcpw\d09901435 File Name: Hydroxide(OH-)_December2020 Plot Date: February 9, 2021 12:33 PM Cadd User: Alan Santiago

Attachments

probability x 2 log cycles

RECURRENCE INTERVAL (yrs)

1.1 2 5 10

99.99 99.9 99.8 99 98 95 90 80 70 60 50 40 30 20 10 5 2 1 0.5 0.2 0.1 0.05 0.01

11.2 ft³/s

YEARLY 7 CONSECUTIVE DAY FLOW (ft³/s)

0.01 0.05 0.1 0.2 0.5 1 2 5 10 20 30 40 50 60 70 80 90 95 98 99 99.8 99.9 99.99

PROBABILITY OF LARGER FLOW (%)

ATTACHMENT G-2
MASS FLUX CALCULATIONS - pH
PATCHOGUE RIVER

Mass Flux Calculation
Enter site data in yellow highlighted cells

pH (December 2020) **Figure No.** See Figure G-2

mf = kiA * C
Where: mf = mass flux, µg/s
k = hydraulic conductivity, cm/s
I = hydraulic gradient, dimensionless
A = cross-sectional area, $cm^{2\,(L * b)}$
C = (µg/L)/1000=µg/cm^3

Shallow Groundwater Flux

10-100 Contour

						Contour Interval	Geomean	Segment Length	Thickness
k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells	10			
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours	100	31.62	23	18
C=	31.6227766	µg/L =	0.031622777	µg/cm^3	Geometric mean concentration between selected contours	1000	316.23	63	18
L =	23	ft =	701.04	cm	Length of segment between selected contours [C]	4905	2214.72	25	18
b =	18	ft =	548.64	cm	Saturated thickness				
mf =	1.1E+01	µg/s	3.5E+02	g/yr	0.77275 lbs/yr				

100-1000 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	316.23	µg/L =	0.316227766	µg/cm^3	Geometric mean concentration between selected contours
L =	63	ft =	1920.24	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	3.1E+02	µg/s	9.6E+03	g/yr	21.1665 lbs/yr

1000-4905 Contour

k =	6.1E-03	hydraulic conductivity, cm/s			Geometric mean of PDI slug tests for shallow water table wells
i =	0.15	hydraulic gradient, dimensionless			Measured in vicinity of selected contours
C=	2214.72	µg/L =	2.214723459	µg/cm^3	Geometric mean concentration between selected contours
L =	25	ft =	762	cm	Length of segment between selected contours [C]
b =	18	ft =	548.64	cm	Saturated thickness
mf =	8.5E+02	µg/s	2.7E+04	g/yr	58.8258 lbs/yr
mf_{sgw} =	1164.11	µg/s	36711.4	g/yr	80.765 lbs/yr

River Concentration

$$C_R = \frac{mf_{sgw}}{D_R}$$

Where:
D_R = Patchogue River flow, L/s — 11.2 — 7Q10 flow (ft^3/s) calculated using data from a USGS river gauging station (USGS 01306000 PATCHOGUE RIVER AT PATCHOGUE NY), for period 4/1/1958 through
mf_{sgw} = Shallow groundwater flux — See above

D_R = 11.2 ft^3/s = 317 L/s

C_R = 4.74 µg/L
Note - Value is based on hydroxide ion (OH^-) from groundwater discharge plus ambient OH^- in river (1.07 µg/L).

pH_R = 7.45 std. units