NEW YORK STATE | Department of Environmental Conservation

Aquifer Characteristics

MASTIC FIRE DEPARTMENT SUBSTATION (SITE #152265)

BROOKHAVEN, NY

AUGUST 2023

Kathy Hochul, Governor | Basil Seggos, Commissioner

Table of Contents

1.0 Site Location and Background

1.1 SITE LOCATION AND FEATURES

The Mastic Fire Department Substation (“site”) is located in a suburban area in the Town of Brookhaven located east of William Floyd Parkway and north of Sunrise Highway at the southern end of the Brookhaven Calabro Airport. The areas immediately to the east and west of the site are wooded, to the north are the Calabro baseball fields, and to the south is the Sunrise Service Road N (**Figure 1**).

The site is relatively flat and currently operating as an active fire station. A one-story masonry building that contains a two-bay garage, dispatch room, utility room, and restroom facilities is present on site. The garage is used for firefighting vehicles and equipment, including aqueous film forming foam (AFFF) concentrate. An access road on the north side of the property provides the substation direct access to the airport to respond to emergencies. The remainder of the property is paved with a lawn around the perimeter.

1.2 SITE HISTORY

The Brookhaven Calabro Airport was constructed during World War II for military purposes, after which the airport was transferred to New York State. In 1961, the airport was acquired by the Town of Brookhaven. In 1981, the Mastic Fire Department Substation was developed to support the airport during emergencies.

Due to the site’s history and presence of pefluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) detected in shallow groundwater downgradient of the site, DEC designated the site as a potential site requiring further investigation to determine if the site poses a significant threat to public health or the environment.

1.3 PREVIOUS INVESTIGATIONS

In 2019, groundwater samples were collected from two temporary points (four sample intervals per location) by Environmental Assessment & Remediations (EAR). Results from the temporary screening exhibited concentrations as high as 501 parts per trillion (ppt) and 19.1 ppt of PFOS and PFOA, respectively. These concentrations are above the current drinking water standard of 10 ppt for each PFOS and PFOA.

A Site Characterization (SC) was completed in 2021 by EAR that included a site inspection, installation of three permanent overburden monitoring wells, collection of groundwater samples from the monitoring wells, collection of groundwater samples from nine temporary points (two sample intervals per location), and collection of soil samples from four surface soil and three subsurface soil locations. All samples were analyzed for per- and polyfluoroalkyl substances (PFAS) and a subset of samples were additionally analyzed for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), metals, Polychlorinated Biphenyls (PCBs), and herbicides/pesticides. Groundwater results detected PFOA and PFOS at respective maximum concentrations of 26.5 ppt and 3,380 ppt, exceeding the 10 ppt drinking water standard for each compound individually. Based upon the results of the 2019 and 2021 investigation, the width of the PFOS plume is approximately 150 ft. PFOA was not detected in any soil samples collected. PFOS was detected in five of six soil samples with a maximum concentration of 7.34 parts per billion (ppb), exceeding the Protection of Groundwater soil guidance value of 1 ppb.

1.4 SITE GEOLOGY AND HYDROGEOLOGY

Site soils consist of relatively homogenous, tan medium sand with trace fine gravel and are likely associated with outwash deposits. Boring logs and monitoring well construction logs have been included in **Appendix A**. The groundwater table was encountered between 39.30 to 41.38 feet below ground surface in permanent overburden monitoring wells. Overburden groundwater flow direction is towards the southeast.

2.0 Field Activities and Methods

The primary objective of the field work was to determine site-specific aquifer conditions. It is intended that this information aid the New York State Department of Environmental Conservation ("NYSDEC") during the remedial process.

Field activities described in this section were completed by NYSDEC April 27, 2022 through April 28, 2022 in accordance with the April 2022 Aquifer Characteristics Work Plan (**Appendix A**).

The completed field activities included the following:

- Groundwater Elevation Survey
- Pumping Tests
- Groundwater Sampling

2.1 DEVIATIONS FROM THE WORK PLAN

Methods and sampling procedures are described in **Sections 2.2** through **2.4** below and are consistent with the Aquifer Characteristics Work Plan (April 2022) and the DEC Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), June 2021 guidance document (DEC, 2021).

Deviations from the April 2022 work plan include:

- Due to the lack of drawdown, the pumping rate was progressively increased through each test to the maximize the pumping rate and drawdown in the well (see **Appendix B** for more details).
- Sufficient water column volume was present to perform a standard pump test which yields higher quality results when compared to a slug test; therefore, a slug test was not performed.
- After the pump tests were complete, a groundwater sample was collected from each well and analyzed for PFAS and select metals (Method 537 Modified and EPA Method 6010, respectively; **Table 1**).
- A survey of the groundwater well elevations was conducted to confirm groundwater flow direction (**Figure 2)**.

2.2 PUMPING TEST METHODS

All three pump tests conducted were set up and conducted in the same manner and is as follows. Water level measurements were collected at the beginning of each day prior to lowering any equipment into the well. Equipment placed into the well included a Grundfos pump, approximately 1 foot above the bottom of the well, followed by a Van Essen Mini-Diver transducer, and a water level meter. Once placed in the well the groundwater table was allowed to equilibrate before pumping commenced. A Van Essen Baro-Diver was additionally placed at the surface adjacent to the monitoring well to collect atmospheric measurements that would later be used to compensate data collected by the Mini-Diver based on atmospheric pressure measurements.

The pumping test began pumping approximately 2 to 3 gallons per minute (gpm). Manual water level measurements were recorded every minute at the beginning of each pumping rate to assess changes in the water table. Once stabilized, the pump speed was increased until the maximum pump speed was achieved, approximately 6 gpm. Pumping rate was periodically determined by measuring the amount of time required to fill a five-gallon bucket. Water level measurements were recorded manually and by the transducers throughout the duration of the pumping test. The transducers were setup to record a pressure reading every second; however, measurements recorded every minute by the transducers were used for aquifer characteristic calculations. Manual and mini-diver collected water levels can be found in **Appendix C**.

Pumped water was routed from the pump through high density polyethylene (HDPE) tubing into a 275-gallon tote. Water from this tote was pumped through two granulated activated carbon tanks to treat water prior to discharging back to the ground surface and surficial aquifer from which the water was originally derived.

2.3 GROUNDWATER SAMPLING

Groundwater grab samples were collected at the conclusion of the pumping test using a clean stainless-steel bailer. Samples were analyzed for PFAS by method 537M and for calcium, iron, and magnesium by EPA Method 6010D. Groundwater parameters, described below, were noted at the time of sampling.

In-Text Table 1: Groundwater Parameters

Sample Location	Sample Date	Sample Time	Temperature (°C)	pH	Total Dissolved Solids	ORP (mV)	Conductivity (mS/cm)	Turbidity (NTU)	Dissolved Oxygen (mg/L)
MW-1	04/27/2022	2:30 PM	14.73	6.1	0.071	232	0.113	0	5.28
MW-2	04/28/2022	9:29 AM	14.76	5.63	0.205	222	0.315	23.8	7.87
MW-3	04/28/2022	10:50 AM	14.36	4.86	0.085	202	0.129	42.3	8

Samples were collected in laboratory supplied bottles, placed on ice, and submitted to Con-Test, A Pace Analytical Laboratory for analysis. Quality assurance and quality control samples collected included one field duplicate, one equipment blank, one matrix spike, and one matrix spike duplicate which is consistent with standard sampling protocols. Full laboratory reports can be found in **Appendix D**.

2.4 SURVEY

A groundwater table elevation survey was conducted on April 28, 2022. A reference point was established at the northwest corner of the monument pad located on the south side of the facility. The surveyed elevation of the reference point was given an arbitrary value of 100 feet and a water table elevation was determined using the survey information and water level measurements collected on April 28, 2022. The groundwater elevations indicates that groundwater flow direction at the site is towards the southeast (**Figure 2)**. In-text Table 2, below, shows the results from the survey. Horizontal coordinates were also collected using a Trimble Unit.

In-Text Table 2: Monitoring Well and Groundwater Table Elevation Survey				
Location	Surveyed Measurement (ft)	Relative Elevation (Top of Casing, ft)	Depth to Water (ft)	Relative Water Table Elevation (ft)
Reference Point	2.79	100	NA	NA
MW-01	5.80	96.99	39.32	57.67
MW-02	3.84	98.95	41.36	57.59
MW-03	3.86	98.93	41.38	57.55

2.5 Aquifer Characteristics Equations

To evaluate aquifer characteristics, transmissivity, specific capacity, and hydraulic conductivity was calculated using the equations outlined below.

2.5.1 Specific Capacity

Specific capacity of a well provides information regarding maximum yield at a specific pumping rate and can be used to estimate transmissivity. This value can be determined by the following equation (Mace, 2001):

$$SC = \frac{Q}{s}$$ *Equation 1*

Where:

SC = Specific capacity (gpm/ft)

Q = pumping rate (gpm)

s = drawdown over 1 day (ft)

2.5.2 Transmissivity

Transmissivity can be estimated from specific capacity for an unconfined aquifer by(Batu, 1998):

$$T = 1.042\left(\frac{Q}{s_w}\right)$$ *Equation 2*

Where:

T = Transmissivity (m^2/day)

Q = pumping rate (m^3/day)

s_w = drawdown (m)

Transmissivity values were also calculated using the Cooper-Jacob's (1946) equation which is a simplified version of the Theis (1935) equation. The Theis equation assumed that the pumping well completely penetrates the aquifer, the aquifer is isotropic, homogenous, and confined, and the pumping rate is constant. The Cooper-Jacob equation simplified the transmissivity equation (USGS, 2002) to:

$$T = \frac{2.3\,Q}{4\pi\Delta s}$$

$$T = \frac{0.183Q}{\Delta s}$$ *Equation 3*

Where:

T = Transmissivity (ft^2/min)

Q = Constant rate pumping test (ft^3/min)

Δs = slope of the line per one log cycle (feet)

The Cooper-Jacob equation also assumes that the equation can be applied to water-table aquifers where two times the drawdown during the pumping test is significantly smaller than the aquifer thickness.

2.5.3 Hydraulic Conductivity

Hydraulic conductivity measures the ability of a material, rock or soil, to transmit fluid and can be calculated based on the transmissivity and saturated thickness of the aquifer by:

$$K = \frac{T}{b}$$ *Equation 4*

Where:

K = Hydraulic conductivity (ft/min)

T = Transmissivity (ft^2/min)

b = saturated thickness of the aquifer (ft)

2.5.4 Hardness

Groundwater hardness can be computed by using the concentrations of calcium and magnesium in the water by the following equation:

$$Hardness = 2.497\left(Calcium\frac{mg}{L}\right) + 4.118\left(Magnesium\frac{mg}{L}\right) \qquad Equation\ 5$$

3.0 Results

The following discuss field observations, sample analytical results, and aquifer characteristics as determined by the pumping tests. Data collected for this project has not been validated. Please refer to the Tables section of the report for all sample analytical results.

3.1 Standards, Criteria, and Guidance

The SCGs used to evaluate the groundwater analytical results are outlined below:

- NYSDEC TOGS 1.1.1 Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations, Class GA, June 1998 / NYSDEC Guidelines for Sampling and Analysis of PFAS, June 2021.
- New York State Department of Environmental Conservation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), June 2021.
- Water hardness can be evaluated using the general guidelines outlined by USGS (USGS, 2018).

3.2 Aquifer Characteristics

The aquifer characteristics determined for each monitoring well are derived from the equations identified in Section 2.5 Aquifer Characteristics Equations. Hydraulic properties were calculated for each well using the data collected by the mini-diver per minute, excluding the first 10 minutes of pumping as those results are considered invalid.

Different variable inputs were used to calculate the hydraulic properties at each pumping well and is described as follows:

Equations 2 and 3

1. Pumping rate variable, Q, was identified as the maximum pumping rate for each test.

Equation 3

1. The slope per log cycle, Δs, was calculated using the trendline equation as pumping tests were not completed over one entire log cycle (to 100 minutes).

Equation 4

1. The assumed saturated thickness of the upper glacial sand aquifer, *b*, is 100 feet (McClymonds, 1972).

3.2.1 MW-1

The pumping test at MW-1 was conducted for 80 minutes with maximum pumping rate (Q_{max}) of 5.82 gpm or 0.778 cubic feet per minute (cfm). Maximum drawdown was recorded both manually and by the mini-diver and was determined to be 0.30 feet and 0.2581 feet, respectively.

Figure 3

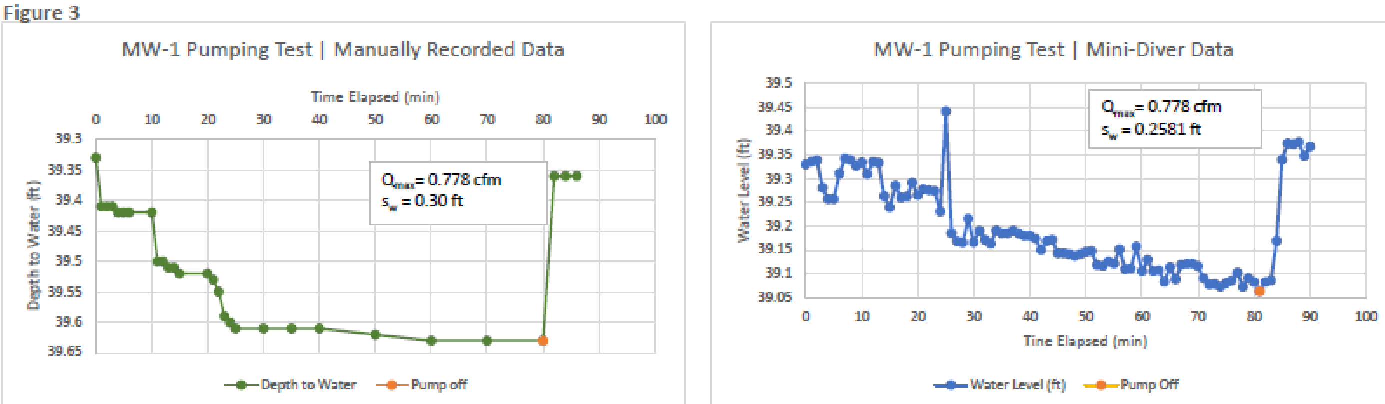
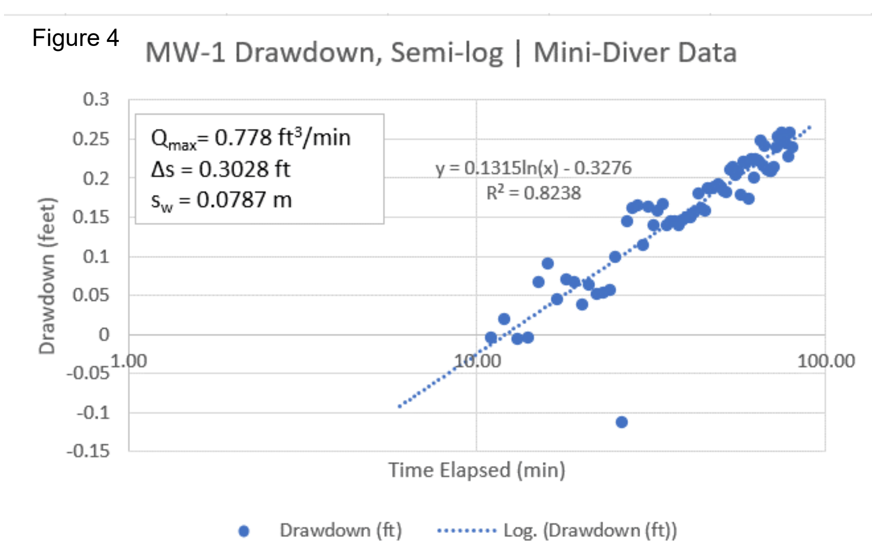


Figure 3, above, shows the water levels recorded through the duration of the pumping test. At roughly 25 minutes, an outlier was recorded by the mini-diver as illustrated in Figure 3 indicating a significant increase in water level. Around this time, the pump temporarily dropped in speed and field personnel moved the equipment around in the borehole to correct the issue resulting in a temporary increase in water level. The comparison between the manually collected water levels and the mini-diver water levels supports that the mini-diver was in proper working condition. Subsequent aquifer property calculations are based on the mini-diver data.

Input variables are depicted on the below graph in **Figure 4** and the breakdown of calculations can be found in **Appendix E**. The specific capacity, calculated using Equation 1 above, was determined to be 22.55 gpm/ft. Transmissivity and hydraulic conductivity measurements were determined to be approximately 4,521.35 ft²/day and 45.21 ft/day, respectively, using Equation 2 and Equation 4. Equation 4 estimates hydraulic conductivity to be 6.77 ft/day based on a transmissivity of 676.80 ft²/day using Equation 3.

Figure 4



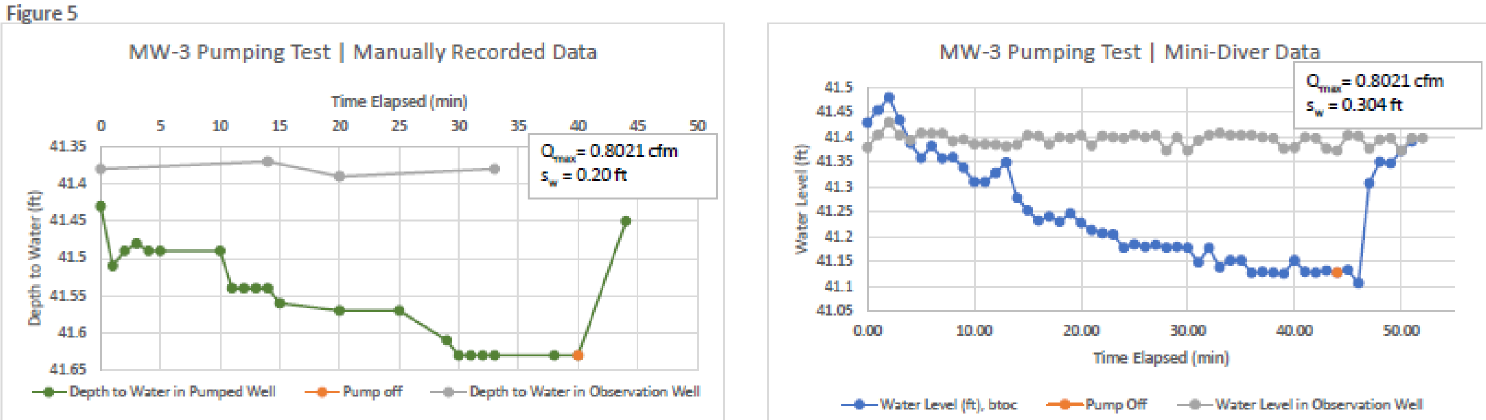
3.2.2 MW-2

Shortly after beginning the final pumping test at location MW-2, the pump malfunctioned and ultimately would not run. Data was only collected for a couple of minutes before pump failure, so values of transmissivity and hydraulic conductivity were not determined. Based on soil boring logs, the stratigraphy at the site is relatively homogenous. This is supported by similar transmissivity and hydraulic conductivity results from pumping tests completed at locations MW-1 and MW-3. It is likely that results from location MW-2 would be similar to those calculated at MW-1 and MW-3.

3.2.3 MW-3

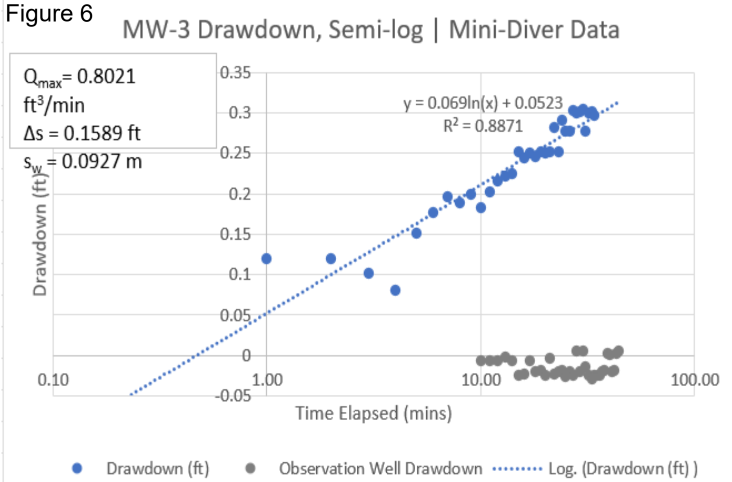
The pumping test at MW-3 occurred over 44 minutes with a maximum pumping rate of 6 gpm (0.8021 cfm) and a maximum drawdown of 0.20 ft to 0.304 feet as respectively recorded manually and by the mini-diver. **Figure 5**, below, shows the changes in water level in the pumping and observation wells throughout the test; water level changed in the observation well MW-2 were not observed (+/- 0.01 feet).

Figure 5



Data collected manually are comparable to the mini-diver data which confirms the mini-diver was in proper working order. Subsequent aquifer characteristics were calculated using the mini-diver data only.

Figure 6



Input variables are depicted on the above graph in **Figure 6** and breakdown of calculations are provided in **Appendix E**. The specific capacity is 19.74 gpm/ft. Transmissivity and hydraulic conductivity measurements were determined to be 3,957.20 ft^2/day and 39.57 ft/day, respectively, using Equation 2 and Equation 4. Equation 3 estimates transmissivity to be 1,330.56 ft^2/day and hydraulic conductivity (Equation 4) to be 13.31 ft/day.

3.3 Analytical Results

Groundwater samples were collected at MW-1, MW-2, and MW-3 and analyzed for PFAS and metals (calcium, iron, and magnesium). Thirty-four PFAS compounds were included in the analysis (**Table 1**). Note, only PFOA and PFOS have guidance criteria. The maximum concentration of PFOA and PFOS was 18 nanograms per liter (ng/L) and 250 ng/L at MW-2, respectively. All three monitoring wells exceeded proposed NYS Class GA guidance values (groundwater) for PFOS whereas PFOA had exceedances in MW-2 and MW-3. In general, PFAS sampling results from this sampling event are similar to those concentrations observed in December 2020; however, there was an order of magnitude increase in PFOS concentrations in upgradient MW-1 and downgradient MW-3.

	PFOA (ng/L)		**PFOS (ng/L)**	
	December 2020	April 2022	December 2020	April 2022
MW-1	0.95 J	1.40 J	3.43	14.00
MW-2	15.40	18.00	295.00	250.00
MW-3	1.73 J	9.20 J	90.90	190.0

One duplicate sample was collected from MW-2 and analyzed for PFAS compounds. The duplicate sample results are comparable to the corresponding normal sample.

Of the metals analyzed, only iron exhibited an exceedance of the NYS Class GA guidance value of 0.3 milligrams per liter (mg/L) in all three wells. Concentrations of iron ranged from 3.3 mg/L to 6.6 mg/L with the maximum concentration present in MW-2. Water hardness was calculated using the concentrations of magnesium and calcium found in each of the groundwater samples. Hardness concentrations ranged from 21.54 mg/L to 43.99 mg/L which classifies the water as soft (USGS, 2018).

An equipment blank and a post-filter sample was collected as part of the quality assurance/quality control program and analyzed for PFAS compounds (**Table 2**). PFAS compounds were not detected by the laboratory in the equipment blank except for perfluorotetradecanoic acid was detected at an estimated concentration of 0.72 J ng/l. This detection does not have significant impacts on sample results. The post-filter sample was collected to evaluate the current effectiveness of the granular activated carbon treatment system, a known best management practice to effectively remove PFAS compounds from water. The filtered sample showed limited reduction of PFAS compounds, possible due to the age of the carbon vessels or growth of bacteria on the carbon due to inconsistent use.

4.0 Discussion

Based on the groundwater elevation survey conducted on April 28, 2022 the groundwater flow direction was determined to be towards the southeast. Groundwater elevations were similar in the upgradient well MW-1 to the downgradient well MW-3 with elevations of 57.67 ft bgs and 57.55 ft bgs, respectively. The hydraulic gradient, change in head over distance, was nearly flat with a result of 0.0007.

Transmissivity values were calculated for each monitoring well using two equations. Equation 2 overestimates the transmissivity as the maximum drawdown over the pumping test is used whereas equation 3 utilizes the slope of the drawdown across one log cycle. Sands are expected to have higher transmissivity due to their high permeability properties. Site transmissivity using equation 2 range from 3,957.20 ft^2/day to 4,521.35 ft^2/day. Transmissivity range from 676.80 ft^2/day to 1,330.56 ft^2/day when using equation 3.

As hydraulic conductivity is a function of transmissivity and saturated thickness of the aquifer, hydraulic conductivities calculated from transmissivity inputs from Equation 2 are higher than those represented by Equation 3. Hydraulic conductivities calculated from Equation 2 and Equation 3 inputs range from 39.57 ft/day to 45.21 ft/day and 6.77 ft/day to 13.31 ft/day, respectively. Literature hydraulic conductivity for the upper glacial aquifer ranges from 53 ft/day to 240 ft/day (Scorca, 1994; McClymonds, 1972). The results for this site are generally lower than literature ranges for the aquifer.

The specific capacities calculated from the maximum pumping rates and associated drawdowns ranged from 19.74 gpm/ft to 22.55 gpm/ft. As the unconfined aquifer is partially penetrated by the monitoring well, the specific capacities are expected to be lower than a well that fully penetrates the entire saturated thickness of the aquifer. In this case, the monitoring well only penetrates a portion of the assumed aquifer thickness of 100 feet, the calculated specific capacities are underestimated.

Storativity calculations were not performed for these pumping tests as there was no drawdown observed in monitoring wells in proximity to a pumping well. The shortest distance between all monitoring wells is 60 feet, MW-2 to MW-3. The radius of influence (ROI) was not observed at the maximum pumping rate of 6 gpm, an expected ROI is no greater than the shorted distance between the observation and pumping well, approximately 60 ft.

An empirical model was used to assess the discharge from a hypothetical recovery well and recharge into a hypothetical discharge basin at the Site. The model uses aquifer-derived data from the pumping tests conducted for the analysis. In order to achieve a more significant drawdown than what was observed, a pumping rate of 123 gpm was used based on the calculated specific capacity results. The model indicates that at this pumping rate for 365 days the water table will drawdown approximately 8 feet and have a ROI of approximately 50 feet out from the pumping well. A mounding analysis was completed to assess changes in the water table elevation if pumped and treated water was returned to the ground surface. After 365 days, the model indicates that the water table will rise to within 15 feet of the ground surface and impact an area around the discharge point in an approximate 100-foot radius. Additional information regarding the model inputs and analysis can be found in **Appendix F**. It should be noted that this is a hypothetical model that should be further refined through additional site evaluation.

Determining the aquifer characteristics were limited by the well diameter and pump used. It is recommended that a larger extraction well or monitoring well be installed which would accommodate a larger pump capable of achieving specific capacities observed in pump tests and model outputs. Additional pumping tests are recommended to refine the transmissivity, hydraulic conductivity, and specific capacity values of the site aquifer. Additional well locations would be required to refine the aquifer characteristics. A 6 inch well located near an existing monitoring well and close to a potential extraction point is recommended. This location would allow a refined pump test using an observation well to verify the radius of influence and gain additional information.

5.0 References

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FIGURES

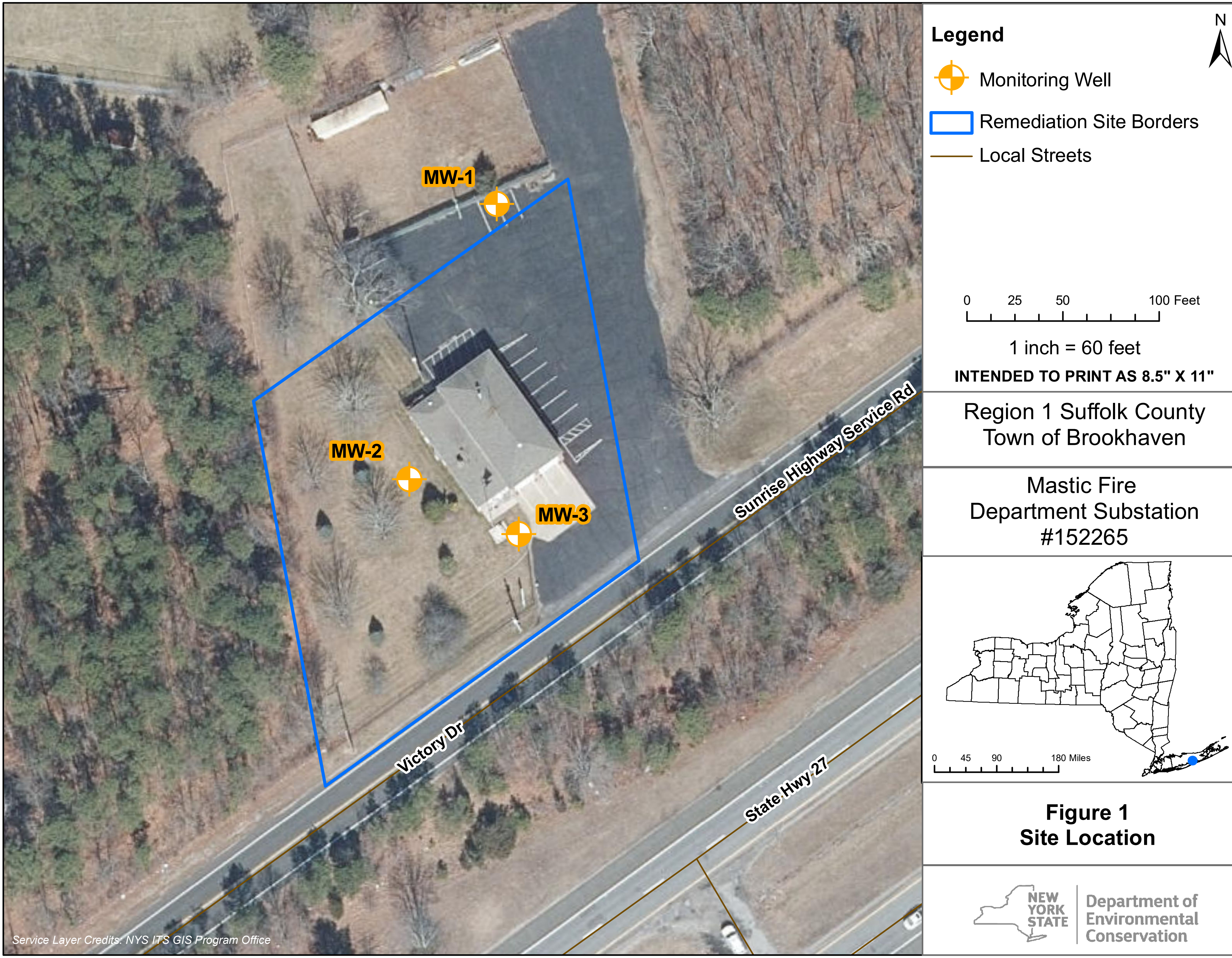

Figure 1
Site Location

Legend

N

- Monitoring Well
- Survey Reference Point
- Remediation Site Borders
- Approx. Groundwater Flow Direction
- 57.67 Groundwater Elevation (ft)
- Groundwater Contour (ft)

0 25 50 100 Feet

1 inch = 60 feet

INTENDED TO PRINT AS 8.5 X 11 INCHES

Region 1 Suffolk County
Town of Brookhaven

Mastic Fire
Department Substation
#152265

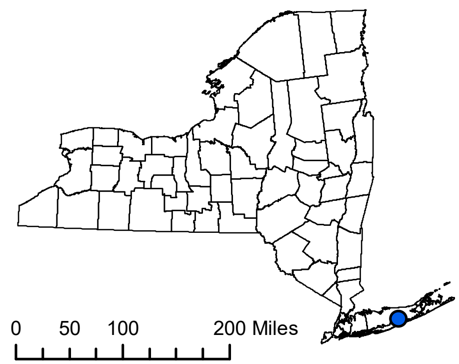

Figure 2
Groundwater Elevation Survey

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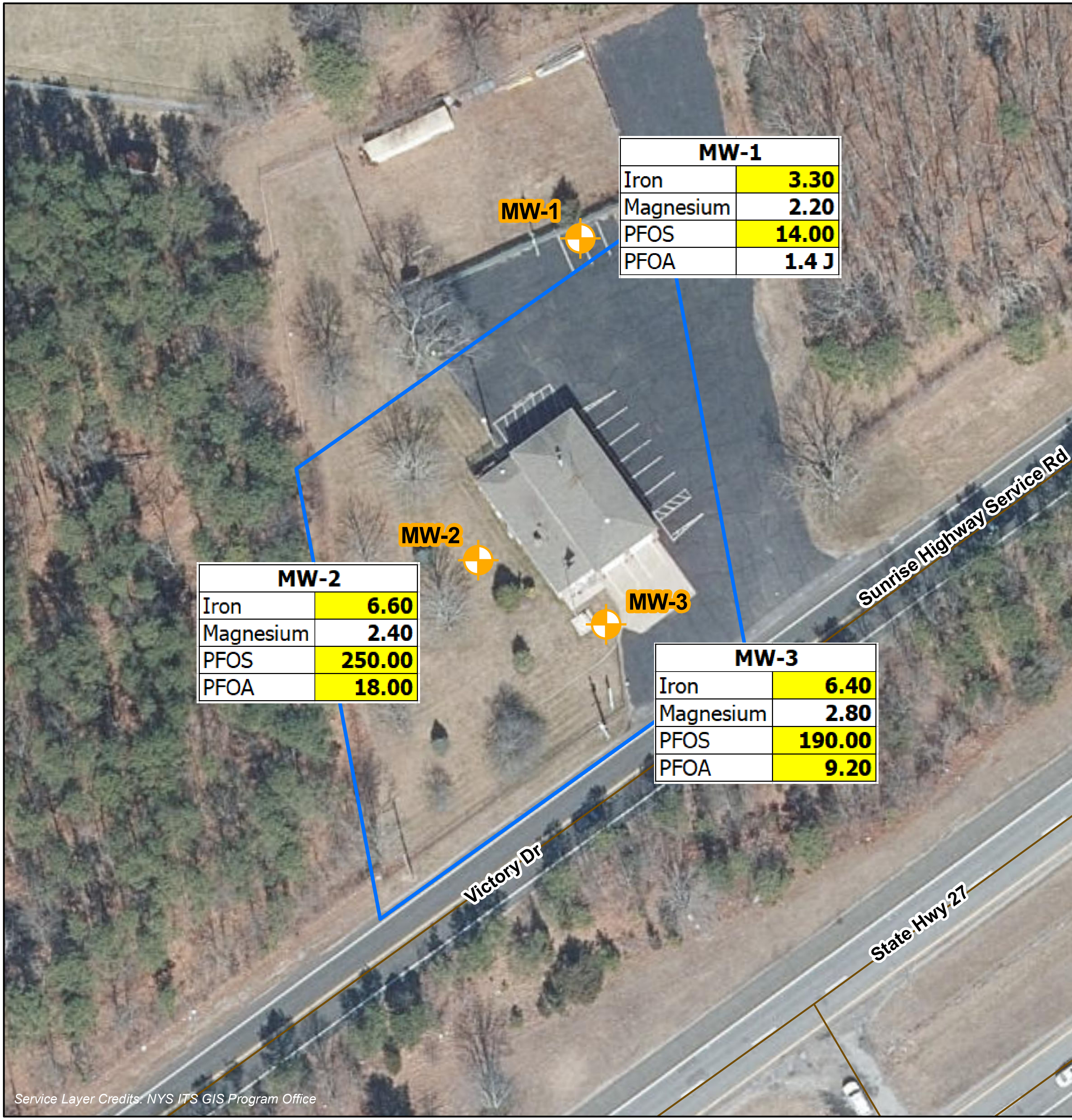

MW-1	
Iron	3.30
Magnesium	2.20
PFOS	14.00
PFOA	1.4 J

MW-2	
Iron	6.60
Magnesium	2.40
PFOS	250.00
PFOA	18.00

MW-3	
Iron	6.40
Magnesium	2.80
PFOS	190.00
PFOA	9.20

Legend

N

Monitoring Well

Remediation Site Borders

Local Streets

0 25 50 100 Feet

1 inch = 60 feet

INTENDED TO PRINT AS 8.5" X 11"

Groundwater		
Compound	Units	NYSDEC Class GA [1]
Iron	mg/l	3
Magnesium	mg/l	35
PFOS	ng/l	6.7*
PFOA	ng/l	2.7*

[1]NYSDEC TOGS 1.1.1, Class GA Standards and Guidance Values, Revised June 1998

*DRAFT Proposed TOGS 1.1.1, Class GA Guidance Value, June 2021

J - an estimated value

Highlighted - Indicates compound was detected above applicable criteria

*Only detected compounds with applicable guidance values or standards are shown

Region 1 Suffolk County
Town of Brookhaven

Mastic Fire
Department Substation
#152265

Figure 3
Groundwater Analytical Results

NEW YORK STATE Department of Environmental Conservation

TABLES

Table 1
Groundwater Analytical Results

			Location Code	MW-1		MW-2		MW-2		MW-3	
			Sample Date	4/27/2022		4/28/2022		4/28/2022		4/28/2022	
			Matrix	WG		WG		WG		WG	
			Sample Type Code	N		N		FD		N	
Analyte	Unit	NYS Class GA[1]	NYSDEC PFAS Guidelines[2]	Result	Qualifer	Result	Qualifer	Result	Qualifer	Result	Qualifer
Metals											
Calcium	mg/l	NC	-	**5.00**		**7.90**		NA		**13.00**	
Iron	mg/l	0.3	-	**3.30**		**6.60**		NA		**6.40**	
Magnesium	mg/l	35	-	**2.20**		**2.40**		NA		**2.80**	
PFAS											
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	ng/l	NC	NC	< 0.59	U	< 0.59	U	< 0.57	U	< 0.6	U
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	ng/l	NC	NC	< 0.56	U	**3.50**		**2.70**		< 0.57	U
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	ng/l	NC	NC	< 0.26	U	< 0.26	U	< 0.25	U	< 0.26	U
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	ng/l	NC	NC	< 0.33	U	**7.30**		**7.30**		**0.97**	J
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ng/l	NC	NC	< 0.32	U	< 0.32	U	< 0.31	U	< 0.33	U
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid	ng/l	NC	NC	< 0.36	U	< 0.36	U	< 0.35	U	< 0.36	U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/l	NC	NC	< 0.22	U	< 0.22	U	< 0.21	U	< 0.22	U
N-deuterioethylperfluoro-1-octanesulfonamidoacetic acid	ng/l	NC	NC	< 0.58	U	< 0.58	U	< 0.56	U	< 0.59	U
N-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid	ng/l	NC	NC	< 0.69	U	< 0.69	U	< 0.68	U	< 0.71	U
Nonafluoro-3,6-dioxaheptanoic acid	ng/l	NC	NC	< 0.25	U	< 0.25	U	< 0.25	U	< 0.26	U
Perfluoro(2-ethoxyethane)sulfonic acid	ng/l	NC	NC	< 0.21	U	< 0.21	U	< 0.21	U	< 0.22	U
Perfluoro-1-butanesulfonamide (FBSA)	ng/l	NC	NC	< 0.17	U	**0.29**	J	**0.30**	J	**0.37**	J
Perfluoro-1-hexanesulfonamide (FHxSA)	ng/l	NC	NC	< 0.28	U	**1.50**	J	**1.40**	J	< 0.29	U
Perfluoro-3-methoxypropanoic acid	ng/l	NC	NC	< 0.38	U	< 0.38	U	< 0.37	U	< 0.39	U
Perfluoro-4-methoxybutanoic acid	ng/l	NC	NC	< 0.31	U	< 0.31	U	< 0.3	U	< 0.32	U
Perfluorobutanesulfonic acid (PFBS)	ng/l	NC	NC	< 0.26	U	**1.20**	J	**1.30**	J	**2.70**	
Perfluorobutanoic Acid	ng/l	NC	NC	< 0.68	U	**8.40**		**8.40**		**20.00**	
Perfluorodecanesulfonic acid (PFDS)	ng/l	NC	NC	< 0.3	U	**0.44**	J	**0.41**	J	< 0.3	U
Perfluorodecanoic acid (PFDA)	ng/l	NC	NC	< 0.45	U	< 0.45	U	< 0.44	U	< 0.46	U
Perfluorododecanoic acid (PFDoA)	ng/l	NC	NC	< 0.4	U	< 0.4	U	< 0.39	U	< 0.41	U
Perfluoroheptanesulfonic acid (PFHpS)	ng/l	NC	NC	< 0.86	U	**1.90**		**1.90**		**1.40**	J
Perfluoroheptanoic acid (PFHpA)	ng/l	NC	NC	**0.83**	J	**15.00**		**16.00**		**16.00**	
Perfluorohexanesulfonic acid (PFHxS)	ng/l	NC	NC	**2.20**		**22.00**		**21.00**		**19.00**	
Perfluorohexanoic acid (PFHxA)	ng/l	NC	NC	**0.42**	J	**12.00**		**12.00**		**36.00**	
Perfluorononanesulfonic Acid (PFNC)	ng/l	NC	NC	< 0.15	U	< 0.15	U	< 0.15	U	< 0.16	U
Perfluorononanoic acid (PFNA)	ng/l	NC	NC	**0.48**	J	**170.00**		**170.00**		**6.80**	
Perfluorooctane Sulfonamide (FOSA)	ng/l	NC	NC	< 0.38	U	< 0.38	U	< 0.37	U	< 0.39	U
Perfluorooctanesulfonic acid (PFOS)	ng/l	2.7*	10	**14.00**		**250.00**		**240.00**		**190.00**	
Perfluorooctanoic acid (PFOA)	ng/l	6.7*	10	**1.40**	J	**18.00**		**18.00**		**9.20**	
Perfluoropentanesulfonic Acid (PFPeS)	ng/l	NC	NC	< 0.24	U	**1.40**	J	**1.30**	J	**2.10**	
Perfluoropentanoic Acid (PFPeA)	ng/l	NC	NC	**0.56**	J	**17.00**		**17.00**		**48.00**	
Perfluorotetradecanoic acid (PFTA)	ng/l	NC	NC	< 0.33	U	< 0.33	U	< 0.33	U	< 0.34	U
Perfluorotridecanoic Acid (PFTriA/PFTrDA)	ng/l	NC	NC	< 0.25	U	< 0.25	U	< 0.25	U	< 0.26	U
Perfluoroundecanoic Acid (PFUnA)	ng/l	NC	NC	< 0.34	U	< 0.34	U	< 0.33	U	< 0.34	U

Notes:

[1]New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 1998. [2]New York State Department of Environmental Conservation, Sampling, Analysis, and Assessment of Per- and Polyfluoroalkyl Substances (PFAS), June 2021.

*Proposed Technical and Operational Guidance Series, Class GA Guidance Value, June 2021.

Sample Type Code: N - Normal, FD - Field Duplicate

U - Compound not detected at the reporting limit shown

J - estimated value

NC - No standards, criteria, or guidance values exist

Bold - Indicates compound was detected

Underlined - Compound detected above NYSDEC PFAS Guidelines

Highlighted - Compound detected above NYS Class GA criteria

Table 2
Analytical Results

Analyte	Unit	NYS Class GA[1]	NYSDEC PFAS Guidelines[2]	Equipment Blank		Post- Filter	
			Sample Date	4/27/2022		4/28/2022	
			Matrix Code	WQ		WG	
			Sample Type Code	EB		N	
				Result	Qualifier	Result	Qualifier
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	ng/l	NC	NC	< 0.66	U	< 0.58	U
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid	ng/l	NC	NC	< 0.63	U	< 0.55	U
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid	ng/l	NC	NC	< 0.29	U	< 0.26	U
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid	ng/l	NC	NC	< 0.38	U	**1.1**	J
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ng/l	NC	NC	< 0.36	U	< 0.32	U
9-Chlorohexadecafluoro-3-Oxanonane-1-Sulfonic Acid	ng/l	NC	NC	< 0.4	U	< 0.36	U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/l	NC	NC	< 0.25	U	< 0.22	U
N-deuterioethylperfluoro-1-octanesulfonamidoacetic acid	ng/l	NC	NC	< 0.65	U	< 0.57	U
N-deuteriomethylperfluoro-1-octanesulfonamidoacetic acid	ng/l	NC	NC	< 0.79	U	< 0.69	U
Nonafluoro-3,6-dioxaheptanoic acid	ng/l	NC	NC	< 0.29	U	< 0.25	U
Perfluoro(2-ethoxyethane)sulfonic acid	ng/l	NC	NC	< 0.24	U	< 0.21	U
Perfluoro-1-butanesulfonamide (FBSA)	ng/l	NC	NC	< 0.2	U	**0.39**	J
Perfluoro-1-hexanesulfonamide (FHxSA)	ng/l	NC	NC	< 0.32	U	**0.51**	J
Perfluoro-3-methoxypropanoic acid	ng/l	NC	NC	< 0.43	U	< 0.38	U
Perfluoro-4-methoxybutanoic acid	ng/l	NC	NC	< 0.35	U	< 0.31	U
Perfluorobutanesulfonic acid (PFBS)	ng/l	NC	NC	< 0.29	U	**2.9**	
Perfluorobutanoic Acid	ng/l	NC	NC	< 0.77	U	**14**	
Perfluorodecanesulfonic acid (PFDS)	ng/l	NC	NC	< 0.34	U	< 0.3	U
Perfluorodecanoic acid (PFDA)	ng/l	NC	NC	< 0.51	U	< 0.45	U
Perfluorododecanoic acid (PFDoA)	ng/l	NC	NC	< 0.46	U	< 0.4	U
Perfluoroheptanesulfonic acid (PFHpS)	ng/l	NC	NC	< 0.97	U	**1.2**	J
Perfluoroheptanoic acid (PFHpA)	ng/l	NC	NC	< 0.36	U	**16**	
Perfluorohexanesulfonic acid (PFHxS)	ng/l	NC	NC	< 0.35	U	**17**	
Perfluorohexanoic acid (PFHxA)	ng/l	NC	NC	< 0.4	U	**37**	
Perfluorononanesulfonic Acid (PFNS)	ng/l	NC	NC	< 0.17	U	< 0.15	U
Perfluorononanoic acid (PFNA)	ng/l	NC	NC	< 0.36	U	**6.9**	
Perfluorooctane Sulfonamide (FOSA)	ng/l	NC	NC	< 0.44	U	< 0.38	U
Perfluorooctanesulfonic acid (PFOS)	ng/l	2.7*	10	< 0.62	U	**210**	
Perfluorooctanoic acid (PFOA)	ng/l	6.7*	10	< 0.71	U	**9.1**	
Perfluoropentanesulfonic Acid (PFPeS)	ng/l	NC	NC	< 0.27	U	**2.1**	
Perfluoropentanoic Acid (PFPeA)	ng/l	NC	NC	< 0.41	U	**33**	
Perfluorotetradecanoic acid (PFTA)	ng/l	NC	NC	**0.72**	J	< 0.33	U
Perfluorotridecanoic Acid (PFTriA/PFTrDA)	ng/l	NC	NC	< 0.29	U	< 0.25	U
Perfluoroundecanoic Acid (PFUnA)	ng/l	NC	NC	< 0.38	U	< 0.34	U

Notes:

[1]New York State Department of Environmental Conservation, Technical and Operational Guidance Series (1.1.1), Class GA Standards and Guidance Values, Revised June 1998.

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APPENDIX A

Aquifer Characteristics Work Plan

MASTIC FIRE DEPARTMENT SUBSTATION (SITE NO. 152265)

BROOKHAVEN, NY

APRIL 2022

Kathy Hochul, Governor | Basil Seggos, Commissioner

Table of Contents

1.0 BACKGROUND AND PROJECT OBJECTIVES

1.1 SITE LOCATION AND FEATURES

The Mastic Fire Department Substation (“site”) is located in a suburban area in the Town of Brookhaven located east of William Floyd Parkway and north of Sunrise Highway at the southern end of the Brookhaven Calabro Airport. The areas immediately to the east and west of the site are wooded, to the north are the Calabro baseball fields, and to the south is the Sunrise Service Road N (**Figures 1 and 2**).

The site is relatively flat and currently operating as an active fire station. A one-story masonry building that contains a two-bay garage, dispatch room, utility room, and restroom facilities is present on site. The garage is used for firefighting vehicles and equipment, including aqueous film forming foam (AFFF) concentrate. An access road on the north side of the property provides the substation direct access to the airport to respond to emergencies. The remainder of the property is paved with a lawn around the perimeter.

1.2 SITE HISTORY

The Brookhaven Calabro Airport was constructed during World War II for military purposes, after which the airport was transferred to New York State. In 1961, the airport was acquired by the Town of Brookhaven. In 1981, the Mastic Fire Department Substation was developed to support the airport during emergencies.

Due to the site’s history and presence of pefluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) detected in shallow groundwater downgradient of the site, DEC designated the site as a potential site requiring further investigation to determine if the site poses a significant threat to public health or the environment.

1.3 PREVIOUS INVESTIGATIONS

In 2019, groundwater samples were collected from two temporary points (four sample intervals per location) by Environmental Assessment & Remediations (EAR). Results from the temporary screening exhibited concentrations as high as 501 parts per trillion (ppt) and 19.1 ppt of PFOS and PFOA, respectively. These concentrations are above the current drinking water standard of 10 ppt for each PFOS and PFOA.

A Site Characterization (SC) was completed in 2021 by EAR that included a site inspection, installation of three permanent overburden monitoring wells, collection of groundwater samples from the monitoring wells, collection of groundwater samples from nine temporary points (two sample intervals per location), and collection of soil samples from four surface soil and three subsurface soil locations. All samples were analyzed for per- and polyfluoroalkyl substances (PFAS) and a subset of samples were additionally analyzed for volatile organic compounds (VOCs), semi volatile organic compounds (SVOCs), metals, Polychlorinated Biphenyls (PCBs), and herbicides/pesticides. Groundwater results detected PFOA and PFOS at respective maximum concentrations of 26.5 ppt and 3,380 ppt, exceeding the 10 ppt drinking water standard for each compound individually. PFOA was not detected in any soil samples collected. PFOS was detected in five of six soil samples with a maximum concentration of 7.34 parts per billion (ppb), exceeding the Protection of Groundwater soil guidance value of 3.7 ppb.

1.4 SITE GEOLOGY AND HYDROGEOLOGY

Site soils consist of relatively homogenous, tan medium sand with trace fine gravel and are likely associated with outwash deposits. Boring logs and monitoring well construction logs have been included in **Appendix A**. The groundwater table was encountered around 40 feet below ground surface in permanent overburden monitoring wells. Overburden groundwater flow direction is towards the south.

1.5 PROJECT OBJECTIVES

The primary objective of this work plan is to determine site-specific aquifer conditions. It is intended that this information aid the New York State Department of Environmental Conservation ("Department") during the remedial process. The Department will conduct pumping tests on three on-site monitoring wells.

2.0 FIELD ACTIVITIES

2.1 METHODS

Aquifer characteristics such as transmissivity, hydraulic conductivity, and storativity will be estimated using data collected from a constant-rate pumping test. All relevant and collected data will be recorded in field logs. Due to limited water columns in each of the wells and time constraints, slug tests may be performed additionally, or in place of, the constant-rate pumping test. Methods for each are outlined below and will be conducted in accordance with the Department's Health and Safety Plan (HASP):

2.1.1 CONSTANT-RATE PUMPING TEST

Pumping tests will be performed in the following order, time permitting: downgradient MW-3, upgradient MW-1, and then MW-2 (**Figure 3**). Water level measurements will be collected at each monitoring well before pumping tests begin which will allow for the determination of static water level, saturated thickness of the aquifer, and depth to the top of the screen from the water table. Measurements will be relative to top of the well riser. A clean Grundfos® or Whale® pump and a data logging pressure transducer will be secured to the top of the well casing and lowered into the monitoring well. Due to the limited water columns, the transducer will be located towards the bottom of the well and the pump intake will be located a foot above the transducer. The transducer, which will verify the depth below the water interface, will be activated by the computer program and lowered into the well on a string. Background water levels will be recorded for every minute for five minutes (or until stabilization within 0.3 feet) to ensure static conditions prior to the pump test. Pumping rates (5 gallons per minute maximum) will be recorded using an in-line flow meter or by calculating the volume of water removed over a given time. Water level measurements will also be recorded, using a water-level meter, at a minimum of 5-minute intervals to confirm the results of the data logger. Water levels in non-pumping wells will be observed to determine if the cone of influence extends to the pumping well. Pumping tests will be conducted for a maximum of 4 hours or until the well is pumped dry. At the completion of the pump test, the amount of time needed for full recovery will be noted. Water level measurements during recovery will be recorded more frequently than indicated above.

If water level measurements in observation wells do not exhibit drawdown, a pumping test on another monitoring well may be conducted.

2.1.2 SLUG TEST

Slug tests will be implemented due to time constraints or limited water column availability. Similar to the pumping test, static water level measurements will be collected prior to performing the test (as outlined in Section 2.1.1). Since the well screen interval bridges the water table, a rising-head test would be conducted, where an object of known volume, is removed from the well casing, causing an artificial change in water level. Water level measurements will be recorded by a data logging pressure transducer and or manually using a water level meter until the water level recovers within 0.3 feet of the static condition. Care will be taken to prevent the slug from disturbing the transducer. Results from the slug tests will also be used to determine aquifer characteristics described above.

2.2 INVESTIGATION DERIVED WASTE (IDW) MANAGEMENT

Water generated from the pumping tests will be containerized in totes or drums for subsequent treatment by granular activated carbon (GAC) vessels. Water will be routed through the GAC system to remove site contamination prior to discharge. Treated water will then be discharged to unpaved ground, allowing for infiltration into the same groundwater aquifer unit in a manner that will not result in surface water runoff.

Any disposable personal protective equipment and pumping equipment will be placed in sealed garbage bags and disposed of as municipal solid waste.

2.3 DECONTAMINATION

Decontamination of any non-dedicated equipment (e.g., water level meters and transducer) will be performed using a standard non-phosphate detergent (e.g., Alconox®) wash and potable water rinse. Equipment will be allowed to air dry before reuse.

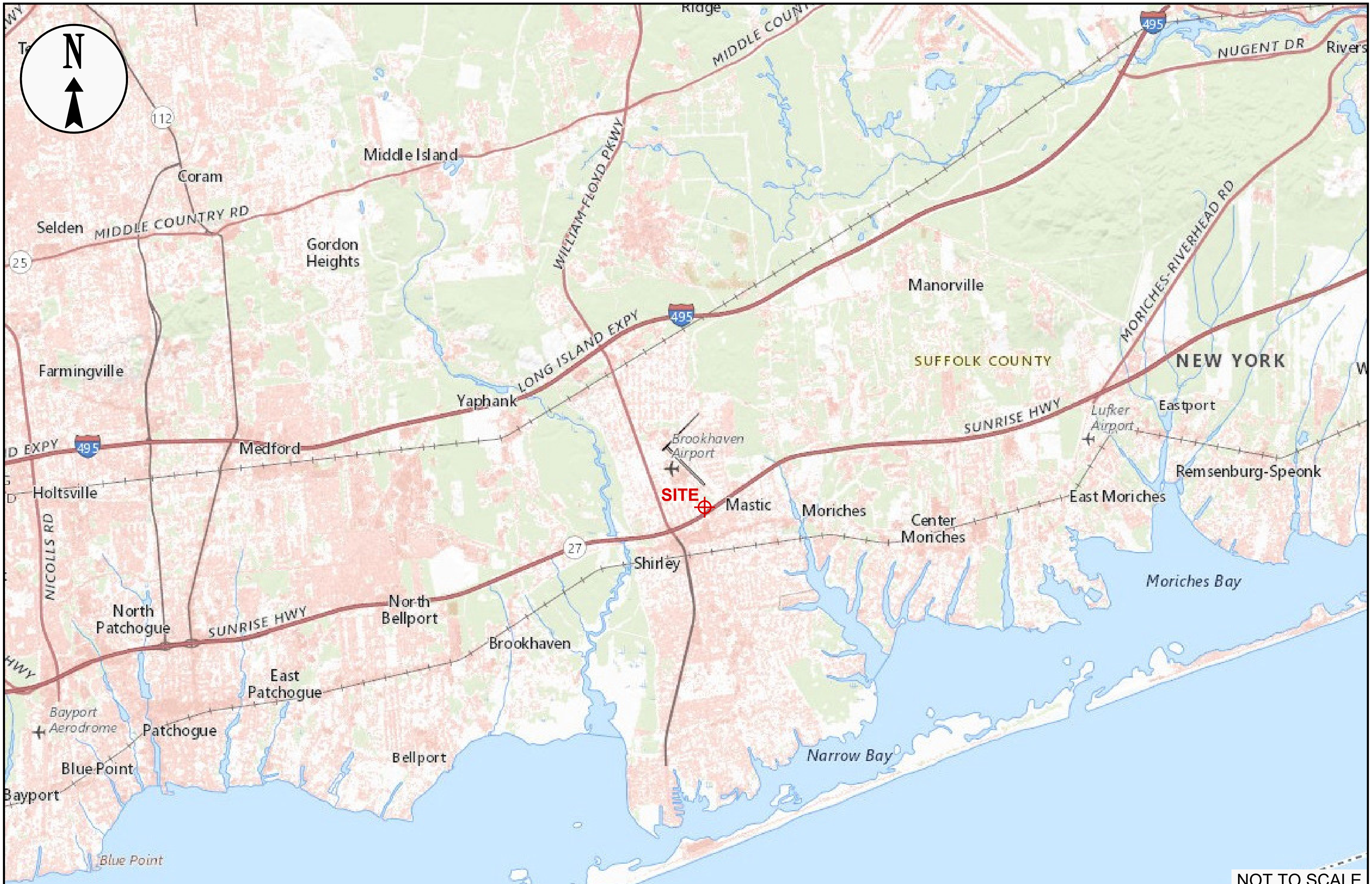
3.0 REPORT

A report, including figures and tables, will be prepared that describes field activities and presents aquifer test results. Photographs, field logs, and applicable hydraulic calculations will be included as separate appendices.

FIGURES

FIGURE 1

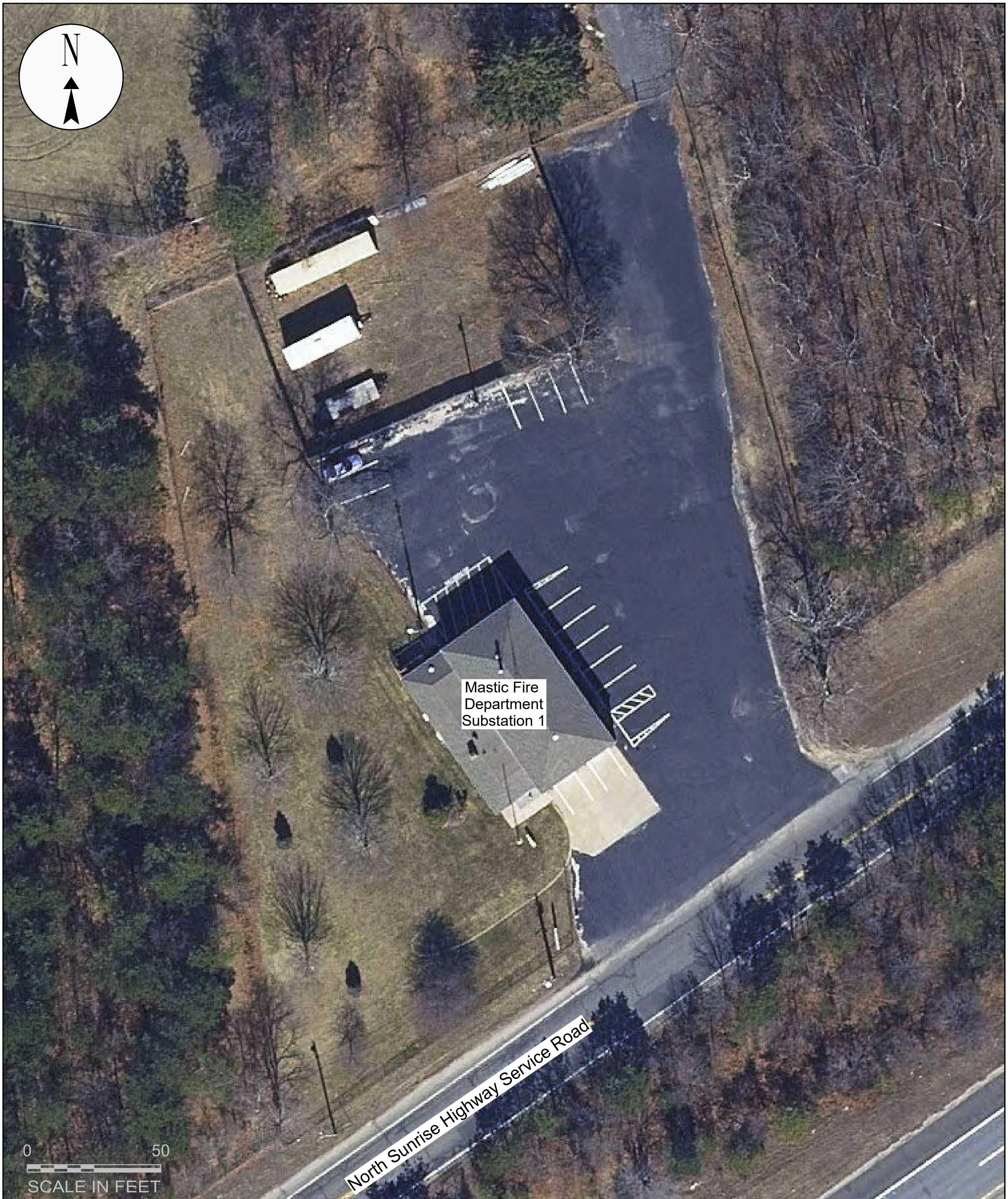
FIGURE 1



ENVIRONMENTAL ASSESSMENT & REMEDIATIONS	Site Location Map	Mastic Fire Department Substation Sunrise Service Road North Shirley, NY NYSDEC Site #152265

FIGURE 2

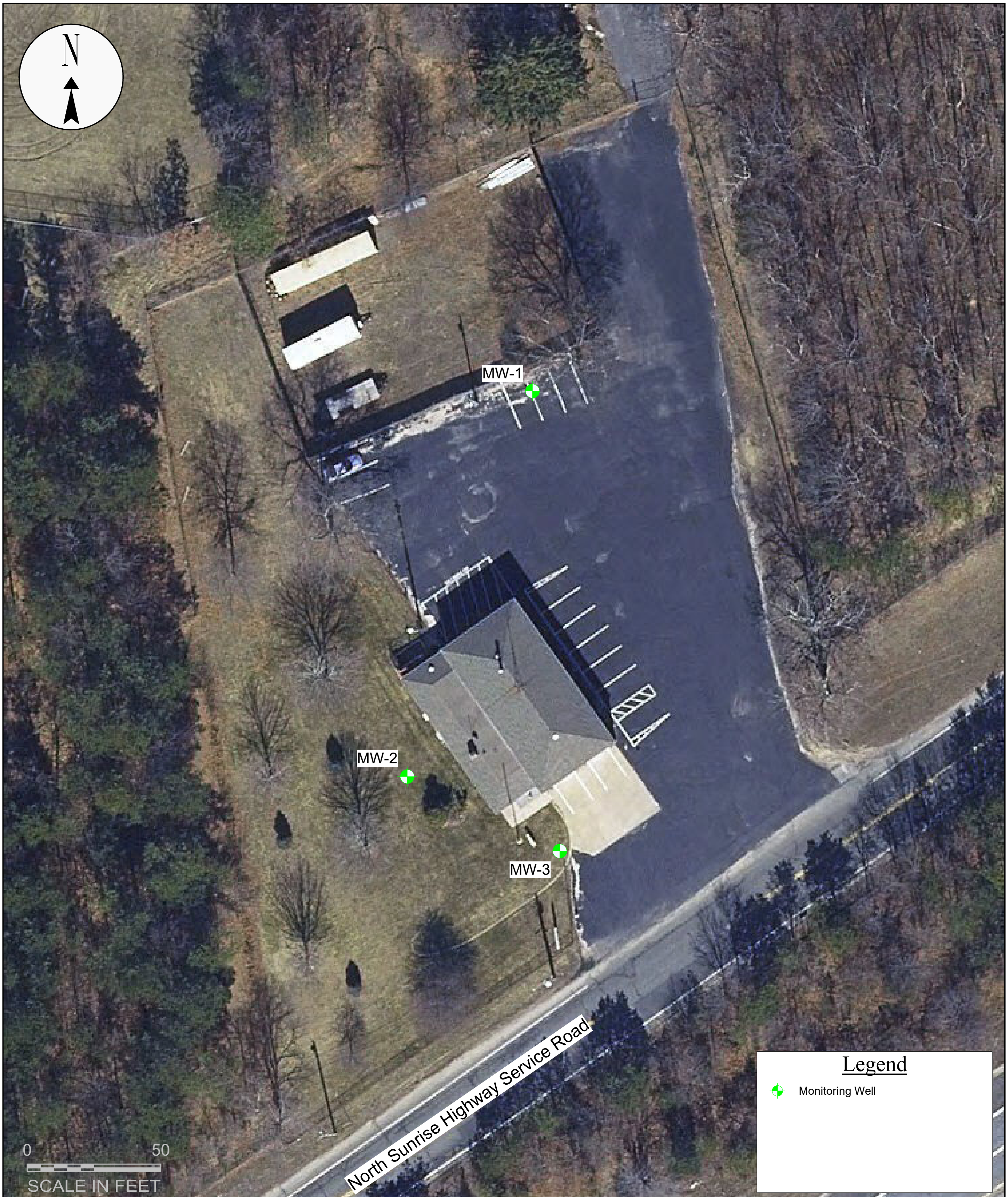
FIGURE 2



ENVIRONMENTAL ASSESSMENT & REMEDIATIONS	Site Map	Mastic Fire Department Substation Sunrise Service Road North Shirley, NY NYSDEC Site #152265

FIGURE 3

FIGURE 4



ENVIRONMENTAL ASSESSMENT & REMEDIATIONS

Site Map

Mastic Fire Department Substation
Sunrise Service Road North
Shirley, NY
NYSDEC Site #152265

APPENDIX A

225 Atlantic Avenue
Patchogue, NY 11772
Office: 631.447.6400
Fax: 631.447.6497
Toll-Free: 1.888.EAR.6789
E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/23/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME	Mastic Fire Department Substation
SITE ADDRESS	Sunrise Highway Shirley, NY
SITE ID NUMBER	152265
WELL ID	MW-1
DRILLING METHOD	Hollow Stem Auger
DRILLING COMPANY	Environmental Assessment & Remediations
HEAD DRILLER	A. Duchimaza
LOGGED BY	J. Lohan
BOREHOLE DIAMETER	4.25"
SAMPLE METHOD	Auger Cuttings (AC)
DEPTH-TO-WATER	40.34'
TOTAL WELL DEPTH	47'

WELL CONSTRUCTION

CASING
Type PVC Diameter 2" Length 37'

SCREEN
Type PVC Diameter 2" Slot 0.010" Length 10'

GRAVEL PACK #00 Well Gravel (34'-35') #2 Well Gravel (35'-47')

CASING SEAL Grout (1'-34')

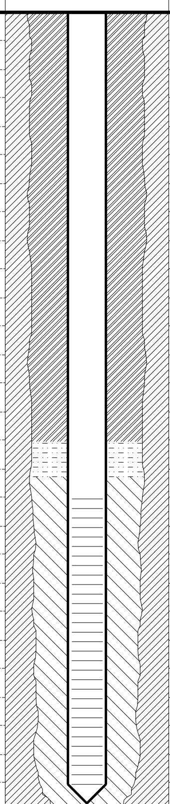
SECURITY 8"X12" Steel, Bolt-Down Manhole Cover
2" Locking Well Cap

FINISH Concrete Pad

COMMENTS MW-1 is located 21' E of parking lot light pole, 79' NE of NE corner of station building, & 9.75' S of chain link fence line.

Soil Lithology/Field Observations

Depth Below Grade | Well Design



40.34'

TWD 47'

NOT TO SCALE

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-5'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
5'-35'	Tan medium sand, little fine sand, trace coarse sand; moist, no odor.	AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
		AC	30'-35'	0.0ppm	-
35'-47'	Tan medium sand, little fine sand, trace coarse sand; wet, no odor.	AC	35'-40'	0.0ppm	-
		AC	40'-45'	0.0ppm	-
		AC	45'-47'	0.0ppm	-

#2 Well Gravel | #00 Well Gravel | Grout

225 Atlantic Avenue
Patchogue, NY 11772
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Fax: 631.447.6497
Toll-Free: 1.888.EAR.6789
E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/25/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME: Mastic Fire Department Substation
SITE ADDRESS: Sunrise Highway
Shirley, NY

SITE ID NUMBER: 152265
WELL ID: MW-2
DRILLING METHOD: Hollow Stem Auger
DRILLING COMPANY: Environmental Assessment & Remediations
HEAD DRILLER: A. Duchimaza
LOGGED BY: J. Lohan
BOREHOLE DIAMETER: 4.25"
SAMPLE METHOD: Auger Cuttings (AC)
DEPTH-TO-WATER: 42.39'
TOTAL WELL DEPTH: 48'

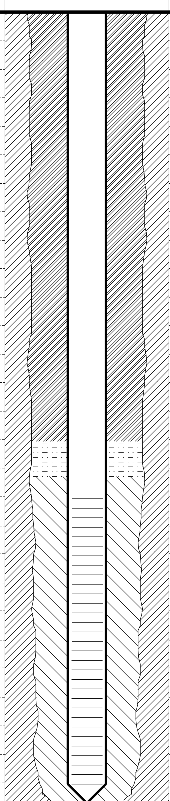
WELL CONSTRUCTION

CASING
Type PVC Diameter 2" Length 38'

SCREEN
Type PVC Diameter 2" Slot 0.010" Length 10'

GRAVEL PACK: #00 Well Gravel (35'-36') #2 Well Gravel (36'-48')
CASING SEAL: Grout (1'-35')
SECURITY: 8"X12" Steel, Bolt-Down Manhole Cover
2" Locking Well Cap
FINISH: Concrete Pad
COMMENTS: MW-2 is located 36.5' NW of SW corner of station building, 35.65' SW of NW corner of station building, & 49.5' NW flag pole.

Depth Below Grade / Well Design



42.39'

TWD 47'

NOT TO SCALE

Soil Lithology/Field Observations

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-5'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
5'-35'	Tan medium sand, little fine sand, trace coarse sand; dry, no odor.	AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
		AC	30'-35'	0.0ppm	-
35'-40'	Tan medium sand, little fine sand, trace coarse sand; moist, no odor.	AC	35'-40'	0.0ppm	-
40'-48'	Tan medium sand, little fine sand, trace coarse sand; wet, no odor.	AC	40'-45'	0.0ppm	-
		AC	45'-48'	0.0ppm	-

#2 Well Gravel | #00 Well Gravel | Grout

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Fax: 631.447.6497
Toll-Free: 1.888.EAR.6789
E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/30/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME	Mastic Fire Department Substation
SITE ADDRESS	Sunrise Highway Shirley, NY
SITE ID NUMBER	152265
WELL ID	MW-3
DRILLING METHOD	Hollow Stem Auger
DRILLING COMPANY	Environmental Assessment & Remediations
HEAD DRILLER	A. Duchimaza
LOGGED BY	J. Lohan
BOREHOLE DIAMETER	4.25"
SAMPLE METHOD	Auger Cuttings (AC)
DEPTH-TO-WATER	42.38'
TOTAL WELL DEPTH	50'

WELL CONSTRUCTION

CASING
Type PVC Diameter 2" Length 40'

SCREEN
Type PVC Diameter 2" Slot 0.010" Length 10'

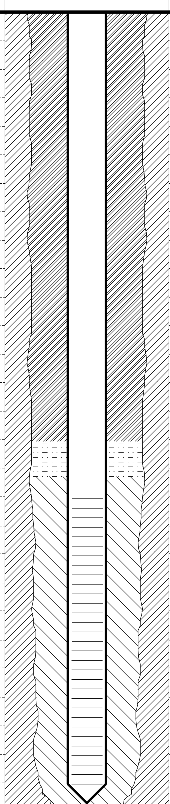
GRAVEL PACK	#00 Well Gravel (37'-38') #2 Well Gravel (38'-50')
CASING SEAL	Grout (1'-37')
SECURITY	8"X12" Steel, Bolt-Down Manhole Cover 2" Locking Well Cap
FINISH	Concrete Pad
COMMENTS	MW-3 is located 26.15' N of fire hydrant, 28' SE of SW corner of station building, & 36.25' SW of SE corner of station building.

Soil Lithology/Field Observations

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-30'	Tan medium sand, little fine sand, little coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
		AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
30'-40'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	AC	30'-35'	0.0ppm	-
		AC	35'-40'	0.0ppm	-
40'-50'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; wet, no odor.	AC	40'-45'	0.0ppm	-
		AC	45'-50'	0.0ppm	-

Depth Below Grade: 42.38' (water level); TWD 50'

Well Design



NOT TO SCALE

#2 Well Gravel | #00 Well Gravel | Grout

APPENDIX B

AQUIFER TEST DATA FORM

SITE NAME/CODE:	#152265 Mastic Fire Dept Substation	START/END DATE:	4/27/2022
LOCATION ID:	MW-1	MEASUREMENT POINT:	N side top of PVC
STATIC WATER LEVEL (FT):	39.33	WELL DEPTH (FT):	48.13
SCREEN INTERVAL (FT):	37 - 47	PUMP DEPTH (FT):	~47
TEST START TIME:	1:25 PM	END TIME:	2:46 PM

Time	Elapsed Time (min)	Pumping Well Water Level (ft btmp*)	Drawdown in Pumping Well (ft)	Observation Well Water Level (ft btmp*)	Drawdown in Observation Well (ft)	Pumping Rate (gpm)	RPM	Notes
1:25 PM	0	39.33	0	NR	NR	2.5	219.2	Pump turned on
1:26 PM	1	39.41	0.08	NR	NR	2.5	219.2	
1:27 PM	2	39.41	0.08	NR	NR	2.5	219.2	
1:28 PM	3	39.41	0.08	NR	NR	2.5	219.2	
1:29 PM	4	39.42	0.09	NR	NR	2.5	219.2	
1:30 PM	5	39.42	0.09	NR	NR	2.5	219.2	
1:31 PM	6	39.42	0.09	NR	NR	2.5	219.2	
1:35 PM	10	39.42	0.09	NR	NR	2.5	219.2	
1:36 PM	11	39.5	0.17	NR	NR	3.76	305	
1:37 PM	12	39.5	0.17	NR	NR	3.76	305	
1:38 PM	13	39.51	0.18	NR	NR	3.76	305	~35 gallons pumped
1:39 PM	14	39.51	0.18	NR	NR	3.76	305	
1:40 PM	15	39.52	0.19	NR	NR	3.76	305	
1:45 PM	20	39.52	0.19	NR	NR	3.76	305	
1:46 PM	21	39.53	0.2	NR	NR	5	394	
1:47 PM	22	39.55	0.22	NR	NR	5	370	Pump speed dropped
1:48 PM	23	39.59	0.26	NR	NR	5	370	
1:49 PM	24	39.6	0.27	NR	NR	5	370	
1:50 PM	25	39.61	0.28	NR	NR	5	370	
1:55 PM	30	39.61	0.28	NR	NR	5	370	~100 gallons pumped
2:00 PM	35	39.61	0.28	NR	NR	5.2	370	
2:05 PM	40	39.61	0.28	NR	NR	5.2	370	
2:15 PM	50	39.62	0.29	NR	NR	5.81	370	
2:25 PM	60	39.63	0.3	NR	NR	5.82	370	
2:35 PM	70	39.63	0.3	NR	NR	5.82	370	
2:45 PM	80	39.63	0.3	NR	NR	5.82	370	
2:46 PM	81	NR	NR	NR	NR	0	0	pump off
2:47 PM	82	39.36	0.03	NR	NR	0	0	
2:49 PM	84	39.36	0.03	NR	NR	0	0	
2:51 PM	86	39.36	0.03	NR	NR	0	0	recovered

*NR - Not Recorded

AQUIFER TEST DATA FORM

SITE NAME/CODE:	#152265 Mastic Fire Dept Substation	START/END DATE:	4/28/2022
LOCATION ID:	MW-2	MEASUREMENT POINT:	E side Top of PVC
STATIC WATER LEVEL (FT):	41.39	WELL DEPTH (FT):	48.99
SCREEN INTERVAL (FT):	38-48	PUMP DEPTH (FT):	~48
TEST START TIME:	10:48 AM	END TIME:	10:50 AM

Time	Elapsed Time (min)	Pumping Well Water Level (ft btmp*)	Drawdown in Pumping Well (ft)	Observation Well Water Level (ft btmp*)	Drawdown in Observation Well (ft)	Pumping Rate (gpm)	RPM	Notes
10:48 AM	0	41.39	0	NR	NR	NR	350	Pump turned on
10:49 AM	1	41.67	0.28	NR	NR	NR	250	
10:50 AM	2	41.66	0.27	NR	NR	NR	0	Pump off - malfunction
10:54 AM	6	41.38	-0.01	NR	NR	NR	0	Pump off - malfunction

*NR - Not Recorded

AQUIFER TEST DATA FORM

SITE NAME/CODE:	#152265 Mastic Fire Dept Substation	START/END DATE:	4/28/2022
LOCATION ID:	MW-3	MEASUREMENT POINT:	E side top of PVC
STATIC WATER LEVEL (FT):	41.43	WELL DEPTH (FT):	51.65
SCREEN INTERVAL (FT):	40-50	PUMP DEPTH (FT):	~50
TEST START TIME:	9:18 AM	END TIME:	10:02 AM

Time	Elapsed Time (min)	Pumping Well Water Level (ft btmp*)	Drawdown in Pumping Well (ft)	Observation Well Water Level (ft btmp*)	Drawdown in Observation Well (ft)	Pumping Rate (gpm)	RPM	Notes
9:18 AM	0	41.43	0	41.38	0.00	2.99	257	Pump turned on
9:19 AM	1	41.51	0.08	NR	NR	2.99	257	
9:20 AM	2	41.49	0.06	NR	NR	2.99	257	
9:21 AM	3	41.48	0.05	NR	NR	2.99	257	
9:22 AM	4	41.49	0.06	NR	NR	2.99	257	
9:23 AM	5	41.49	0.06	NR	NR	2.99	257	
9:28 AM	10	41.49	0.06	NR	NR	2.99	257	
9:29 AM	11	41.54	0.11	NR	NR	6	352	
9:30 AM	12	41.54	0.11	NR	NR	6	352	
9:31 AM	13	41.54	0.11	NR	NR	6	352	
9:32 AM	14	41.54	0.11	41.37	-0.01	6	352	
9:33 AM	15	41.56	0.13	NR	NR	6	352	
9:38 AM	20	41.57	0.14	41.39	0.01	6	352	
9:43 AM	25	41.57	0.14	NR	NR	6	352	
9:47 AM	29	41.61	0.18	NR	NR	6	400	
9:48 AM	30	41.63	0.2	NR	NR	6	400	
9:49 AM	31	41.63	0.2	NR	NR	6	400	
9:50 AM	32	41.63	0.2	NR	NR	6	400	
9:51 AM	33	41.63	0.2	41.38	0.00	6	400	
9:56 AM	38	41.63	0.2	NR	NR	6	400	
9:58 AM	40	41.63	0.2	NR	NR	6	400	
10:02 AM	44	41.45	0.02	NR	NR	0	0	Pump off, Recovered after ~20 seconds

*NR - Not Recorded

Static water level at Observation Well MW-2 was 41.38' below top of PVC.

APPENDIX C

MW-1 Pump Test Mini-Diver Data

Location	Time	Time Elapsed (min)	Pressure	Temperature	WaterLevel (cm)	Water Column Above Diver (ft)	Water Level (ft)	Drawdown (ft)
mw-1	13:25:01	0.00	1200.4	13.18666667	170.7	5.60039388	39.33	0
mw-1	13:26:01	1.00	1200.591667	13.03333333	170.8791667	5.606272051	39.33587817	-0.005878171
mw-1	13:27:01	2.00	1200.591667	12.92666667	170.9541667	5.608732683	39.3383388	-0.008338803
mw-1	13:28:01	3.00	1199.058333	12.87333333	169.2083333	5.551454683	39.2810608	0.048939197
mw-1	13:29:01	4.00	1198.291667	12.82666667	168.4791666	5.52753189	39.25713801	0.07286199
mw-1	13:30:01	5.00	1198.291667	12.79333333	168.4791667	5.527531892	39.25713801	0.072861988
mw-1	13:31:01	6.00	1199.825	12.77333333	170.1	5.58070884	39.31031496	0.01968504
mw-1	13:32:01	7.00	1200.4	12.73333333	171.075	5.61269703	39.34230315	-0.01230315
mw-1	13:33:01	8.00	1200.4	12.75333333	170.975	5.60941619	39.33902231	-0.00902231
mw-1	13:34:01	9.00	1200.4	12.75333333	170.5875	5.596702934	39.32630905	0.003690946
mw-1	13:35:01	10.00	1200.4	12.75333333	170.825	5.60449493	39.33410105	-0.00410105
mw-1	13:36:01	11.00	1199.825	12.74	170.075	5.57988863	39.30949475	0.02050525
mw-1	13:37:01	12.00	1200.4	12.73333333	170.8625	5.605725244	39.33533136	-0.005331364
mw-1	13:38:01	13.00	1200.4	12.72666667	170.8	5.60367472	39.33328084	-0.00328084
mw-1	13:39:01	14.00	1198.291667	12.72	168.6791667	5.534093572	39.26369969	0.066300308
mw-1	13:40:01	15.00	1197.525	12.71333333	167.9375	5.509760674	39.23936679	0.090633206
mw-1	13:41:01	16.00	1198.866667	12.70666667	169.3416667	5.555829137	39.28543526	0.044564743
mw-1	13:42:01	17.00	1198.1	12.70666667	168.575	5.530676031	39.26028215	0.069717849
mw-1	13:43:01	18.00	1198.1	12.70666667	168.65	5.53313666	39.26274278	0.06725722
mw-1	13:44:01	19.00	1198.866667	12.70666667	169.5291667	5.561980712	39.29158683	0.038413168
mw-1	13:45:01	20.00	1198.1	12.70666667	168.7375	5.536007395	39.26561351	0.064386485
mw-1	13:46:01	21.00	1198.1	12.7	169.125	5.54872065	39.27832677	0.05167323
mw-1	13:47:01	22.00	1198.1	12.7	169.05	5.546260021	39.27586614	0.054133859
mw-1	13:48:01	23.00	1198.1	12.7	168.9875	5.544209495	39.27381562	0.056184385
mw-1	13:49:01	24.00	1196.566667	12.7	167.6791666	5.50128517	39.23089129	0.09910871
mw-1	13:50:01	25.00	1202.891667	12.77333333	174.1166667	5.712489247	39.44209537	-0.112095367
mw-1	13:51:01	26.00	1195.225	12.96	166.275	5.45521671	39.18482283	0.14517717
mw-1	13:52:01	27.00	1194.458333	12.77333333	165.7708333	5.438675808	39.16828193	0.161718072
mw-1	13:53:01	28.00	1194.458333	12.72	165.6833333	5.435805073	39.16541119	0.164588807
mw-1	13:54:01	29.00	1195.8	12.70666667	167.2	5.48556448	39.2151706	0.1148294
mw-1	13:55:01	30.00	1194.458333	12.69333333	165.7083333	5.436625283	39.1662314	0.163768597
mw-1	13:56:01	31.00	1195.225	12.68666667	166.425	5.46013797	39.18974409	0.14025591
mw-1	13:57:01	32.00	1194.458333	12.68666667	165.8583333	5.441546543	39.17115266	0.158847337
mw-1	13:58:01	33.00	1194.458333	12.68666667	165.6208333	5.433754547	39.16336067	0.166639333
mw-1	13:59:01	34.00	1195.033333	12.68	166.4458333	5.460821478	39.1904276	0.139572402
mw-1	14:00:01	35.00	1195.033333	12.68	166.2708333	5.455080008	39.18468613	0.145313872
mw-1	14:01:01	36.00	1195.033333	12.68	166.2708333	5.455080008	39.18468613	0.145313872
mw-1	14:02:01	37.00	1195.033333	12.68	166.4333333	5.460411373	39.19001749	0.139982507
mw-1	14:03:01	38.00	1195.033333	12.68	166.2583333	5.454669903	39.18427602	0.145723977
mw-1	14:04:01	39.00	1195.033333	12.68	166.1083333	5.449748643	39.17935476	0.150645237
mw-1	14:05:01	40.00	1195.033333	12.68	166.1208333	5.450158749	39.17976487	0.150235131
mw-1	14:06:01	41.00	1195.033333	12.68	165.9333333	5.444007173	39.17361329	0.156386707
mw-1	14:07:01	42.00	1194.266667	12.68	165.2166667	5.420494487	39.15010061	0.179899393
mw-1	14:08:01	43.00	1195.033333	12.68	165.7833333	5.439085913	39.16869203	0.161307967
mw-1	14:09:01	44.00	1195.033333	12.68	165.8583334	5.441546544	39.17115266	0.158847336
mw-1	14:10:01	45.00	1194.266667	12.68	165.0166667	5.413932807	39.14353893	0.186461073
mw-1	14:11:01	46.00	1194.266667	12.68	165.0166667	5.413932807	39.14353893	0.186461073
mw-1	14:12:01	47.00	1194.266667	12.68	164.9416667	5.411472177	39.1410783	0.188921703
mw-1	14:13:01	48.00	1194.266667	12.68	164.8166667	5.407371127	39.13697725	0.193022753
mw-1	14:14:01	49.00	1194.266667	12.68	164.9416667	5.411472177	39.1410783	0.188921703
mw-1	14:15:01	50.00	1194.266667	12.68	165.0916667	5.416393436	39.14599956	0.184000444
mw-1	14:16:01	51.00	1194.266667	12.68	165.1416667	5.418033857	39.14763998	0.182360023
mw-1	14:17:01	52.00	1193.5	12.68	164.25	5.3887797	39.11838582	0.21161418
mw-1	14:18:01	53.00	1193.5	12.68	164.1875	5.386729175	39.1163353	0.213664705
mw-1	14:19:01	54.00	1193.5	12.68	164.475	5.396161591	39.12576771	0.204232289
mw-1	14:20:01	55.00	1193.5	12.68	164.3375	5.391650435	39.12125656	0.208743445

Location	Time	Time Elapsed (min)	Pressure	Temperature	WaterLevel (cm)	Water Column Above Diver (ft)	Water Level (ft)	Drawdown (ft)
mw-1	14:21:01	56.00	1194.266667	12.68	165.2541667	5.421724802	39.15133092	0.178669078
mw-1	14:22:01	57.00	1192.925	12.68666667	163.975	5.379757388	39.10936351	0.220636492
mw-1	14:23:01	58.00	1192.925	12.68666667	164.0125	5.380987705	39.11059382	0.219406175
mw-1	14:24:01	59.00	1194.266667	12.68	165.4291667	5.427466272	39.15707239	0.172927608
mw-1	14:25:01	60.00	1192.925	12.68666667	163.85	5.37565634	39.10526246	0.22473754
mw-1	14:26:01	61.00	1193.691667	12.68666667	164.5916667	5.399989237	39.12959536	0.200404643
mw-1	14:27:01	62.00	1192.925	12.68666667	163.85	5.37565634	39.10526246	0.22473754
mw-1	14:28:01	63.00	1192.925	12.68666667	163.9125	5.377706863	39.10731298	0.222687017
mw-1	14:29:01	64.00	1192.158333	12.68666667	163.1583333	5.352963863	39.08256998	0.247430017
mw-1	14:30:01	65.00	1192.925	12.68666667	164.1	5.38385844	39.11346456	0.21653544
mw-1	14:31:01	66.00	1192.158333	12.68666667	163.3208334	5.358295229	39.08790135	0.242098651
mw-1	14:32:01	67.00	1192.925	12.68666667	164.2625	5.389189806	39.11879593	0.211204074
mw-1	14:33:01	68.00	1192.925	12.68666667	164.325	5.39124033	39.12084645	0.20915355
mw-1	14:34:01	69.00	1192.925	12.68666667	164.325	5.39124033	39.12084645	0.20915355
mw-1	14:35:01	70.00	1192.925	12.68666667	164.175	5.38631907	39.11592519	0.21407481
mw-1	14:36:01	71.00	1192.158333	12.68666667	163.3833333	5.360345753	39.08995187	0.240048127
mw-1	14:37:01	72.00	1192.158333	12.68666667	162.9958333	5.347632498	39.07723862	0.252761382
mw-1	14:38:01	73.00	1192.158333	12.68666667	163.0208333	5.348452707	39.07805883	0.251941173
mw-1	14:39:01	74.00	1192.158333	12.68666667	162.8458334	5.34271124	39.07231736	0.25768264
mw-1	14:40:01	75.00	1192.158333	12.68666667	163.0833333	5.350503234	39.08010935	0.249890646
mw-1	14:41:01	76.00	1192.158333	12.68666667	163.2333333	5.355424493	39.08503061	0.244969387
mw-1	14:42:01	77.00	1192.925	12.68666667	163.75	5.3723755	39.10198162	0.22801838
mw-1	14:43:01	78.00	1192.158333	12.68666667	162.8333333	5.342301133	39.07190725	0.258092747
mw-1	14:44:01	79.00	1192.733333	12.68	163.3958333	5.360755857	39.09036198	0.239638023
mw-1	14:45:01	80.00	1192.733333	12.68	163.1458333	5.352553757	39.08215988	0.247840123
mw-1	14:46:01	81.00	1192.158333	12.68666667	162.5708333	5.333688928	39.06329505	0.266704952
mw-1	14:47:01	82.00	1192.733333	12.68	163.1458333	5.352553758	39.08215988	0.247840122
mw-1	14:48:01	83.00	1192.733333	12.68	163.2458333	5.355834598	39.08544072	0.244559282
mw-1	14:49:01	84.00	1195.033333	12.68	165.7833333	5.439085913	39.16869203	0.161307967
mw-1	14:50:01	85.00	1200.4	14.13	171	5.6102364	39.33984252	-0.00984252
mw-1	14:51:01	86.00	1201.166667	15.23666667	172.0416667	5.644411817	39.37401794	-0.044017937
mw-1	14:52:01	87.00	1201.166667	15.48333333	171.9916667	5.642771396	39.37237752	-0.042377516
mw-1	14:53:01	88.00	1201.166667	15.31666667	172.1166667	5.646872446	39.37647857	-0.046478566
mw-1	14:54:01	89.00	1200.4	15	171.2375	5.618028396	39.34763452	-0.017634516
mw-1	14:55:01	90.00	1201.166667	14.88666667	171.8291667	5.637440031	39.36704615	-0.037046151

MW-3 Pump Test Mini-Diver Data

Location	TimeStamp	Time	Pressure	Temperature	WaterLevel(cm)	Water Column Above Diver (ft)	Water Level (ft)	Drawdown (ft)
mw-3	4/28/2022	9:18:00	1223.591667	13.63666667	189.5166667	6.217738607	41.43	0
mw-3	4/28/2022	9:19:00	1224.166667	13.62333333	190.2916667	6.243165117	41.45542651	-0.02542651
mw-3	4/28/2022	9:20:00	1224.933333	13.61666667	191.0583333	6.268318223	41.48057962	-0.050579617
mw-3	4/28/2022	9:21:00	1223.591667	13.61	189.6916667	6.223480077	41.43574147	-0.00574147
mw-3	4/28/2022	9:22:00	1221.866667	13.67	188.2416667	6.175907897	41.38816929	0.04183071
mw-3	4/28/2022	9:23:00	1221.1	13.75	187.35	6.14665374	41.35891513	0.071084867
mw-3	4/28/2022	9:24:00	1221.866667	13.79666667	188.0916667	6.170986637	41.38324803	0.04675197
mw-3	4/28/2022	9:25:00	1221.1	13.82333333	187.325	6.14583353	41.35809492	0.071905077
mw-3	4/28/2022	9:26:00	1221.1	13.83	187.4	6.14829416	41.36055555	0.069444447
mw-3	4/28/2022	9:27:00	1220.333333	13.83666667	186.7583333	6.127242103	41.3395035	0.090496503
mw-3	4/28/2022	9:28:00	1219.758333	13.84333333	185.8833333	6.098534753	41.31079615	0.119203853
mw-3	4/28/2022	9:29:00	1219.758333	13.84333333	185.8833333	6.098534753	41.31079615	0.119203853
mw-3	4/28/2022	9:30:00	1220.333333	13.85	186.4333333	6.116579373	41.32884077	0.101159233
mw-3	4/28/2022	9:31:00	1221.1	13.85666667	187.075	6.13763143	41.34989282	0.080107177
mw-3	4/28/2022	9:32:00	1218.8	13.85666667	184.9	6.06627316	41.27853455	0.151465447
mw-3	4/28/2022	9:33:00	1218.033333	13.85	184.1333333	6.041120053	41.25338145	0.176618553
mw-3	4/28/2022	9:34:00	1217.458333	13.84333333	183.5083333	6.020614803	41.2328762	0.197123803
mw-3	4/28/2022	9:35:00	1217.458333	13.84333333	183.7583333	6.028816903	41.2410783	0.188921703
mw-3	4/28/2022	9:36:00	1217.458333	13.84333333	183.4333333	6.018154173	41.23041557	0.199584433
mw-3	4/28/2022	9:37:00	1218.033333	13.85	183.9583333	6.035378583	41.24763998	0.182360023
mw-3	4/28/2022	9:38:00	1217.266667	13.85	183.3666667	6.015966947	41.22822834	0.20177166
mw-3	4/28/2022	9:39:00	1216.691667	13.84333333	182.9166667	6.001203167	41.21346456	0.21653544
mw-3	4/28/2022	9:40:00	1216.691667	13.84333333	182.7416667	5.995461697	41.20772309	0.22227691
mw-3	4/28/2022	9:41:00	1216.691667	13.84333333	182.6666667	5.993001067	41.20526246	0.22473754
mw-3	4/28/2022	9:42:00	1215.925	13.84333333	181.85	5.96620754	41.17846893	0.251531067
mw-3	4/28/2022	9:43:00	1215.925	13.84333333	182.05	5.97276922	41.18503061	0.244969387
mw-3	4/28/2022	9:44:00	1215.925	13.84333333	181.9	5.96784796	41.18010935	0.249890647
mw-3	4/28/2022	9:45:00	1215.925	13.84333333	182.025	5.97194901	41.1842104	0.245789597
mw-3	4/28/2022	9:46:00	1215.925	13.84333333	181.85	5.96620754	41.17846893	0.251531067
mw-3	4/28/2022	9:47:00	1215.925	13.84333333	181.9	5.96784796	41.18010935	0.249890647
mw-3	4/28/2022	9:48:00	1215.925	13.84333333	181.85	5.96620754	41.17846893	0.251531067
mw-3	4/28/2022	9:49:00	1215.158333	13.84333333	180.9333333	5.936133173	41.14839457	0.281605433
mw-3	4/28/2022	9:50:00	1215.733333	13.85	181.8333333	5.965660733	41.17792213	0.252077873
mw-3	4/28/2022	9:51:00	1214.391667	13.84333333	180.6416667	5.926564057	41.13882545	0.29117455
mw-3	4/28/2022	9:52:00	1214.966667	13.85	181.0666667	5.940507627	41.15276902	0.27723098
mw-3	4/28/2022	9:53:00	1214.966667	13.85	181.0666667	5.940507627	41.15276902	0.27723098
mw-3	4/28/2022	9:54:00	1214.2	13.85	180.3	5.91535452	41.12761591	0.302384087
mw-3	4/28/2022	9:55:00	1214.391667	13.84333333	180.3666667	5.917541747	41.12980314	0.30019686
mw-3	4/28/2022	9:56:00	1214.391667	13.84333333	180.3166667	5.915901327	41.12816272	0.30183728
mw-3	4/28/2022	9:57:00	1214.2	13.85	180.25	5.9137141	41.12597549	0.304024507
mw-3	4/28/2022	9:58:00	1214.966667	13.85	181.0666667	5.940507627	41.15276902	0.27723098
mw-3	4/28/2022	9:59:00	1214.391667	13.84333333	180.3666667	5.917541747	41.12980314	0.30019686
mw-3	4/28/2022	10:00:00	1214.391667	13.84333333	180.3166667	5.915901327	41.12816272	0.30183728
mw-3	4/28/2022	10:01:00	1214.391667	13.84333333	180.4416667	5.920002377	41.13226377	0.29773623
mw-3	4/28/2022	10:02:00	1214.391667	13.84333333	180.3166667	5.915901327	41.12816272	0.30183728
mw-3	4/28/2022	10:03:00	1214.391667	13.84333333	180.4916667	5.921642797	41.13390419	0.29609581
mw-3	4/28/2022	10:04:00	1213.625	13.84333333	179.675	5.89484927	41.10711066	0.322889337
mw-3	4/28/2022	10:05:00	1219.758333	13.84333333	185.8083333	6.096074123	41.30833552	0.121664483
mw-3	4/28/2022	10:06:00	1221.291667	14.11	187.1166667	6.138998447	41.35125984	0.07874016
mw-3	4/28/2022	10:07:00	1221.1	14.94666667	187.025	6.13599101	41.3482524	0.081747597
mw-3	4/28/2022	10:08:00	1221.866667	15.72333333	187.7916667	6.161144117	41.37340551	0.05659449
mw-3	4/28/2022	10:09:00	1222.441667	16.51333333	188.3666667	6.180008947	41.39227034	0.03772966
mw-3	4/28/2022	10:10:00	1192.733333	16.75666667	158.6583333	5.205326063	40.41758746	1.012412543

APPENDIX D

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

June 7, 2022

Brian Jankauskas
NYS Division of Environmental Remediation
625 Broadway 12th Floor
Albany, NY 12233-7012

Project Location: NY
Client Job Number:
Project Number: 152265
Laboratory Work Order Number: 22D2230

Enclosed are results of analyses for samples as received by the laboratory on April 30, 2022. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Raymond J. McCarthy
Project Manager

Table of Contents

con-test
A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

NYS Division of Environmental Remediation
625 Broadway 12th Floor
Albany, NY 12233-7012
ATTN: Brian Jankauskas

REPORT DATE: 6/7/2022

PURCHASE ORDER NUMBER: 144273

PROJECT NUMBER: 152265

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 22D2230

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: NY

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MW-1-2022-04-27	22D2230-01	Ground Water		SOP-454 PFAS	
				SW-846 6010D	
EB-2022-04-27	22D2230-02	Ground Water		SOP-454 PFAS	
Filter-4-28-22	22D2230-03	Ground Water		SOP-454 PFAS	
MW-3-2022-04-28	22D2230-04	Ground Water		SOP-454 PFAS	
				SW-846 6010D	
MW-2-2022-04-28	22D2230-05	Ground Water		SOP-454 PFAS	
				SW-846 6010D	
Duplicate	22D2230-06	Ground Water		SOP-454 PFAS	

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CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

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SOP-454 PFAS

Qualifications:

MS-07A

Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.

Analyte & Samples(s) Qualified:

Perfluorohexanesulfonic acid (PFH
22D2230-01[MW-1-2022-04-27], B307756-MS1, B307756-MSD1

Perfluorononanesulfonic acid (PFN
B307756-MS1, B307756-MSD1

Perfluorooctanesulfonic acid (PFO
22D2230-01[MW-1-2022-04-27], B307756-MS1, B307756-MSD1

Perfluorooctanoic acid (PFOA)
22D2230-01[MW-1-2022-04-27], B307756-MS1, B307756-MSD1

Perfluoropentanoic acid (PFPeA)
22D2230-01[MW-1-2022-04-27], B307756-MS1, B307756-MSD1

MS-22

Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.

Analyte & Samples(s) Qualified:

Perfluorodecanoic acid (PFDA)
B307756-MS1

Perfluorohexanoic acid (PFHxA)
22D2230-01[MW-1-2022-04-27], B307756-MS1

Perfluorononanoic acid (PFNA)
22D2230-01[MW-1-2022-04-27], B307756-MS1

PF-17

Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.

Analyte & Samples(s) Qualified:

d5-NEtFOSAA
22D2230-04[MW-3-2022-04-28]

M2-6:2FTS
22D2230-04[MW-3-2022-04-28]

M2-8:2FTS
22D2230-04[MW-3-2022-04-28]

M3PFBS
B307756-BLK1

M3PFHxS
B307756-BLK1

M5PFHxA
B307756-BLK1

M5PFPeA
B307756-BLK1

M8PFOA
B307756-BLK1

MPFBA
B307756-BLK1

PF-20

Sample extracted at a dilution. Elevated reporting limits due to adjusted sample volume during preparation.

Analyte & Samples(s) Qualified:

22D2230-03RE1[Filter-4-28-22], 22D2230-04RE1[MW-3-2022-04-28], 22D2230-05RE1[MW-2-2022-04-28], 22D2230-06RE1[Duplicate]

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S-29

Extracted Internal Standard is outside of control limits.

Analyte & Samples(s) Qualified:

M2-4:2FTS
22D2230-05[MW-2-2022-04-28], S071428-CCV2

M2-6:2FTS
B307756-MS1

M2-8:2FTS
22D2230-06[Duplicate], B307756-MS1

M3HFPO-DA
B307756-BS1, B307756-MS1, B308205-BS1

M8PFOA
B307756-MS1

V-05

Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

Analyte & Samples(s) Qualified:

Hexafluoropropylene oxide dimer a
S071702-CCV2, S071702-CCV4, S071702-CCV5

Perfluorononanesulfonic acid (PFN
S071702-CCV1

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Lisa A. Worthington
Technical Representative

con-test® A Pace Analytical® Laboratory

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: NY Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-1-2022-04-27 Sampled: 4/27/2022 15:30

Sample ID: 22D2230-01

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoropentanoic acid (PFPeA)	0.56	1.8	0.36	ng/L	1	MS-07A, J	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorohexanoic acid (PFHxA)	0.42	1.8	0.35	ng/L	1	MS-22, J	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
11Cl-PF3OUdS (F53B Minor)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
9Cl-PF3ONS (F53B Major)	ND	1.8	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.22	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.56	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorodecanoic acid (PFDA)	ND	1.8	0.45	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.40	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.21	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	0.86	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
N-EtFOSAA	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
N-MeFOSAA	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.30	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.15	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	0.28	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	0.17	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorohexanesulfonic acid (PFHxS)	2.2	1.8	0.31	ng/L	1	MS-07A	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoropetanesulfonic acid (PFPeS)	ND	1.8	0.24	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluoroheptanoic acid (PFHpA)	0.83	1.8	0.31	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorooctanoic acid (PFOA)	1.4	1.8	0.62	ng/L	1	MS-07A, J	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorooctanesulfonic acid (PFOS)	14	1.8	0.55	ng/L	1	MS-07A	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH
Perfluorononanoic acid (PFNA)	0.48	1.8	0.32	ng/L	1	MS-22, J	SOP-454 PFAS	5/6/22	5/10/22 12:24	BLH

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: NY | Sample Description: | Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-1-2022-04-27 | Sampled: 4/27/2022 15:30

Sample ID: 22D2230-01

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Calcium	5.0	0.50	0.11	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:42	ATP
Iron	3.3	0.050	0.019	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:42	ATP
Magnesium	2.2	0.050	0.0095	mg/L	1		SW-846 6010D	6/3/22	6/4/22 2:19	ATP

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Project Location: NY   Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: EB-2022-04-27   Sampled: 4/27/2022 15:25

Sample ID: 22D2230-02

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	ND	2.1	0.77	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorobutanesulfonic acid (PFBS)	ND	2.1	0.29	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoropentanoic acid (PFPeA)	ND	2.1	0.41	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorohexanoic acid (PFHxA)	ND	2.1	0.40	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
11Cl-PF3OUdS (F53B Minor)	ND	2.1	0.66	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
9Cl-PF3ONS (F53B Major)	ND	2.1	0.40	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	2.1	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	2.1	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	2.1	0.63	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorodecanoic acid (PFDA)	ND	2.1	0.51	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorododecanoic acid (PFDoA)	ND	2.1	0.46	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	2.1	0.24	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoroheptanesulfonic acid (PFHpS)	ND	2.1	0.97	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
N-EtFOSAA	ND	2.1	0.65	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
N-MeFOSAA	ND	2.1	0.79	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorotetradecanoic acid (PFTA)	0.72	2.1	0.38	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	2.1	0.29	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	2.1	0.29	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	2.1	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorooctanesulfonamide (FOSA)	ND	2.1	0.44	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorononanesulfonic acid (PFNS)	ND	2.1	0.17	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	2.1	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoro-1-butanesulfonamide (FBSA)	ND	2.1	0.20	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorohexanesulfonic acid (PFHxS)	ND	2.1	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	2.1	0.43	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	2.1	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	2.1	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoropetanesulfonic acid (PFPeS)	ND	2.1	0.27	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoroundecanoic acid (PFUnA)	ND	2.1	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	2.1	0.29	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluoroheptanoic acid (PFHpA)	ND	2.1	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorooctanoic acid (PFOA)	ND	2.1	0.71	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorooctanesulfonic acid (PFOS)	ND	2.1	0.62	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH
Perfluorononanoic acid (PFNA)	ND	2.1	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:32	BLH

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Project Location: NY | Sample Description: | Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: Filter-4-28-22 | Sampled: 4/28/2022 10:15

Sample ID: 22D2230-03

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	14	1.8	0.68	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorobutanesulfonic acid (PFBS)	2.9	1.8	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoropentanoic acid (PFPeA)	33	1.8	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorohexanoic acid (PFHxA)	37	1.8	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
11Cl-PF3OUdS (F53B Minor)	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
9Cl-PF3ONS (F53B Major)	ND	1.8	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.22	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	0.55	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorodecanoic acid (PFDA)	ND	1.8	0.45	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.40	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.21	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoroheptanesulfonic acid (PFHpS)	1.2	1.8	0.86	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
N-EtFOSAA	ND	1.8	0.57	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
N-MeFOSAA	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	0.30	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.15	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	0.51	1.8	0.28	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoro-1-butanesulfonamide (FBSA)	0.39	1.8	0.17	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorohexanesulfonic acid (PFHxS)	17	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	1.1	1.8	0.33	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoropetanesulfonic acid (PFPeS)	2.1	1.8	0.24	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluoroheptanoic acid (PFHpA)	16	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorooctanoic acid (PFOA)	9.1	1.8	0.62	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH
Perfluorooctanesulfonic acid (PFOS)	210	20	6.0	ng/L	1		SOP-454 PFAS	5/12/22	5/17/22 3:11	BLH
Perfluorononanoic acid (PFNA)	6.9	1.8	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:39	BLH

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Project Location: NY Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-3-2022-04-28 Sampled: 4/28/2022 10:30

Sample ID: 22D2230-04

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	20	1.9	0.70	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorobutanesulfonic acid (PFBS)	2.7	1.9	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoropentanoic acid (PFPeA)	48	1.9	0.37	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorohexanoic acid (PFHxA)	36	1.9	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
11Cl-PF3OUdS (F53B Minor)	ND	1.9	0.60	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
9Cl-PF3ONS (F53B Major)	ND	1.9	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.9	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.9	0.22	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.9	0.57	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorodecanoic acid (PFDA)	ND	1.9	0.46	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorododecanoic acid (PFDoA)	ND	1.9	0.41	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.9	0.22	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoroheptanesulfonic acid (PFHpS)	1.4	1.9	0.88	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
N-EtFOSAA	ND	1.9	0.59	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
N-MeFOSAA	ND	1.9	0.71	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorotetradecanoic acid (PFTA)	ND	1.9	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	1.9	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.9	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorodecanesulfonic acid (PFDS)	ND	1.9	0.30	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorooctanesulfonamide (FOSA)	ND	1.9	0.39	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorononanesulfonic acid (PFNS)	ND	1.9	0.16	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.9	0.29	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoro-1-butanesulfonamide (FBSA)	0.37	1.9	0.18	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorohexanesulfonic acid (PFHxS)	19	1.9	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.9	0.39	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.9	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	0.97	1.9	0.34	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoropetanesulfonic acid (PFPeS)	2.1	1.9	0.24	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoroundecanoic acid (PFUnA)	ND	1.9	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.9	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluoroheptanoic acid (PFHpA)	16	1.9	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorooctanoic acid (PFOA)	9.2	1.9	0.64	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH
Perfluorooctanesulfonic acid (PFOS)	190	20	6.0	ng/L	1		SOP-454 PFAS	5/12/22	5/17/22 3:18	BLH
Perfluorononanoic acid (PFNA)	6.8	1.9	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:46	BLH

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Project Location: NY   Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-3-2022-04-28   Sampled: 4/28/2022 10:30

Sample ID: 22D2230-04

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Calcium	13	0.50	0.11	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:48	ATP
Iron	6.4	0.050	0.019	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:48	ATP
Magnesium	2.8	0.050	0.0095	mg/L	1		SW-846 6010D	5/6/22	5/12/22 16:34	ATP

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Project Location: NY Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-2-2022-04-28 Sampled: 4/28/2022 11:30

Sample ID: 22D2230-05

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.4	1.8	0.68	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorobutanesulfonic acid (PFBS)	1.2	1.8	0.26	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoropentanoic acid (PFPeA)	17	1.8	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorohexanoic acid (PFHxA)	12	1.8	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
11Cl-PF3OUdS (F53B Minor)	ND	1.8	0.59	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
9Cl-PF3ONS (F53B Major)	ND	1.8	0.36	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.22	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	3.5	1.8	0.56	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorodecanoic acid (PFDA)	ND	1.8	0.45	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.40	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.21	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoroheptanesulfonic acid (PFHpS)	1.9	1.8	0.86	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
N-EtFOSAA	ND	1.8	0.58	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
N-MeFOSAA	ND	1.8	0.69	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.26	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorodecanesulfonic acid (PFDS)	0.44	1.8	0.30	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.15	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	1.5	1.8	0.28	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoro-1-butanesulfonamide (FBSA)	0.29	1.8	0.17	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorohexanesulfonic acid (PFHxS)	22	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.38	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.3	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoropetanesulfonic acid (PFPeS)	1.4	1.8	0.24	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluoroheptanoic acid (PFHpA)	15	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorooctanoic acid (PFOA)	18	1.8	0.62	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH
Perfluorooctanesulfonic acid (PFOS)	250	20	6.0	ng/L	1		SOP-454 PFAS	5/12/22	5/17/22 3:26	BLH
Perfluorononanoic acid (PFNA)	170	1.8	0.32	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 12:54	BLH

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Project Location: NY   Sample Description: Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: MW-2-2022-04-28   Sampled: 4/28/2022 11:30

Sample ID: 22D2230-05

Sample Matrix: Ground Water

Metals Analyses (Total)

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Calcium	7.9	0.50	0.11	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:54	ATP
Iron	6.6	0.050	0.019	mg/L	1		SW-846 6010D	5/6/22	5/11/22 20:54	ATP
Magnesium	2.4	0.050	0.0095	mg/L	1		SW-846 6010D	5/6/22	5/12/22 16:40	ATP

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Project Location: NY | Sample Description: | Work Order: 22D2230

Date Received: 4/30/2022

Field Sample #: Duplicate | Sampled: 4/28/2022 00:00

Sample ID: 22D2230-06

Sample Matrix: Ground Water

Semivolatile Organic Compounds by - LC/MS-MS

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Perfluorobutanoic acid (PFBA)	8.4	1.8	0.66	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorobutanesulfonic acid (PFBS)	1.3	1.8	0.25	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoropentanoic acid (PFPeA)	17	1.8	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorohexanoic acid (PFHxA)	12	1.8	0.34	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
11Cl-PF3OUdS (F53B Minor)	ND	1.8	0.57	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
9Cl-PF3ONS (F53B Major)	ND	1.8	0.35	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	0.21	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
8:2 Fluorotelomersulfonic acid (8:2FTS A)	2.7	1.8	0.54	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorodecanoic acid (PFDA)	ND	1.8	0.44	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorododecanoic acid (PFDoA)	ND	1.8	0.39	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	0.21	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoroheptanesulfonic acid (PFHpS)	1.9	1.8	0.84	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
N-EtFOSAA	ND	1.8	0.56	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
N-MeFOSAA	ND	1.8	0.68	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorotetradecanoic acid (PFTA)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorodecanesulfonic acid (PFDS)	0.41	1.8	0.29	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorooctanesulfonamide (FOSA)	ND	1.8	0.37	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorononanesulfonic acid (PFNS)	ND	1.8	0.15	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoro-1-hexanesulfonamide (FHxSA)	1.4	1.8	0.28	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoro-1-butanesulfonamide (FBSA)	0.30	1.8	0.17	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorohexanesulfonic acid (PFHxS)	21	1.8	0.30	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	0.37	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	0.30	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.3	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoropetanesulfonic acid (PFPeS)	1.3	1.8	0.23	ng/L	1	J	SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoroundecanoic acid (PFUnA)	ND	1.8	0.33	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	0.25	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluoroheptanoic acid (PFHpA)	16	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorooctanoic acid (PFOA)	18	1.8	0.61	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH
Perfluorooctanesulfonic acid (PFOS)	240	20	6.0	ng/L	1		SOP-454 PFAS	5/12/22	5/17/22 3:40	BLH
Perfluorononanoic acid (PFNA)	170	1.8	0.31	ng/L	1		SOP-454 PFAS	5/6/22	5/10/22 13:01	BLH

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Sample Extraction Data

Prep Method: SOP 454-PFAAS **Analytical Method: SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22D2230-01 [MW-1-2022-04-27]	B307756	274	1.00	05/06/22
22D2230-02 [EB-2022-04-27]	B307756	242	1.00	05/06/22
22D2230-03 [Filter-4-28-22]	B307756	274	1.00	05/06/22
22D2230-04 [MW-3-2022-04-28]	B307756	268	1.00	05/06/22
22D2230-05 [MW-2-2022-04-28]	B307756	274	1.00	05/06/22
22D2230-06 [Duplicate]	B307756	281	1.00	05/06/22

Prep Method: SOP 454-PFAAS **Analytical Method: SOP-454 PFAS**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22D2230-03RE1 [Filter-4-28-22]	B308205	25.0	1.00	05/12/22
22D2230-04RE1 [MW-3-2022-04-28]	B308205	25.0	1.00	05/12/22
22D2230-05RE1 [MW-2-2022-04-28]	B308205	25.0	1.00	05/12/22
22D2230-06RE1 [Duplicate]	B308205	25.0	1.00	05/12/22

Prep Method: SW-846 3005A **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22D2230-01 [MW-1-2022-04-27]	B307823	50.0	50.0	05/06/22
22D2230-04 [MW-3-2022-04-28]	B307823	50.0	50.0	05/06/22
22D2230-05 [MW-2-2022-04-28]	B307823	50.0	50.0	05/06/22

Prep Method: SW-846 3005A **Analytical Method: SW-846 6010D**

Lab Number [Field ID]	Batch	Initial [mL]	Final [mL]	Date
22D2230-01RE1 [MW-1-2022-04-27]	B308365	25.0	25.0	06/03/22

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B307756 - SOP 454-PFAAS										
Blank (B307756-BLK1)				Prepared: 05/06/22 Analyzed: 05/10/22						
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L							
11Cl-PF3OUdS (F53B Minor)	ND	1.8	ng/L							
9Cl-PF3ONS (F53B Major)	ND	1.8	ng/L							
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L							
N-EtFOSAA	ND	1.8	ng/L							
N-MeFOSAA	ND	1.8	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L							
Perfluoropetanesulfonic acid (PFPeS)	ND	1.8	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L							
LCS (B307756-BS1)				Prepared: 05/06/22 Analyzed: 05/10/22						
Perfluorobutanoic acid (PFBA)	7.27	1.8	ng/L	8.95		81.2	73-129			
Perfluorobutanesulfonic acid (PFBS)	6.52	1.8	ng/L	7.92		82.3	72-130			
Perfluoropentanoic acid (PFPeA)	6.96	1.8	ng/L	8.95		77.7	72-129			
Perfluorohexanoic acid (PFHxA)	7.17	1.8	ng/L	8.95		80.1	72-129			
11Cl-PF3OUdS (F53B Minor)	5.51	1.8	ng/L	8.43		65.4	50-150			
9Cl-PF3ONS (F53B Major)	6.65	1.8	ng/L	8.34		79.7	50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	7.12	1.8	ng/L	8.43		84.4	50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	4.58	1.8	ng/L	8.95		51.2	50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	6.92	1.8	ng/L	8.59		80.5	67-138			
Perfluorodecanoic acid (PFDA)	7.09	1.8	ng/L	8.95		79.2	71-129			
Perfluorododecanoic acid (PFDoA)	7.21	1.8	ng/L	8.95		80.5	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	7.34	1.8	ng/L	7.97		92.1	50-150			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B307756 - SOP 454-PFAAS											
LCS (B307756-BS1)				Prepared: 05/06/22 Analyzed: 05/10/22							
Perfluoroheptanesulfonic acid (PFHpS)	7.09	1.8	ng/L	8.55		82.9		69-134			
N-EtFOSAA	7.70	1.8	ng/L	8.95		86.0		61-135			
N-MeFOSAA	7.02	1.8	ng/L	8.95		78.4		65-136			
Perfluorotetradecanoic acid (PFTA)	6.99	1.8	ng/L	8.95		78.1		71-132			
Perfluorotridecanoic acid (PFTrDA)	6.88	1.8	ng/L	8.95		76.9		65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	6.98	1.8	ng/L	8.37		83.4		63-143			
Perfluorodecanesulfonic acid (PFDS)	7.24	1.8	ng/L	8.64		83.8		53-142			
Perfluorooctanesulfonamide (FOSA)	7.77	1.8	ng/L	8.95		86.8		67-137			
Perfluorononanesulfonic acid (PFNS)	6.84	1.8	ng/L	8.59		79.5		69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	8.09	1.8	ng/L	8.95		90.4		50-150			
Perfluoro-1-butanesulfonamide (FBSA)	8.13	1.8	ng/L	8.95		90.8		50-150			
Perfluorohexanesulfonic acid (PFHxS)	6.63	1.8	ng/L	8.19		80.9		68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	7.94	1.8	ng/L	8.95		88.7		50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	7.79	1.8	ng/L	8.95		87.1		50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	6.36	1.8	ng/L	8.50		74.7		64-140			
Perfluoropetanesulfonic acid (PFPeS)	7.01	1.8	ng/L	8.41		83.4		71-127			
Perfluoroundecanoic acid (PFUnA)	6.62	1.8	ng/L	8.95		74.0		69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.72	1.8	ng/L	8.95		86.2		50-150			
Perfluoroheptanoic acid (PFHpA)	7.66	1.8	ng/L	8.95		85.6		72-130			
Perfluorooctanoic acid (PFOA)	7.46	1.8	ng/L	8.95		83.3		71-133			
Perfluorooctanesulfonic acid (PFOS)	6.62	1.8	ng/L	8.28		79.9		65-140			
Perfluorononanoic acid (PFNA)	6.41	1.8	ng/L	8.95		71.6		69-130			
Matrix Spike (B307756-MS1)	**Source: 22D2230-01**			Prepared: 05/06/22 Analyzed: 05/10/22							
Perfluorobutanoic acid (PFBA)	7.29	1.8	ng/L	9.14	ND	79.7		73-129			
Perfluorobutanesulfonic acid (PFBS)	5.92	1.8	ng/L	8.09	ND	73.2		72-130			
Perfluoropentanoic acid (PFPeA)	6.81	1.8	ng/L	9.14	0.560	**68.4**	*	72-129			MS-07A
Perfluorohexanoic acid (PFHxA)	6.74	1.8	ng/L	9.14	0.419	**69.1**	*	72-129			MS-22
11Cl-PF3OUdS (F53B Minor)	4.37	1.8	ng/L	8.61	ND	50.8		50-150			
9Cl-PF3ONS (F53B Major)	5.91	1.8	ng/L	8.52	ND	69.3		50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	5.94	1.8	ng/L	8.61	ND	69.0		50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	5.12	1.8	ng/L	9.14	ND	56.0		50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	6.14	1.8	ng/L	8.77	ND	70.0		67-138			
Perfluorodecanoic acid (PFDA)	6.37	1.8	ng/L	9.14	ND	**69.7**	*	71-129			MS-22
Perfluorododecanoic acid (PFDoA)	7.31	1.8	ng/L	9.14	ND	80.0		72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	6.69	1.8	ng/L	8.13	ND	82.3		50-150			
Perfluoroheptanesulfonic acid (PFHpS)	6.67	1.8	ng/L	8.73	ND	76.4		69-134			
N-EtFOSAA	7.25	1.8	ng/L	9.14	ND	79.3		61-135			
N-MeFOSAA	6.80	1.8	ng/L	9.14	ND	74.4		65-136			
Perfluorotetradecanoic acid (PFTA)	6.54	1.8	ng/L	9.14	ND	71.5		71-132			
Perfluorotridecanoic acid (PFTrDA)	6.66	1.8	ng/L	9.14	ND	72.9		65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	6.35	1.8	ng/L	8.55	ND	74.3		63-143			
Perfluorodecanesulfonic acid (PFDS)	5.74	1.8	ng/L	8.82	ND	65.1		53-142			
Perfluorooctanesulfonamide (FOSA)	7.11	1.8	ng/L	9.14	ND	77.8		67-137			
Perfluorononanesulfonic acid (PFNS)	6.01	1.8	ng/L	8.77	ND	**68.4**	*	69-127			MS-07A
Perfluoro-1-hexanesulfonamide (FHxSA)	5.38	1.8	ng/L	9.14	ND	58.9		50-150			
Perfluoro-1-butanesulfonamide (FBSA)	6.67	1.8	ng/L	9.14	ND	73.0		50-150			
Perfluorohexanesulfonic acid (PFHxS)	7.84	1.8	ng/L	8.36	2.19	**67.6**	*	68-131			MS-07A
Perfluoro-4-oxapentanoic acid (PFMPA)	8.12	1.8	ng/L	9.14	ND	88.8		50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	7.04	1.8	ng/L	9.14	ND	77.0		50-150			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC		%REC Limits	RPD	RPD Limit	Notes
Batch B307756 - SOP 454-PFAAS											
Matrix Spike (B307756-MS1)		**Source: 22D2230-01**		Prepared: 05/06/22 Analyzed: 05/10/22							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.13	1.8	ng/L	8.68	ND	82.1		64-140			
Perfluoropetanesulfonic acid (PFPeS)	6.57	1.8	ng/L	8.59	ND	76.4		71-127			
Perfluoroundecanoic acid (PFUnA)	6.49	1.8	ng/L	9.14	ND	71.1		69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.15	1.8	ng/L	9.14	ND	78.2		50-150			
Perfluoroheptanoic acid (PFHpA)	7.56	1.8	ng/L	9.14	0.829	73.7		72-130			
Perfluorooctanoic acid (PFOA)	7.19	1.8	ng/L	9.14	1.43	**63.0**	*	71-133			MS-07A
Perfluorooctanesulfonic acid (PFOS)	16.5	1.8	ng/L	8.45	14.0	**30.0**	*	65-140			MS-07A
Perfluorononanoic acid (PFNA)	6.35	1.8	ng/L	9.14	0.481	**64.2**	*	69-130			MS-22
Matrix Spike Dup (B307756-MSD1)		**Source: 22D2230-01**		Prepared: 05/06/22 Analyzed: 05/10/22							
Perfluorobutanoic acid (PFBA)	7.31	1.7	ng/L	8.74	ND	83.7		73-129	0.342	30	
Perfluorobutanesulfonic acid (PFBS)	5.91	1.7	ng/L	7.73	ND	76.4		72-130	0.228	30	
Perfluoropentanoic acid (PFPeA)	6.82	1.7	ng/L	8.74	0.560	**71.7**	*	72-129	0.183	30	MS-07A
Perfluorohexanoic acid (PFHxA)	6.84	1.7	ng/L	8.74	0.419	73.5		72-129	1.46	30	
11Cl-PF3OUdS (F53B Minor)	4.50	1.7	ng/L	8.23	ND	54.7		50-150	2.84	30	
9Cl-PF3ONS (F53B Major)	6.21	1.7	ng/L	8.14	ND	76.2		50-150	4.96	30	
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	6.10	1.7	ng/L	8.23	ND	74.2		50-150	2.72	30	
Hexafluoropropylene oxide dimer acid (HFPO-DA)	5.15	1.7	ng/L	8.74	ND	58.9		50-150	0.483	30	
8:2 Fluorotelomersulfonic acid (8:2FTS A)	6.01	1.7	ng/L	8.39	ND	71.6		67-138	2.23	30	
Perfluorodecanoic acid (PFDA)	6.50	1.7	ng/L	8.74	ND	74.4		71-129	2.02	30	
Perfluorododecanoic acid (PFDoA)	6.56	1.7	ng/L	8.74	ND	75.1		72-134	10.8	30	
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	6.88	1.7	ng/L	7.77	ND	88.5		50-150	2.71	30	
Perfluoroheptanesulfonic acid (PFHpS)	6.61	1.7	ng/L	8.34	ND	79.3		69-134	0.831	30	
N-EtFOSAA	7.04	1.7	ng/L	8.74	ND	80.6		61-135	2.98	30	
N-MeFOSAA	6.85	1.7	ng/L	8.74	ND	78.4		65-136	0.727	30	
Perfluorotetradecanoic acid (PFTA)	6.50	1.7	ng/L	8.74	ND	74.4		71-132	0.601	30	
Perfluorotridecanoic acid (PFTrDA)	6.62	1.7	ng/L	8.74	ND	75.8		65-144	0.605	30	
4:2 Fluorotelomersulfonic acid (4:2FTS A)	6.36	1.7	ng/L	8.17	ND	77.9		63-143	0.248	30	
Perfluorodecanesulfonic acid (PFDS)	5.67	1.7	ng/L	8.43	ND	67.3		53-142	1.22	30	
Perfluorooctanesulfonamide (FOSA)	7.04	1.7	ng/L	8.74	ND	80.6		67-137	0.979	30	
Perfluorononanesulfonic acid (PFNS)	5.73	1.7	ng/L	8.39	ND	**68.4**	*	69-127	4.66	30	MS-07A
Perfluoro-1-hexanesulfonamide (FHxSA)	5.76	1.7	ng/L	8.74	ND	66.0		50-150	6.83	30	
Perfluoro-1-butanesulfonamide (FBSA)	6.46	1.7	ng/L	8.74	ND	74.0		50-150	3.16	30	
Perfluorohexanesulfonic acid (PFHxS)	7.21	1.7	ng/L	7.99	2.19	**62.8**	*	68-131	8.41	30	MS-07A
Perfluoro-4-oxapentanoic acid (PFMPA)	8.15	1.7	ng/L	8.74	ND	93.4		50-150	0.425	30	
Perfluoro-5-oxahexanoic acid (PFMBA)	6.95	1.7	ng/L	8.74	ND	79.6		50-150	1.17	30	
6:2 Fluorotelomersulfonic acid (6:2FTS A)	6.87	1.7	ng/L	8.30	ND	82.8		64-140	3.63	30	
Perfluoropetanesulfonic acid (PFPeS)	6.17	1.7	ng/L	8.21	ND	75.2		71-127	6.19	30	
Perfluoroundecanoic acid (PFUnA)	6.19	1.7	ng/L	8.74	ND	70.9		69-133	4.71	30	
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.07	1.7	ng/L	8.74	ND	80.9		50-150	1.20	30	
Perfluoroheptanoic acid (PFHpA)	7.15	1.7	ng/L	8.74	0.829	72.4		72-130	5.58	30	
Perfluorooctanoic acid (PFOA)	7.01	1.7	ng/L	8.74	1.43	**63.9**	*	71-133	2.48	30	MS-07A
Perfluorooctanesulfonic acid (PFOS)	15.8	1.7	ng/L	8.08	14.0	**22.8**	*	65-140	4.27	30	MS-07A
Perfluorononanoic acid (PFNA)	6.57	1.7	ng/L	8.74	0.481	69.7		69-130	3.47	30	

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B308205 - SOP 454-PFAAS										
Blank (B308205-BLK1)				Prepared: 05/12/22 Analyzed: 05/17/22						
Perfluorobutanoic acid (PFBA)	ND	1.8	ng/L							
Perfluorobutanesulfonic acid (PFBS)	ND	1.8	ng/L							
Perfluoropentanoic acid (PFPeA)	ND	1.8	ng/L							
Perfluorohexanoic acid (PFHxA)	ND	1.8	ng/L							
11Cl-PF3OUdS (F53B Minor)	ND	1.8	ng/L							
9Cl-PF3ONS (F53B Major)	ND	1.8	ng/L							
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ND	1.8	ng/L							
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ND	1.8	ng/L							
8:2 Fluorotelomersulfonic acid (8:2FTS A)	ND	1.8	ng/L							
Perfluorodecanoic acid (PFDA)	ND	1.8	ng/L							
Perfluorododecanoic acid (PFDoA)	ND	1.8	ng/L							
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	ND	1.8	ng/L							
Perfluoroheptanesulfonic acid (PFHpS)	ND	1.8	ng/L							
N-EtFOSAA	ND	1.8	ng/L							
N-MeFOSAA	ND	1.8	ng/L							
Perfluorotetradecanoic acid (PFTA)	ND	1.8	ng/L							
Perfluorotridecanoic acid (PFTrDA)	ND	1.8	ng/L							
4:2 Fluorotelomersulfonic acid (4:2FTS A)	ND	1.8	ng/L							
Perfluorodecanesulfonic acid (PFDS)	ND	1.8	ng/L							
Perfluorooctanesulfonamide (FOSA)	ND	1.8	ng/L							
Perfluorononanesulfonic acid (PFNS)	ND	1.8	ng/L							
Perfluoro-1-hexanesulfonamide (FHxSA)	ND	1.8	ng/L							
Perfluoro-1-butanesulfonamide (FBSA)	ND	1.8	ng/L							
Perfluorohexanesulfonic acid (PFHxS)	ND	1.8	ng/L							
Perfluoro-4-oxapentanoic acid (PFMPA)	ND	1.8	ng/L							
Perfluoro-5-oxahexanoic acid (PFMBA)	ND	1.8	ng/L							
6:2 Fluorotelomersulfonic acid (6:2FTS A)	ND	1.8	ng/L							
Perfluoropetanesulfonic acid (PFPeS)	ND	1.8	ng/L							
Perfluoroundecanoic acid (PFUnA)	ND	1.8	ng/L							
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	ND	1.8	ng/L							
Perfluoroheptanoic acid (PFHpA)	ND	1.8	ng/L							
Perfluorooctanoic acid (PFOA)	ND	1.8	ng/L							
Perfluorooctanesulfonic acid (PFOS)	ND	1.8	ng/L							
Perfluorononanoic acid (PFNA)	ND	1.8	ng/L							
LCS (B308205-BS1)				Prepared: 05/12/22 Analyzed: 05/17/22						
Perfluorobutanoic acid (PFBA)	7.59	1.8	ng/L	8.94		84.9	73-129			
Perfluorobutanesulfonic acid (PFBS)	6.55	1.8	ng/L	7.91		82.7	72-130			
Perfluoropentanoic acid (PFPeA)	7.08	1.8	ng/L	8.94		79.1	72-129			
Perfluorohexanoic acid (PFHxA)	7.16	1.8	ng/L	8.94		80.0	72-129			
11Cl-PF3OUdS (F53B Minor)	5.62	1.8	ng/L	8.42		66.7	50-150			
9Cl-PF3ONS (F53B Major)	7.43	1.8	ng/L	8.33		89.1	50-150			
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	6.74	1.8	ng/L	8.42		80.0	50-150			
Hexafluoropropylene oxide dimer acid (HFPO-DA)	5.41	1.8	ng/L	8.94		60.4	50-150			
8:2 Fluorotelomersulfonic acid (8:2FTS A)	6.91	1.8	ng/L	8.58		80.4	67-138			
Perfluorodecanoic acid (PFDA)	7.61	1.8	ng/L	8.94		85.0	71-129			
Perfluorododecanoic acid (PFDoA)	7.60	1.8	ng/L	8.94		85.0	72-134			
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	7.51	1.8	ng/L	7.96		94.4	50-150			

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QUALITY CONTROL

Semivolatile Organic Compounds by - LC/MS-MS - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B308205 - SOP 454-PFAAS										
LCS (B308205-BS1)				Prepared: 05/12/22 Analyzed: 05/17/22						
Perfluoroheptanesulfonic acid (PFHpS)	6.41	1.8	ng/L	8.54		75.1	69-134			
N-EtFOSAA	7.95	1.8	ng/L	8.94		88.9	61-135			
N-MeFOSAA	7.43	1.8	ng/L	8.94		83.1	65-136			
Perfluorotetradecanoic acid (PFTA)	7.22	1.8	ng/L	8.94		80.8	71-132			
Perfluorotridecanoic acid (PFTrDA)	7.51	1.8	ng/L	8.94		84.0	65-144			
4:2 Fluorotelomersulfonic acid (4:2FTS A)	6.98	1.8	ng/L	8.36		83.5	63-143			
Perfluorodecanesulfonic acid (PFDS)	6.98	1.8	ng/L	8.63		80.8	53-142			
Perfluorooctanesulfonamide (FOSA)	8.43	1.8	ng/L	8.94		94.3	67-137			
Perfluorononanesulfonic acid (PFNS)	7.13	1.8	ng/L	8.58		83.1	69-127			
Perfluoro-1-hexanesulfonamide (FHxSA)	8.03	1.8	ng/L	8.94		89.8	50-150			
Perfluoro-1-butanesulfonamide (FBSA)	7.96	1.8	ng/L	8.94		89.0	50-150			
Perfluorohexanesulfonic acid (PFHxS)	6.72	1.8	ng/L	8.18		82.1	68-131			
Perfluoro-4-oxapentanoic acid (PFMPA)	7.94	1.8	ng/L	8.94		88.8	50-150			
Perfluoro-5-oxahexanoic acid (PFMBA)	8.13	1.8	ng/L	8.94		90.9	50-150			
6:2 Fluorotelomersulfonic acid (6:2FTS A)	7.48	1.8	ng/L	8.50		88.1	64-140			
Perfluoropetanesulfonic acid (PFPeS)	6.75	1.8	ng/L	8.41		80.3	71-127			
Perfluoroundecanoic acid (PFUnA)	7.55	1.8	ng/L	8.94		84.5	69-133			
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	7.73	1.8	ng/L	8.94		86.4	50-150			
Perfluoroheptanoic acid (PFHpA)	7.60	1.8	ng/L	8.94		84.9	72-130			
Perfluorooctanoic acid (PFOA)	7.81	1.8	ng/L	8.94		87.4	71-133			
Perfluorooctanesulfonic acid (PFOS)	7.02	1.8	ng/L	8.27		84.9	65-140			
Perfluorononanoic acid (PFNA)	6.85	1.8	ng/L	8.94		76.6	69-130			

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QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B307823 - SW-846 3005A										
Blank (B307823-BLK1)				Prepared: 05/06/22 Analyzed: 05/11/22						
Calcium	ND	0.50	mg/L							
Iron	0.019	0.050	mg/L							
Magnesium	ND	0.050	mg/L							
LCS (B307823-BS1)				Prepared: 05/06/22 Analyzed: 05/11/22						
Calcium	3.68	0.50	mg/L	4.00		92.0	80-120			
Iron	3.65	0.050	mg/L	4.00		91.1	80-120			
Magnesium	3.86	0.050	mg/L	4.00		96.6	80-120			
LCS Dup (B307823-BSD1)				Prepared: 05/06/22 Analyzed: 05/11/22						
Calcium	3.70	0.50	mg/L	4.00		92.6	80-120	0.620	20	
Iron	3.66	0.050	mg/L	4.00		91.5	80-120	0.396	20	
Magnesium	3.92	0.050	mg/L	4.00		97.9	80-120	1.36	20	
Duplicate (B307823-DUP1)	**Source: 22D2230-01**			Prepared: 05/06/22 Analyzed: 05/11/22						
Calcium	5.19	0.50	mg/L		5.03			3.09	20	
Iron	3.45	0.050	mg/L		3.35			3.06	20	
Matrix Spike (B307823-MS1)	**Source: 22D2230-01**			Prepared: 05/06/22 Analyzed: 05/11/22						
Calcium	8.73	0.50	mg/L	4.00	5.03	92.6	75-125			
Iron	6.97	0.050	mg/L	4.00	3.35	90.6	75-125			
Batch B308365 - SW-846 3005A										
Blank (B308365-BLK1)				Prepared: 06/03/22 Analyzed: 06/04/22						
Magnesium	ND	0.050	mg/L							
LCS (B308365-BS1)				Prepared: 06/03/22 Analyzed: 06/04/22						
Magnesium	4.04	0.050	mg/L	4.00		101	80-120			
LCS Dup (B308365-BSD1)				Prepared: 06/03/22 Analyzed: 06/04/22						
Magnesium	4.04	0.050	mg/L	4.00		101	80-120	0.106	20	
Matrix Spike (B308365-MS1)	**Source: 22D2230-01RE1**			Prepared: 06/03/22 Analyzed: 06/04/22						
Magnesium	6.25	0.050	mg/L	4.00	2.22	101	75-125			
Matrix Spike Dup (B308365-MSD1)	**Source: 22D2230-01RE1**			Prepared: 06/03/22 Analyzed: 06/04/22						
Magnesium	6.18	0.050	mg/L	4.00	2.22	99.0	75-125	1.06	20	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-07A	Matrix spike and spike duplicate recovery is outside of control limits. Analysis is in control based on laboratory fortified blank recovery. Possibility of matrix effects that lead to low bias or non-homogeneous sample aliquot cannot be eliminated.
MS-22	Either matrix spike or MS duplicate is outside of control limits, but the other is within limits. RPD between the two MS/MSD results is within method specified criteria.
PF-17	Extracted Internal Standard recovery is outside of control limits. Data is not significantly affected since associated analyte is not detected and bias is on the high side.
PF-20	Sample extracted at a dilution. Elevated reporting limits due to adjusted sample volume during preparation.
S-29	Extracted Internal Standard is outside of control limits.
V-05	Continuing calibration verification (CCV) did not meet method specifications and was biased on the low side for this compound.

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-1-2022-04-27 (22D2230-01)			Lab File ID: 22D2230-01.d			Analyzed: 05/10/22 12:24			
M8FOSA	294300.7	4.0525	306,279.00	4.0525	96	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	89573.93	2.670717	136,414.00	2.670717	66	50 - 150	0.0000	+/-0.50	
M2PFTA	1141587	4.419083	1,075,749.00	4.419083	106	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	169505.9	3.88305	122,100.00	3.883033	139	50 - 150	0.0000	+/-0.50	
MPFBA	613268.1	1.13325	597,775.00	1.13325	103	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	265382.9	2.970317	187,730.00	2.970317	141	50 - 150	0.0000	+/-0.50	
M6PFDA	744847.9	3.883567	609,912.00	3.88355	122	50 - 150	0.0000	+/-0.50	
M3PFBS	144065.7	2.044217	131,438.00	2.044217	110	50 - 150	0.0000	+/-0.50	
M7PFUnA	975437.7	4.03395	800,959.00	4.03395	122	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	91152.7	3.5256	71,686.00	3.525583	127	50 - 150	0.0000	+/-0.50	
M5PFPeA	588195.3	1.849383	508,949.00	1.849383	116	50 - 150	0.0000	+/-0.50	
M5PFHxA	870644.7	2.763583	766,115.00	2.7554	114	50 - 150	0.0082	+/-0.50	
M3PFHxS	124172.8	3.300333	115,625.00	3.300333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	855209.5	3.277233	758,194.00	3.268017	113	50 - 150	0.0092	+/-0.50	
M8PFOA	819053.1	3.534133	694,476.00	3.534117	118	50 - 150	0.0000	+/-0.50	
M8PFOS	133410.1	3.71625	124,022.00	3.71625	108	50 - 150	0.0000	+/-0.50	
M9PFNA	678082.3	3.725217	605,785.00	3.71725	112	50 - 150	0.0080	+/-0.50	
MPFDoA	952776.3	4.16925	867,168.00	4.177317	110	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	236868.9	4.041417	181,786.00	4.041417	130	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	238618.7	3.96185	230,100.00	3.961833	104	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
EB-2022-04-27 (22D2230-02)			Lab File ID: 22D2230-02.d			Analyzed: 05/10/22 12:32			
M8FOSA	279526.5	4.0525	306,279.00	4.0525	91	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	101495.7	2.670717	136,414.00	2.670717	74	50 - 150	0.0000	+/-0.50	
M2PFTA	1010212	4.419083	1,075,749.00	4.419083	94	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	94717.29	3.883033	122,100.00	3.883033	78	50 - 150	0.0000	+/-0.50	
MPFBA	679125.3	1.13325	597,775.00	1.13325	114	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	257571.1	2.970317	187,730.00	2.970317	137	50 - 150	0.0000	+/-0.50	
M6PFDA	629264.1	3.88355	609,912.00	3.88355	103	50 - 150	0.0000	+/-0.50	
M3PFBS	137495.9	2.044217	131,438.00	2.044217	105	50 - 150	0.0000	+/-0.50	
M7PFUnA	902587.3	4.03395	800,959.00	4.03395	113	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	61007.63	3.5256	71,686.00	3.525583	85	50 - 150	0.0000	+/-0.50	
M5PFPeA	544411.2	1.849383	508,949.00	1.849383	107	50 - 150	0.0000	+/-0.50	
M5PFHxA	807522.9	2.7554	766,115.00	2.7554	105	50 - 150	0.0000	+/-0.50	
M3PFHxS	112054.9	3.300333	115,625.00	3.300333	97	50 - 150	0.0000	+/-0.50	
M4PFHpA	754635.5	3.277233	758,194.00	3.268017	100	50 - 150	0.0092	+/-0.50	
M8PFOA	737398.7	3.534117	694,476.00	3.534117	106	50 - 150	0.0000	+/-0.50	
M8PFOS	114524.5	3.71625	124,022.00	3.71625	92	50 - 150	0.0000	+/-0.50	
M9PFNA	598212.8	3.725217	605,785.00	3.71725	99	50 - 150	0.0080	+/-0.50	
MPFDoA	866419.5	4.16925	867,168.00	4.177317	100	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	190915.1	4.041417	181,786.00	4.041417	105	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	187661.3	3.961833	230,100.00	3.961833	82	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Filter-4-28-22 (22D2230-03)			Lab File ID: 22D2230-03.d			Analyzed: 05/10/22 12:39			
M8FOSA	294305.4	4.0525	306,279.00	4.0525	96	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	73476.79	2.670717	136,414.00	2.670717	54	50 - 150	0.0000	+/-0.50	
M2PFTA	1057244	4.419083	1,075,749.00	4.419083	98	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	81757.81	3.88305	122,100.00	3.883033	67	50 - 150	0.0000	+/-0.50	
MPFBA	626597.1	1.12495	597,775.00	1.13325	105	50 - 150	-0.0083	+/-0.50	
M3HFPO-DA	245020.2	2.970317	187,730.00	2.970317	131	50 - 150	0.0000	+/-0.50	
M6PFDA	670367.2	3.883567	609,912.00	3.88355	110	50 - 150	0.0000	+/-0.50	
M3PFBS	140443.8	2.035933	131,438.00	2.044217	107	50 - 150	-0.0083	+/-0.50	
M7PFUnA	797363.3	4.03395	800,959.00	4.03395	100	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	54323.22	3.5256	71,686.00	3.525583	76	50 - 150	0.0000	+/-0.50	
M5PFPeA	563614.1	1.849383	508,949.00	1.849383	111	50 - 150	0.0000	+/-0.50	
M5PFHxA	836460.1	2.7554	766,115.00	2.7554	109	50 - 150	0.0000	+/-0.50	
M3PFHxS	123167.2	3.300333	115,625.00	3.300333	107	50 - 150	0.0000	+/-0.50	
M4PFHpA	824089.3	3.268017	758,194.00	3.268017	109	50 - 150	0.0000	+/-0.50	
M8PFOA	763311.3	3.534117	694,476.00	3.534117	110	50 - 150	0.0000	+/-0.50	
M8PFOS	119454.4	3.71625	124,022.00	3.71625	96	50 - 150	0.0000	+/-0.50	
M9PFNA	620121.3	3.725217	605,785.00	3.71725	102	50 - 150	0.0080	+/-0.50	
MPFDoA	881656.7	4.177333	867,168.00	4.177317	102	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	166269	4.041417	181,786.00	4.041417	91	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	204210.5	3.96185	230,100.00	3.961833	89	50 - 150	0.0000	+/-0.50	
Filter-4-28-22 (22D2230-03RE1)			Lab File ID: 22D2230-03RE1.d			Analyzed: 05/17/22 03:11			
M8PFOS	125273.7	3.684083	104,400.00	3.6841	120	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-3-2022-04-28 (22D2230-04)			Lab File ID: 22D2230-04.d			Analyzed: 05/10/22 12:46			
M8FOSA	302591.3	4.052516	306,279.00	4.0525	99	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	108963.8	2.670733	136,414.00	2.670717	80	50 - 150	0.0000	+/-0.50	
M2PFTA	1265066	4.419083	1,075,749.00	4.419083	118	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	310203	3.88305	122,100.00	3.883033	254	50 - 150	0.0000	+/-0.50	*
MPFBA	658073.8	1.13325	597,775.00	1.13325	110	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	229064.4	2.970317	187,730.00	2.970317	122	50 - 150	0.0000	+/-0.50	
M6PFDA	821609.1	3.883567	609,912.00	3.88355	135	50 - 150	0.0000	+/-0.50	
M3PFBS	153155.5	2.044233	131,438.00	2.044217	117	50 - 150	0.0000	+/-0.50	
M7PFUnA	1106747	4.033967	800,959.00	4.03395	138	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	108410.7	3.5256	71,686.00	3.525583	151	50 - 150	0.0000	+/-0.50	*
M5PFPeA	642041.5	1.849383	508,949.00	1.849383	126	50 - 150	0.0000	+/-0.50	
M5PFHxA	961383.1	2.7636	766,115.00	2.7554	125	50 - 150	0.0082	+/-0.50	
M3PFHxS	127008.8	3.30035	115,625.00	3.300333	110	50 - 150	0.0000	+/-0.50	
M4PFHpA	924253.5	3.27725	758,194.00	3.268017	122	50 - 150	0.0092	+/-0.50	
M8PFOA	877718.4	3.534133	694,476.00	3.534117	126	50 - 150	0.0000	+/-0.50	
M8PFOS	125847.1	3.716267	124,022.00	3.71625	101	50 - 150	0.0000	+/-0.50	
M9PFNA	681741.6	3.71725	605,785.00	3.71725	113	50 - 150	0.0000	+/-0.50	
MPFDoA	1090869	4.169267	867,168.00	4.177317	126	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	280462.2	4.041433	181,786.00	4.041417	154	50 - 150	0.0000	+/-0.50	*
d3-NMeFOSAA	268188	3.96185	230,100.00	3.961833	117	50 - 150	0.0000	+/-0.50	
MW-3-2022-04-28 (22D2230-04RE1)			Lab File ID: 22D2230-04RE1.d			Analyzed: 05/17/22 03:18			
M8PFOS	135453.8	3.684083	104,400.00	3.6841	130	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
MW-2-2022-04-28 (22D2230-05)			Lab File ID: 22D2230-05.d			Analyzed: 05/10/22 12:54			
M8FOSA	159905.7	4.052516	306,279.00	4.0525	52	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	51200.94	2.670717	136,414.00	2.670717	38	50 - 150	0.0000	+/-0.50	*
M2PFTA	664224.4	4.4191	1,075,749.00	4.419083	62	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	162158.9	3.88305	122,100.00	3.883033	133	50 - 150	0.0000	+/-0.50	
MPFBA	446235.5	1.13325	597,775.00	1.13325	75	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	144705.4	2.970317	187,730.00	2.970317	77	50 - 150	0.0000	+/-0.50	
M6PFDA	514929.6	3.883567	609,912.00	3.88355	84	50 - 150	0.0000	+/-0.50	
M3PFBS	102518.5	2.044217	131,438.00	2.044217	78	50 - 150	0.0000	+/-0.50	
M7PFUnA	663055.1	4.033967	800,959.00	4.03395	83	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	56435.68	3.5256	71,686.00	3.525583	79	50 - 150	0.0000	+/-0.50	
M5PFPeA	410273.1	1.849383	508,949.00	1.849383	81	50 - 150	0.0000	+/-0.50	
M5PFHxA	613895.6	2.7554	766,115.00	2.7554	80	50 - 150	0.0000	+/-0.50	
M3PFHxS	84012.51	3.300333	115,625.00	3.300333	73	50 - 150	0.0000	+/-0.50	
M4PFHpA	600497.3	3.268033	758,194.00	3.268017	79	50 - 150	0.0000	+/-0.50	
M8PFOA	550479	3.534133	694,476.00	3.534117	79	50 - 150	0.0000	+/-0.50	
M8PFOS	80928.98	3.716267	124,022.00	3.71625	65	50 - 150	0.0000	+/-0.50	
M9PFNA	402483.2	3.71725	605,785.00	3.71725	66	50 - 150	0.0000	+/-0.50	
MPFDoA	593456.6	4.169267	867,168.00	4.177317	68	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	145326.7	4.041433	181,786.00	4.041417	80	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	131410.3	3.96185	230,100.00	3.961833	57	50 - 150	0.0000	+/-0.50	
MW-2-2022-04-28 (22D2230-05RE1)			Lab File ID: 22D2230-05RE1.d			Analyzed: 05/17/22 03:26			
M8PFOS	129801.2	3.684083	104,400.00	3.6841	124	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Duplicate (22D2230-06)			Lab File ID: 22D2230-06.d			Analyzed: 05/10/22 13:01			
M8FOSA	205510.3	4.052516	306,279.00	4.0525	67	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	78625.58	2.670717	136,414.00	2.670717	58	50 - 150	0.0000	+/-0.50	
M2PFTA	923011.4	4.4191	1,075,749.00	4.419083	86	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	267743.4	3.88305	122,100.00	3.883033	219	50 - 150	0.0000	+/-0.50	*
MPFBA	632311.3	1.13325	597,775.00	1.13325	106	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	235407.7	2.970317	187,730.00	2.970317	125	50 - 150	0.0000	+/-0.50	
M6PFDA	722446.1	3.883567	609,912.00	3.88355	118	50 - 150	0.0000	+/-0.50	
M3PFBS	146606.4	2.044217	131,438.00	2.044217	112	50 - 150	0.0000	+/-0.50	
M7PFUnA	937019.5	4.033967	800,959.00	4.03395	117	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	97557.7	3.5256	71,686.00	3.525583	136	50 - 150	0.0000	+/-0.50	
M5PFPeA	607786.7	1.849383	508,949.00	1.849383	119	50 - 150	0.0000	+/-0.50	
M5PFHxA	883761.8	2.7554	766,115.00	2.7554	115	50 - 150	0.0000	+/-0.50	
M3PFHxS	124342.8	3.300333	115,625.00	3.300333	108	50 - 150	0.0000	+/-0.50	
M4PFHpA	835506	3.268017	758,194.00	3.268017	110	50 - 150	0.0000	+/-0.50	
M8PFOA	799825.3	3.534133	694,476.00	3.534117	115	50 - 150	0.0000	+/-0.50	
M8PFOS	110548.2	3.71625	124,022.00	3.71625	89	50 - 150	0.0000	+/-0.50	
M9PFNA	581987.4	3.71725	605,785.00	3.71725	96	50 - 150	0.0000	+/-0.50	
MPFDoA	813565.2	4.169267	867,168.00	4.177317	94	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	203760	4.041433	181,786.00	4.041417	112	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	194341.4	3.96185	230,100.00	3.961833	84	50 - 150	0.0000	+/-0.50	
Duplicate (22D2230-06RE1)			Lab File ID: 22D2230-06RE1.d			Analyzed: 05/17/22 03:40			
M8PFOS	124683.3	3.684083	104,400.00	3.684083	119	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B307756-BLK1)			Lab File ID: B307756-BLK1.d			Analyzed: 05/10/22 11:34			
M8FOSA	345762.5	4.052516	306,279.00	4.0525	113	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	172991.1	2.678933	136,414.00	2.670717	127	50 - 150	0.0082	+/-0.50	
M2PFTA	1093269	4.4191	1,075,749.00	4.419083	102	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	143446.3	3.88305	122,100.00	3.883033	117	50 - 150	0.0000	+/-0.50	
MPFBA	958992.9	1.13325	597,775.00	1.13325	160	50 - 150	0.0000	+/-0.50	*
M3HFPO-DA	242321.9	2.970317	187,730.00	2.970317	129	50 - 150	0.0000	+/-0.50	
M6PFDA	873663.7	3.883567	609,912.00	3.88355	143	50 - 150	0.0000	+/-0.50	
M3PFBS	201398.7	2.044217	131,438.00	2.044217	153	50 - 150	0.0000	+/-0.50	*
M7PFUnA	1097067	4.033967	800,959.00	4.03395	137	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	103026.4	3.5256	71,686.00	3.525583	144	50 - 150	0.0000	+/-0.50	
M5PFPeA	792137.7	1.857667	508,949.00	1.849383	156	50 - 150	0.0083	+/-0.50	*
M5PFHxA	1198460	2.763583	766,115.00	2.7554	156	50 - 150	0.0082	+/-0.50	*
M3PFHxS	176563.6	3.30035	115,625.00	3.300333	153	50 - 150	0.0000	+/-0.50	*
M4PFHpA	1112015	3.27725	758,194.00	3.268017	147	50 - 150	0.0092	+/-0.50	
M8PFOA	1125121	3.534133	694,476.00	3.534117	162	50 - 150	0.0000	+/-0.50	*
M8PFOS	175714.2	3.716267	124,022.00	3.71625	142	50 - 150	0.0000	+/-0.50	
M9PFNA	874272.1	3.725217	605,785.00	3.71725	144	50 - 150	0.0080	+/-0.50	
MPFDoA	1084660	4.17735	867,168.00	4.177317	125	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	229653.7	4.041433	181,786.00	4.041417	126	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	308318.9	3.961867	230,100.00	3.961833	134	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B307756-BS1)			Lab File ID: B307756-BS1.d			Analyzed: 05/10/22 11:27			
M8FOSA	335955.6	4.052516	306,279.00	4.0525	110	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	149228.8	2.67895	136,414.00	2.670717	109	50 - 150	0.0082	+/-0.50	
M2PFTA	1090031	4.4191	1,075,749.00	4.419083	101	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	133764.6	3.88305	122,100.00	3.883033	110	50 - 150	0.0000	+/-0.50	
MPFBA	796632.1	1.13325	597,775.00	1.13325	133	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	319785	2.970333	187,730.00	2.970317	170	50 - 150	0.0000	+/-0.50	*
M6PFDA	737928.8	3.883567	609,912.00	3.88355	121	50 - 150	0.0000	+/-0.50	
M3PFBS	164514.9	2.044217	131,438.00	2.044217	125	50 - 150	0.0000	+/-0.50	
M7PFUnA	993855.6	4.033967	800,959.00	4.03395	124	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	87666.92	3.5256	71,686.00	3.525583	122	50 - 150	0.0000	+/-0.50	
M5PFPeA	656696.1	1.857667	508,949.00	1.849383	129	50 - 150	0.0083	+/-0.50	
M5PFHxA	962740.6	2.7636	766,115.00	2.7554	126	50 - 150	0.0082	+/-0.50	
M3PFHxS	141569	3.300333	115,625.00	3.300333	122	50 - 150	0.0000	+/-0.50	
M4PFHpA	923353	3.27725	758,194.00	3.268017	122	50 - 150	0.0092	+/-0.50	
M8PFOA	899138.8	3.534133	694,476.00	3.534117	129	50 - 150	0.0000	+/-0.50	
M8PFOS	143565.5	3.716267	124,022.00	3.71625	116	50 - 150	0.0000	+/-0.50	
M9PFNA	785096.5	3.725217	605,785.00	3.71725	130	50 - 150	0.0080	+/-0.50	
MPFDoA	896866.6	4.177333	867,168.00	4.177317	103	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	180480.9	4.041433	181,786.00	4.041417	99	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	253438.4	3.96185	230,100.00	3.961833	110	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Matrix Spike (B307756-MS1)			Lab File ID: B307756-MS1.d			Analyzed: 05/10/22 11:41			
M8FOSA	283671.8	4.052516	306,279.00	4.0525	93	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	113182.2	2.670733	136,414.00	2.670717	83	50 - 150	0.0000	+/-0.50	
M2PFTA	1117893	4.4191	1,075,749.00	4.419083	104	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	242828.3	3.88305	122,100.00	3.883033	199	50 - 150	0.0000	+/-0.50	*
MPFBA	754063.6	1.13325	597,775.00	1.13325	126	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	284480.3	2.970317	187,730.00	2.970317	152	50 - 150	0.0000	+/-0.50	*
M6PFDA	885281.1	3.883567	609,912.00	3.88355	145	50 - 150	0.0000	+/-0.50	
M3PFBS	184878.9	2.044217	131,438.00	2.044217	141	50 - 150	0.0000	+/-0.50	
M7PFUnA	1132210	4.033967	800,959.00	4.03395	141	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	125601.7	3.5256	71,686.00	3.525583	175	50 - 150	0.0000	+/-0.50	*
M5PFPeA	750003.7	1.849383	508,949.00	1.849383	147	50 - 150	0.0000	+/-0.50	
M5PFHxA	1111677	2.7636	766,115.00	2.7554	145	50 - 150	0.0082	+/-0.50	
M3PFHxS	157693.6	3.300333	115,625.00	3.300333	136	50 - 150	0.0000	+/-0.50	
M4PFHpA	1066285	3.27725	758,194.00	3.268017	141	50 - 150	0.0092	+/-0.50	
M8PFOA	1062696	3.534133	694,476.00	3.534117	153	50 - 150	0.0000	+/-0.50	*
M8PFOS	164394.2	3.716267	124,022.00	3.71625	133	50 - 150	0.0000	+/-0.50	
M9PFNA	856492	3.71725	605,785.00	3.71725	141	50 - 150	0.0000	+/-0.50	
MPFDoA	967194.4	4.169267	867,168.00	4.177317	112	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	262603.8	4.041433	181,786.00	4.041417	144	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	279536.3	3.96185	230,100.00	3.961833	121	50 - 150	0.0000	+/-0.50	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Matrix Spike Dup (B307756-MSD1)			Lab File ID: B307756-MSD1.d			Analyzed: 05/10/22 11:49			
M8FOSA	237285.5	4.052516	306,279.00	4.0525	77	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	90156	2.670733	136,414.00	2.670717	66	50 - 150	0.0000	+/-0.50	
M2PFTA	1073719	4.4191	1,075,749.00	4.419083	100	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	162231.6	3.88305	122,100.00	3.883033	133	50 - 150	0.0000	+/-0.50	
MPFBA	663290.4	1.13325	597,775.00	1.13325	111	50 - 150	0.0000	+/-0.50	
M3HFPO-DA	254404.3	2.970333	187,730.00	2.970317	136	50 - 150	0.0000	+/-0.50	
M6PFDA	816673.6	3.883583	609,912.00	3.88355	134	50 - 150	0.0000	+/-0.50	
M3PFBS	160090.9	2.044233	131,438.00	2.044217	122	50 - 150	0.0000	+/-0.50	
M7PFUnA	1094497	4.033967	800,959.00	4.03395	137	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	84605.45	3.525617	71,686.00	3.525583	118	50 - 150	0.0000	+/-0.50	
M5PFPeA	647413.3	1.849383	508,949.00	1.849383	127	50 - 150	0.0000	+/-0.50	
M5PFHxA	955160.1	2.7636	766,115.00	2.7554	125	50 - 150	0.0082	+/-0.50	
M3PFHxS	141927.6	3.30035	115,625.00	3.300333	123	50 - 150	0.0000	+/-0.50	
M4PFHpA	945618.4	3.277267	758,194.00	3.268017	125	50 - 150	0.0093	+/-0.50	
M8PFOA	903938.4	3.53415	694,476.00	3.534117	130	50 - 150	0.0000	+/-0.50	
M8PFOS	144239	3.716267	124,022.00	3.71625	116	50 - 150	0.0000	+/-0.50	
M9PFNA	744696.6	3.717267	605,785.00	3.71725	123	50 - 150	0.0000	+/-0.50	
MPFDoA	994331.8	4.169267	867,168.00	4.177317	115	50 - 150	-0.0081	+/-0.50	
d5-NEtFOSAA	255760.8	4.041433	181,786.00	4.041417	141	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	266893	3.961867	230,100.00	3.961833	116	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
Blank (B308205-BLK1)			Lab File ID: B308205-BLK1.d			Analyzed: 05/17/22 01:59			
M8FOSA	308384.4	4.00455	261,188.00	4.00455	118	50 - 150	0.0000	+/-0.50	
M2-4:2FTS	144943.2	2.5543	104,204.00	2.5543	139	50 - 150	0.0000	+/-0.50	
M2PFTA	989331.5	4.378417	918,855.00	4.378417	108	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	147513.8	3.842967	102,063.00	3.842967	145	50 - 150	0.0000	+/-0.50	
MPFBA	786375.5	1.100017	536,591.00	1.0917	147	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	228531.2	2.8884	154,591.00	2.8884	148	50 - 150	0.0000	+/-0.50	
M6PFDA	722132.6	3.84345	552,361.00	3.843467	131	50 - 150	0.0000	+/-0.50	
M3PFBS	142973.7	1.944683	113,891.00	1.944683	126	50 - 150	0.0000	+/-0.50	
M7PFUnA	865231.1	3.993983	713,494.00	3.993983	121	50 - 150	0.0000	+/-0.50	
M2-6:2FTS	86200.85	3.48535	62,579.00	3.48535	138	50 - 150	0.0000	+/-0.50	
M5PFPeA	604702.3	1.766017	440,894.00	1.766017	137	50 - 150	0.0000	+/-0.50	
M5PFHxA	905178.3	2.646767	676,024.00	2.646767	134	50 - 150	0.0000	+/-0.50	
M3PFHxS	129728.9	3.258733	98,387.00	3.250667	132	50 - 150	0.0081	+/-0.50	
M4PFHpA	921533	3.219533	682,806.00	3.219533	135	50 - 150	0.0000	+/-0.50	
M8PFOA	841030.4	3.493867	623,979.00	3.493867	135	50 - 150	0.0000	+/-0.50	
M8PFOS	133282.4	3.684083	104,400.00	3.6841	128	50 - 150	0.0000	+/-0.50	
M9PFNA	698268.1	3.685133	502,103.00	3.685133	139	50 - 150	0.0000	+/-0.50	
MPFDoA	826579.6	4.136817	740,344.00	4.136817	112	50 - 150	0.0000	+/-0.50	
d5-NEtFOSAA	182593.3	4.00145	154,318.00	4.001467	118	50 - 150	0.0000	+/-0.50	
d3-NMeFOSAA	236770.3	3.921883	185,224.00	3.921883	128	50 - 150	0.0000	+/-0.50	

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INTERNAL STANDARD AREA AND RT SUMMARY

SOP-454 PFAS

Internal Standard	Response	RT	Reference Response	Reference RT	Area %	Area % Limits	RT Diff	RT Diff Limit	Q
LCS (B308205-BS1)			Lab File ID: B308205-BS1R.d			Analyzed: 05/17/22 09:33			
M8FOSA	254094.3	4.020534	261,188.00	4.01255	97	50 - 150	0.0080	+/-0.50	
M2-4:2FTS	90489.58	2.570733	104,204.00	2.570733	87	50 - 150	0.0000	+/-0.50	
M2PFTA	929688.2	4.386533	918,855.00	4.386533	101	50 - 150	0.0000	+/-0.50	
M2-8:2FTS	95922.54	3.850917	102,063.00	3.842967	94	50 - 150	0.0080	+/-0.50	
MPFBA	686136.4	1.108317	536,591.00	1.100017	128	50 - 150	0.0083	+/-0.50	
M3HFPO-DA	234657.1	2.904767	154,591.00	2.896583	152	50 - 150	0.0082	+/-0.50	*
M6PFDA	645109.2	3.851417	552,361.00	3.843467	117	50 - 150	0.0080	+/-0.50	
M3PFBS	134766	1.96145	113,891.00	1.95315	118	50 - 150	0.0083	+/-0.50	
M7PFUnA	799353.9	4.001983	713,494.00	3.993983	112	50 - 150	0.0080	+/-0.50	
M2-6:2FTS	54650.81	3.493333	62,579.00	3.48535	87	50 - 150	0.0080	+/-0.50	
M5PFPeA	531580.4	1.7826	440,894.00	1.7743	121	50 - 150	0.0083	+/-0.50	
M5PFHxA	793582.3	2.663233	676,024.00	2.655	117	50 - 150	0.0082	+/-0.50	
M3PFHxS	115042.6	3.25875	98,387.00	3.25875	117	50 - 150	0.0000	+/-0.50	
M4PFHpA	814873.9	3.227617	682,806.00	3.227617	119	50 - 150	0.0000	+/-0.50	
M8PFOA	737681.4	3.50185	623,979.00	3.50185	118	50 - 150	0.0000	+/-0.50	
M8PFOS	119447.6	3.692083	104,400.00	3.684083	114	50 - 150	0.0080	+/-0.50	
M9PFNA	600060.9	3.693117	502,103.00	3.685133	120	50 - 150	0.0080	+/-0.50	
MPFDoA	765128.8	4.144834	740,344.00	4.136817	103	50 - 150	0.0080	+/-0.50	
d5-NEtFOSAA	151555	4.00945	154,318.00	4.001467	98	50 - 150	0.0080	+/-0.50	
d3-NMeFOSAA	203840.9	3.929883	185,224.00	3.921883	110	50 - 150	0.0080	+/-0.50	

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SOP-454 PFAS in Water	
Perfluorobutanoic acid (PFBA)	NH-P
Perfluorobutanesulfonic acid (PFBS)	NH-P
Perfluoropentanoic acid (PFPeA)	NH-P
Perfluorohexanoic acid (PFHxA)	NH-P
11Cl-PF3OUdS (F53B Minor)	NH-P
9Cl-PF3ONS (F53B Major)	NH-P
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	NH-P
Hexafluoropropylene oxide dimer acid (HFPO-DA)	NH-P
8:2 Fluorotelomersulfonic acid (8:2FTS A)	NH-P
Perfluorodecanoic acid (PFDA)	NH-P
Perfluorododecanoic acid (PFDoA)	NH-P
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	NH-P
Perfluoroheptanesulfonic acid (PFHpS)	NH-P
N-EtFOSAA	NH-P
N-MeFOSAA	NH-P
Perfluorotetradecanoic acid (PFTA)	NH-P
Perfluorotridecanoic acid (PFTrDA)	NH-P
4:2 Fluorotelomersulfonic acid (4:2FTS A)	NH-P
Perfluorodecanesulfonic acid (PFDS)	NH-P
Perfluorooctanesulfonamide (FOSA)	NH-P
Perfluorononanesulfonic acid (PFNS)	NH-P
Perfluoro-1-hexanesulfonamide (FHxSA)	NH-P
Perfluoro-1-butanesulfonamide (FBSA)	NH-P
Perfluorohexanesulfonic acid (PFHxS)	NH-P
Perfluoro-4-oxapentanoic acid (PFMPA)	NH-P
Perfluoro-5-oxahexanoic acid (PFMBA)	NH-P
6:2 Fluorotelomersulfonic acid (6:2FTS A)	NH-P
Perfluoropetanesulfonic acid (PFPeS)	NH-P
Perfluoroundecanoic acid (PFUnA)	NH-P
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	NH-P
Perfluoroheptanoic acid (PFHpA)	NH-P
Perfluorooctanoic acid (PFOA)	NH-P
Perfluorooctanesulfonic acid (PFOS)	NH-P
Perfluorononanoic acid (PFNA)	NH-P
SW-846 6010D in Water	
Calcium	CT,NH,NY,ME,VA,NC
Iron	CT,NH,NY,ME,VA,NC
Magnesium	CT,NH,NY,ME,VA,NC

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Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2024
MA	Massachusetts DEP	M-MA100	06/30/2022
CT	Connecticut Department of Publilc Health	PH-0165	12/31/2022
NY	New York State Department of Health	10899 NELAP	04/1/2023
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2023
RI	Rhode Island Department of Health	LAO00373	12/30/2022
NC	North Carolina Div. of Water Quality	652	12/31/2022
NJ	New Jersey DEP	MA007 NELAP	06/30/2022
FL	Florida Department of Health	E871027 NELAP	06/30/2022
VT	Vermont Department of Health Lead Laboratory	LL720741	07/30/2022
ME	State of Maine	MA00100	06/9/2023
VA	Commonwealth of Virginia	460217	12/14/2022
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2022
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2022
NC-DW	North Carolina Department of Health	25703	07/31/2022
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2022
MI	Dept. of Env, Great Lakes, and Energy	9100	09/6/2022

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CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevent fields

LAB USE ONLY- Affix Workorder/Login Label Here or List Pace Workorder Number or MTJL Log-in Number Here

22D2230

ALL SHADED AREAS are for LAB USE ONLY

Company: DEC

Billing Information:

Address: 625 Broadway 12th Floor Albany

Report To: Brian Jankauskas

Email To: brian.jankauskas@dec.ny.gov

Copy To: Brian.Jankauskas@dec.ny.gov

Site Collection Info/Address:

Customer Project Name/Number:

State: / County/City: Time Zone Collected: [ ] PT [ ] MT [ ] CT [ ] ET

Phone:
Email:

Site/Facility ID #:

Compliance Monitoring? [ ] Yes [ ] No

Collected By (print): B.J.

Purchase Order #:
Quote #:

DW PWS ID #:
DW Location Code:

Collected By (signature): [signature]

Turnaround Date Required: 10 day

Immediately Packed on Ice: [ ] Yes [ ] No

Sample Disposal: [X] Dispose as appropriate [ ] Return [ ] Archive: ______ [ ] Hold: ______

Rush: [ ] Same Day [ ] Next Day [ ] 2 Day [ ] 3 Day [ ] 4 Day [ ] 5 Day (Expedite Charges Apply)

Field Filtered (if applicable): [ ] Yes [ ] No
Analysis: ______

* Matrix Codes (Insert in Matrix box below): Drinking Water (DW), Ground Water (GW), Wastewater (WW), Product (P), Soil/Solid (SL), Oil (OL), Wipe (WP), Air (AR), Tissue (TS), Bioassay (B), Vapor (V), Other (OT)

Container Preservative Type **

** Preservative Types: (1) nitric acid, (2) sulfuric acid, (3) hydrochloric acid, (4) sodium hydroxide, (5) zinc acetate, (6) methanol, (7) sodium bisulfate, (8) sodium thiosulfate, (9) hexane, (A) ascorbic acid, (B) ammonium sulfate, (C) ammonium hydroxide, (D) TSP, (U) Unpreserved, (O) Other ______

Lab Project Manager:

Customer Sample ID	Matrix *	Comp / Grab	Collected Date	Collected Time	Composite End Date	Composite End Time	Res Cl	# of Ctns	~~EPA method 6020 (metals)~~ KG	537.1 modified (PFAS)	EPA method 6020 (Mg, Fe, Ca)	Lab Sample # / Comments
MW-1-2022-04-27	GW	G	4/27/22	3:30				3		2	1	1
MW-1-2022-04-27-MS	GW	G	4/27/22	3:30				2		2	0	1
MW-1-2022-04-27-MSD	GW	G	4/27/22	3:30				2		2	0	1
EB-2022-04-27	-	-	4/27/22	3:25				2		2	0	2
Filter-[illegible]22	GW	G	4/28/22	10:15				2		2	0	3
MW3-2022-04-28	GW	G	4/28/22	10:30				3		2	1	4
MW2-2022-04-28	GW	G	4/28/22	11:30				3		2	1	5
DUPLICATE	GW	G	4/28/22					2		2	0	6

Lab Profile/Line:
Lab Sample Receipt Checklist:
- Custody Seals Present/Intact Y N (NA)
- Custody Signatures Present (Y) N NA
- Collector Signature Present (Y) N NA
- Bottles Intact (Y) N NA
- Correct Bottles (Y) N NA
- Sufficient Volume (Y) N NA
- Samples Received on Ice (Y) N NA
- VOA - Headspace Acceptable Y N (NA)
- USDA Regulated Soils Y N (NA)
- Samples in Holding Time (Y) N NA
- Residual Chlorine Present Y N (NA)
- Cl Strips:
- Sample pH Acceptable (Y) N NA
- pH Strips: HC173324
- Sulfide Present Y N (NA)
- Lead Acetate Strips: ______

LAB USE ONLY:
Lab Sample # / Comments:

Customer Remarks / Special Conditions / Possible Hazards: NYSDEC Cat B; NYSDEC EDD

Type of Ice Used: (Wet) Blue Dry None

Packing Material Used: ~~Sara Rivinus~~ SR

Radchem sample(s) screened (<500 cpm): Y N (NA)

SHORT HOLDS PRESENT (<72 hours): Y (N) N/A

Lab Tracking #: 2690948

Samples received via: FEDEX UPS (Client) Courier Pace Courier

Lab Sample Temperature Info:
Temp Blank Received: Y (N) NA
Therm ID#:
Cooler 1 Temp Upon Receipt: 1.8 oC
Cooler 1 Therm Corr. Factor: +.1 oC
Cooler 1 Corrected Temp: 1.9 oC
Comments:

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	MTJL LAB USE ONLY
[signature]	4/28/22	Sara Rivinus	4/28/22 1253	Table #:
[signature] - Pace LT	4/29/22 1805	[signature] 3.7	4/30 1013	Acctnum: Template: Prelogin:
				PM: PB:

Trip Blank Received: Y N (NA) HCL MeOH TSP Other

Non Conformance(s): YES / NO

Page: ___ of: ___

APPENDIX E

Aquifer Characteristics Equations

MW-1

Equation 1 – Specific Capacity

$$Specific\ Capacity\ (SC)\ = \frac{Pumping\ Rate\ (Q)}{Drawdown\ over\ 1\ day\ (s)}$$

$$SC = \frac{5.82\ gpm}{0.2581\ ft}$$

$$SC = 22.55\ gpm/ft$$

Equation 2 – Transmissivity & Equation 4 -- Hydraulic Conductivity

$$Transmissivity\ (T)\ = 1.042\left(\frac{Pumping\ Rate\ (Q)}{Drawdown(s_w)}\right)$$

$$T = 1.042\ \left(\frac{31.725\ m^3/day}{0.0787\ m}\right)$$

$$T = 420.044\ \ m^2/day$$

$$T = 4{,}521.35\ \ ft^2/day$$

$$Hydraulic\ Conductivity\ (K) = \frac{Transmissivity\ (T)}{Saturated\ thickness\ of\ the\ aquifer\ (b)}$$

$$K = \ \frac{4{,}521.354\ \ ft^2/day}{100\ ft}$$

$$K = 45.21\ ft/day$$

MW-1 (cont.)

Equation 3 – Transmissivity & Equation 4 -- Hydraulic Conductivity

$$Transmissivity\ (T) = \frac{2.3}{4\pi}\left(\frac{Pumping\ Rate\ (Q)}{Slope\ per\ 1 \log cycle\ (\Delta s)}\right)$$

$$T = \frac{0.183Q}{\Delta s}$$

$$T = \frac{0.183\ (0.778\ ft^3/min)}{0.3028\ ft}$$

$$T = 0.470\ \ ft^2/min$$

$$T = 676.8\ \ ft^2/day$$

$$Hydraulic\ Conductivity\ (K) = \frac{Transmissivity\ (T)}{Saturated\ thickness\ of\ the\ aquifer\ (b)}$$

$$K = \frac{676.8\ \ ft^2/day}{100\ ft}$$

$$K = 6.77\ ft/day$$

Equation 5 – Hardness

$$Hardness = 2.497\left(Calcium\frac{mg}{L}\right) + 4.118\left(Magnesium\frac{mg}{L}\right)$$

$$Hardness = 2.497\left(5.00\frac{mg}{L}\right) + 4.118\left(2.20\frac{mg}{L}\right)$$

$$Hardness = 21.54\frac{mg}{L}$$

MW-2

Equation 5 – Hardness

$$Hardness = 2.497\left(Calcium\frac{mg}{L}\right) + 4.118\left(Magnesium\frac{mg}{L}\right)$$

$$Hardness = 2.497\left(7.90\frac{mg}{L}\right) + 4.118\left(2.40\frac{mg}{L}\right)$$

$$Hardness = 29.61\frac{mg}{L}$$

MW-3

Equation 1 – Specific Capacity

$$Specific\ Capacity\ (SC)\ =\ \frac{Pumping\ Rate\ (Q)}{Drawdown\ over\ 1\ day\ (s)}$$

$$SC = \frac{6.00\ gpm}{0.3040\ ft}$$

$$SC = 19.74\ gpm/ft$$

Equation 2 – Transmissivity & Equation 4 -- Hydraulic Conductivity

$$Transmissivity\ (T)\ = 1.042\left(\frac{Pumping\ Rate\ (Q)}{Drawdown(s_w)}\right)$$

$$T = 1.042\ \left(\frac{32.706\, m^3/day}{0.0927\ m}\right)$$

$$T = 367.633\ \ m^2/day$$

$$T = 3{,}957.20\ \ ft^2/day$$

$$Hydraulic\ Conductivity\ (K) = \frac{Transmissivity\ (T)}{Saturated\ thickness\ of\ the\ aquifer\ (b)}$$

$$K = \frac{3{,}957.20\ \ ft^2/day}{100\ ft}$$

$$K = 39.57\ ft/day$$

MW-3 (cont.)

Equation 3 – Transmissivity & Equation 4 -- Hydraulic Conductivity

$$Transmissivity\ (T) = \frac{2.3}{4\pi}\left(\frac{Pumping\ Rate\ (Q)}{Slope\ per\ 1\log cycle\ (\Delta s)}\right)$$

$$T = \frac{0.183Q}{\Delta s}$$

$$T = \frac{0.183\ (0.802\ ft^3/min)}{0.1589\ ft}$$

$$T = 0.924\ \ ft^2/min$$

$$T = 1{,}330.56\ \ ft^2/day$$

$$Hydraulic\ Conductivity\ (K) = \frac{Transmissivity\ (T)}{Saturated\ thickness\ of\ the\ aquifer\ (b)}$$

$$K = \frac{1{,}330.56\ \ ft^2/day}{100\ ft}$$

$$K = 13.31\ ft/day$$

Equation 5 – Hardness

$$Hardness = 2.497\left(Calcium\frac{mg}{L}\right) + 4.118\left(Magnesium\frac{mg}{L}\right)$$

$$Hardness = 2.497\left(13.00\frac{mg}{L}\right) + 4.118\left(2.80\frac{mg}{L}\right)$$

$$Hardness = 43.99\frac{mg}{L}$$

APPENDIX F

AQUIFER PUMPING TEST REPORT
MASTIC FIRE DEPARTMENT STATION #1 SITE
MASTIC, NEW YORK

September 2022

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

TABLE OF CONTENTS

Page

Tables

Figures

Appendices

INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) conducted a pumping test of Monitor Well MW-1 (MW-1) at the Mastic Fire Department Station #1 site (the Site) located along the Sunrise Service Road North in the Hamlet of Mastic, New York. The pumping test at the Site included the pumping of Monitor Well MW-1 for the purpose of designing a recovery well for the treatment of PFAS impacted groundwater at the Site. The test was implemented to determine the relative yield and hydraulic influence in the area of MW-1 and to determine the anticipated water flow-through required for a pad-mounted granular activated carbon groundwater treatment system.

BACKGROUND

The Site encompasses an area of approximately one acre, situated south of the Brookhaven Calabro Airport (Figure 1). The Site is used as a fire station and based on historical information, the use of PFAS containing fire retardant foam is the cause for elevated PFAS concentrations observed in groundwater.

Site Conditions

The Site occurs in the Atlantic/Long Island Sound Watershed, which in the Mastic area is drained by easterly-flowing tributaries of the Forge River. The Site is generally underlain by sand and gravel deposited by glacial melt water or local streams during the most recent glaciation period. The part of Long Island south of the Ronkonkoma Terminal Moraine is known as an outwash plain, which is another glacial depositional feature created by melted glacial water that flows sediment out from underneath the glacier and deposits it at the end point of the glacier, creating a flat plain of sediment.

Local Ground-Water Resources

The overburden materials underlying the Site comprise the uppermost groundwater bearing formations at the Site. Groundwater in the overburden generally moves through and is stored in the pore spaces that surround the comprising granular materials. Typically, the coarser the dominant grain size of these materials, the easier it is for ground water to move through the respective unit due to the corresponding coarser pore space size. As such, relatively greater amounts of ground water can occur in and move through overburden materials composed primarily of sand and gravel than for finer grained clay and silt because of the corresponding pore space size differences.

Nassau and Suffolk counties obtain their drinking water from three major aquifers underlying Long Island which constitute a sole source aquifer. The three major Long Island aquifers constitute the local water supply for Long Island and include from the shallowest to the deepest, the Upper Glacial, the Magothy and the Lloyd aquifers.

The Upper Glacial Aquifer formed during the last ice age and is the youngest and closest to the surface. The Upper Glacial was laid down during the last Ice Age, 10-15 million years ago and it contains sands, pebbles, rocks and occasionally boulders, carried to Long Island and left behind by the glaciers. The water table is found in the Upper Glacial aquifer.

The Magothy Aquifer is the largest of Long Island's aquifers and consists of sand deposits alternating with clay. This aquifer attains a maximum thickness of approximately 1,100 feet and is the source of water for most of Nassau County and about half of Suffolk County. The formation can be seen in the coastal bluffs of the north shore and plunges under the land surface to the south. The sand and gravel of the Magothy aquifer was deposited in the upper Cretaceous Period, about 50-80 million years ago. The Magothy aquifer supplies more than 90% of the water used in Nassau County and about 50% of the water used in Suffolk County.

The Lloyd Aquifer is the oldest and deepest of Long Island's aquifers. The Lloyd Aquifer consists of a sand and gravel formation ranging in thickness up to 500 feet thick and were deposited during the Cretaceous Period, about 80-100 million years ago. The Lloyd aquifer is 1,800 feet below the surface at its deepest point. The Lloyd aquifer is found at depths averaging 200-300 feet along the north shore and approximately 1,500 feet below the land surface along the south shore.

Monitor Well MW-1 and Associated Observation Wells

Monitor Well MW-1, MW-2 and MW-3 were installed with two-inch diameter PVC in November 2020, to approximate completion depths of 47 feet below grade (ft bg), 48 ft bg and 50 ft bg, respectively (geologic logs attached as Appendix I). Each well was constructed with 10-feet long, 0.01-inch slot screens situated at the bottom of the boring. Monitor Well MW-1 was utilized as the pumping well while Monitor Wells MW-2 and MW-3 were utilized as observation wells during the pumping test. The installation locations of these wells were sited by the NYSDEC as shown on Figure 2. Static water levels in these wells at the time of installation were approximately 42 ft bg.

PUMPING TEST

The NYSDEC conducted a 1-hour duration, pumping test on April 27, 2022 utilizing Monitor Well MW-1 at the Site as the pumping well, in order to establish the performance and yield characteristics of the tapped water table aquifer. Ground-water data were collected during the pre-pumping (background), pumping, and post-pumping (recovery) periods of the pumping test using the pumping well and two observation wells.

The rate selected for the pumping well during the pumping test was generally based on the capacity of the 2-inch submersible pump installed in Monitor Well MW-1. The pump was operated at its maximum capacity by the end of the pumping test at a rate 5.82 gallons per minute (gpm). The observation wells utilized for the pumping test included other overburden Monitor Wells MW-2 and MW-3, that penetrate the local overburden aquifer and were installed within 150 and 175 feet of the pumping well, respectively.

A summary of the pumping well and associated observation wells used during pumping test is provided as Table 1. The locations of the utilized pumping well and on-site observation points were presented on Figure 2.

Test Setup

A 2-inch diameter submersible pump was temporarily set at a depth of about 46 ft bg in the pumping well (MW-1). A bucket was used to measure the pumping rate for the pumping well during the test. Depth to water was measured to within 0.01 feet using a manually operated electric water-level indicator and dedicated electronic data loggers. The water discharged by the pump during the pumping test was directed via a non-leaking HDPE tubing into a holding tank.

Background and Recovery Monitoring

Background measurements were collected from the Monitor Wells MW-1, MW-2 and MW-3 prior to implementing the pumping test. Subsequent to the completion of the pumping test, water-level recovery was monitored using the observation point network. The recovery monitoring began immediately following pump shutdown using dedicated electronic water level recording devices and continued until water levels had recovered to within 90% of the pre-test static water levels at the respective pumping well.

Pumping Test Summary

The pumping test was started on April 27, 2022 at 13:25. This test consisted of the pumping of Monitor Well MW-1, at an initial rate of 2.5 gpm to a maximum rate of 5.82 gpm. The static water level measured prior to the test was 39.3 feet below the top of the casing (ft btoc). The pumping duration was approximately 60 minutes. The pumping rates were adjusted as needed over the duration of the pumping test to maintain the rate of 5.82 gpm. The pumping level measured prior to pump shutdown at the tested well was 39.63 ft btoc. The pump in the well was shut off by 14:46 on April 27, 2022**.** A summary of the corresponding data (e.g., drawdown) collected for the well tested during the pumping test is provided as Table 1.

The graphs used to plot the water level responses during the pumping test are presented in Appendix II. Minor drops in water level shown in the hydrograph of the pumping well represent an increase in the pumping rate as time progresses.

The background water-level data for Monitor Well MW-1 exhibited a flat trend prior to initiation of the pumping test (Appendix II). The pump in MW-1 was started at 13:25 on April 27, 2022 for the pumping test, and the rate was set at 2.5 gpm. The total drawdown (difference between pre-test static water level and pumping level) exhibited during the pumping for the test was 0.33 feet (Table 1). The pump in Monitor Well MW-1 was shut down at 14:46 on April 27, 2022. The water level in Monitor Well MW-1 recovered after pump shut-off for the test to approximately 99% of the pre-pumping static water level (Appendix II).

Monitor Wells MW-2 and MW-3, which are approximately 150 and 175 feet apart, respectively, from Monitor Well MW-1 were used as observation wells (Figure 2). The corresponding amounts of drawdown at MW-2 and MW-3 associated with the pumping of Monitor Well MW-1 were not observed during the pumping test.

AQUIFER CHARACTERISTICS

Ground-water level data obtained during the pumping test of Monitor Well MW-1 were converted to drawdown. The amount of drawdown was used in calculating the specific capacity of the well and plotted against elapsed time and distance to determine hydraulic characteristics of the overburden aquifer in the vicinity of the Site. The plotted data were analyzed using the "straight line" methods of Cooper-Jacob (1946). The calculations of aquifer characteristics is based on a pumping rate for Monitor Well MW-1 of 5.82 gpm. Plots of the time-drawdown, and distance-drawdown for the pumping well are presented in Appendix II. Calculations of the specific capacity and transmissivity of MW-1 are presented below and summarized in Table 2.

The specific capacity determined for the MW-1 from the pumping test was calculated to be 17.64 gpm/ft as follows:

Sc = pumping rate/drawdown

= 5.82 gpm/0.33 feet = 17.64 gpm/ft or 25,402 gallons per day (gpd)/ft

The transmissivity value calculated for MW-1 using the Modified Cooper-Jacob equation, is approximately 26,454 gpd/ft as follows:

T = (pumping rate/change in drawdown)(1,500)

= (5.82 gpm/0.33 feet)(1,500) = 26,454 gpd/ft

The transmissivity value calculated for MW-1 from the time-drawdown graph based on straight line drawn on the graph shown in Appendix II, is approximately 9,038 gpd/ft as follows:

T = (264)(pumping rate)/change in drawdown over one log cycle

= (264)(5.82 gpm)/0.17 feet = 9,038 gpd/ft

Besides being used to determine transmissivity values, the distance versus drawdown analysis provides for a determination of the approximate "radius-of-influence" about the pumping well associated with the respective pumping conditions. The radius of influence is typically extended to the point in the aquifer where drawdown is zero ("r_o"). Under theoretical conditions for a homogeneous, uniform aquifer, the radius of influence is typically considered to be uniform in all directions.

In order to effectively determine the radius of influence using a distance-drawdown graph, observable drawdown is necessary in nearby observation wells to plot the drawdown observed in these wells against the distance of the observation wells from the pumping well. However, no drawdown was observed in the Monitor Wells MW-2 and MW-3 during the pumping test of MW-1 to effectively do this. Since log of r^2 is the same as 2 log r, it follows that the value of the change in drawdown over one log cycle (Δs) for the distance-drawdown graph is twice the Δs for the time-drawdown graph. For a given aquifer and a given pumping rate, the ratio for the slopes of the two straight lines is a fixed relationship. Therefore, when Δs is determined from a time-drawdown graph, the slope of the line on the distance-drawdown graph should be twice as great if the well is pumped at the same rate. The Δs determined from the time-drawdown graph prepared for the pumping test of MW-1 is 0.17 feet over one log cycle.

Therefore, the Δs applied for the distance-drawdown graph would be 0.34 feet over one log cycle.

In order, to determine the distance-drawdown at an increased pumping rate, the ratio of the Δs is multiplied by the change in pumping rate. In order to determine the radius of influence on the distance-drawdown graph with MW-1 pumping at approximately 123 gpm with a drawdown in the well fixed at 7 feet (based on specific capacity data), the Δs is multiplied by 7 to get a Δs of 2.38 feet over one log cycle. When plotted on the distance-drawdown graph, the drawdown in MW-1 was adjusted to 75 percent of the capacity of the pumping water level (approximately 5.25 feet) to account for inefficiencies in the pumping well. When a straight line is drawn from 5.25 feet of drawdown with a Δs of 2.38 feet, the radius-of-influence (r^0) distributed about monitor Well MW-1 based on data collected from the pumping test is approximately 40 feet. When the transmissivity is calculated using the straight line on the distance-drawdown graph using the increase pumping rate and Δs of 2.38 feet, the transmissivity is determined to be 27,287 gpd/ft as follows:

T = (528)(pumping rate)/change in drawdown over one log cycle

= (528)(123 gpm)/2.38 feet = 27,287 gpd/ft

In order to verify the radius of influence and possible mounding influence from the pumping of MW-1 at a rate of 123 gpm, an analytical model described in the next section was utilized incorporating the aquifer characteristics determined above.

MODEL ANALYSES

An interactive program which solves Glover's Analytical Solution (1960) for recharge from a rectangular basin that was created by Daniel Sunada at the Colorado State University and is called the Colorado State University Pit and Well (CSUPAW) program was utilized to model the discharge from a hypothetical recovery well and recharge into a hypothetical discharge basin at the Site. Aquifer data derived from the pumping test analyses was utilized to model the proposed use of a recovery well at the Site. The program is capable of graphically displaying the rise and decline of the recharge mound for an infinite homogeneous medium. The program allows the user to predict the response of a water table in response to a discharge well or artificial recharge of water from a rectangular basin in a homogenous aquifer.

Inputs to the program for the discharge well or mounding analysis include: discharge (gallons per minute) or recharge rate (feet/day); transmissivity (square feet/day); specific yield; time period (days); depth to water (feet); saturated thickness (feet); and basin geometry (feet). The output is presented in a visual display which allows the user to see the corresponding cone of depression or mounding, depending on whether discharge well or recharge basin is selected.

For the purpose of evaluating the effects of pumping and mounding on the water table aquifer underlying the Site, aquifer characteristics derived from data collected during the April 2022 pumping test were used in the model analyses. In order to achieve more significant drawdown, pumping the well at 123 gpm was selected based on the specific capacity calculation since this was utilized in the analysis for determining the radius of influence in the distance-drawdown graph. Below is a is list of the inputs for the recovery well and mounding model simulation.

For the model analyses of the discharge well (recovery well), the following parameters were selected based on data from the pumping test:

Discharge rate: 123 gallons per minute
Transmissivity: 3,537 square feet/day
Specific yield: 0.33 (dimensionless)
Duration: 365 days
Distance/increment: 500 feet/50 feet (scale in graphic display)
Saturated thickness: 40 feet (based on field data)

For the model analysis of the recharge basin (flow from the recovery well), the following parameters were selected based on data from the pumping test:

Recharge rate: 11,885 feet/day (based on half of basin width)
Transmissivity: 1,208 square feet/day
Specific yield: 0.33 (dimensionless)
Duration: 365 days
Distance/increment: 500 feet/50 feet (scale in graphic display)
Depth to water: 40 feet (based on field data)
Basin width: 2 feet
Basin length: 1 foot

The graphical output from the discharge well model analysis is shown in Appendix III. Based on this model run, pumping at a rate of 123 gpm shows a corresponding drawdown in the well of approximately 8 ft bg after pumping for 365 days and a radius of influence of approximately 50 feet out from the pumping well. This data roughly correlates with the radius of influence of 40 feet from the pumping well determined from the distance-drawdown analysis described above.

The graphical output for the mounding analysis is shown in Appendix III. Based on this model run, it is assumed that approximately 177,800 gallons per day (23,770 cubic feet or 123 gpm) will be pumped to the ground at a location well away from the pumping well. The graphical output from this model run shows a mounding effect of a rise in the water table to within 15 feet of the ground surface after 365 days and the rise does not reach the surface. The majority of the mound affect extends out in a radius of about 100 feet from the discharge point.

As is shown in the output graphical display for the recovery well simulation, the radius of influence and amount of drawdown is similar to the radius of influence determined in the distance-drawdown graph and the specific capacity data, respectively. The mounding analysis shows that the water discharged to the ground surface from the recovery well will assimilate back into the aquifer without reaching the surface and creating a ponding effect.

CONCLUSIONS AND RECOMMENDATIONS

The results of the pumping tests of Monitor well MW-1 at the Site support the following conclusions and recommendations:

1. The specific capacity calculated for Monitor well MW-1 using a drawdown of 0.33 feet and a pumping rate of 5.82 gpm was 17.63 gpm/foot of drawdown.

2. The aquifer transmissivity ranged between 9,038 and 27,287 gpd/ft based on the pumping test data. The radius-of-influence of the MW-1 well based on the distance-drawdown analysis is about 40 feet.

3. The modelling analyses of the pumping of the recovery well and subsequent recharge to the ground surface via a 2 feet by 1 foot basin showed a similar radius of influence for the recovery well as determined from the distance-drawdown graph and that the discharge from the recovery well will assimilate back into the aquifer without daylighting to the surface.

4. As a conservative approach, the modelling analysis uses a single recovery well for the Site constructed as a six-inch diameter well to a depth of approximately 65 feet below grade with a pumping rate of at least 125 gpm, to create a radius of influence of approximately 50 feet. The pumping rate would produce a pumping water level at approximately 50 feet below grade. The discharge distance should be at least 100 feet from the recovery well. Based upon the approximate plume extent of 150 feet, 2 recovery wells constructed similar to the modelled recovery well would need to be installed. It is likely that several, smaller recovery wells could be installed to produce a radius of influence to adequately capture the plume. Additional site pump tests should be conducted to refine the number of extraction wells, well depths, configurations, and pumping rates.

REFERENCES

Driscoll, F.G. (1986). *Groundwater and Wells*. Sixth Printing. Johnson Screens, St. Paul, Minnesota.

McClymonds, N.E. and Franke, O.L. (1972). *Water-Transmitting Properties of Aquifers on Long Island, New York.* USGS. Washington D.C.

Sunada, Daniel K. (1985). *Flow from Wells and Recharge Pits.* Colorado State University Pit and Well (CSUPAW) Program, Colorado State University.

TABLES

TABLE 1

MASTIC FIRE DEPARTMENT STATION #1 SITE
MASTIC, NEW YORK

MW-1 PUMP TEST SUMMARY

WELL ID	INSTALLATION DATE	WELL DEPTH (ft bg)(1)	WELL DIAMETER (in) (2)	CASING SETTING (ft bg) (1)	STATIC WATER LEVEL (ft bg)	PUMPING WATER LEVEL (ft bg)	DRAWDOWN (feet)
MW-1	11/23/2020	47	2	0 – 37	39.30	39.63	0.33
MW-2	11/25/2020	48	2	0 – 38	41.32	41.32	Not observed
MW-3	11/30/2020	50	2	0 – 40	41.25	41.25	Not observed

Notes: (1) Feet below grade.
(2) Inches.

TABLE 2

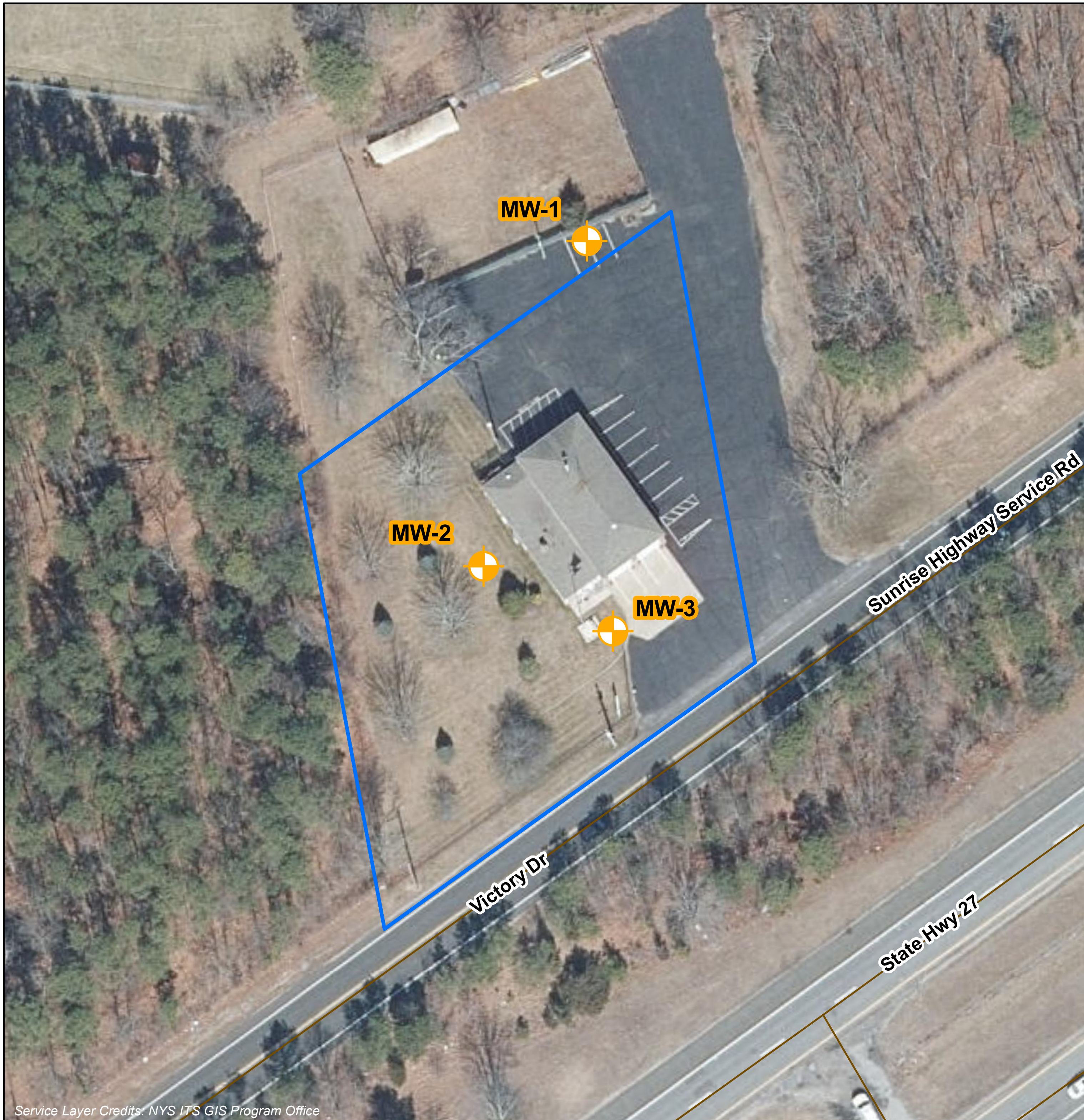
MASTIC FIRE DEPARTMENT STATION #1 SITE
MASTIC, NEW YORK

SUMMARY OF AQUIFER CHARACTERISTICS

METHOD [1]	**T** [2]	**r^0** [3]
SPECIFIC CAPACITY	Sc = 5.82 gpm/0.33 ft = 17.63 gpm/ft or 25,402 gpd/ft	N/A [4]
COOPER-JACOB DISTANCE VERSUS DRAWDOWN	T = (528)(123 gpm)/2.38 = 27,287 gpd/ft	40 feet
COOPER-JACOB TIME VERSUS DRAWDOWN	T = (264)(5.82 gpm)/0.17 = 9,038 gpd/ft	N/A
MODIFIED COOPER-JACOB	T = (5.82 gpm/0.33 ft)(1,500) = 26,459 gpd/ft	N/A

Notes: (1) See Appendix II for data plots.
(2) Transmissivity expressed in units of gallons per day per foot (gpd/ft)
(3) r^0 = radius of influence in feet.
(4) Not applicable.

FIGURES



Legend

N

- Monitoring Well
- Remediation Site Borders
- Local Streets

0 25 50 100 Feet

1 inch = 60 feet

INTENDED TO PRINT AS 8.5" X 11"

Region 1 Suffolk County
Town of Brookhaven

Mastic Fire
Department Substation
#152265

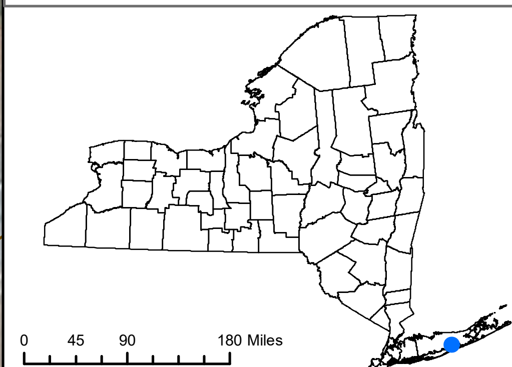
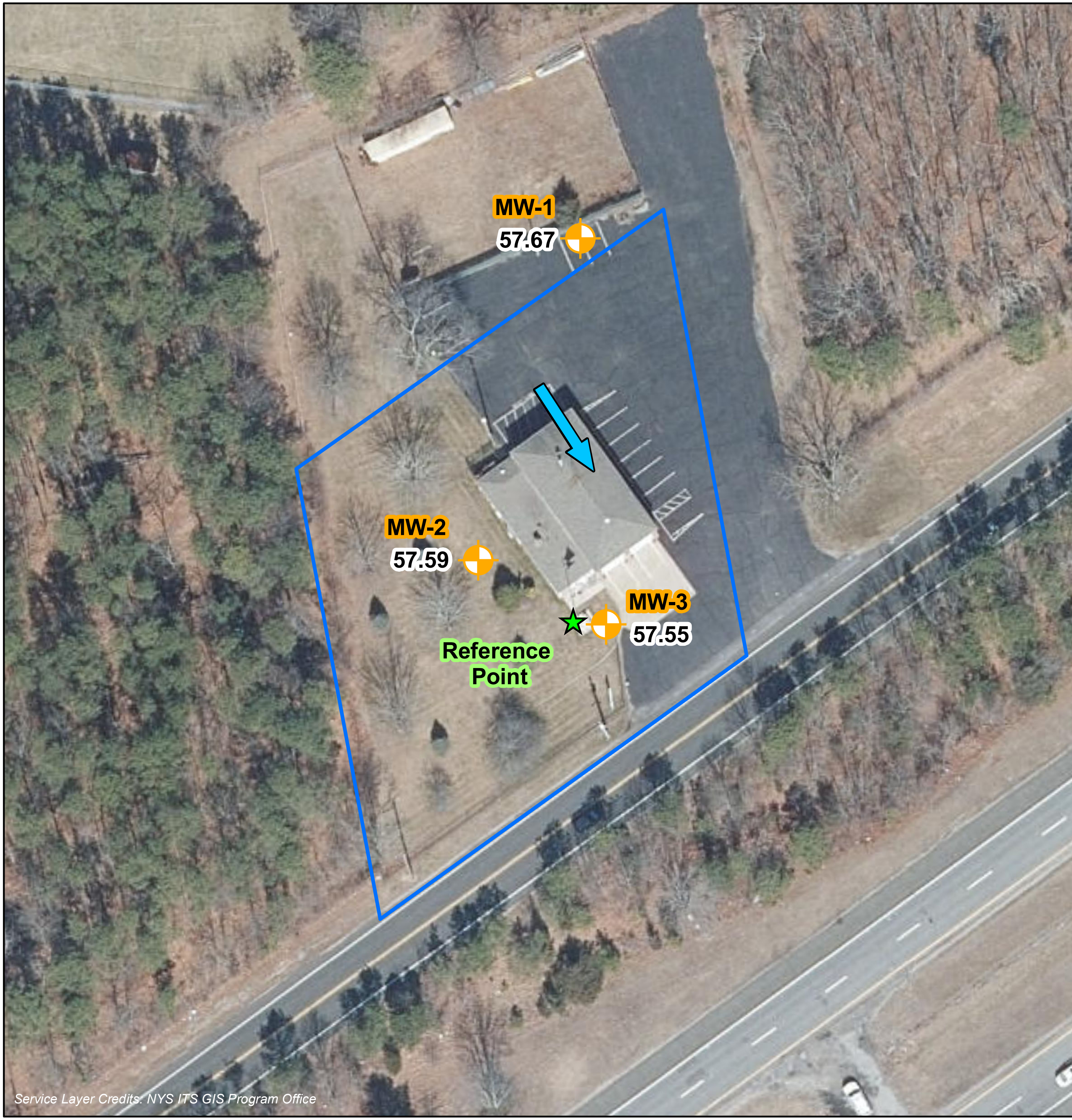


Figure 1
Site Location

NEW YORK STATE | Department of Environmental Conservation



Legend

N

- Monitoring Well
- Survey Reference Point
- Remediation Site Borders
- Approx. Groundwater Flow Direction
- 57.67 Groundwater Elevation

0 25 50 100 Feet

1 inch = 60 feet

INTENDED TO PRINT AS 8.5" X 11"

Region 1 Suffolk County
Town of Brookhaven

Mastic Fire
Department Substation
#152265

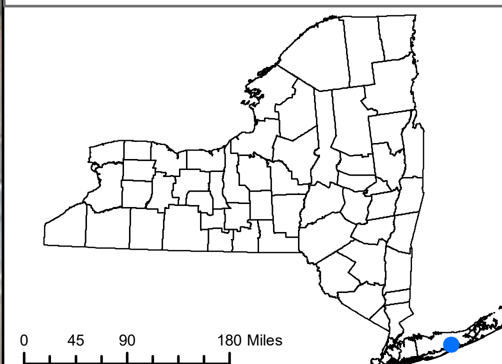


Figure 2
Groundwater Elevation Survey

NEW YORK STATE Department of Environmental Conservation

APPENDICES

APPENDIX I

WELL LOGS

225 Atlantic Avenue
Patchogue, NY 11772
Office: 631.447.6400
Fax: 631.447.6497
Toll-Free: 1.888.EAR.6789
E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/23/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME	Mastic Fire Department Substation
SITE ADDRESS	Sunrise Highway Shirley, NY
SITE ID NUMBER	152265
WELL ID	MW-1
DRILLING METHOD	Hollow Stem Auger
DRILLING COMPANY	Environmental Assessment & Remediations
HEAD DRILLER	A. Duchimaza
LOGGED BY	J. Lohan
BOREHOLE DIAMETER	4.25"
SAMPLE METHOD	Auger Cuttings (AC)
DEPTH-TO-WATER	40.34'
TOTAL WELL DEPTH	47'

WELL CONSTRUCTION

CASING

Type PVC Diameter 2" Length 37'

SCREEN

Type PVC Diameter 2" Slot 0.010" Length 10'

GRAVEL PACK #00 Well Gravel (34'-35') #2 Well Gravel (35'-47')

CASING SEAL Grout (1'-34')

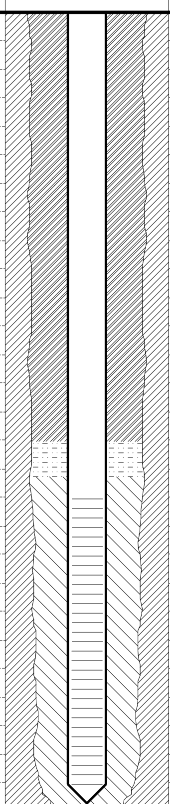
SECURITY 8"X12" Steel, Bolt-Down Manhole Cover
2" Locking Well Cap

FINISH Concrete Pad

COMMENTS MW-1 is located 21' E of parking lot light pole, 79' NE of NE corner of station building, & 9.75' S of chain link fence line.

Soil Lithology/Field Observations

Depth Below Grade | Well Design



40.34'

TWD 47'

NOT TO SCALE

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-5'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
5'-35'	Tan medium sand, little fine sand, trace coarse sand; moist, no odor.	AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
		AC	30'-35'	0.0ppm	-
35'-47'	Tan medium sand, little fine sand, trace coarse sand; wet, no odor.	AC	35'-40'	0.0ppm	-
		AC	40'-45'	0.0ppm	-
		AC	45'-47'	0.0ppm	-

#2 Well Gravel | #00 Well Gravel | Grout

225 Atlantic Avenue
Patchogue, NY 11772
Office: 631.447.6400
Fax: 631.447.6497
Toll-Free: 1.888.EAR.6789
E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/25/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME	Mastic Fire Department Substation
SITE ADDRESS	Sunrise Highway
	Shirley, NY
SITE ID NUMBER	152265
WELL ID	MW-2
DRILLING METHOD	Hollow Stem Auger
DRILLING COMPANY	Environmental Assessment & Remediations
HEAD DRILLER	A. Duchimaza
LOGGED BY	J. Lohan
BOREHOLE DIAMETER	4.25"
SAMPLE METHOD	Auger Cuttings (AC)
DEPTH-TO-WATER	42.39'
TOTAL WELL DEPTH	48'

WELL CONSTRUCTION

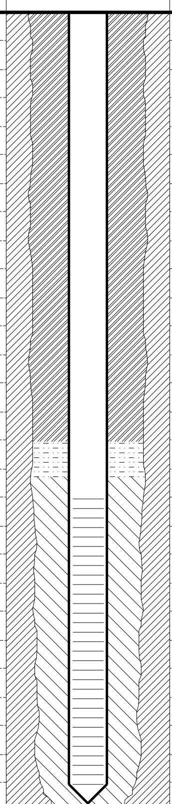
CASING
Type PVC Diameter 2" Length 38'

SCREEN
Type PVC Diameter 2" Slot 0.010" Length 10'

GRAVEL PACK	#00 Well Gravel (35'-36') #2 Well Gravel (36'-48')
CASING SEAL	Grout (1'-35')
SECURITY	8"X12" Steel, Bolt-Down Manhole Cover
	2" Locking Well Cap
FINISH	Concrete Pad
COMMENTS	MW-2 is located 36.5' NW of SW corner of station building, 35.65' SW of NW corner of station building, & 49.5' NW flag pole.

Depth Below Grade: 42.39'; TWD 47'

Well Design



NOT TO SCALE

Soil Lithology/Field Observations

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-5'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
5'-35'	Tan medium sand, little fine sand, trace coarse sand; dry, no odor.	AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
		AC	30'-35'	0.0ppm	-
35'-40'	Tan medium sand, little fine sand, trace coarse sand; moist, no odor.	AC	35'-40'	0.0ppm	-
40'-48'	Tan medium sand, little fine sand, trace coarse sand; wet, no odor.	AC	40'-45'	0.0ppm	-
		AC	45'-48'	0.0ppm	-

#2 Well Gravel | #00 Well Gravel | Grout

225 Atlantic Avenue
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E-mail: info@enviro-asmnt.com
www.Enviro-Asmnt.com

Installation Date 11/30/20

DRILLING LOG - Monitoring Well Installation

DRILLING DETAILS

PROJECT/SITE NAME	Mastic Fire Department Substation
SITE ADDRESS	Sunrise Highway
	Shirley, NY
SITE ID NUMBER	152265
WELL ID	MW-3
DRILLING METHOD	Hollow Stem Auger
DRILLING COMPANY	Environmental Assessment & Remediations
HEAD DRILLER	A. Duchimaza
LOGGED BY	J. Lohan
BOREHOLE DIAMETER	4.25"
SAMPLE METHOD	Auger Cuttings (AC)
DEPTH-TO-WATER	42.38'
TOTAL WELL DEPTH	50'

WELL CONSTRUCTION

CASING
Type PVC Diameter 2" Length 40'

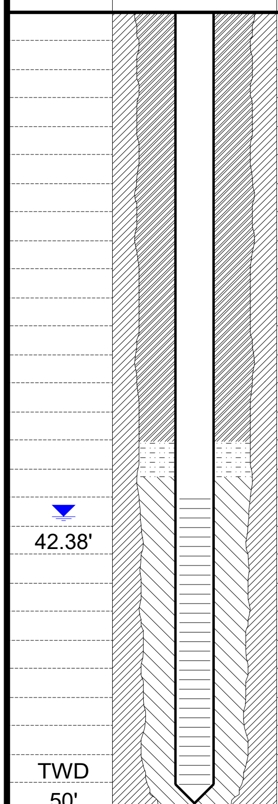
SCREEN
Type PVC Diameter 2" Slot 0.010" Length 10'

GRAVEL PACK	#00 Well Gravel (37'-38') #2 Well Gravel (38'-50')
CASING SEAL	Grout (1'-37')
SECURITY	8"X12" Steel, Bolt-Down Manhole Cover
	2" Locking Well Cap
FINISH	Concrete Pad
COMMENTS	MW-3 is located 26.15' N of fire hydrant, 28' SE of SW corner of station building, & 36.25' SW of SE corner of station building.

Soil Lithology/Field Observations

Depth	Description/Classification	Sample Type	Screening Interval	PID Reading	Percent Recovery
0'-30'	Tan medium sand, little fine sand, little coarse sand, trace fine gravel; moist, no odor.	PH	0'-5'	0.0ppm	-
		AC	5'-10'	0.0ppm	-
		AC	10'-15'	0.0ppm	-
		AC	15'-20'	0.0ppm	-
		AC	20'-25'	0.0ppm	-
		AC	25'-30'	0.0ppm	-
30'-40'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; moist, no odor.	AC	30'-35'	0.0ppm	-
		AC	35'-40'	0.0ppm	-
40'-50'	Tan medium sand, little fine sand, trace coarse sand, trace fine gravel; wet, no odor.	AC	40'-45'	0.0ppm	-
		AC	45'-50'	0.0ppm	-

Depth Below Grade | Well Design



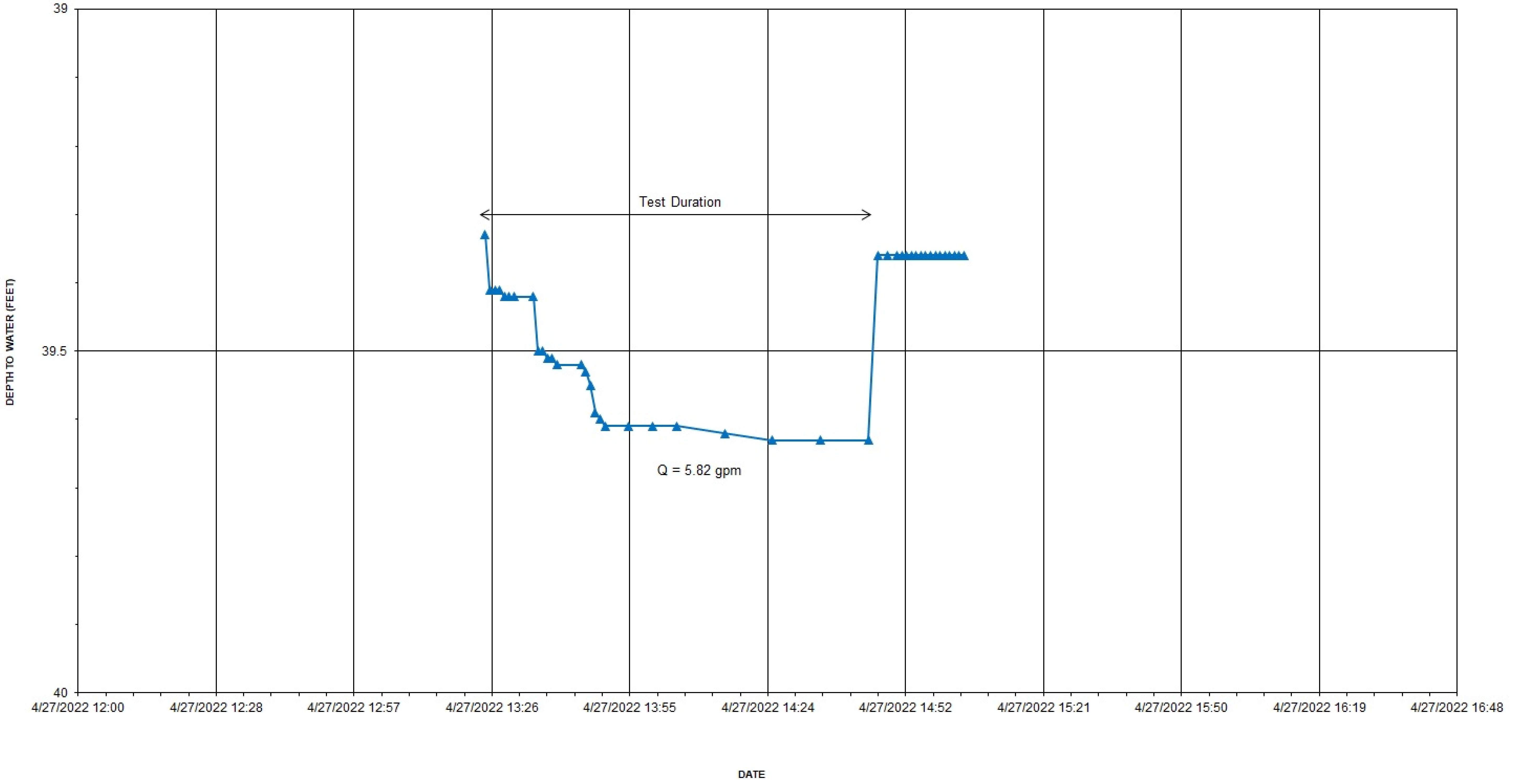
NOT TO SCALE

#2 Well Gravel | #00 Well Gravel | Grout

APPENDIX II

HYDROGRAPHS

PRATT PROJECT
MASTIC, NEW YORK
MW-1: DEPTH TO WATER VS. TIME
PUMPING TEST, 4-27-2022

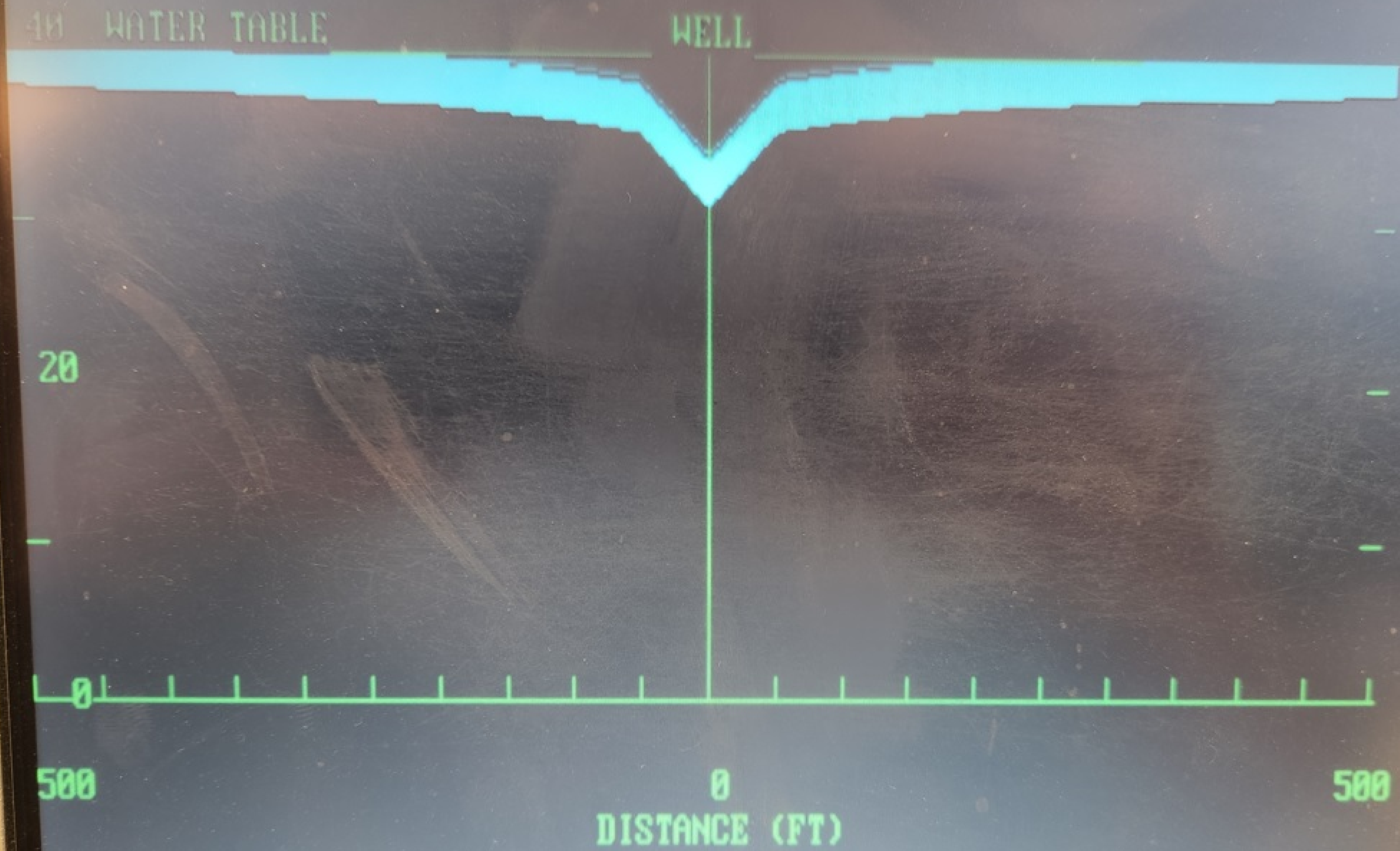


APPENDIX III

MODEL ANALYSES

1)	RECHARGE RATE (ft./day)	11885
2)	TRANSMISSIVITY (sq. ft./day)	1208
3)	SPECIFIC YIELD	.33
4)	BEGINNING TIME	1
	FINAL TIME (days)	365
	TIME INCREMENT (days)	1
5)	END OF RECHARGE PERIOD (days)	365
6)	BEGINNING DISTANCE (ft.)	0
	FINAL DISTANCE (ft.)	500
	DISTANCE INCREMENT (ft.)	50
7)	DEPTH TO WATER (ft.)	40
8)	ANGLE FROM X- AXIS (deg.)	0
12)	BASIN WIDTH (ft.)	2
13)	BASIN LENGTH (ft.)	1

TYPE THE NUMBER OF THE VARIABLE YOU
WISH TO CHANGE. PRESS <ENTER> TO
CONTINUE WITHOUT FURTHER CHANGES.



TIME 365 (DAYS)

PRESS <ENTER> TO CONTINUE

1)	DISCHARGE RATE (gpm)	123
2)	TRANSMISSIVITY (sq. ft./day)	3537
3)	SPECIFIC YIELD	.33
4)	BEGINNING TIME	1
	FINAL TIME (days)	365
	TIME INCREMENT (days)	1
5)	END OF DISCHARGE PERIOD	365
6)	BEGINNING DISTANCE (ft.)	0
	FINAL DISTANCE (ft.)	500
	DISTANCE INCREMENT (ft.)	50
7)	SATURATED THICKNESS (ft.)	40
8)	ANGLE FROM X- AXIS (deg.)	0

TYPE THE NUMBER OF THE VARIABLE YOU
WISH TO CHANGE. PRESS <ENTER> TO
CONTINUE WITHOUT FURTHER CHANGES.


GROUND SURFACE
40
BASIN
20
WATER TABLE
500
0
500
DISTANCE (FT)
TIME 365 (DAYS)
PRESS <ENTER> TO CONTINUE