MOVE YOUR ENVIRONMENT FORWARD

October 26, 2024

Ms. Tanya Trevisan
Duxbury Safe Water Committee, Inc.
Co James Begley, LSP
21 Tinkers Ledge Road
Duxbury, MA 02332
Via email: jbegley@mtenvironmental.com

RE: ENVIRONMENTAL FORENSIC SERVICES, DUXBURY PFAS SOURCES AND MUNICIPAL DRINKING WATER SUPPLY WELLS, DUXBURY, MASSACHUSETTS (HRP # DUX0001.MC)

Dear Ms. Trevisan:

BACKGROUND

HRP Associates, Inc. (HRP) is pleased to submit the following forensic evaluation relating to the detection of per- and polyfluoroalkyl substances (PFAS) in groundwater associated with the Duxbury Landfills Site and various municipal drinking water supply wells located in Duxbury, Massachusetts. The work was completed on behalf of the Duxbury Safe Water Committee (https://duxburysafewater.org/) with funding provided by Massachusetts Department of Environmental Protection (MassDEP) Bureau of Waste Site Cleanup Technical Assistance Grant (TAG) 2024-2025 Program. The forensic evaluation focuses on the Duxbury Municipal Landfill, the McNeil Dump (Duxbury Landfill, Inc.), the Duxbury central fire station, and other potential sources of PFAS detected in these wells. These potential PFAS sources and the municipal supply wells are indicated on **Figure 1**. The presence of individual PFAS compounds and their percentage of total PFAS in groundwater samples can be used to identify a signature for specific PFAS sources. Evaluation of these signatures constitutes a forensic analysis useful in evaluating sources impacting municipal wells.

The investigation considered residential septic system densities in the vicinity of the municipal supply wells as a potential source of PFAS (**Figure 2**). Wastewater discharged to groundwater from residential properties is known to contain PFAS from consumer product usage. In addition, wastewater from commercial properties may contain PFAS from similar products and potential additional PFAS releases associated with commercial practices. Septic system wastewater discharges may modify PFAS signatures as groundwater migrates downgradient from sources. Transformation of specific PFAS compounds may occur when PFAS compounds are provided with an environment conducive to forming other PFAS compounds such as the presence of certain bacteria or oxidizing conditions. The composition of PFAS in groundwater may also change as it migrates downgradient because some PFAS compounds are able to migrate faster and further than other compounds. The potential for PFAS to be redistributed throughout the septic system network through usage of PFAS impacted water distributed throughout the Town of Duxbury from the municipal drinking water supply wells was also considered.

It should be noted that the septic system densities depicted on **Figure 2** are based on information and figures included in Weston & Sampson's (W&S) report titled *PFAS Source and Hydrogeological Investigation,* February 2024 (the "W&S 2024 Report"). A copy of this report is included in **Attachment 1**.

As part of the forensic evaluation, HRP reviewed analytical data from 110 groundwater samples collected by W&S and/or the Duxbury Water Department and analyzed for PFAS. The analytical data was used to create radar charts (a forensic evaluation tool discussed in detail below) documenting the PFAS signatures in the area for comparison to municipal drinking water supply wells. Laboratory reports are included as **Attachment 2** and tabulated analytical data is included in **Attachment 3**.

GEOLOGICAL SETTING

Duxbury is in the New England coastal lowland zone, which was shaped by the Wisconsinan glaciation event that ended approximately 11,000 years ago. **Figure 3** presents a representative geologic cross-section of the Duxbury Municipal Landfill that was presented in the report titled *Hydrogeologic Contaminant Assessment of the Duxbury Landfills*, prepared by IEP, Inc. and dated June 1988 (the "IEP 1988 Report"). A copy of the report is included in **Attachment 4**.

According to the IEP 1988 Report, unconsolidated subsurface soils range between approximately 40 and 200 feet thick overlying granitic bedrock. Unconsolidated geologic materials in the study area consist of glaciofluvial and glaciolacustrine deposits and till. Groundwater is present in these soils below the water table.

- The uppermost overburden unit consists of coarse-grained sand and gravel soils deposited by glacial meltwater and referred to as "stratified drift." This unit ranges in thickness between approximately 40 and 100 feet. Groundwater in the stratified drift unit comprises Duxbury's primary drinking water supply aquifer.
- Finer-grained silt and clay glaciolacustrine soils deposited in lower energy lake-like environments underlie the stratified drift unit in the eastern portion of the study area.
- Beneath the stratified drift or glaciolacustrine soils is an approximately 20-foot-thick mantle of glacial till that directly overlies the granite bedrock. The till unit consists of poorly sorted sand, silt, and gravel and has a low permeability. The bedrock surface topography is relatively flat due to glacial scour.

The unconfined water table is located in the stratified drift aquifer at depths ranging between approximately 20 feet and 50 feet below surface grade (bsg). Groundwater in the study area generally flows eastward at an average velocity between 2 and 3 feet per day. There is a negligible vertical gradient within this unit, but there is a slight upward gradient from the till towards the stratified drift aquifer.

The migration of PFAS in groundwater is slower than the velocity at which groundwater moves through the aquifer. This is because the PFAS compounds interact with the organic carbon present in the saturated soils, thereby slowing, or retarding the rate at which they move in the aquifer. A

site-specific calculation known as the retardation rate is necessary to determine how much slower PFAS analytes will mobilize in groundwater. The calculation of this rate is beyond the scope of this forensic evaluation and as such, is presumed that PFAS will move throughout the aquifer at rates slightly slower than the average groundwater velocity of 730 to 1,095 feet per year.

For general comparative purposes, PFAS released from the landfills following the groundwater flow directions and particle tracks documented in the W&S 2024 Report (**Attachment 1**) could potentially reach the Depot Street Well within 2 to 4.5 years. Alternatively, PFAS released from the Duxbury central fire station could potentially reach the Partridge Road Well within 4 to 6 years.

CONCEPTUAL SITE MODEL

The Conceptual Site Model is a generalized description and interpretation of conditions related to the PFAS Site. The Town of Duxbury utilizes a network of twelve municipal supply wells (**Figure 1**) for its drinking water supply. Each well has its own pump station and chemical feed equipment. Water generally has not required additional treatment, with the exception of iron and manganese removal at the Evergreen Wells. The Partridge Road wells were shut down in 2021 following the detection of elevated PFAS concentrations. The Depot Street Well has been out of service in recent years due to elevated concentrations of iron and manganese. Considering that minimal groundwater treatment is occurring at the municipal supply wells, the PFAS signatures from the raw water and treated water should be similar. A comparison of the raw water vs. treated water from the municipal wells is provided in **Attachment 5** and it confirms there is no significant change in the forensic signatures.

HRP's forensic investigation focused on the potential PFAS impacts on Duxbury's municipal drinking water supply wells from the Duxbury Municipal Landfill and the McNeil Dump. These adjoining landfills are no longer active and based on details included in the IEP 1988 Report, landfill material extends to just above the water table. The Duxbury Municipal Landfill property is currently used as a solid waste transfer station.

A monitoring well network consisting of shallow and deep wells have been installed at each landfill. The IEP 1988 Report also documented a 1,500-foot wide, 20-30-foot-thick plume of landfill-related groundwater impacts that extended eastward to the Depot Street Well. Particle tracking (a form of groundwater modeling that predicts how a particle such as a contaminant would migrate under various scenarios) included in the W&S 2024 Report (**Attachment 1**) show that a hydrogeologic relationship exists between both landfills and the Depot Street municipal drinking supply well under various steady state and transient municipal well pumping scenarios. A steady state system assumes that flow conditions and other properties of the model remain constant over time. A transient model simulates changes over time. It is important to note that under both scenarios, particles [representing groundwater and potentially contaminants] from the landfills are modeled to reach the Depot Street municipal drinking supply.

Other potential PFAS sources that were evaluated in the forensic investigation include potential sources identified by W&S that included the Duxbury central fire station and a potential PFAS commercial source location identified in a North American Industry Classification System (NAICS)

search (**Figure 1**)**.** No groundwater samples have been collected for PFAS analyses from the vicinity of these potential sources. Particle tracking figures in the W&S 2024 Report (**Attachment 1**) show that a hydrogeologic relationship exists between the Duxbury central fire station and the Partridge Road municipal drinking water supply well under various steady state pumping scenarios. In several transient scenarios, the particles pass directly below the municipal supply well. The potential PFAS point source locations identified by W&S in the NAICS search (**Figure 1**) does not appear to have particle tracks that are likely to impact the municipal drinking water supply wells.

Most residences and commercial properties in the Duxbury area utilize septic systems for wastewater treatment. The potential exists for comparatively low "background" groundwater impacts from use of consumer products containing PFAS that end up releasing PFAS to wastewater and septic systems. Historical discharge of PFAS contaminated municipal drinking water that had originated at the Partridge and Depot Street Wells may have been recharged back into the subsurface through septic systems, contributing to background concentrations. PFAS in landscaping products may impact groundwater at levels considered background. PFAS has also been identified in rainwater in Massachusetts. **Figure 2** presents septic system densities in relation to the municipal drinking water supply wells. This figure is based on details presented in the W&S 2024 Report (**Attachment 1**) that shows the relative potential distribution of septic system density in the Duxbury area.

FORENSIC EVALUATION METHOD

HRP was provided with groundwater PFAS analytical results for samples from monitoring wells at the Duxbury Municipal Landfill, the McNeil Dump, and from Duxbury's municipal supply wells (raw water and/or treated water). Monitoring well results comprised one sampling event conducted in 2022, while the municipal supply wells were sampled multiple times from 2021 to 2024. It should be noted that the forensic evaluation is based on an extremely limited set of data (one monitoring event from the landfill) using different PFAS analytical methods and reporting different lists of 18 to 24 PFAS analytes. It is assumed that samplers collecting PFAS samples followed industry accepted protocols such as those documented in the following guidance documents:

- Sampling and Analysis Guidance for PFAS at Disposal Sites Regulated Under the Massachusetts Contingency Plan, prepared by MassDEP, dated November 13, 2023.
- Field Sampling Guidelines for PFAS using U.S. Environmental Protection Agency (EPA) Method 537 or 537.1, prepared by the MassDEP, dated June 2021.

To determine the PFAS signature for each groundwater sample, PFAS data was normalized by summing the laboratory reported concentrations of reported PFAS compounds (18 to 24 PFAS analytes) and dividing each individual reported PFAS compound concentration by the sample total concentrations. This result provides relative proportions, similar to a percentage composition, of each analyte. Plotting the results in radar charts allows for a comparison of PFAS signatures from different locations independent of concentration magnitude. These radar charts only focus on percentages for compounds based on concentration and do not display concentration directly. Concentration was considered separately in this study, mainly to assist with understanding source proximity, assuming higher concentrations indicate a closer source.

For clarification purposes, the following terms are being defined:

- Total PFAS is the sum of all laboratory reported PFAS analytes.
- PFAS6 is the sum of the six PFAS analytes regulated by MassDEP. These six analytes include:
- Perfluorodecanoic acid (PFDA)
- Perfluoroheptanoic acid (PFHpA)
- Perfluorohexanesulfonic acid (PFHxS)
- Perfluorononanoic acid (PFNA)
- Perfluorooctanesulfonic acid (PFOS)
- Perfluorooctanoic acid (PFOA)
- PFAS analytes consistently detected within the Duxbury groundwater and/or municipal drinking water supply samples include PFAS6 plus the following three additional PFAS analytes:
- Perfluorobutanoic acid (PFBA)
- Perfluorohexanoic acid (PFHxA)
- Perfluorobutanesulfonic acid (PFBS)

These nine PFAS analytes are collectively referred to as the "PFAS analytes of interest" and on average, were detected in over 90% of the samples and 98% of the drinking water samples. It should be noted that PFBA was not included in the analysis of the municipal drinking water wells. Therefore, HRP's analysis used eight PFAS compounds, consisting of PFAS6 plus PFHxA and PFBS.

HRP prepared radar charts of the PFAS analytes of interest for each groundwater sample to graphically represent the normalized results (**Attachment 5**) for comparison purposes. The radar charts are like a fingerprint or "signature" that can be used to determine consistency in detections, relative individual PFAS compound contribution, and potential sources. They can also be used to document PFAS compound transformation as PFAS moves through groundwater. Refer to **Figure 2** for a depiction of Total PFAS and PFAS6 detected at each drinking water supply well and **Figure 4** for representative radar charts for each municipal drinking water supply well and the two landfills. Laboratory reports are included in **Attachment 2** and tabulated analytical data is included in **Attachment 3**.

HRP used a conceptual hydrogeologic approach to interpret the radar charts. PFAS signatures from each supply well were compared to monitoring well data from the landfills (**Attachment 5** and **Figure 4**). Consideration was made for each municipal drinking water supply well's relative location to the landfills and areas of high septic system density (**Figure 2**), based on known groundwater flow directions and modeled particle tracks (W&S 2024 Report, **Attachment 1**). Based on these parameters, the municipal drinking water supply wells identified in the table below

have been identified as containing known source levels of PFAS or representing background levels of PFAS. Background levels of PFAS are defined as PFAS relating to septic system discharges that include consumer products and may have discharged drinking water containing source levels of PFAS introduced into the water supply system. Background may also include other non-point sources of PFAS such as products used in landscaping. PFAS source levels are defined as PFAS resulting from a release of hazardous materials. Examples of a releases include but are not limited to:

- Discharge of landfill leachate containing PFAS into the groundwater.
- Application of aqueous film forming foam (AFFF) containing PFAS for fire extinguishing/training purposes.
- Emissions from commercial/industrial processes or operations that use PFAS that are introduced into the subsurface.

Municipal Well Location	Background Level Location	Source Well Location	Highest PFAS6 Detection (ng/L)	Hydrogeological Relationship to Landfill	Hydrogeological Relationship to Fire Department
Depot Street	No	Yes	14.95	Down-Gradient	Down-Gradient
Partridge Road	No	Yes	105.21	Down-Gradient	Down-Gradient
Lake Shore Drive	Yes	No	10.19	Upgradient	Upgradient
Evergreen Street	Yes	No	5.31	Upgradient	Upgradient
Damon Street	Yes	No	9.75	Cross-Gradient	Cross-Gradient
Millbrook Pond	Yes	No	9.41	Cross-Gradient	Cross-Gradient
Mayflower Street	Yes	No	9.09	Cross-Gradient	Cross-Gradient
Tremont Street	Yes	No	3.81	Cross-Gradient	Cross-Gradient

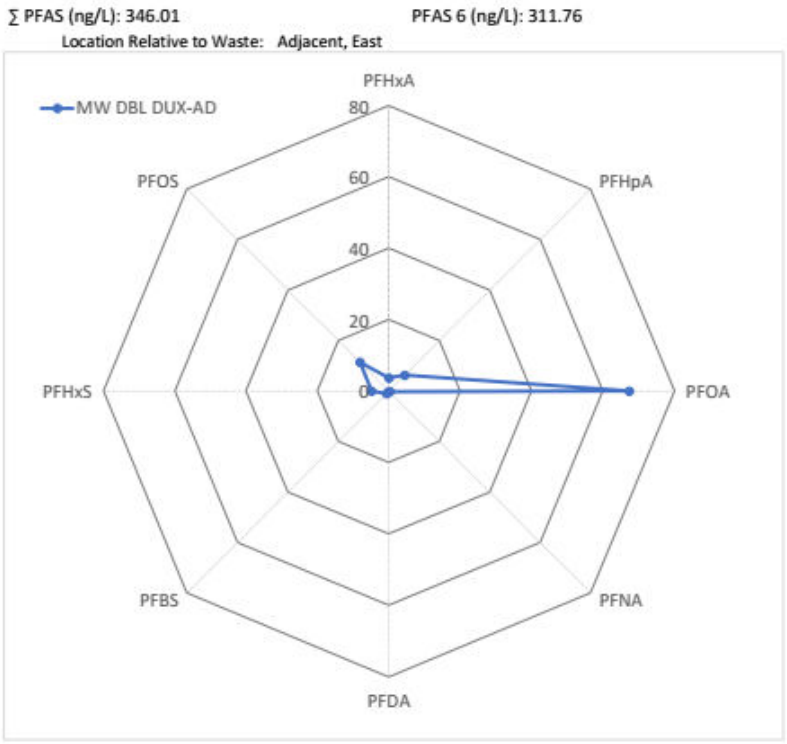
The results of the forensic investigation are presented below.

FORENSIC EVALUATION RESULTS

Duxbury Municipal Landfill

The monitoring well network at the Duxbury Municipal Landfill (**Figure 1**) includes shallow and deep monitoring wells located downgradient or in the vicinity of the landfill area. The highest Total PFAS concentration included in the entire analytical data set was reported at deep monitoring well DUX-AD located directly downgradient of the landfill, with a Total PFAS concentration of 346.01 nanograms per liter (ng/L) and PFAS6 of 311.76 ng/L. This monitoring well is screened at a similar elevation to the Depot Street municipal drinking water well (**Figure 3**). It should be noted that the landfill has several PFAS signatures within and upgradient to it. As these various signatures converge downgradient of the landfill, they create a new more distinct

signature. Monitoring well DUX-AD is representative of this combined signature and is representative of the landfill. The radar chart is indicated below.



Radar Chart MW DBL Dux-AD (July 15, 2024) Municipal Landfill

Relative PFAS percentage ranges, Total PFAS and PFAS6 for groundwater in the vicinity of the Duxbury Municipal Landfill in the deep wells are as follows:

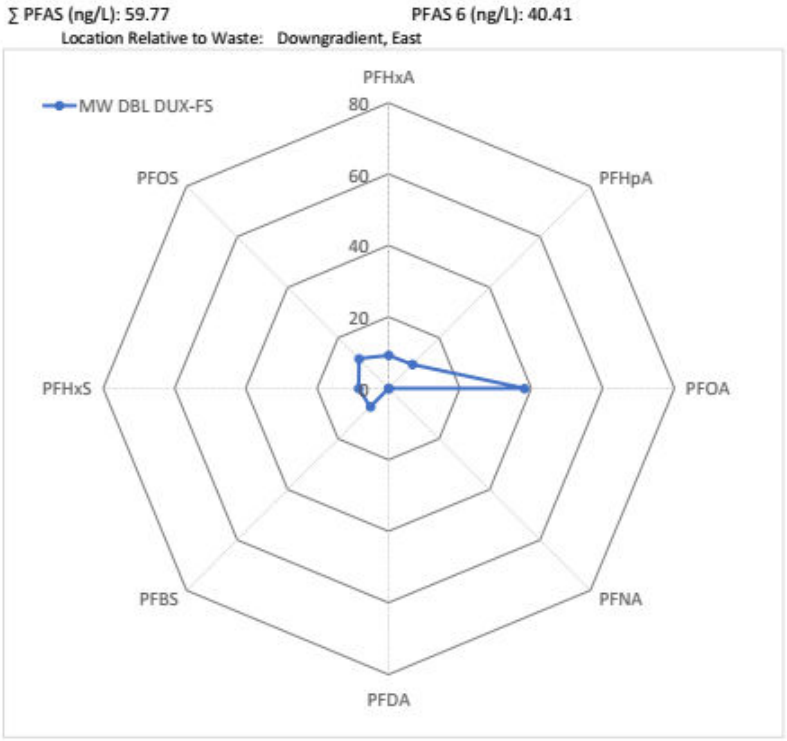
PFBA = 0 to 8%	PFNA = 0%	PFOS = 0 to 19%
PFHxA = 4 to 13%	PFDA = 0%	Total PFAS = 41 to 346 ng/L
PFHpA = 6 to 13%	PFBS = 0 to 5%	PFAS6 = 27 to 312 ng/L
PFOA = 36 to 67%	PFHxS = 5 to 8%	Percent of Detections = 78 to 95%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the Duxbury Municipal Landfill in the shallow wells are as follows:

PFBA = 0 to 12%	PFNA = 0 to 1%	PFOS = 0 to 18%
PFHxA = 0 to 17%	PFDA = 0%	Total PFAS = 3 to 127 ng/L
PFHpA = 0 to 10%	PFBS = 0 to 7%	PFAS6 = 0 to 69 ng/L
PFOA = 0 to 53%	PFHxS = 0 to 8%	Percent of Detections = 89%

The most notable feature in the PFAS analytical results for groundwater samples from the Duxbury Landfill monitoring wells is the prevalence of PFOA. An example of the radar chart from

a shallow monitoring well located directly downgradient of landfill is below. Refer to **Figure 4** for a distribution of radar charts in relationship to the sampling location.



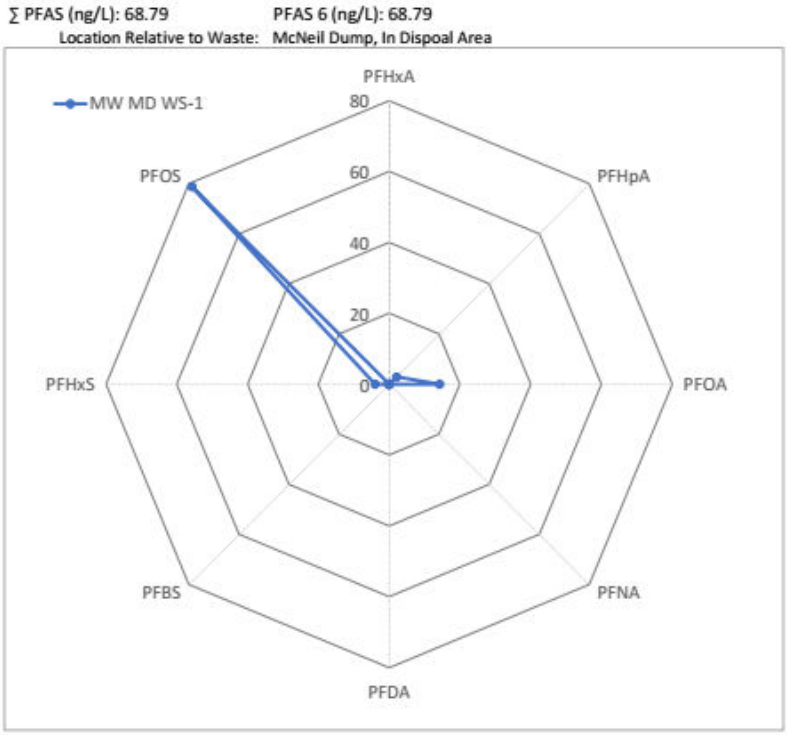
Radar Chart MW DBL Dux-FS (July 14, 2022) Municipal Landfill

McNeil Dump

The monitoring well network at the McNeil Dump (**Figure 1**) includes monitoring wells located within and downgradient of the landfill area. The most notable feature in the PFAS analytical results for groundwater samples from the McNeil Dump monitoring wells is the prevalence of PFOS. A maximum Total PFAS concentration for the McNeil Dump was observed at monitoring well WS-1, with a Total PFAS and PFAS6 concentration of 68.79 ng/L. Relative PFAS percentage ranges, Total PFAS and PFAS6 for the McNeil Dump are as follows:

PFBA = 0%	PFNA = 0%	PFOS = 0 to 100%
PFHxA = 0%	PFDA = 0%	Total PFAS = 0 to 69 ng/L
PFHpA = 0 to 3%	PFBS = 0%	PFAS6 = 0 to 69 ng/L
PFOA = 0 to 14%	PFHxS = 0 to 4%	Percent of Detections = 100%

The radar chart for this well is indicated below.



Radar Chart MW MD WS-1 (July 13, 2024) McNeil Dump

The dominance of PFOS at the McNeil dump could be related to the application of legacy formulations of AFFF, which utilized PFOS as an active ingredient during the time that the landfill was active (1940s until 1970s, IEP 1988 Report, **Attachment 4**). According to the W&S 2024 Report, the Duxbury Fire Department extinguished multiple fires at the McNeil Dump using "wet water", a potential PFAS containing firefighting foam. According to the Interstate Technology Regulatory Counsil (ITRC), some legacy firefighting foams (1960s until 1973) were predominantly PFOS based and were sold by 3M under the name "Light Water". It is unclear if the "Wet Water" used by the fire department at the McNeil Dump fires were a legacy AFFF consistent with "Light Water.

Depot Street Municipal Drinking Water Well

The Depot Street municipal drinking water supply well is located approximately 2,500 feet downgradient of the landfills (**Figure 1**). As indicated in the W&S 2024 Report, modeled particle tracks using various steady state and transient conditions indicate a hydraulic connection between the Depot Street Well and the two landfills (**Attachment 1**). A maximum Total PFAS concentration of 15.71 ng/L and a PFAS6 concentration of 14.95 ng/L was observed in April 2021.

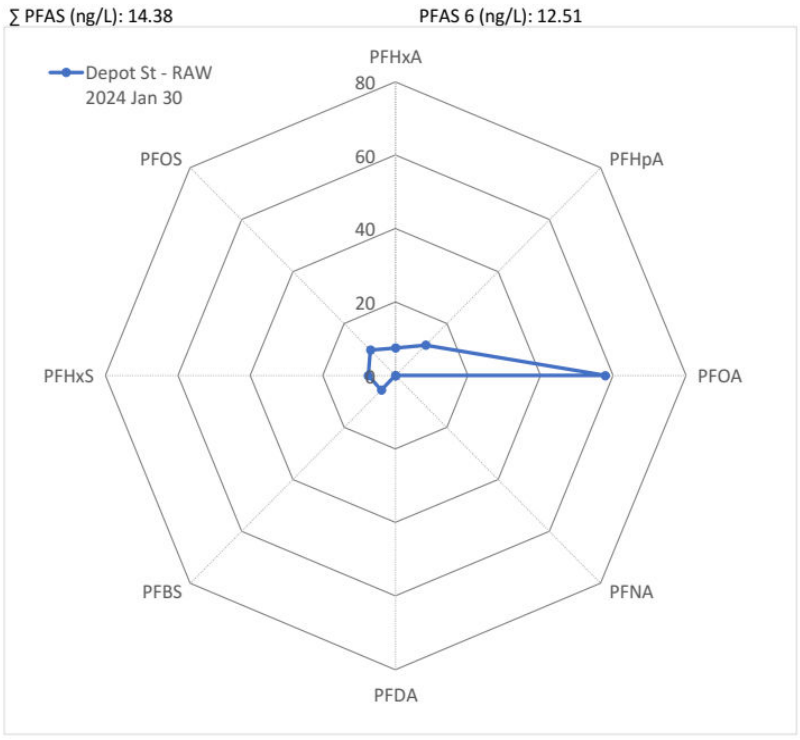
Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 9 to 15%
PFHxA = 0 to 12%	PFDA = 0%	Total PFAS = 8 to 16 ng/L
PFHpA = 10 to 13%	PFBS = 0 to 6%	PFAS6 = 8 to 13 ng/L
PFOA = 53 to 66%	PFHxS = 7 to 9%	Percent of Detections = 100%

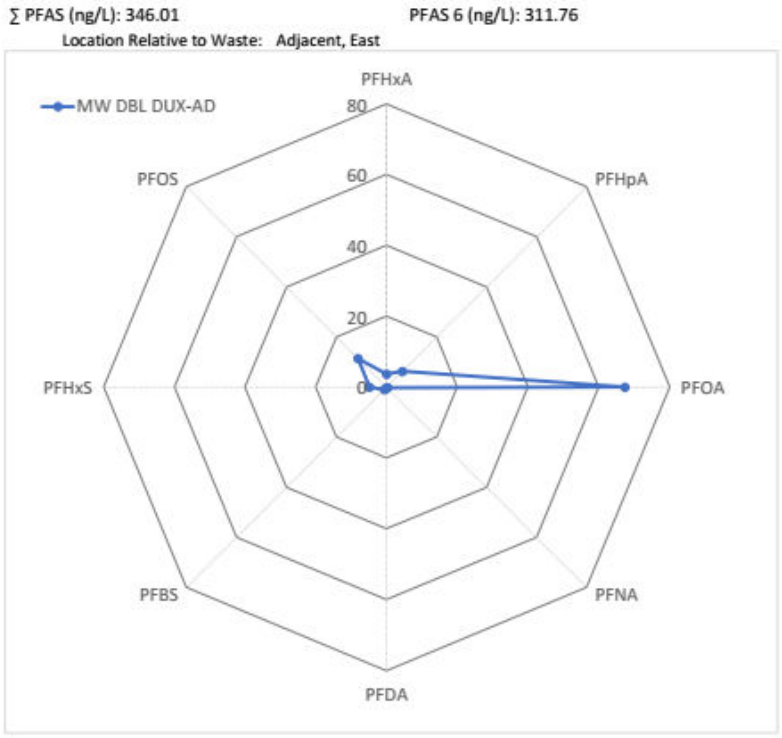
Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 9 to 52%
PFHxA = 0 to 19%	PFDA = 0%	Total PFAS = 2 to 18 ng/L
PFHpA = 0 to 12%	PFBS = 0 to 10%	PFAS6 = 2 to 15 ng/L
PFOA = 16 to 56%	PFHxS = 0 to 27%	Percent of Detections = 73 to 100%

A representative fingerprint for the Depot Street Well is presented below along with two representative radar charts from the Duxbury Municipal Landfill for comparison on the next page.



Radar Chart Depot St – RAW (January 30, 2024) Depot Street Well



Radar Chart MW DBL Dux-AD (July 15, 2022) Municipal Landfill



Radar Chart MW DBL Dux-FS (July 14, 2022) Municipal Landfill

The similarities between these Radar Charts suggest that the Duxbury Municipal Landfill is likely impacting the Depot Street municipal drinking water supply well.

Partridge Road Municipal Drinking Water Well

The Partridge Road municipal supply well is located approximately 4,500 feet downgradient of the landfills and the Duxbury Fire Department central fire station, located at 668 Tremont Street. (**Figure 1**). According to W&S it is also located downgradient of a potential carpet cleaning service PFAS source and an area of high septic system density (**Figure 2**). As indicated in the W&S 2024 Report, modeled particle tracks using various steady state conditions indicate a hydraulic connection between the Patridge Road municipal drinking water supply well area and the upgradient central fire station (**Attachment 1**). The McNeil Dump also shows particle tracks to the Partridge Road area under select steady state conditions and transient models show particles (**Attachment 1**). The carpet cleaning site does not show a connection in any of the particle track models. There are numerous residential properties and commercial properties with septic systems located between the central fire station/McNeil Dump area and the Partridge Well.

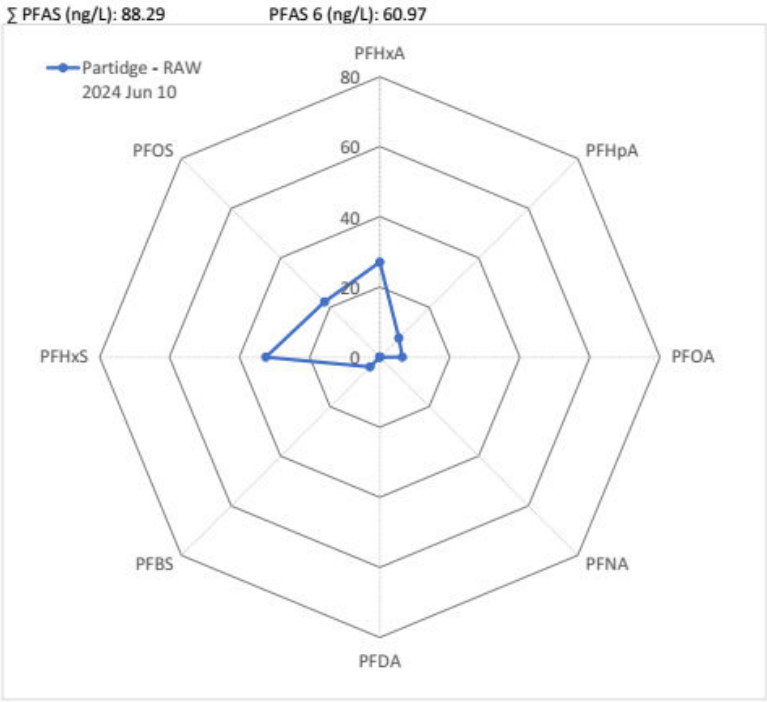
A maximum Total PFAS concentration of 145.3 ng/L and PFAS6 of 105.21 ng/L was observed in finished water (treated) in June 2021. This well was removed from service following the detection of PFAS compounds in excess of MassDEP drinking water standards; however, sampling has continued since. Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from the well is as follows:

PFBA = N/A	PFNA = 0%	PFOS = 20 to 24%
PFHxA = 17 to 25%	PFDA = 0%	Total PFAS = 8 to 145 ng/L
PFHpA = 6 to 7%	PFBS = 5 to 13%	PFAS6 = 6 to 105 ng/L
PFOA = 7 to 29%	PFHxS = 10 to 39%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from the wells is as follows:

PFBA = N/A	PFNA = 0%	PFOS = 20 to 26%
PFHxA = 21 to 28%	PFDA = 0%	Total PFAS = 88 to 138 ng/L
PFHpA = 6 to 9%	PFBS = 3 to 5%	PFAS6 = 61 to 101 ng/L
PFOA = 6 to 7%	PFHxS = 29 to 37%	Percent of Detections = 100%

A representative fingerprint for the Partridge Road well is presented below.



Radar Chart Partridge – RAW (June 10, 2024) Partridge Road Well

The detections at the Partridge Road municipal supply well are not consistent with the signature associated with the Duxbury Municipal Landfill. The most notable feature in the PFAS analytical results for groundwater samples from the Partridge Well is the prevalence of PFHxS and that the concentration of PFAS compounds is higher at this location compared to all other municipal wells. PFHxS is a PFAS commonly found in legacy AFFF used for firefighting and in waterproofing for clothing and other purposes. The elevated PFAS detections suggest a release of PFAS source closer to the well or a combination of closer sources and impacts emanating from the McNeil Landfill/central fire station area. Additional investigation of groundwater in the vicinity of the well and upgradient, including in the vicinity of Depot Street and Halls Corner and near the central fire station, would be necessary to identify sources of PFAS at the well.

Tremont Street Municipal Drinking Supply Wells

The Tremont Street municipal drinking water supply wells are located approximately 3,000 feet cross-gradient of the landfills and outside the particle track area documented in the W&S 2024 Report (**Attachment 1**). As indicated on **Figure 2**, they are located downgradient of an area of low septic system density. A maximum Total PFAS concentration of 5.51 ng/L was observed in October 2023 and a maximum PFAS6 concentration of 3.81 ng/L was observed in January 2024.

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from Wells 1 and 2 are as follows:

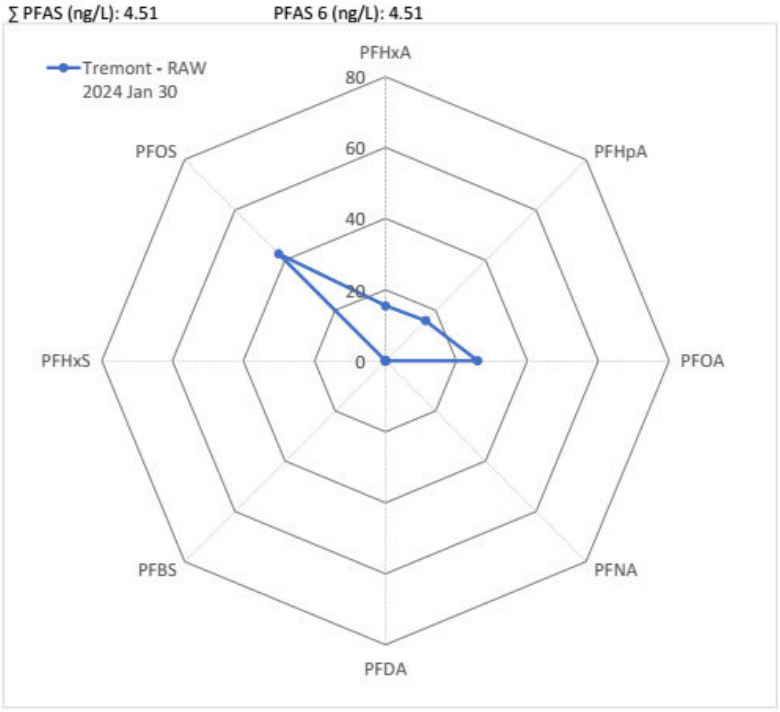
PFBA = N/A	PFNA = 0%	PFOS = 31 to 70%
PFHxA = 0 to 25%	PFDA = 0%	Total PFAS = 3 to 6 ng/L
PFHpA = 0 to 16%	PFBS = 0%	PFAS6 = 2 to 4 ng/L
PFOA = 23 to 41%	PFHxS = 0%	Percent of Detections = 85 to 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 30 to 60%
PFHxA = 0 to 20%	PFDA = 0%	Total PFAS = 1 to 4 ng/L
PFHpA = 0 to 19%	PFBS = 0%	PFAS6 = 1 to 4 ng/L
PFOA = 31 to 50%	PFHxS = 0%	Percent of Detections = 100%

Note that the fluctuations in relative PFAS percentages at this location are likely because of concentrations near the laboratory reporting limits rather than actual significant changes in the groundwater chemistry. Since the overall concentration is low a small change in concentrations of any compound may significantly affect the plot.

A fingerprint for the Tremont Street Well is presented below.



Radar Chart Tremont – RAW (January 30, 2024) Tremont Street Well

The detection in this municipal drinking water supply well is presumed to be representative of background conditions in the area.

Evergreen Street Municipal Drinking Water Supply Wells

These supply wells are located approximately 1,500 feet upgradient of the Duxbury Municipal Landfill and McNeil Dump (**Figure 1**). Areas upgradient of this location have a low density of septic systems as indicated on **Figure 2**. A maximum Total PFAS concentration of 7.79 ng/L was observed in October 2023 and the maximum PFAS6 concentration of 5.31 ng/L in January 2024.

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 16 to 31%
PFHxA = 14 to 21%	PFDA = 0%	Total PFAS = 5 to 7 ng/L
PFHpA = 0 to 12%	PFBS = 12 to 15%	PFAS6 = 4 to 5 ng/L
PFOA = 29 to 35%	PFHxS = 10 to 14%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 16 to 30%
PFHxA = 17 to 23%	PFDA = 0%	Total PFAS = 3 to 7 ng/L
PFHpA = 0 to 13%	PFBS = 0 to 12%	PFAS6 = 2 to 5 ng/L
PFOA = 32 to 49%	PFHxS = 0 to 13%	Percent of Detections = 100%

Note that the fluctuations in relative PFAS percentages at this location are likely because of concentrations near the laboratory reporting limit rather than actual significant changes in the groundwater chemistry. A representative fingerprint for the Evergreen Street Well is presented below.



Radar Chart Evergreen – RAW (January 30, 2024) Evergreen Street Well

The detections in this municipal drinking water supply well are presumed to be representative of background conditions in the area.

Lake Shore Drive Supply Well

This municipal drinking water supply well is located approximately 2 miles upgradient of the landfills (**Figure 1**) and is situated in an area with moderate septic system density as indicated on **Figure 2**. A maximum Total PFAS concentration of 15.99 ng/L and a PFAS6 concentration of 10.19 ng/L was observed in January 2024. Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from the well is as follows:

PFBA = N/A	PFNA = 0%	PFOS = 16 to 20%
PFHxA = 15 to 18%	PFDA = 0%	Total PFAS = 13 to 16 ng/L
PFHpA = 8 to 11%	PFBS = 14 to 21%	PFAS6 = 9 to 10 ng/L
PFOA = 31 to 33%	PFHxS = 6 to 8%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from the well is as follows:

PFBA = N/A	PFNA = 0%	PFOS = 18 to 21%
PFHxA = 14 to 16%	PFDA = 0%	Total PFAS = 8 to 13 ng/L
PFHpA = 8 to 10%	PFBS = 13 to 18%	PFAS6 = 6 to 9 ng/L
PFOA = 31 to 33%	PFHxS = 9 to 10%	Percent of Detections = 100%

A representative fingerprint for the Lake Shore Drive Well is presented below.



Radar Chart Lakeshore – RAW (June 10, 2024) Lakeshore Well

The detections in this municipal drinking water supply well are presumed to be representative of background conditions in the area. Testing the concentration of PFAS in the adjacent surface water may aid in understanding PFAS concentrations at the well.

Mayflower Street Municipal Drinking Water Wells

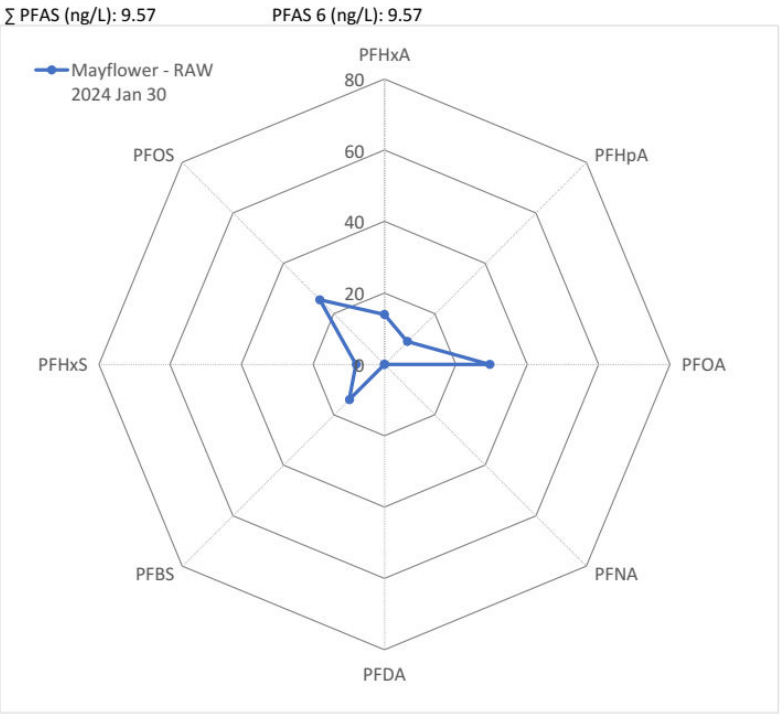
These municipal drinking water supply wells are located approximately 4,000 feet upgradient to cross-gradient of the landfills (**Figure 1**) and are situated within an area of low septic system density (**Figure 2**); however, they are downgradient of an area with moderate septic system density (**Figure 2**). A maximum Total PFAS concentration of 13.19 ng/L and PFAS6 concentration of 9.09 ng/L was observed in October 2023. Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 23 to 31%
PFHxA = 14 to 19%	PFDA = 0%	Total PFAS = 8 to 13 ng/L
PFHpA = 0 to 9%	PFBS = 12 to 16%	PFAS6 = 5 to 9 ng/L
PFOA = 29 to 33%	PFHxS = 7 to 8%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 23 to 28%
PFHxA = 14 to 16%	PFDA = 0%	Total PFAS = 5 to 8 ng/L
PFHpA = 0 to 9%	PFBS = 14 to 18%	PFAS6 = 4 to 6 ng/L
PFOA = 28 to 37%	PFHxS = 0 to 12%	Percent of Detections = 100%

A representative fingerprint for the Mayflower Street Well is presented below.



Radar Chart Mayflower – RAW (January 30, 2024) Mayflower Street Well

The detections in this municipal drinking water supply well are presumed to be representative of background conditions in the area.

Damon Street and Millbrook Pond Municipal Drinking Water Supply Wells

These municipal drinking water supply wells are located approximately 1 mile north of the landfills (**Figure 1**) and are situated cross-gradient in regional groundwater flow patterns (**Figure 2**). They have been grouped together due to their hydrogeological relationship in relation to the other wells and the similarity of the PFAS fingerprints. These wells are in an area of low to moderate septic system density (**Figure 2**). A maximum Total PFAS concentration of 16.07 ng/L was observed in the Damon Street Well in October 2023, while a maximum Total PFAS concentration for the Millbrook Pond Well of 13.99 ng/L was observed in January 2024.

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from Damon Street Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 17 to 20%
PFHxA = 24 to 27%	PFDA = 0%	Total PFAS = 12 to 16 ng/L
PFHpA = 7 to 9%	PFBS = 12 to 13%	PFAS6 = 8 to 10 ng/L
PFOA = 27 to 29%	PFHxS = 7 to 8%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from Damon Street Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 16 to 21%
PFHxA = 17 to 36%	PFDA = 0%	Total PFAS = 11 to 16 ng/L
PFHpA = 7 to 8%	PFBS = 10 to 14%	PFAS6 = 8 to 9 ng/L
PFOA = 25 to 32%	PFHxS = 7 to 11%	Percent of Detections = 100%

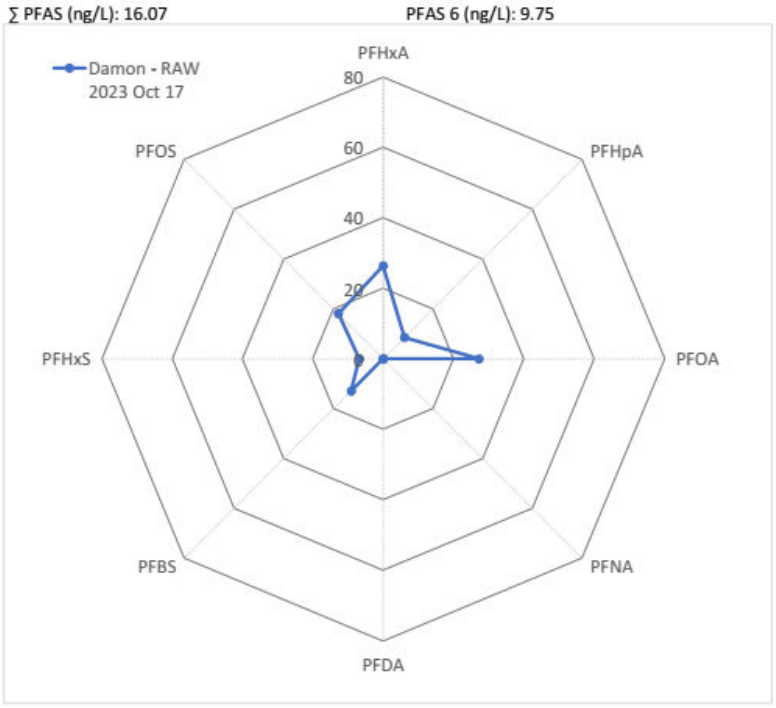
Relative PFAS percentage ranges, Total PFAS and PFAS6 for the untreated water from Millbrook Pond Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 17 to 29%
PFHxA = 13 to 21%	PFDA = 0%	Total PFAS = 11 to 14 ng/L
PFHpA = 7 to 11%	PFBS = 12 to 16%	PFAS6 = 7 to 9 ng/L
PFOA = 28 to 33%	PFHxS = 6 to 7%	Percent of Detections = 100%

Relative PFAS percentage ranges, Total PFAS and PFAS6 for the treated water from Millbrook Pond Wells 1 and 2 are as follows:

PFBA = N/A	PFNA = 0%	PFOS = 17 to 21%
PFHxA = 19 to 21%	PFDA = 0%	Total PFAS = 10 to 14 ng/L
PFHpA = 7 to 10%	PFBS = 12 to 14%	PFAS6 = 7 to 9 ng/L
PFOA = 31 to 33%	PFHxS = 7 to 8%	Percent of Detections = 100%

A representative fingerprint for the Damon Street and Millbrook Pond Well is presented below.



Radar Chart Damon – RAW (October 17, 2023) Damon Street Well



Radar Chart Millbrook – RAW (June 10, 2024) Millbrook Well

The detections in these municipal drinking water supply well are presumed to be representative of background conditions in the area.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This forensic evaluation is based on a limited data set. Potential PFAS sources in the vicinity and upgradient of the municipal drinking water supply wells have not been adequately investigated. The opinions expressed below are subject to change when additional data becomes available.

Based on the data and evaluation presented in the preceding text and the attachments to this report, HRP draws the following primary conclusions.

- PFAS observed at the Depot Street municipal drinking water supply well appears to have mainly originated from PFAS released to groundwater from the Duxbury Landfill. This finding is based on multiple lines of evidence including concentration, the similarity of the PFAS signatures, the dominance of PFOA in both samples, and the modeling particle tracks that establish a tight hydrogeologic connection between the landfill and the Depot Street supply well.
- PFAS signatures observed at the Partridge Road municipal drinking water supply well are different than the PFAS observed in the Depot Street municipal drinking water supply well and the landfills. The PFAS detected in the Partridge Road Well contains relatively proportionate values of PFHxS, PFOS, and PFHxA with a lower percentage of PFOA. It is possible that undocumented release(s) of PFAS have occurred within the particle track path from the central fire station/McNeil Dump area and the Partridge Road municipal drinking water supply well. The overall high concentration of PFAS suggests a source close to the well or high historical concentrations from a distant upgradient source. It is possible that the lower percentage of PFOA detections are related to PFAS from the McNeil dump traveling towards the Partridge Road municipal drinking water supply well under certain circumstances. No groundwater monitoring results are available for the upgradient central fire station or other potential sources near Halls Corner and commercial development on Depot Street.
- PFAS signatures in groundwater samples obtained from the other ten municipal water supply wells appear to reflect comparatively low background concentrations of PFAS, likely associated with domestic wastewater and other "background" sources of PFAS in groundwater. These background concentrations are significant with respect to potential public health impact.

Recommendations

As indicated above, this forensic analysis is based upon limited analytical data. Two different PFAS analytical methods were utilized and only one round of groundwater testing has been completed at the landfills. Additional investigation of sources and the extent of PFAS in groundwater is necessary to confirm sources and understand potential future impacts to the water supply system.

No testing has been completed in proximity to the central fire station or other potential PFAS sources as indicated on **Figure 1**. An assessment of current and past management of legacy AFFF and more recent firefighting foams has not been completed for the Duxbury central fire station. Current practices at the municipal landfill transfer station including waste material handling, storage, and storm-water management have not been assessed to determine the impact of current practices on groundwater PFAS concentrations. To further refine the conceptual site model and strengthen the forensic investigation, HRP recommends the following:

- Targeted installation of monitoring wells to assess groundwater quality in the vicinity and down-gradient of the central fire station and assessment of foam management and training operations at the facility. Groundwater samples should be collected for PFAS by EPA Method 1633.
- Targeted installation of monitoring wells within right-of ways including Depot Street and Partridge Road to assess groundwater quality from potential undocumented releases of PFAS. Sampling surface water streams and wetlands in this area may be useful and reduce well installation costs. Groundwater and surface water samples should be collected for PFAS by EPA Method 1633.
- Collection of additional groundwater samples from both landfills. Groundwater samples should be collected for PFAS by EPA Method 1633.
- When sufficient data from all potential source and receptor locations (e.g., the landfills and water supply wells) are available, a statistical analysis should be completed to estimate the confidence ranges of the conclusions.
- Collection of stormwater at the transfer station to assess the impact of current practices on groundwater PFAS concentrations. Stormwater samples should be collected for PFAS by EPA Method 1633.
- Analysis of select samples for PFAS Signature®, a method developed by Battelle to aid in identifying the source of PFAS in mixed source plumes. This method uses a combination of high-resolution mass spectrometry techniques in combination with PFAS targeted analysis and machine learning for evaluation of 495 PFAS analytes. Results of this analysis are used as additional lines of evidence to link and identify PFAS sources.
- Continued analysis of the municipal drinking water supply wells for PFAS by EPA Method 537.1 for regulatory compliance with split samples being analyzed for PFAS by EPA Method 1633.

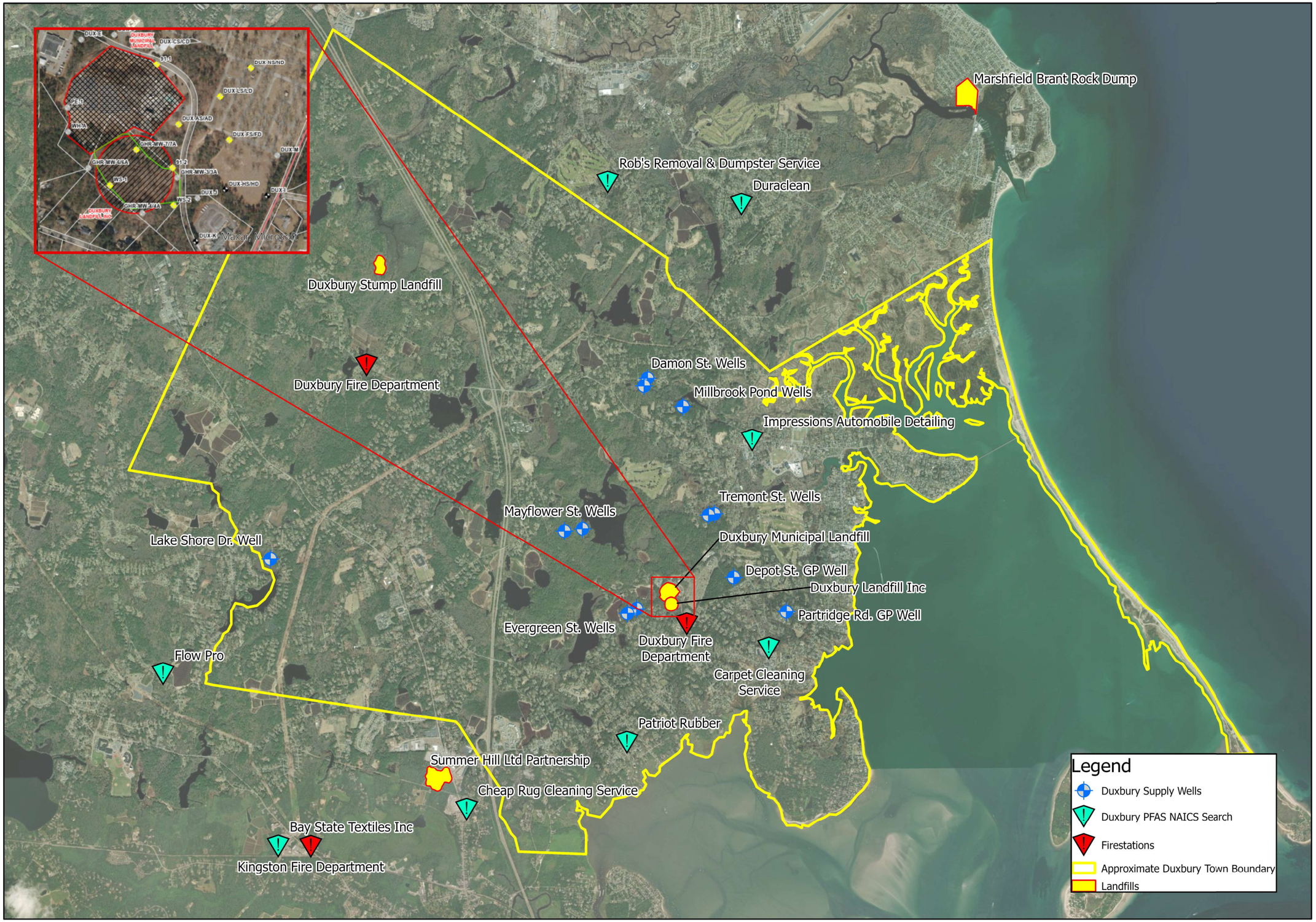
If you have any questions or require additional information, please feel free to contact us at (781) 243-1527.

Sincerely,
HRP Associates, Inc.

Bryan Massa, LSP
Principal and Regional Manager

Attachments:
Figure 1 – Supply Well Locations and Potential PFAS Sources
Figure 2 – Cross-Section A-A'
Figure 3 – Septic Density and Total PFAS
Figure 4 – Maximum Total PFAS Concentrations
Attachment 1 – W&S 2024 Report
Attachment 2 – Laboratory Reports
Attachment 3 – Tabulated Analytical Data
Attachment 4 – IEP 1988 Report
Attachment 5 – Radar charts

FIGURES



NOTES: PFAS is defined as per- and polyfluoroalkyl substances.
NAICS - North American Industry Classification System.

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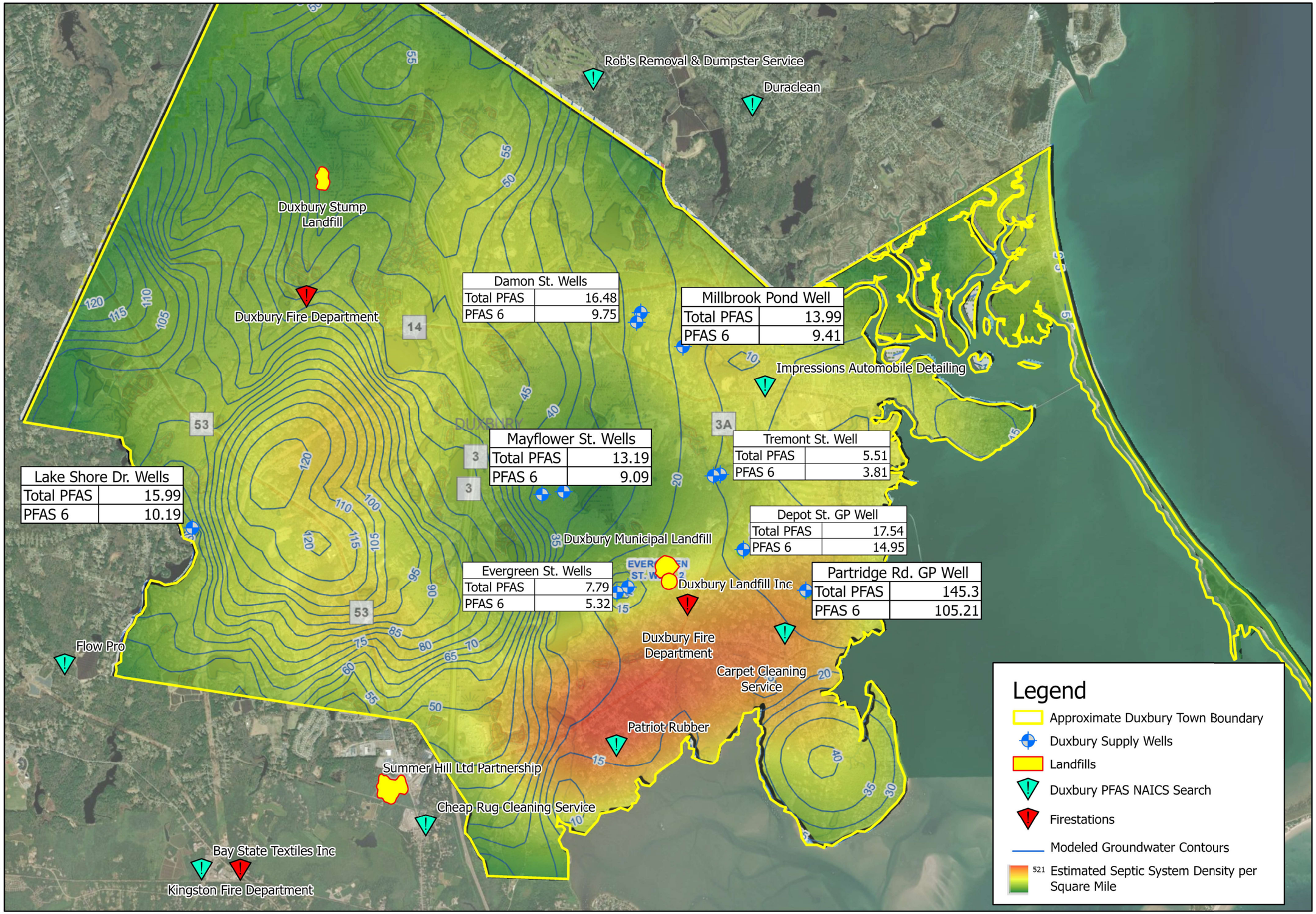
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Site Plan
PFAS Forensic Evaluation
Duxbury Massachusetts

FIGURE NO.
1

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NOTE: Modeled groundwater contours are presented in 5 foot increments (Weston & Sampson, 2024).
PFAS, defined as per- and polyfluoroalkyl substances, presented in nanograms per liter (ng/L). Total PFAS = Sum of all Laboratory Reported PFAS analytes. PFAS6 = Sum of the Six PFAS analytes regulated by MassDEP.

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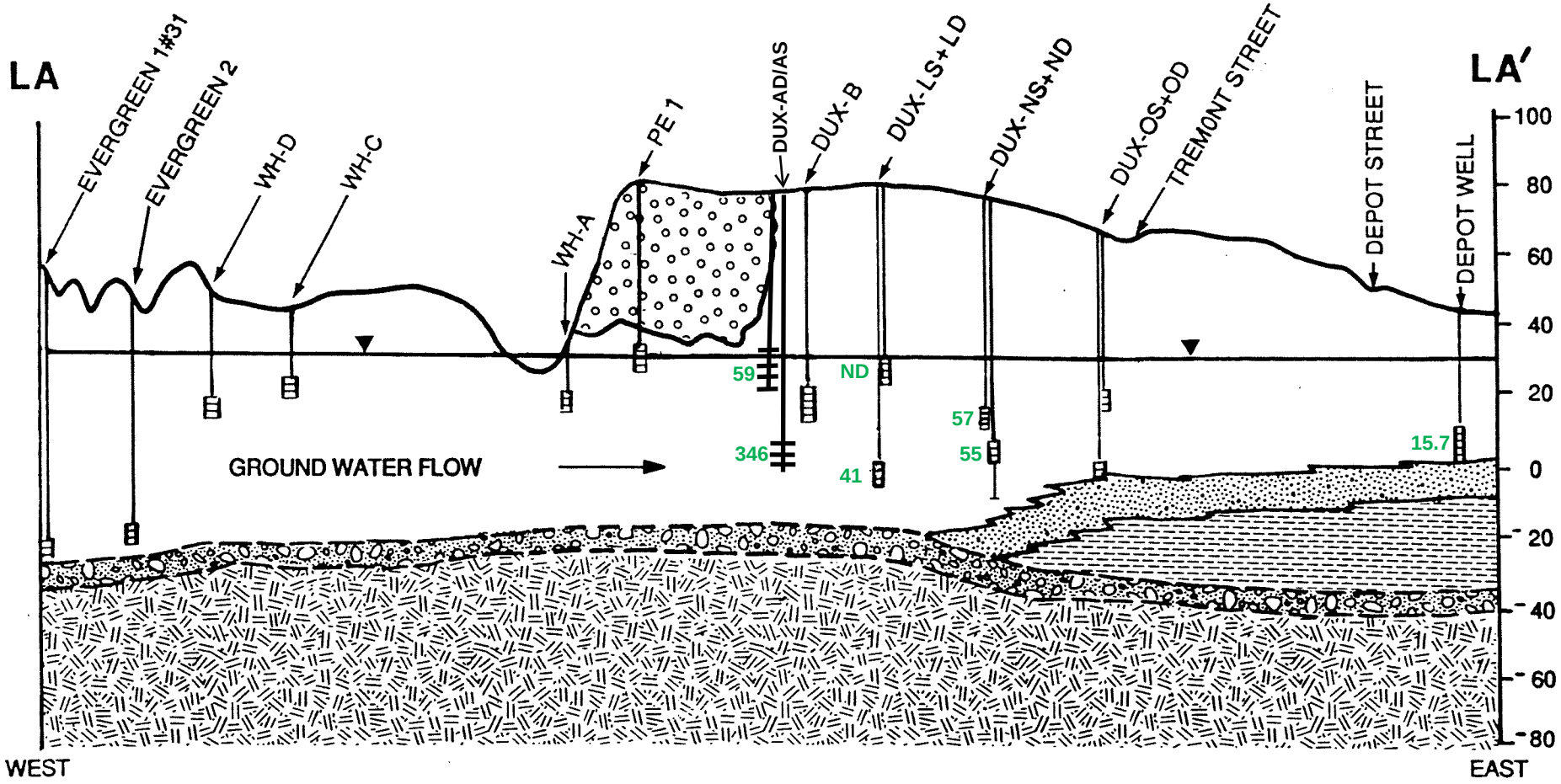
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Septic System Density and Maximum PFAS Detections

PFAS Forensic Evaluation
Duxbury Massachusetts

FIGURE NO.
2

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HYDROGEOLOGIC CROSS- SECTION

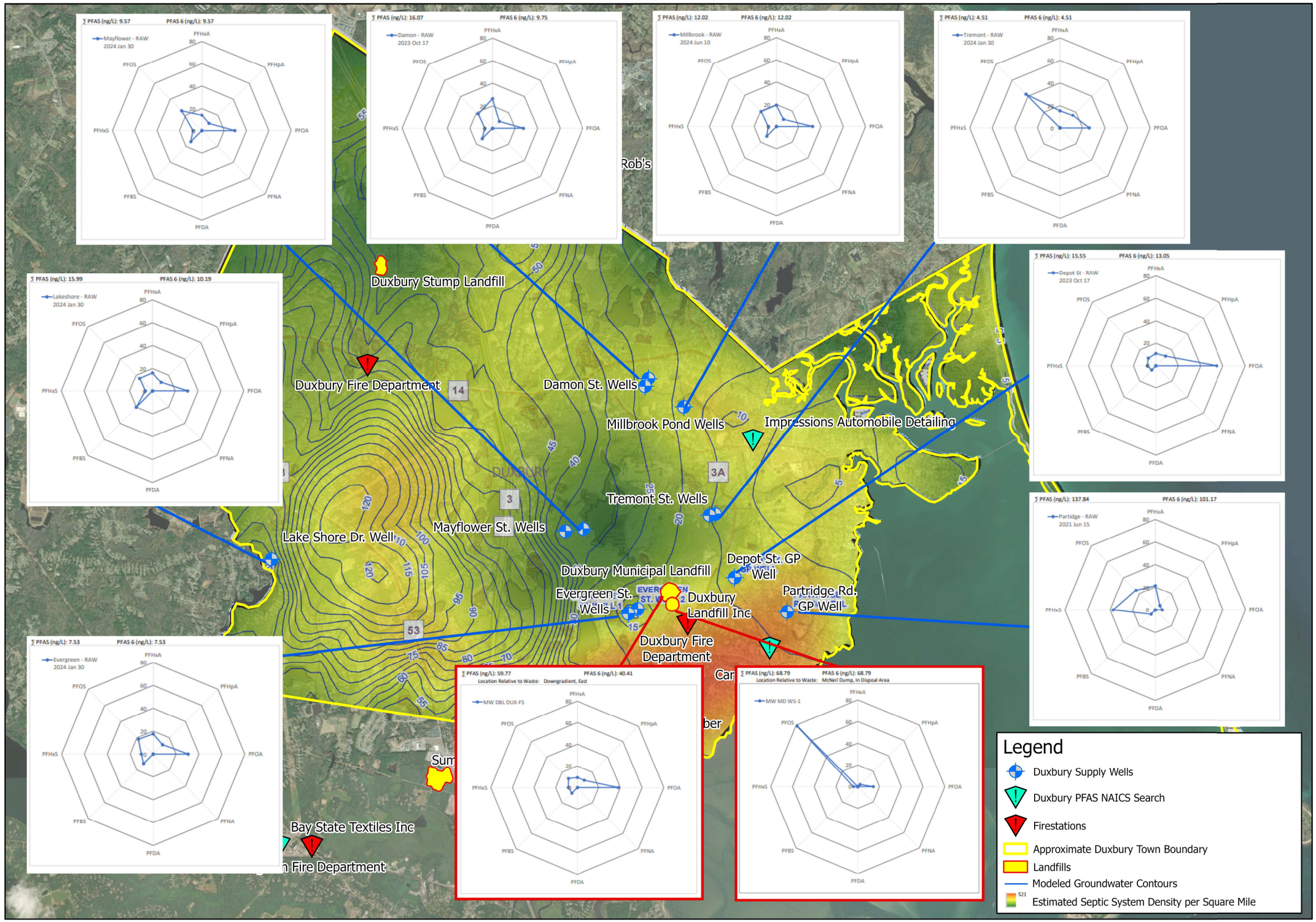
LEGEND

STRATIFIED DRIFT
TILL
REFUSE
GLACIOLACUSTRINE
BEDROCK
34 Total PFAS (ng/L)

SCALE IN FEET

0 600 1200

IEP inc.



NOTES: Modeled groundwater contours are presented in 5 foot increments (Weston & Sampson, 2024). PFAS is defined as per- and polyfluoroalkyl substances.
NAICS - North American Industry Classification System.

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JIC	JIC	SLM

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Radar Plots

PFAS Forensic Evaluation
Duxbury Massachusetts

FIGURE NO.

4

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ATTACHMENT 1
W&S 2024 Report

Weston & Sampson

westonandsampson.com

WESTON & SAMPSON ENGINEERS, INC.
100 Foxborough Boulevard, Suite 250
Foxborough, MA 02035
tel: 508.698.3034

REPORT

FEBRUARY 2024

TOWN OF
Duxbury
MASSACHUSETTS

PFAS Source and Hydrogeological Investigation

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1.0 INTRODUCTION

The Town of Duxbury (Town) contracted Weston & Sampson to provide hydrogeologic services in connection with broadening the understanding of the source(s), distribution in the surficial (unconsolidated deposits) aquifer, and fate of per- and polyfluoroalkyl substances (PFAS) identified in the groundwater pumped from four of the Town's drinking water supply wells. Specifically, Weston & Sampson was tasked with improving the current cursory understanding of the horizontal and vertical extent of PFAS in the sand and gravel aquifer supporting the Depot Street (4082000-03G), Partridge Road (4082000-02G), and Evergreen Street (PWS ID:4082000-07G and 4082000-08G) drinking water supply wells (Figure 1). The groundwater samples collected thus far to support this assessment are primarily limited to the shallow aquifer in the area(s) around the Duxbury Municipal Landfill and McNeil Dump sites (Figure 2). Currently, there are a limited number of monitoring wells screened at elevations consistent with that of the landfill base and slightly below the landfill base. With the current information and data limitations in mind, Weston & Sampson completed a preliminary assessment of reported PFAS distributions and hydrogeologic characteristics of the local aquifer system to: 1) Identify potential sources of PFAS detected at the respective Town wells; and 2) conduct numerical groundwater modeling simulations for developing capture zone delineations for the respective Town wells. The results of the assessment are summarized in the sections below.

1.1 PFAS Background and Regulations

PFAS compounds belong to a group of chemicals that have been used in the manufacture of stain-resistant, water-resistant, and non-stick products. Well-known products that may contain PFAS are certain types of firefighting foam, specifically Aqueous Film Forming Foam (AFFF) which was historically used by the U.S. military, local fire departments, and airports to fight oil and fuel fires. Because of their ubiquitous use, PFAS in drinking water has become an important emerging contaminant issue nationwide. Firefighting activities, manufacturing sites, landfills, spills, air deposition from factories, wastewater/septic and other releases are all potential sources that can introduce PFAS into groundwater and surface water resources, resulting in the contamination of drinking water supplies.

On October 2, 2020, The Massachusetts Department of Environmental Protection (MassDEP) published its public drinking water standard or Massachusetts Maximum Contaminant Level (MMCL) of 20 nanograms per liter (ng/L), or parts per trillion (ppt), applicable to community (COM) and non-transient non-community (NTNC) water supply systems for the sum of the concentrations of six specific PFAS compounds which include: Perfluorooctanesulfonic acid (PFOS), Perfluorooctanoic acid (PFOA), Perfluorohexanesulfonic acid (PFHxS), Perfluorononanoic acid (PFNA), Perfluoroheptanoic acid (PFHpA), and Perfluorodeacanooic acid (PFDA). These compounds are referred to by the MassDEP as "PFAS6", in 310 CMR 22.07G(3)(b).

1.2 Town of Duxbury PFAS Background

In 2021, the Town performed sampling of its eight (8) groundwater public water supply (PWS) wells to evaluate them for the possible presence of PFAS compounds. Analysis of samples obtained from the Depot Street well identified levels of total regulated PFAS compounds (PFAS6) at a combined concentration below the drinking water standard of 20 ng/L (or ppt). Analysis of samples collected from the Partridge Street well identified a total PFAS6 concentration of 75.93 ng/L which is above the drinking water standard. The Partridge Street well was subsequently taken offline later in 2021. The Depot Street Well was not sampled in 2021 since it had been removed from service in 2014 due to high manganese concentrations. Based on prior work conducted by Weston & Sampson, the Duxbury Municipal Landfill and former McNeil Dump have been previously identified as potential sources of PFAS contamination observed at these PWS.

The Duxbury Municipal Landfill is a closed and capped unlined landfill located on Mayflower Street adjacent and north of the McNeil Dump property. The Town's solid waste transfer station and a composting operation are also located at the Duxbury Municipal Landfill property.

Between 1904 and 1968 the landfill was utilized as a burn dump and a sanitary landfill until 1976. The sanitary landfill accepted municipal soil waste including residential, commercial and demolition waste. The Town disposed of wood waste in the adjacent area located southwest of the of the landfill limits in 1986 and 1987.

The area of municipal waste disposal was capped in 1977 with a final cover system consisting of 18 inches of low permeable soil, overlain by 6 inches of vegetative support material. The area that received wood waste was capped in 1998 with a final cover system consisting of 6 inches of daily cover; overlain by 12 inches of low permeability soil; overlain by 6 inches of vegetative support material.

Ongoing post closure environmental monitoring for the landfill has been performed in accordance with a Massachusetts Department of Environmental Protection (MassDEP) Post-Closure Environmental Monitoring Plan originally implemented in 2001. In 2022, following the detection of PFAS in the Town public water supply wells, the MassDEP requested sampling of the landfill monitoring well network for PFAS. Weston & Sampson performed PFAS sampling of the landfill monitoring well network in May and June 2022 as detailed further in this report.

The former McNeil Dump facility occupies an approximately 7-acre parcel of land located adjacent to the Duxbury Municipal Landfill and Transfer Station on Mayflower Street in Duxbury. Historically, the McNeil Dump was used as a sand and gravel pit, that was subsequently utilized as an open dump site from 1946 to 1979. A feasibility study was conducted in 1986 by Duxbury Municipal Landfill, Inc. to determine if landfilling operations could resume at the McNeil Dump facility. That study determined that reactivation was infeasible due to the proximity of the Town's Evergreen Street Wellfield and the facility's location within the corresponding public water supply Zone II.

A hydrogeological containment study was conducted in 1988 by IEP, Inc., to evaluate potential groundwater quality impacts from the Duxbury Municipal Landfill and the McNeil Dump facility. The study documented the existence of an approximately 1,500-foot-wide leachate plume extending a distance of 1,200 feet from the two landfills. The study noted that the landfills were directly upgradient of the Town's Depot Street Well and within its zone of contribution.

In 1988, following the completion of the IEP study, GHR Engineering Associates (GHR) submitted a closure plan to MassDEP on behalf of the previous facility owner. The GHR closure plan was not implemented and MassDEP issued a Notice of Noncompliance for the Site in 1993. A second closure plan was submitted to MassDEP in 1994 by Consulting Engineers & Scientists (CES), Inc., but was not implemented. The CES closure plan indicated that hazardous building debris materials, including asbestos containing materials (ACM), materials containing polychlorinated biphenyls (PCBs), and materials coated with lead-based paints, were disposed of at the McNeil Dump site. In a letter from the Duxbury Safe Water Committee, Inc. to the Duxbury Board of Health, it was reported that numerous fires were recorded during landfill operations. These fires were reportedly extinguished by the Duxbury Fire Department using "wet water", a fire-retardant foam potentially containing PFAS. The McNeil Dump property was acquired by the Town under tax title in 1997.

2.0 DATA EVALUTATION & POTENTIAL CONTAMINATION SOURCE INVENTORY

As part of this study, Weston & Sampson reviewed PFAS data provided by the Town for each PWS source comprising the Town's water supply system. The data reviewed focused only on the 2021 and 2022 PFAS results for the Depot Street Well, Evergreen Street Wells/Wellfield and Partridge Road Well. The PFAS results for the respective PWS wells ("finished water" only) were compared to PFAS sampling results for the monitoring wells within the vicinity of the Duxbury Municipal Landfill and McNeil Dump. Additionally, a desktop analysis was conducted to develop a potential contamination source inventory relative to the locations of the respective PWS wells which included filtering MassGIS and North American Industry Classification System (NAICS) codes for land uses and industrial practices potentially associated with the use of materials or products containing PFAS. The data review and inventory analysis are summarized in Sections 2.1.1, 2.1.2. and 2.1.3 of this report below.

2.1 Town of Duxbury Potential Sources

As mentioned in the introductory paragraphs above, this study focus' primarily on the Depot Street Well, Evergreen Street Wells and Partridge Well. The PFAS data Weston & Sampson received is summarized in Table 1 below:

Table 1: Town of Duxbury PWS PFAS6 Concentrations

Well ID	Sample Date	PFHpA	PFHxS	PFOA	PFNA	PFOS	PFDA	Total PFAS6
Depot Street GP Well (Finished)	4/28/2021	1.15	4.27	2.56	ND	3.60	ND	11.58
Depot Street GP Well (Finished)	5/20/2021	ND	ND	0.78	ND	0.86	ND	1.64
Depot Street GP Well (Finished)	7/26/2021	ND	ND	1.83	ND	1.42	ND	3.25
Depot Street GP Well (Finished)	10/20/2021	2.10	1.48	9.86	ND	1.51	ND	14.95
Depot Street GP Well (Finished)	9/20/2022	1.90	1.06	8.76	ND	2.66	ND	14.38
Partridge Rd GP Well (Finished)	4/28/2021	6.34	37.90	7.29	ND	24.40	ND	**75.93**
Partridge Rd GP Well (Finished)	5/20/2021	0.60	0.85	2.39	ND	1.86	ND	5.69
Partridge Rd GP Well (Finished)	6/15/2021	8.87	53.40	9.44	ND	33.50	ND	**105.21**
Partridge Rd GP Well (Raw)	6/15/2021	7.73	51.60	8.44	ND	33.40	ND	**101.17**
Partridge Rd GP Well (Finished)	7/26/2021	7.45	39.90	8.10	ND	26.60	ND	**82.05**
Partridge Rd GP Well (Finished)	10/22/2021	7.43	41.80	7.46	ND	23.20	ND	**79.89**
Partridge Rd GP Well (Finished)	9/20/2022	4.97	30.30	6.42	ND	15.20	ND	56.89
Evergreen Well 1 and 2 (Finished)	4/28/2021	0.68	0.60	1.88	ND	0.85	ND	4.01
Evergreen Well (07G) (Raw)	4/28/2021	0.63	ND	1.81	ND	0.74	ND	3.18
Evergreen Well (08G) (Raw)	4/28/2021	ND	0.73	1.54	ND	0.73	ND	3.01
Evergreen Well 1 and 2 (Finished)	5/20/2021	ND	ND	1.36	ND	0.82	ND	2.18
Evergreen Well 1 and 2 (Finished)	7/26/2021	ND	0.85	2.29	ND	1.16	ND	4.30
Evergreen Well 1 and 2 (Finished)	10/20/2021	0.63	0.93	2.28	ND	1.19	ND	5.04
Evergreen Well 1 and 2 (Finished)	9/20/2022	0.76	0.76	2.27	ND	1.19	ND	4.98

Note: Total PFAS6 concentrations > 70 ppt and above current Massachusetts PFAS6 MCL are identified in bold.

Between July 13 and 15, 2022, Weston & Sampson staff completed a groundwater monitoring event for monitoring wells at the Duxbury Municipal Landfill network (91-1, DUX-AS, DUX-AD, DUX-LS, DUX-LD, DUX-NS, DUX-ND, DUX-FS and DUX-FD) all located downgradient of the Duxbury Municipal Landfill. Groundwater samples were also collected from the monitoring wells comprising the McNeil Dump site. Groundwater samples

were collected from newly installed monitoring wells (WS-1 and WS-2) and previously installed monitoring wells GHR-MW-7 and MW-91-2 (Figure 2). Weston & Sampson reviewed PFAS data from May 2022 as well but only provided data from July 2022 as it was most closely related to the date of the PWS samples. The PFAS results are summarized in Table 2 and 3 below.

Table 2: Duxbury Landfill Monitoring Well PFAS6 Concentrations from July 2022

Parameter	Units	Monitoring Well								
		91-1	DUX-AS	DUX-AD	DUX-FS	DUX-FD	DUX-LS	DUX-LD	DUX-NS	DUX-ND
PFHpA	ng/L	13.3	3.73	21.8	5.66	4.9	<1.8	5.6	5.57	5.7
PFHxS	ng/L	5.18	3.18	16.7	5.03	4.22	<1.8	2.11	3.71	4.64
PFOA	ng/L	18.8	31.3	233.0	22.7	40.2	<1.8	18.9	18.6	20
PFNA	ng/L	0.634	0.328	0.86	<1.81	<1.86	<1.8	<1.85	<1.78	<1.81
PFOS	ng/L	10	10.5	39.4	7.02	14	<1.8	<1.85	1.99	3.32
PFDA	ng/L	<1.82	<1.76	<1.78	<1.81	<1.86	<1.8	<1.85	<1.78	<1.81
Total PFAS6	ng/L	**47.9**	**49.0**	**311.8**	**40.4**	**63.3**	ND	**26.6**	**29.9**	**33.7**

Notes:
1. ND=Not detected at the reporting limit (RL) for the sample.
2. < represents the resulting concentration was below the laboratory reporting limit shown and therefore was assumed ND.

Table 3: McNeil Dump Monitoring Well PFAS6 Concentrations from July 2022

Parameter	Units	Monitoring Well			
		WS-1	91-2	WS-2	GHR-MW-7
PFHpA	ng/L	2.0	<1.82	<1.84	<1.79
PFHxS	ng/L	2.75	<1.82	<1.84	<1.79
PFOA	ng/L	9.84	<1.82	<1.84	<1.79
PFNA	ng/L	<1.71	<1.82	<1.84	<1.79
PFOS	ng/L	54.2	11	<1.84	<1.79
PFDA	ng/L	<1.71	<1.82	<1.84	<1.79
Total PFAS6	ng/L	**68.79**	**11**	ND	ND

Notes:
1. ND=Not detected at the reporting limit (RL) for the sample.
2. < represents the resulting concentration was below the laboratory reporting limit shown and therefore was assumed ND.

Weston & Sampson attempted to contour the PFAS6 concentrations of the Duxbury Municipal Landfill and McNeil Dump but there is limited information upgradient, cross-gradient and downgradient of these potential sources to delineate the extent of the plume. These data gaps are addressed in Sections 4.0 and 5.0.

To help identify the potential relationship between PFAS identified in groundwater samples collected at the respective PWS wells and the potential source(s) (e.g., the Duxbury Municipal Landfill and McNeil Dump), Weston & Sampson generated radar plots depicting the PFAS6 compounds and corresponding concentrations detected in groundwater samples collected at the PWS wells, Duxbury Municipal Landfill monitoring wells and

the McNeil Dump monitoring wells (Figures 3 to 5). One or more of the targeted PFAS compounds were detected in the samples collected from each of the PWS Wells and most of the monitoring wells associated with the landfill and dump. Of the respective PFAS6 compounds, only PFNA and PFDA have been consistently absent or detected slightly above the respective method detection limits in all of the collected samples. The dominant PFAS compounds for all of the wells are PFOS and PFOA. The relationship between the PFAS6 compounds is different for the monitoring wells comprising the McNeil Dump network when compared with the PWS Wells and the Duxbury Municipal Landfill monitoring wells. Specifically, only PFOA and PFOS were reportedly detected as the dominant PFAS compounds for this location, which is different than the relationship reported for the other groundwater sampling locations (Figures 3 to 5). It should be noted that PFHxS was detected at each of the PWS wells but Partridge Road Well had the highest concentrations that were typically above 30 ppt. Meanwhile, Depot Street well and the Evergreen Streets wells had PFHxS concentrations consistently below 5 ppt, ultimately exhibiting different signatures from the Partridge Road Well.

As mentioned previously, the sample results provided were laboratory results collected from "finished water" and not 'raw water'. As such, the data provided regarding the PFAS concentrations for Depot Street, Partridge Road and the Evergreen Street Wells is limited in its ability to be properly compared with the corresponding source locations. In addition, only one of the sampling events involving the PWS wells aligned temporally with a sampling event conducted for the monitoring wells surrounding Duxbury Municipal Landfill and McNeil Dump. With the exception of the Partridge Road Well, the PFAS6 concentrations of the monitoring wells between the sources and corresponding nearby PWS Wells were about 1 to 2 times higher in magnitude than the supply wells. The data also suggests that PFAS6 concentrations fluctuated slightly in 2021 coincident with the time of year. The respective PWS wells are surrounded by many surface water bodies/wetlands/cranberry bogs, with several of them most likely resulting in geochemical influences on the groundwater flowing downgradient from the respective sources. Based on a paper titled *"Surface-water/groundwater boundaries affect seasonal PFAS concentrations and PFAA precursor transformations" by Andrea Tokranov, Denis LeBlanc, Heidi Pickard and Bridger Ruyle (2021)*, PFAS transport by groundwater moving through such areas can be influenced by biogeochemical mechanisms that change PFAS compound dominance and concentrations, though these transformations are not currently well understood. According to the study, processes such as sediment-water sorption and perfluoroalkyl acid (PFAA) precursor transformation (referred to as precursors) influence PFAS mobility and result in potential contamination of drinking-water supplies near PFAS source zones. The study examined PFAS transport through surface-water/groundwater interface boundaries and discovered order-of-magnitude seasonal fluctuations in perfluoroalkyl acid (PFAA) concentrations and losses of up to ~85% for certain influent precursors. Therefore, it is possible for substantial spatial and temporal variability in PFAS concentrations originating in boundary regions of high biogeochemical reactivity.

2.1.1 Other Point Sources

In addition to the potential point-sources discussed above, other potential point PFAS sources were located within the PWS well area. To help identify these sources and potential degree of contribution, Weston & Sampson performed a desktop analysis of potential point sources in the area which could be sources for PFAS releases. Publicly available databases were used to collect information regarding potential chemical use, spills and hazardous materials handling within the potential capture zones of the respective PWS wells. Records and sources that were used include the following:

- Landfill/Solid Waste Disposal Sites (MassGIS)
- Fire stations (MassGIS)
- Groundwater Discharge Permit Sites (MassGIS)
- NAICS Codes (North American Industry Classification System)
- USGS Topographic Maps
- Fire Department Records

A majority of the data listed above came from the MassGIS database. The NAICS codes were narrowed down to business sectors identified likely to have PFAS use associated with them (chrome plating, fabric coating, carpet

mills, treated paper mills, plastic film manufacturers, etc.). The NAICS is a system for categorizing businesses. It was designed for statistical purposes and for comparing economic data across North America. Companies select the six-digit NAICS code which best describes their primary business activity, and government agencies use these codes to classify industry information. Because PFAS is used in specific industries possible sources of PFAS contamination can be located by searching for companies by NAICS code.

The database and use records were located and mapped on surficial geologic mapping to evaluate the potential for impact to the PWS wells. All potential sources that were located within town boundaries are mapped on Figure 6 and tabulated below:

Table 4: Potential Contamination Source Inventory

Database	Potential Contamination Source Site
MassGIS	Duxbury Stump Landfill (Inactive)
MassGIS	Duxbury Landfill Inc./McNeil Dump (Inactive)
MassGIS	Duxbury Municipal Landfill (Closed)
MassGIS	Summer Hill Landfill (Closed)
MassGIS	Duxbury Fire Department (West)
MassGIS	Duxbury Fire Department (East)
MassGIS	Kingston Fire Department
NAICS	Impressions Automobile Detailing
NAICS	Carpet Cleaning Service
NAICS	Flow Pro
NAICS	Bay State Textiles
NAICS	Cheap Rug Cleaning Service
NAICS	Patriot Rubber

2.1.2 Non-Point Sources

Potential non-point sources of PFAS contamination that were considered in this evaluation included septic systems. Weston & Sampson was not able to access the Town's sewer collection system mapping to identify areas within the project area that could be associated with the discharge of wastewater into the aquifer through Title V septic systems. Therefore, an alternative approach was taken with all property parcels in Town assumed to have a septic system located in the center of the respective property with a density analysis subsequently performed to assess the corresponding potential for septic systems to act as a significant source of PFAS impact on the respective PWS wells. The resulting distribution of potential septic systems is shown on Figure 7A. Weston & Sampson received existing sewer data from the Town and excluded any parcels that were listed as connected to public sewer.

To assist with the resulting septic system distribution mapping, a kernel density analysis was conducted using spatial analyst tool in ArcGIS Pro which calculates a magnitude-per-unit area from point or polyline features using a kernel function to fit a smoothly tapered surface to each point. The results are shown in Figure 7B. This information can contribute to the understanding of 'background' sources within the aquifer. Ambient background concentrations can inform our understanding of potential PFAS baseline levels of contamination that can be expected even in "non-impacted" regions. Wastewater discharge from septic systems is likely to contaminate wells in areas with high septic system density (Bremer and Harter, 2012). The highest density of potential septic systems (521 potential systems within 1 mile) was estimated to be located upgradient of the Partridge Road

Well. Therefore, septic systems are thought to be a likely contributor to the PFAS contamination at the Partridge Road Well.

2.2 Plymouth-Carver Aquifer Model

The numerical groundwater modeling of the study area was performed using the calibrated and verified USGS Plymouth-Carver aquifer model as a base. One steady-state and one transient groundwater flow model were used for this study. These models were developed on the industry-standard MODFLOW computer software. MODFLOW was developed at the U.S. Geological Survey (USGS) by Michael McDonald and Arlen Harbaugh (1984). The model simulates three-dimensional flow using a block-centered finite difference grid. Several layers can be established and individually modeled as confined, unconfined, or a combination of the two. Input to the model is through "packages" that make up "modules" that the numerical code can process. Each "package" is a representation of a physical component in the conceptual model. For instance, there are individual packages for recharge, river flow, well pumping, etc. This model is well documented and has been used extensively in similar settings with acceptable results. After all of the data collection described above was completed the numerical model was used for determination of groundwater flow direction and delineation of capture zones under multiple realistic pumping scenarios.

The MODFLOW program is utilized to simulate groundwater flow. Other integrated software packages, such as MODPATH, are combined with the output from MODFLOW to allow simulation of contaminant transport. A pre- and post-processor known as Groundwater Vistas ® (GV) was used to develop input files and for plotting model results. GV is a graphical interface for input and analysis of MODFLOW and MODPATH data.

Based on the numerical USGS model, the local aquifer thickness varies from 40 to 100 feet (about 70 feet near the Duxbury Municipal Landfill and McNeil Dump). Groundwater elevations varies from about 21 feet to 11 feet NGVD 29 where general groundwater flow direction is from West to East towards the Bluefish River which eventually drains into Duxbury Bay. The average groundwater hydraulic gradient across the site is approximately 0.002. Table 5 below summarizes the public drinking water supply wells of concern for this study and their corresponding permitted pumping rates and screen elevations.

Table 5: PWS Summary Table

Supply Well	Permitted Rate	Model Layer	Modeled Screen Elevation (ft. NGVD 29)	
Depot Street Gravel Pack Well	400 GPM	2	12	-5
Partridge Road Gravel Pack Well	240 GPM	3	-13	-24
Evergreen Street Well #1	550 GPM	6	2	-17
Evergreen Street Well #2	548 GPM	5	4	-2

2.2.1 Steady-State Simulations

The calibrated steady-state model (assumes that all flow conditions and properties of the system are constant with respect to time) was used to delineate capture zones under the following pumping conditions:

- All Wells
- Depot Street Well Only
- Partridge Road Well Only
- Evergreen Street Wells Only
- Depot Street Well and Partridge Road Well
- Depot Street Well and Evergreen Street Wells

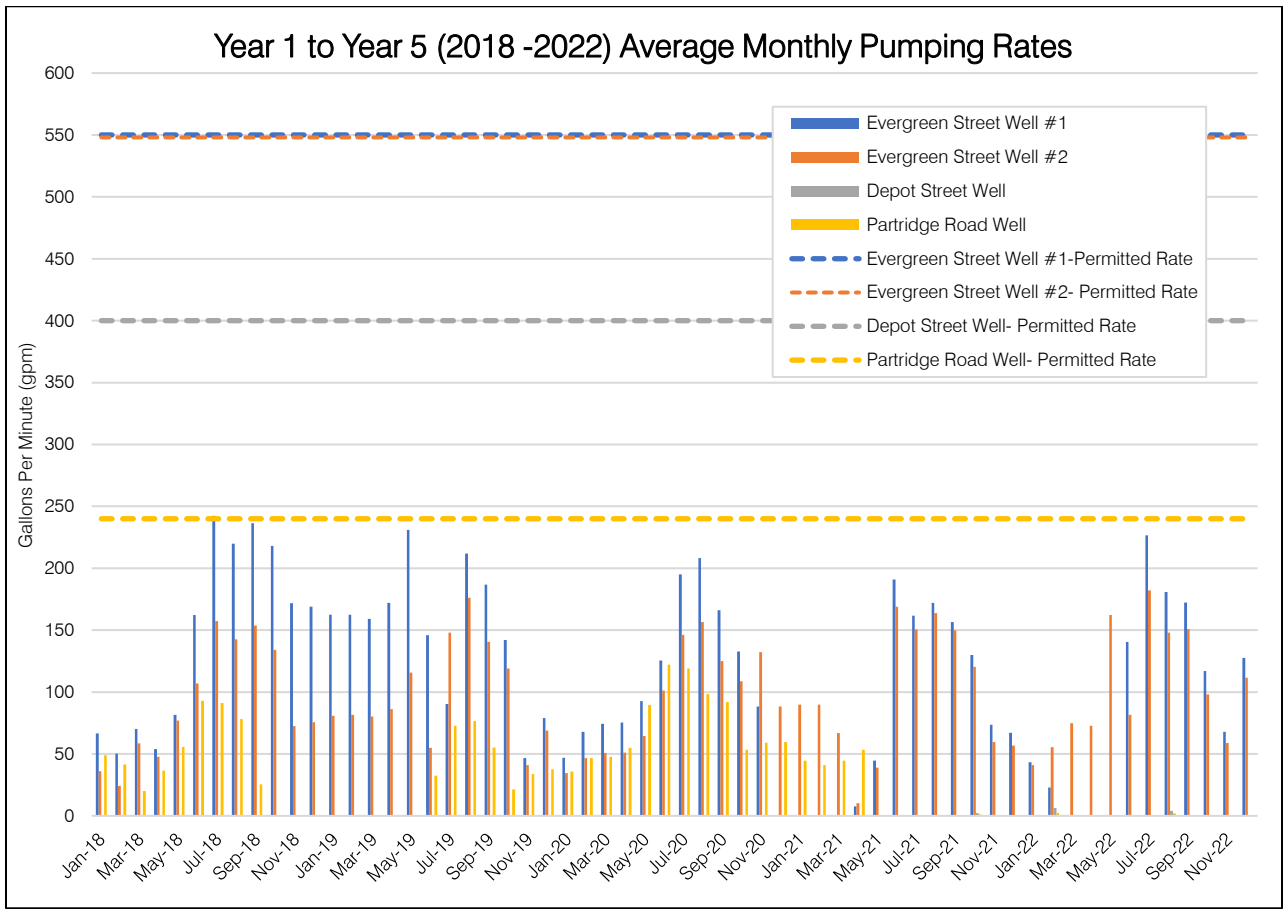
- Partridge Road Well and Evergreen Street Wells

If the well was simulated as pumping, the modeled rate used was equivalent to the permitted pumping rate. The MODFLOW sub-routine MODPATH® was used to delineate capture zones for each simulation. Particles were placed at the corresponding screen interval for each well and tracked back for the selected time-period (180 days). The results include a downgradient and cross-gradient stagnation point determined by particle pathlines and an upgradient recharge boundary defined by extending the groundwater divide defined by the pathlines to its point of intersection with the prevailing hydrogeologic boundaries. Results are summarized in the succeeding sections. Particles were also placed at the potential contamination sources listed in Table 4. The particles were placed in Layer 1 with the exception of the Duxbury Municipal Landfill and McNeil Dump, which were placed in Layer 2 and tracked forward for the selected time period (180-days).

2.2.2 Transient Simulations

The calibrated transient model (conditions that change with time and assess the time-dependent impact on flow predictions) was used to assess flow conditions using actual pumping data from 2018 to 2022. Weston & Sampson received daily flow data from the Town for the Evergreen Street Wells, Depot Street Well and Partridge Road Well. With the transient model, dynamic pumping conditions were simulated as a flux boundary to model the movement of the water table with time. Exhibit A shows the monthly average pumping conditions from 2018 to 2022. As shown, The Depot Street Well and Partridge Road Well are not in use for a majority of this time frame. Instead, the Evergreen Wells were the main production wells pumping during this time frame of the four PWS evaluated. Although, it should be noted the Evergreen Wells were not pumping at full capacity. Results are summarized in the succeeding sections.

Exhibit A


Year 1 to Year 5 (2018 -2022) Average Monthly Pumping Rates
Gallons Per Minute (gpm)
600
550
500
450
400
350
300
250
200
150
100
50
0
Evergreen Street Well #1
Evergreen Street Well #2
Depot Street Well
Partridge Road Well
Evergreen Street Well #1-Permitted Rate
Evergreen Street Well #2- Permitted Rate
Depot Street Well- Permitted Rate
Partridge Road Well- Permitted Rate
Jan-18
Mar-18
May-18
Jul-18
Sep-18
Nov-18
Jan-19
Mar-19
May-19
Jul-19
Sep-19
Nov-19
Jan-20
Mar-20
May-20
Jul-20
Sep-20
Nov-20
Jan-21
Mar-21
May-21
Jul-21
Sep-21
Nov-21
Jan-22
Mar-22
May-22
Jul-22
Sep-22
Nov-22

3.0 NUMERICAL GROUNDWATER MODEL

3.1 Simulation Results

The model simulations discussed in earlier sections were used to evaluate the potential sources of PFAS and whether or not they may be contributing to the contamination of the Evergreen Street Wells, Partridge Road Well and Depot Street Well. Based on the initial simulations, the only relevant potential source sites upgradient of the three sources evaluated are:

- Duxbury Municipal Landfill
- McNeil Dump
- The Duxbury Fire Department (East Side of Town)
- Carpet Cleaning Service (From NAIC Search)

There are a few groundwater divides within the town boundary that limit the other potential sources listed in the inventory provided in **Table 4** which prevent flow towards the PWS wells of this study. Therefore, the four sites listed above were the primary focus of the simulations (**Figure 8**).

3.1.1 Steady-State

A series of figures (Figures 9-15) are provided in this section of the report to present the results of the steady-state numerical model simulations conducted. Each map provides the following information:

- Modeled groundwater head contours of Layer 6
- Potential Contamination (Point) Sources (PCS)
- Modeled Capture Zone associated with each PWS Well commensurate with the Simulation parameters
- MODPATH pathlines (forward modeling from PCS)
- Downgradient Potential Potable Wells located at 95 Fairway Lane and 49 Surplus Street

Each of the figures provide a text box to detail the model run parameters for each simulation, as well as an estimate of the percentage of water being pumped by each drinking water supply well that comes from the Duxbury Municipal Landfill and the McNeil Dump. The potential potable wells included in these figures were obtained from Board of Health (BOH) mapping and are only approximate locations. These wells are downgradient of the potential PFAS plume and were considered potential receptors.

1.1.1. All Wells

The simulation results of the groundwater head contours when all the wells are pumping at their permitted rates are shown in **Figure 9**. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source site(s) which illustrate the discharge locations of these particles. The capture area is the region that contributes the groundwater extracted by the pumping well(s). As shown in the figure, the particles from the landfill and dump intersect the capture zones of the Evergreen Street and Depot Street water supply wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 6:Percent Impacted Capture Zone (All Wells Pumping)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	550	0%
Evergreen Street Well #2	548	2%
Partridge Road Well	240	0%
Depot Street Well	400	3%

This pumping scenario shows particles from the fire station, landfill and dump flowing towards the Evergreen Street Wells and Depot Street Well. Groundwater from the potential contamination source, the carpet cleaning service, seemingly flows towards Partridge Road Well but does not reach the Partridge Road Well. With all four supply wells pumping simultaneously, a majority of the potential PFAS plume is captured by the Evergreen Street Wells and Depot Street Wells. Neither of the potential potable wells (95 Fairway Lane and 49 Surplus Street) are encapsulated by the delineated capture zones nor appear to fall within the flow paths of the potential PFAS sources.

1.1.2. Depot Street Well Only

The simulation results of the groundwater head contours when only the Depot Street Well is pumping at its permitted rate and the other wells are turned off are shown on **Figure 10**. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source sites which illustrate the discharge locations of these particles. As shown in the figure, the particles from the landfill and dump intersect the capture zones of the pumping wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 7:Percent Impacted Capture Zone (Depot Street Well Only)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	0	0% (off)
Evergreen Street Well #2	0	0% (off)
Partridge Road Well	0	0% (off)
Depot Street Well	400	36%

This pumping scenario shows particles from the landfill and dump flowing towards the Depot Street Well. Even though the Partridge Road Well is not pumping in this scenario, the particles from the Duxbury Fire Department still flow towards and pass through the Partridge Road Well. Groundwater from the carpet cleaning service however flows towards the Bluefish River. As predicted, with only the Depot Street Well pumping, a majority of the potential PFAS plume is captured by the Depot Street Well. Neither of the potential potable wells are encapsulated by the delineated capture zone but 95 Fairway Lane appears to fall within the flow path of the Duxbury fire station. 49 Surplus Street is located just outside the boundary of these pathlines.

1.1.3. Partridge Road Well Only

The simulation results of the groundwater head contours when only the Partridge Road Well is pumping at its permitted rate and the other wells are turned off are shown on **Figure 11**. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source sites which illustrate the discharge locations of these particles. As shown in the figure, the particles from the landfill and dump intersect the capture zones of the pumping wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 8:Percent Impacted Capture Zone (Partridge Road Well Only)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	0	0% (off)
Evergreen Street Well #2	0	0% (off)
Partridge Road Well	240	16%
Depot Street Well	0	0% (off)

This pumping scenario shows particles from the dump and fire station flowing towards the Partridge Road Well. Most of the particles from the landfill and some from the dump are still flowing towards the Depot Street Well, even though the Depot Street Well is not pumping in this scenario. Groundwater from the carpet cleaning service only flows in the direction of the Bluefish River. Neither of the potential potable wells are encapsulated by the delineated capture zone but 95 Fairway Lane appears to fall within the flow path of the particles from the landfill and dump. 49 Surplus Street is located just outside the boundary of these pathlines.

1.1.4. Evergreen Street Well #1 and #2 Only

The simulation results of the groundwater head contours when only the Evergreen Street Wells are pumping at their permitted rate and the other wells are turned off are shown on **Figure 12**. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source sites which illustrate the discharge locations of these particles. As shown in the figure, the particles from the landfill and dump intersect the capture zones of the pumping wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 9: Percent Impacted Capture Zone (Evergreen Street Wells Only)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	550	0%
Evergreen Street Well #2	548	2%
Partridge Road Well	0	0% (off)
Depot Street Well	0	0% (off)

This pumping scenario shows particles from the Duxbury Fire Station, landfill and dump flowing towards the Evergreen Street Wells. Groundwater from the carpet cleaning service, flows towards the Bluefish River. As predicted, with only the Evergreen Street Wells pumping, a majority of the potential PFAS contamination is captured by the Evergreen Street Wells. Neither of the potential potable wells (95 Fairway Lane and 49 Surplus Street) are encapsulated by the delineated capture zones nor appear to fall within the flow paths of the potential PFAS sources.

1.1.5. Depot Street Well and Partridge Road Well

The simulation results of the groundwater contours when only the Depot Street Well and Partridge Road Well are pumping at their permitted rates and the Evergreen Street wells are turned off are shown on **Figure 13**. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source sites which illustrate the discharge locations of these particles. As shown in the figure, the particles from the landfill and Dump intersect the capture zones of the pumping wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 10: Percent Impacted Capture Zone (Depot Street Well and Partridge Road Well)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	0	0% (off)
Evergreen Street Well #2	0	0% (off)
Partridge Road Well	240	0%
Depot Street Well	400	35%

This pumping scenario shows particles from the landfill and dump flowing towards the Depot Street Well. Even though the Partridge Road Well is pumping in this scenario, only particles from the Duxbury Fire Department flow towards and pass through the Partridge Road Well. Groundwater from the carpet cleaning service flows towards the Bluefish River. As predicted, with only the Depot Street Well pumping, a majority of the potential PFAS contamination is captured by the Depot Street Well and Partridge Road Well. Neither of the potential potable wells are encapsulated by the delineated capture zone but 95 Fairway Lane appears to fall within the flow path of the particles from the landfill and dump. 49 Surplus Street is located just outside the boundary of these pathlines.

1.1.6. Depot Street Well and Evergreen Street Wells

The simulation results of the groundwater contours when only the Depot Street Well and Evergreen Street Wells are pumping at their permitted rates and the Partridge Road Well is turned off are shown on Figure 14. The delineated capture areas are overlain with the MODPATH particle pathlines of the potential PFAS source sites which illustrate the discharge locations of these particles. As shown in the figure, the particles from the landfill and dump intersect the capture zones of the pumping wells. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 11: Percent Impacted Capture Zone (Depot Street Well and Evergreen Street Wells)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	550	0%
Evergreen Street Well #2	548	2%
Partridge Road Well	0	0% (off)
Depot Street Well	400	2%

This pumping scenario shows particles from the Duxbury Fire Station, landfill and dump flowing towards the Depot Street Well and Evergreen Street Wells. Groundwater from the carpet cleaning service, flows towards the Bluefish River. As predicted, with the Depot Street Well and Evergreen Street Wells pumping, a majority of the potential PFAS contamination is captured by the Depot Street Well and Evergreen Street Wells. Neither of the potential potable wells are encapsulated by the delineated capture zones nor appear to fall within the flow paths of the potential PFAS sources.

1.1.7. Partridge Road Well and Evergreen Street Wells

The simulation results of the groundwater contours when only the Partridge Road Well and Evergreen Street Wells are pumping at their permitted rates and the Depot Street Well is turned off are shown on Figure 15. The delineated capture area is overlain with the MODPATH particle pathlines of the potential PFAS source sites which show the discharge locations of these particles. The table below summarizes the percent impacted capture zone from the Duxbury Municipal Landfill and McNeil Dump site.

Table 12: Percent Impacted Capture Zone (Partridge Road Well and Evergreen Street Wells)

Public Water Supply Well	Modeled Pumping Rate (gpm)	Percent Impacted Capture Zone from nearby Landfill and Dump
Evergreen Street Well #1	550	0%
Evergreen Street Well #2	548	2%
Partridge Road Well	240	1%
Depot Street Well	0	0% (off)

This pumping scenario shows particles from the Duxbury Fire Station, landfill and dump flowing towards the Evergreen Street Wells and particles from the Duxbury fire station flowing towards the Partridge Road Well. Groundwater from the carpet cleaning service flows towards the Bluefish River. As predicted, with only the Depot Street Well pumping, a majority of the potential PFAS contamination is captured by the Depot Street Well. Neither of the potential potable wells (95 Fairway Lane and 49 Surplus Street) are encapsulated by the delineated capture zones nor appear to fall within the flow paths of the potential PFAS sources.

3.1.2 Transient

As mentioned previously, Weston & Sampson received daily pumping data for 2018 to 2022 from the Town. This data was imported into the transient numerical groundwater model to be able to simulate the past five years of pumping trends under existing conditions. Figures 16-20 represent the results at the end of each year simulated. Overall, groundwater elevations and flow direction do not change from 2018 to 2022. Ultimately, groundwater flows to the east, ultimately discharging into the Bluefish River, which eventually drains into Duxbury Bay to the North. As discussed in previous sections, the Evergreen Wells are the main production wells during this timeframe. Depot Street Well is only turned on for short spurts (likely for sampling purposes) and Partridge Well was taken offline in 2021. The MODPATH pathlines from each potential source consistently discharge to the Bluefish River. The pathlines colors represent the model layer each particle is in. It should be noted that the particles were added to Layer 2, as the particles flow horizontally to the east, they also tend to have a downward vertical gradient and flow to Layer 7. As the particles continue to flow towards the river, the particles transition to an upward gradient to discharge into the river, which acts as a sink for groundwater. These simulations also show 95 Fairway Lane and 49 Surplus Street as possible receptors of any PFAS originating from the dump, landfill and fire station.

Transient runs of the Evergreen Street Wells pumping at their permitted rates for one year with the Partridge Road Well pumping at its permitted rate and turned off were also compared to one another (Figure 21). Based on the particle tracking results, a majority of the particles from the dump, landfill and fire station flow towards the Evergreen Street Wells while some of the particles from the fire station flow towards the Bluefish River. The results change slightly once the Partridge Well is pumping at its permitted rate, which altered flow slightly towards the Partridge Well.

3.2 Conclusions

A significant observation resulting from the steady-state modeling was the highly sensitive nature of the pumping conditions. The direction of the particle pathlines representing the potential plume from the Duxbury Municipal Landfill and McNeil Dump were very sensitive to the magnitude of the pumping from the Evergreen Street Wells and Depot Street Well. If the Evergreen Street Wells are simulated as off, particles from the dump and landfill migrate towards the east, whether the Depot Street Well is pumping or not. Groundwater flow direction does not appear to vary much with the Partridge Road Well pumping. Generally, particles from the landfill and dump do not flow towards the Partridge Road Well. Instead, the Partridge Road Well captures groundwater from the Duxbury Fire Department area and the high density area of septic systems in town. If the Evergreen Street Wells are simulated as pumping, both wells pull groundwater from the landfill, dump and the fire department. Particles from the Carpet Cleaning Service (From NAIC Search) ultimately discharge into Bluefish River with each simulation. Pathlines from the Carpet Cleaning Service do not appear to reach the Partridge Road Well and therefore it is not a likely source of impact. Although, this should be verified with additional groundwater samples.

Typically, steady-state conditions are used to evaluate long-term averages while transient conditions are beneficial to observe the system for a shorter time frame and can be modeled with varying pumping conditions. The transient model revealed similar results to the steady-state conditions, where groundwater flow and particle flow path direction were highly sensitive to the Evergreen Street Wells pumping magnitude. For a majority of the time period of 2018 to 2022, the Evergreen Street Wells were the main pumping wells of the four evaluated in this study. The Depot Street Well was only turned on briefly for short periods of time and did not affect groundwater

flow direction. The Partridge Road Well was turned off for half of 2021 and most of 2022 and flow direction remained the same. As discussed earlier, the particle pathlines representing the potential PFAS plume increase in depth to lower layers as groundwater flows towards the east. This could mean the plume is diving down to the deeper part of the aquifer. A diving plume could mean the contaminant plume has migrated to a depth below the water table. Therefore, the shallow aquifer (5 to 20 feet bgs) could be a zone of uncontaminated groundwater or groundwater with lower concentrations of PFAS.

It is important to note that the actual rates of the wells were pumping at approximately 50% of their permitted rates (as shown in Exhibit A). This observation prompted simulations to assess transient conditions of the Evergreen Street Wells pumping at their permitted rates in conjunction with the Partridge Road Well turned on and turned off. As previously noted, the pathlines direction changed slightly when the Partridge Road Well was simulated as pumping at its permitted rate; however, this alteration had no discernable impact on groundwater flow from the landfill and dump.

Based on the findings, it is evident that under most pumping scenarios, groundwater from the landfill and dump is redirected from the Partridge Road Well and flows towards the Evergreen Street Wells and/or the Depot Street Well. Notably, a significant portion of potentially impacted particles flowing towards the Partridge Well can be traced back to the fire department. Modeling results suggest that PFAS contamination originating from the Duxbury Municipal Landfill and McNeil Dump may not be impacting the Partridge Road Well, but rather may be impacting the Depot Street Well. There exists the possibility that for the Evergreen Street Wells to be impacted from both these sources if the wells are pumping at their permitted rates (which did not occur from 2018 to 2022). Despite this, the capture zones of all four pumping wells, as demonstrated in Tables 6-12, are notably expansive compared to the potential impacted area from the Duxbury Municipal Landfill and McNeil Dump site. Consequently, it is expected that PFAS concentrations at the pumping wells are diluted due to these large capture areas, leading to lower PFAS concentrations at the supply wells.

As outlined in Section 2.1, the Partridge Road Well exhibited the highest PFAS6 concentrations, ranging from 5.69 to 105.21 ng/l in 2021 and 2022. Conversely, the Depot Street and Evergreen Steet Wells registered lower PFAS6 concentrations, ranging from 1.64 to 14.95 ng/l and 2.18 to 5.04 ng/l, respectively. Across all four supply wells, PFAS concentrations were lower compared to the monitoring wells at and surrounding the landfill and dump site. Notably, deeper monitoring wells (75 to 85 feet deep) displayed higher PFAS6 concentrations than the shallower monitoring wells. This could explain instances of non-detect results in some monitoring wells and the lower concentrations observed at the Evergreen Street Wells and Depot Street Well. Biogeochemical reactivity emerges as a plausible factor contributing to the variability in PFAS concentrations downstream of the potential contamination sources, as discussed in Section 2.1. However, the absence of historical and seasonal data restricts this hypothesis to a theoretical possibility.

4.0 DATA GAPS

The objective of this study is to evaluate the source or sources of PFAS that may have impacted the Town's Partridge, Depot, and Evergreen Street PWS wells. Furthermore, the study aims to evaluate the extent of the PFAS plume within the surficial aquifer and to understand the distribution and fate of identified PFAS compounds in monitoring wells located near the McNeil Dump and Duxbury Municipal Landfill sites. However, due to limitations in the available concerning spatial and temporal distributions, it is essential to address the following data gaps to strengthen the validity of the conclusions and recommendations outlined in this assessment summary:

1. The distribution of PFAS detected in groundwater samples is confined primarily to the shallow aquifer in the vicinity of the Duxbury Municipal Landfill and McNeil Dump sites, reflecting conditions within a narrowly defined timeframe. Presently, only a limited number of monitoring wells are screened at elevations consistent with the bottom of the landfill and dump, as well as within the aquifer. This scarcity of data impedes the ability to fully delineate the extent of existing PFAS plume and predict variations in plume migration resulting from hydrologic and hydrogeologic fluctuations.

2. This study primarily addressed the identified and potential PFAS contamination sources that could impact the Partridge Road, Depot Street, and Evergreen Street PWS wells. Corresponding flow and particle track modeling were employed to assess the likelihood of these sources impacting the four Town PWS wells, while considering the influence of background or ambient conditions on the local PFAS distribution. However, without more extensive PFAS concentration information or historical groundwater level and pumping data, understanding the influence of background/ambient concentrations on the local groundwater conditions under existing and projected scenarios is challenging. To this end, the availability of the following site-specific historical and future information should provide for more definitive projections of the impacts related to PFAS6 concentrations in the study area and at the respective PWS wells:

    - Precipitation
    - Vertical distribution of PFAS (will require additional monitoring wells)
    - Existing and anticipated pumping scenarios for the PWS wells
    - Local surface water/groundwater interactions and PFAS distributions within these areas (e.g., potential for geochemical reactions)

3. Lastly, the potential contamination source inventory was developed using existing datasets available from the MassDEP and NAICS Codes. There could be other potential contamination sites that were not represented from these datasets and could be potentially identified by an in-person inspection.

5.0 RECOMMENDATIONS

Weston & Sampson conducted a comprehensive desktop analysis and compiled an inventory of potential contamination sources that may be contributing to PFAS contamination detected at the Town's Partridge Road, Depot Street, and Evergreen Street Public Water Supply (PWS) wells. Leveraging the existing numerical model (MODFLOW) developed by USGS for the Plymouth-Carver-Kingston-Duxbury aquifer, along with MODPATH, a particle-tracking post-processing model that computes three-dimensional flow paths using output from groundwater flow simulations based on MODFLOW, capture zones corresponding to each of these wells were delineated. Following our assessment of existing PFAS data and numerical model results, Weston & Sampson offers the following recommendations to fill data gaps (described above) necessary for refining the projections generated from these efforts, aimed at informing future decisions about pumping strategies and controls, as well as treatment of PFAS6 concentrations:

1. Implement the recommended adjustments to the existing monitoring well network. This includes the construction of additional monitoring wells, designed as nested pairs consisting of shallow and deep wells, aimed at delineating the vertical movement of groundwater within the overburden aquifer (Figure 22). These nested monitoring wells should be strategically placed between the potential contamination sources and the respective Town PWS wells and along the Bluefish River. The proposed monitoring wells have been categorized as high priority and low priority. The higher priority wells should be installed prior to the lower priority wells. The proposed monitoring wells are summarized in Table 13 below. Nested staff gauges and piezometers should also be installed at nearby cranberry bogs, ponds, and wetlands, if possible, to evaluate the hydraulic connection between these surface-water features and the underlying aquifer. The water level and quality data that can be obtained through these networks can help to identify any potential geochemical changes that may be occurring between the groundwater and surface water and influencing future PFAS6 distributions. The proposed monitoring network is shown on Figure 22.

Table 13: Proposed Nested Monitoring Wells

Proposed Monitoring Well ID	Priority	Purpose
MW-1-24 S/D	High	Monitor the lateral extent of Duxbury Municipal Landfill and McNeil Dump and upgradient of potential fire station source
MW-2-24 S/D	Low	Monitor upgradient of potential Carpet Cleaning source
MW-3-24 S/D	Low	Monitor downgradient of potential Carpet Cleaning source
MW-4-24 S/D	High	Monitor downgradient of high density area of potential septic systems and upgradient of Partridge Road Well
MW-5-24 S/D	High	Monitor downgradient of potential fire station source
MW-6-24 S/D	Low	Monitor upgradient of Duxbury Street Well
MW-7-24 S/D	High	Monitor further downgradient of high density are of potential septic systems and upgradient of Partridge Road Well
MW-8-24 S/D	Low	Monitor upgradient of Duxbury Municipal Landfill
MW-9-24 S/D	High	Monitor of upgradient of Duxbury Municipal Landfill and McNeil Dump and downgradient of Evergreen Street Wells and wetland complex
MW-10-24 S/D	High	Monitor further downgradient of Duxbury Municipal Landfill and McNeil Dump
MW-11-24 S/D	Low	Monitor downgradient of Duxbury Municipal Landfill and McNeil Dump

2. Collect additional groundwater samples from the existing monitoring wells to expand on historical PFAS data and from proposed monitoring wells (Figure 22) to enhance spatial data resolution. A monitoring program that coincides with the existing landfill monitoring schedule should be maintained to evaluate

PFAS concentrations during various times of year to determine if there are any potential seasonal effects.

3. Request BOH confirm private potable wells exist at 95 Fairway Lane and 49 Surplus Street. If the wells are confirmed to be drinking water wells, collect groundwater samples to determine if they have been impacted by PFAS.
4. Collect surface water samples along multiple reaches of the Bluefish River to assist with determining extent of the plume. Locations should be selected based on access.
5. Collect water level data with dedicated pressure transducers/dataloggers (PTDL) at each monitoring well. Manual measurements should be measured periodically with electric water-level meters to verify the water level data at each PTDL. The resulting dataset can be used as targets in the numerical groundwater model to verify the existing USGS. Modeling conducted to date can be used for planning purposes.
6. Following the additional data collection, realistic projected pumping rates of each impacted supply well should be simulated to represent real-life scenarios to determine the potential plume migration and extent.

6.0 LIMITATIONS

As previously outlined, the groundwater numerical flow model used to delineate capture zones and potential PFAS plume(s) relative to the Town's PWS wells is based on a mathematical representation of groundwater movement through the surficial aquifer. In order to solve the equations that constitute the flow model, simplifying assumptions were made about the aquifer makeup and the physical processes governing groundwater flow. Although groundwater flow models cannot reflect the details and complexities exhibited at every point of the aquifer they do allow the following:

a. Models integrate and assure consistency in influence on groundwater flow due to prevailing aquifer properties, and project recharge, discharge, and groundwater levels.
b. Models can be used to project flows and aquifer characteristics for which direct measurements are not available.
c. Models can be used to simulate response of the aquifer under hypothetical conditions.
d. Models can identify sensitive areas where additional hydrogeologic information could improve understanding of the local groundwater flow variations and projections.

Even though a reliable numerical groundwater model has been established by the USGS for the regional Plymouth-Carver-Kingston-Duxbury aquifer system which includes the Town of Duxbury, the focus of this study was isolated to a small area of the numerical groundwater model. Ideally, the projected conditions in the study area should be verified with actual water level data reflective of background and pumping conditions.

This report was prepared for the use of the Town of Duxbury, exclusively. The findings provided by Weston & Sampson in this report are based solely on the information presented in this document. Future investigations, and/or information that was not available to Weston & Sampson at the time of the investigation, may result in a modification of the findings stated in this report.

Should additional information become available concerning the hydrogeologic and PFAS sources at the landfill and dump or neighboring properties, which could directly impact the PWS wells in the future, or the modeled projections, that information should be made available to Weston & Sampson for review and consideration.

FIGURES

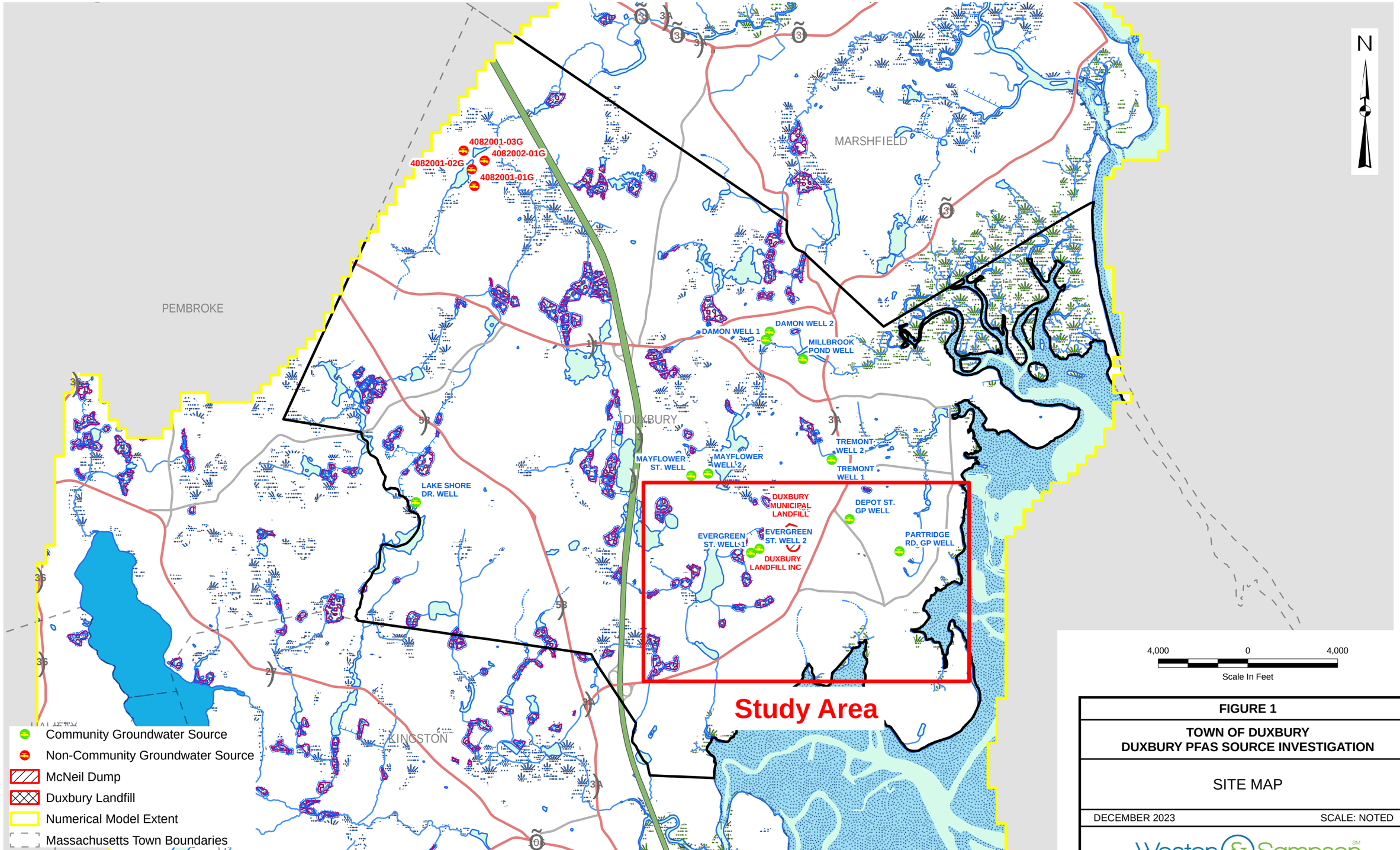


FIGURE 1

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

SITE MAP

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 1- Site Map.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/10/2024 1:44 PM **Opened:** 1/10/2024 1:45 PM

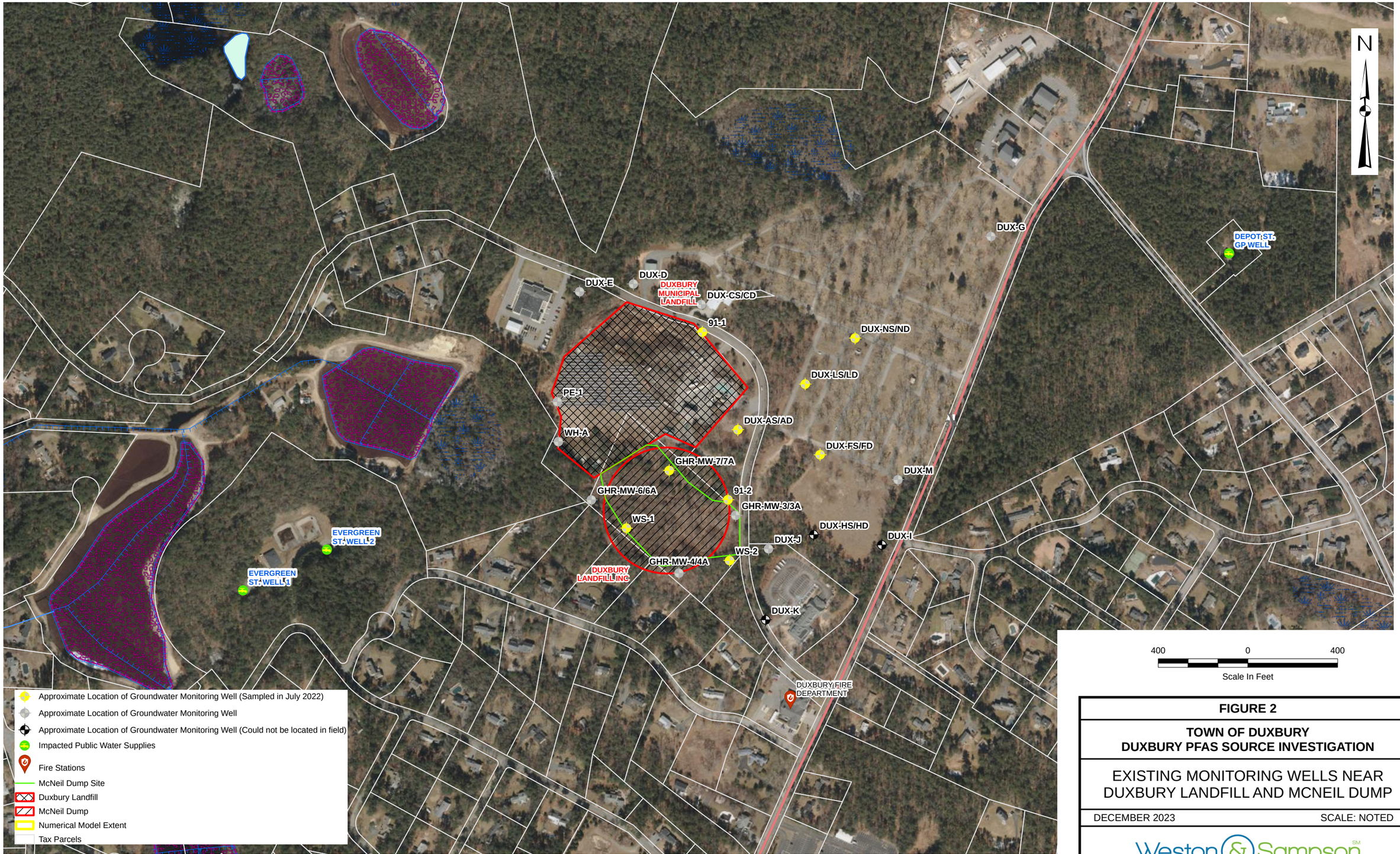


FIGURE 2

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

EXISTING MONITORING WELLS NEAR DUXBURY LANDFILL AND MCNEIL DUMP

DECEMBER 2023 SCALE: NOTED

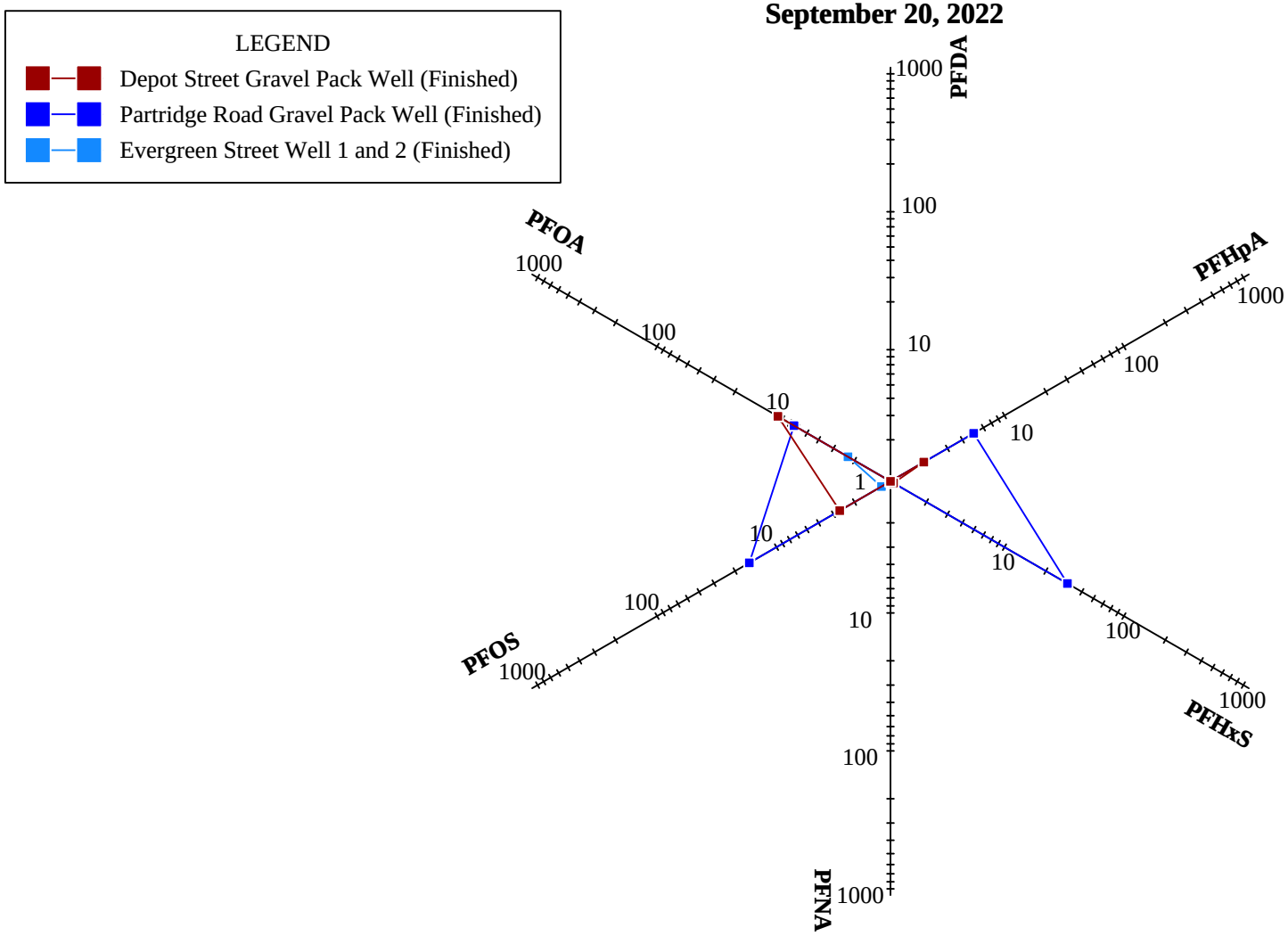
Weston & Sampson SM

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 2- MWs.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 2/22/2024 10:31 AM **Opened:** 2/22/2024 10:33 AM

Figure 3

McNeil Dump & Duxbury Municipal Landfill
DUXBURY, MASSACHUSETTS

PFAS6 Groundwater Analytical Results
Public Water Supply Wells
September 20, 2022

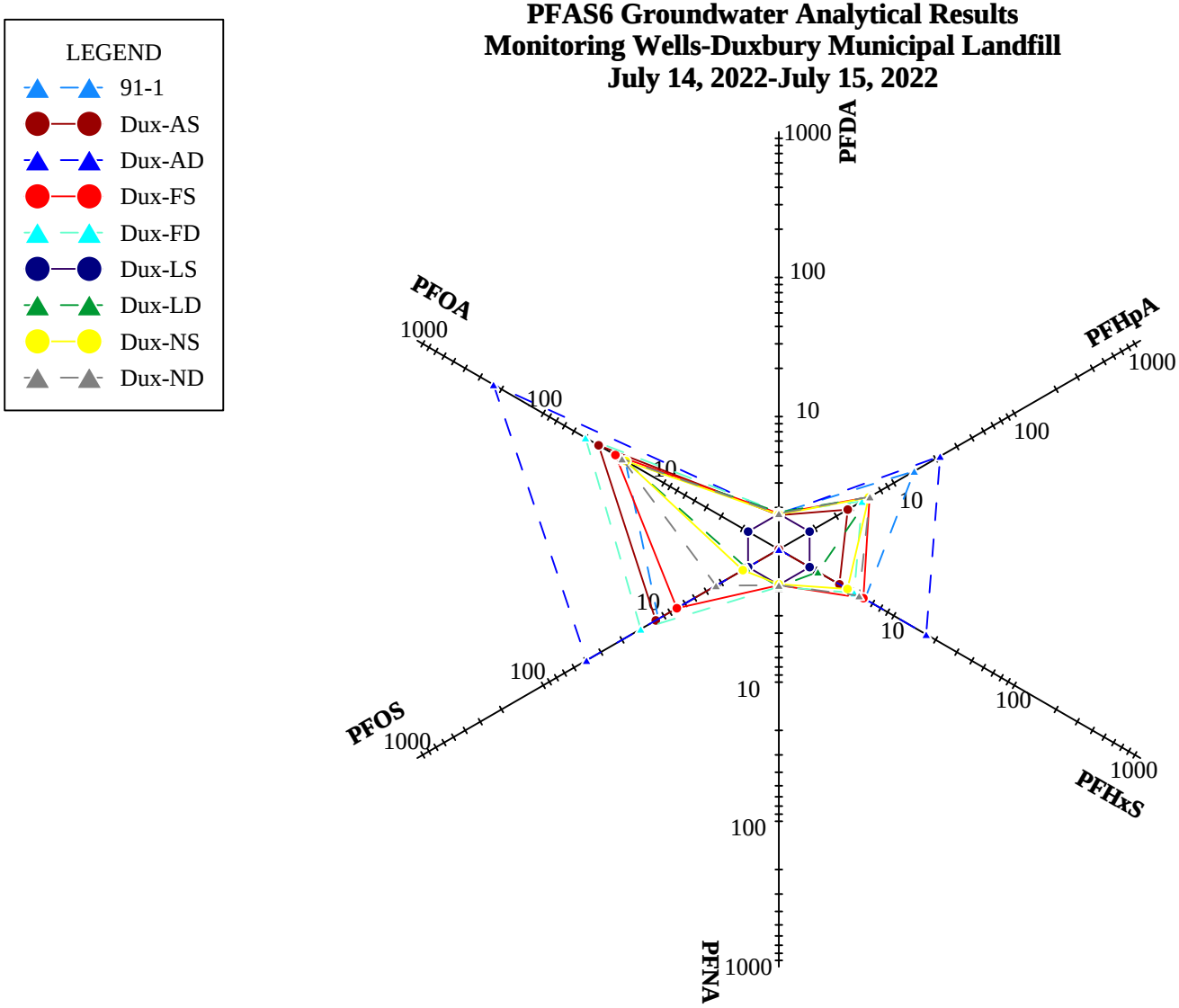


Weston & Sampson

Figure 4

McNeil Dump & Duxbury Municipal Landfill
DUXBURY, MASSACHUSETTS

PFAS6 Groundwater Analytical Results
Monitoring Wells-Duxbury Municipal Landfill
July 14, 2022-July 15, 2022

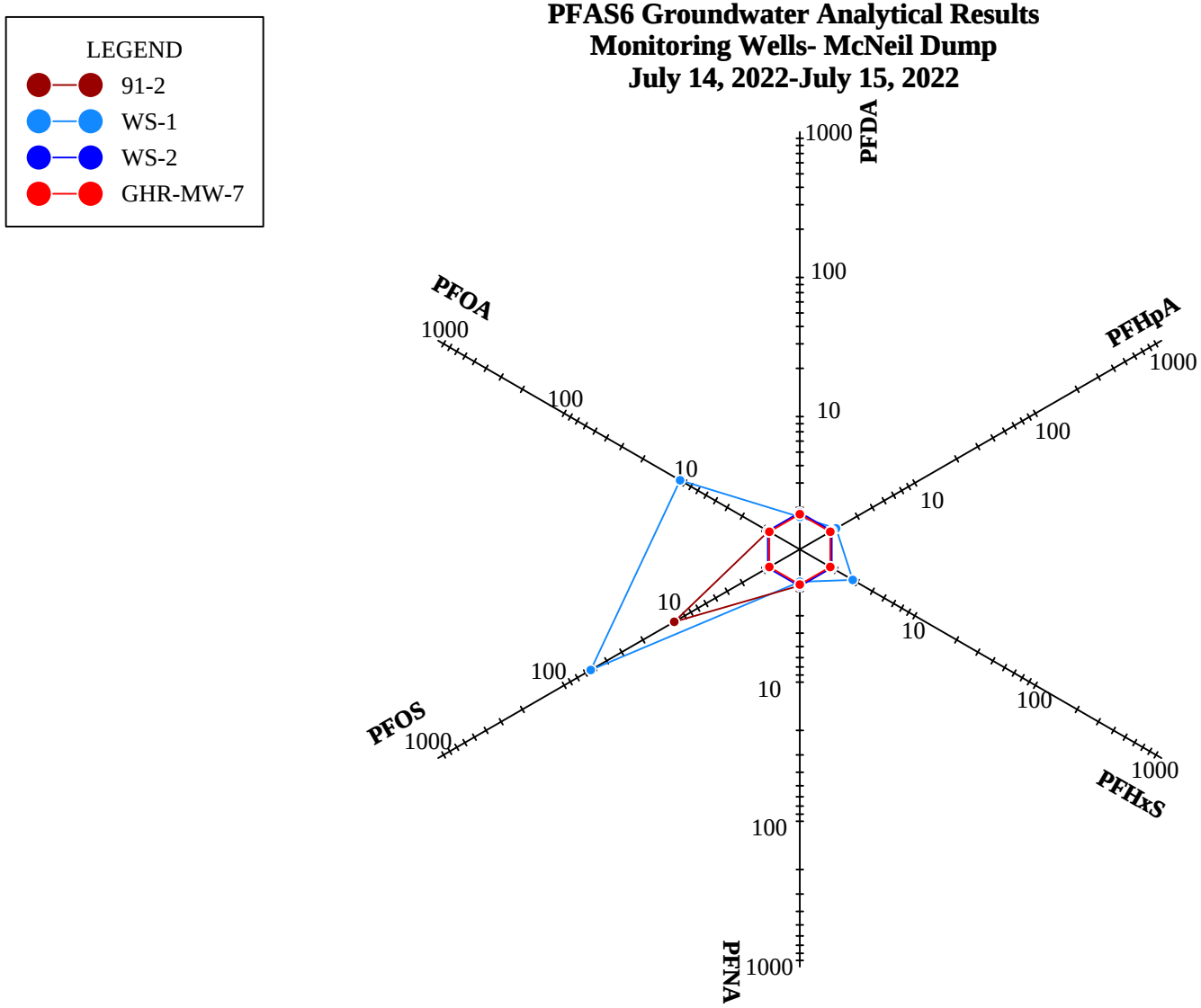


Weston & Sampson

Figure 5

McNeil Dump & Duxbury Municipal Landfill
DUXBURY, MASSACHUSETTS

PFAS6 Groundwater Analytical Results
Monitoring Wells- McNeil Dump
July 14, 2022-July 15, 2022



Weston & Sampson

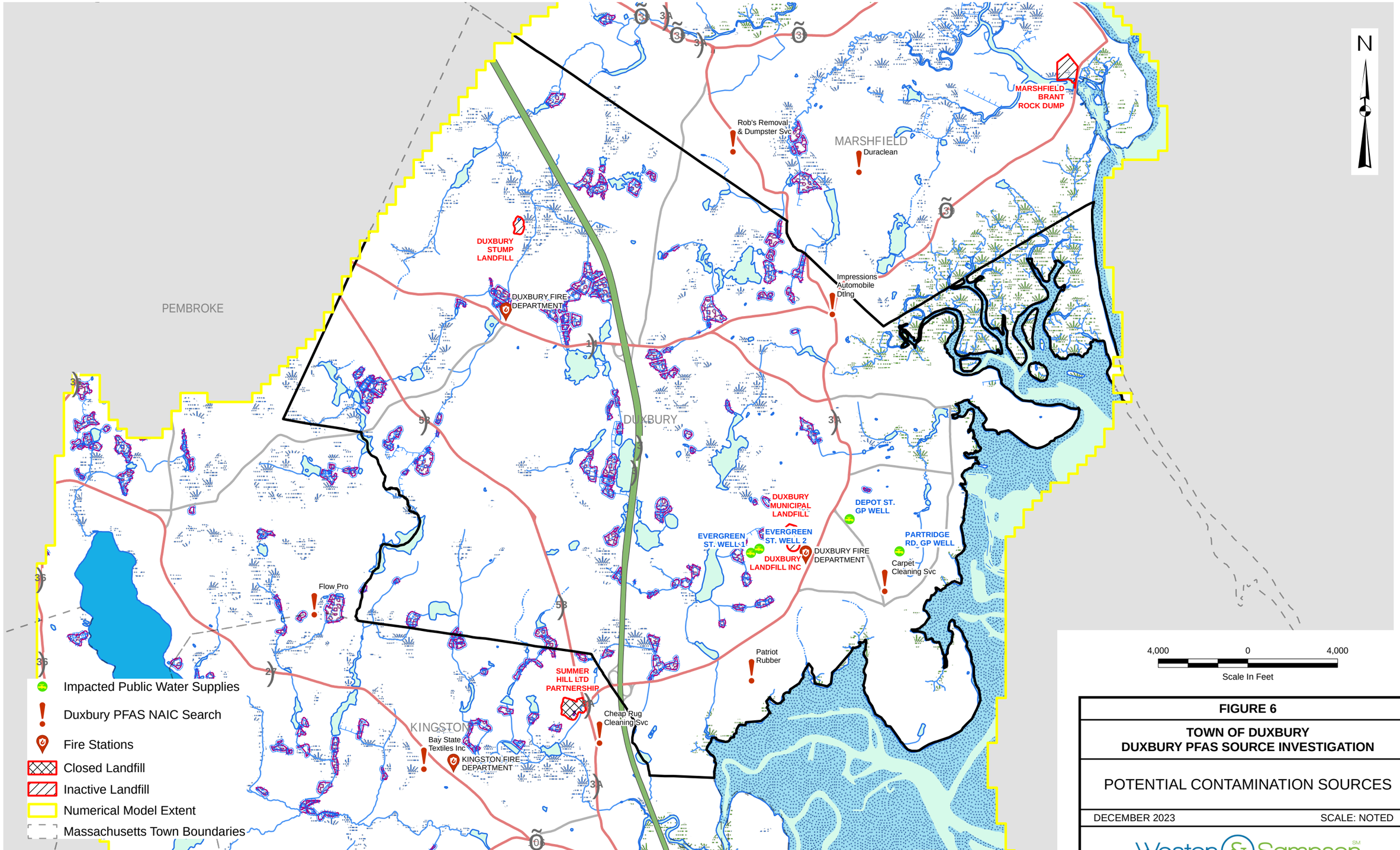


FIGURE 6

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

POTENTIAL CONTAMINATION SOURCES

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 6- PCS.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 12/29/2023 12:37 PM **Opened:** 12/29/2023 4:20 PM

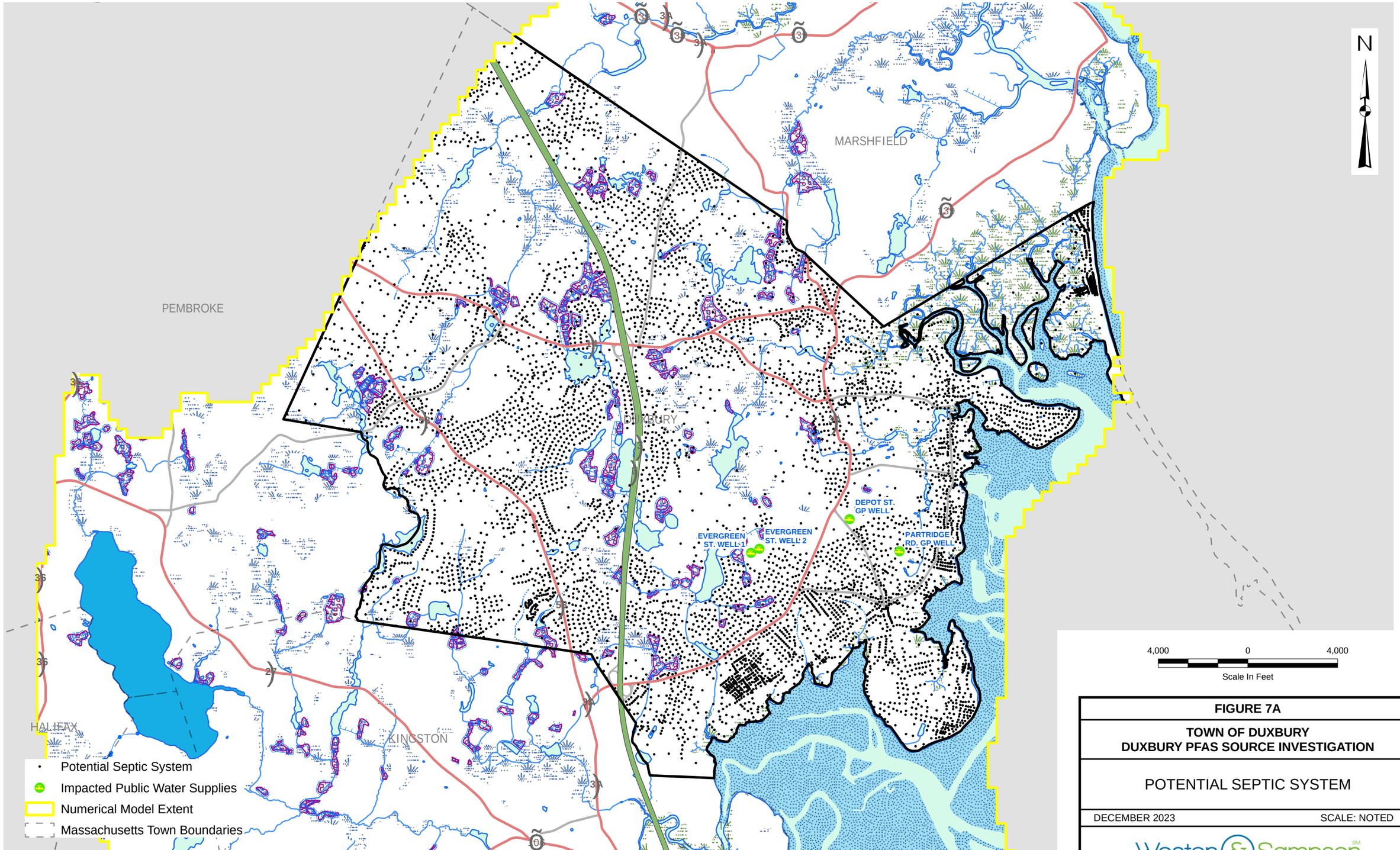


FIGURE 7A

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

POTENTIAL SEPTIC SYSTEM

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 4- SS Density.apx **Map:** Model Domain **User:** GetchellJ **Saved:** 2/1/2024 9:11 AM **Opened:** 2/1/2024 9:13 AM

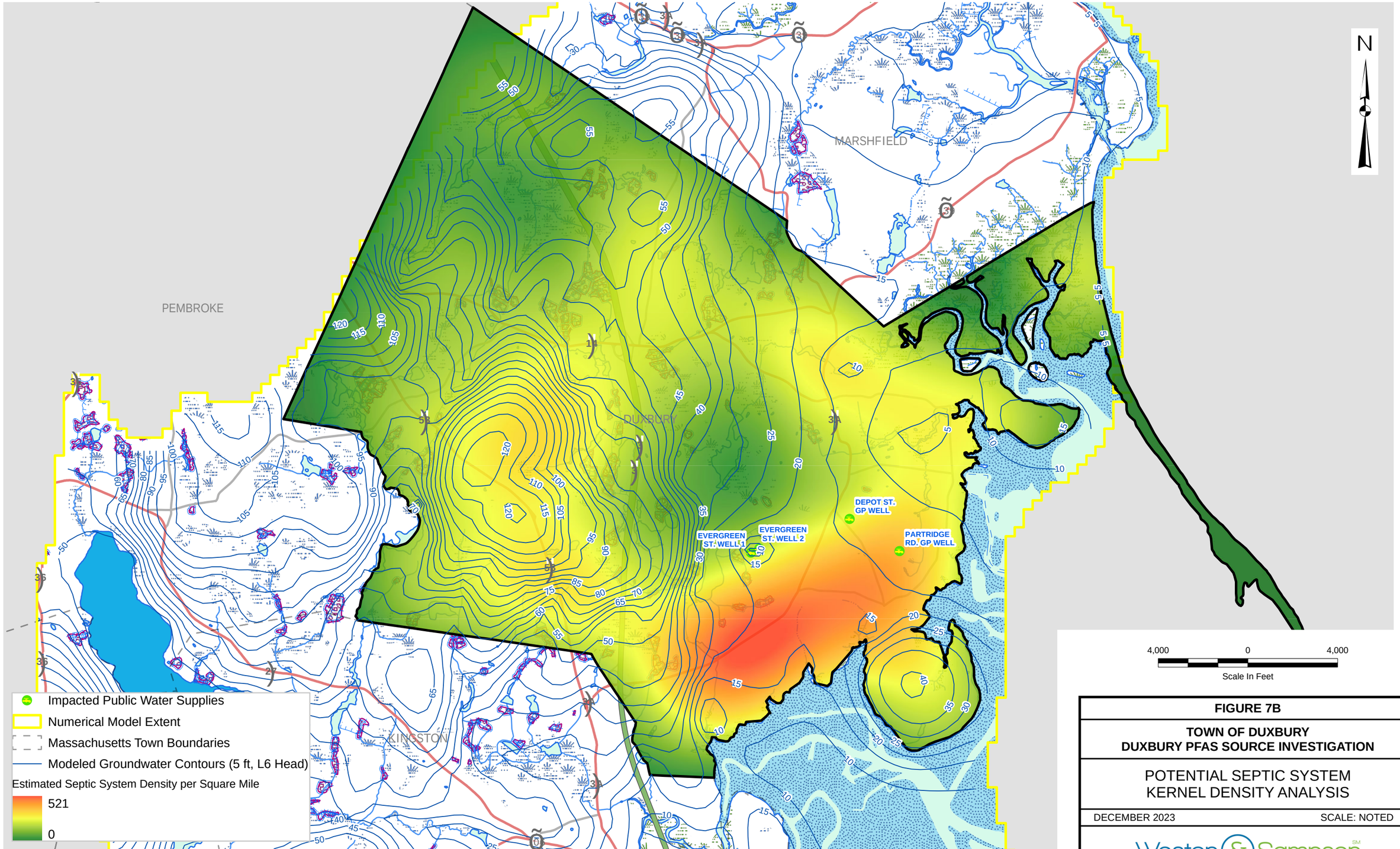


FIGURE 7B

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

POTENTIAL SEPTIC SYSTEM
KERNEL DENSITY ANALYSIS

DECEMBER 2023 SCALE: NOTED

Weston & Sampson SM

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 4B - SS Density.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 2/1/2024 2:15 PM **Opened:** 2/5/2024 5:12 PM

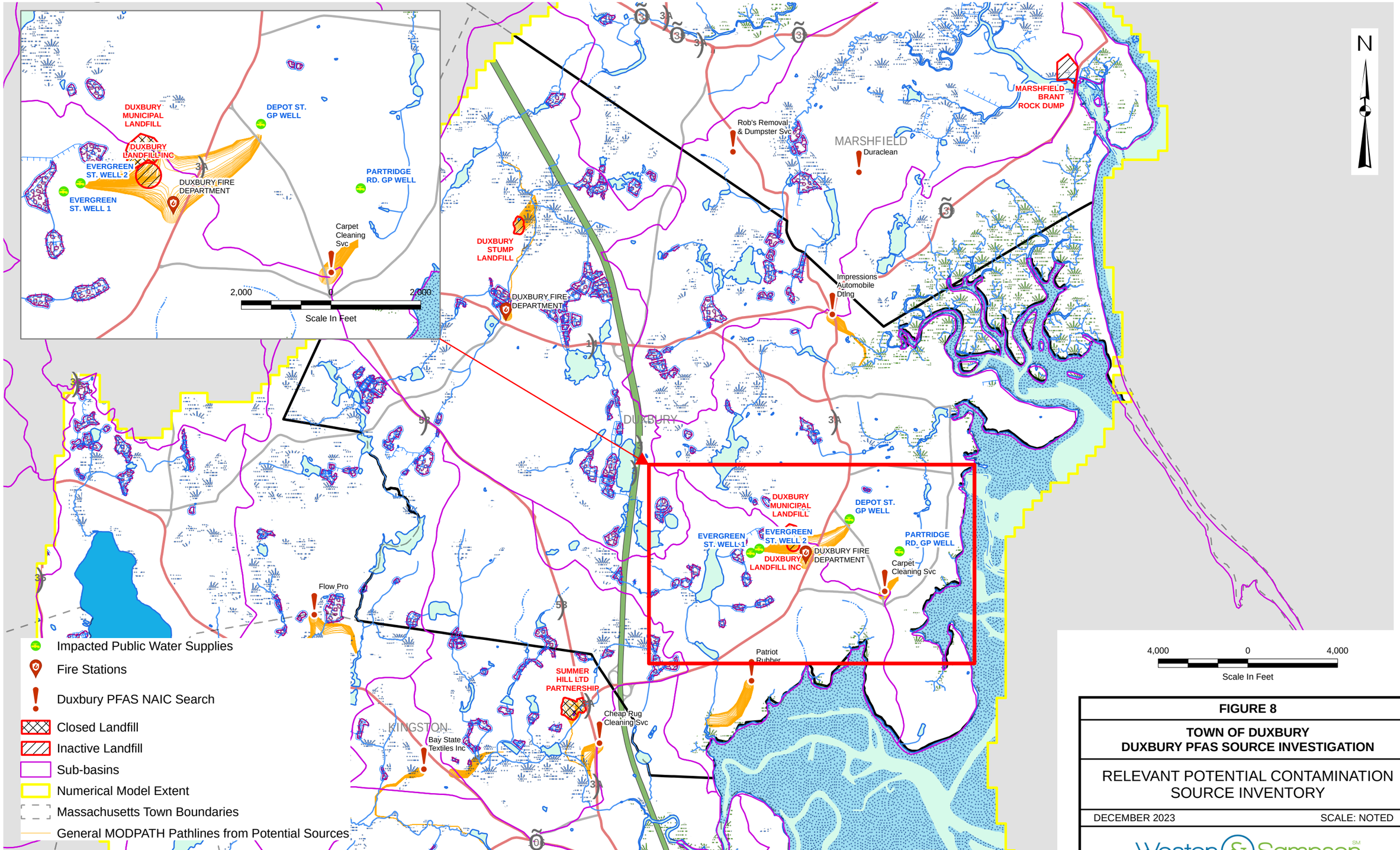


FIGURE 8

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

RELEVANT POTENTIAL CONTAMINATION SOURCE INVENTORY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 3- Relevant PCS.aprx **Map: User:** GetchelJ **Saved:** 12/28/2023 8:43 AM **Opened:** 12/28/2023 8:45 AM

SIMULATION (Steady-State):
Evergreen Street Wells #1 & #2, Partridge Road Well, Depot Street Well Pumping (All Wells) at Permitted Rates

Percent Impacted Capture Zone from Duxbury Landfills:
Evergreen Street Well #1- 0%
Evergreen Street Well #2- 2%
Partridge Road Well- 0%
Depot Street Well- 3%

N

DUXBURY MUNICIPAL LANDFILL
DEPOT ST. GP WELL
EVERGREEN ST. WELL 2
EVERGREEN ST. WELL 1
DUXBURY LANDFILL INC
DUXBURY FIRE DEPARTMENT
PARTRIDGE RD. GP WELL
95 Fairway Lane
49 Surplus Street
Carpet Cleaning Svc
Patriot Rubber
Depot Street
Tremont Street
Chestnut Street
King Town Way

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- MODPATH Pathlines (Forward)
- Modeled Groundwater Contours (5 ft, L6 Head)

1,800 0 1,800
Scale In Feet

FIGURE 9

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION:
ALL WELLS

DECEMBER 2023 SCALE: NOTED

Weston & Sampson SM

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 5- All Wells SS.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/11/2024 11:09 AM **Opened:** 1/11/2024 11:13 AM

SIMULATION (Steady-State):
Depot Street Well Pumping at Permitted Rate

Percent Impacted Capture Zone from Duxbury Landfills:
Depot Street Well- 36%

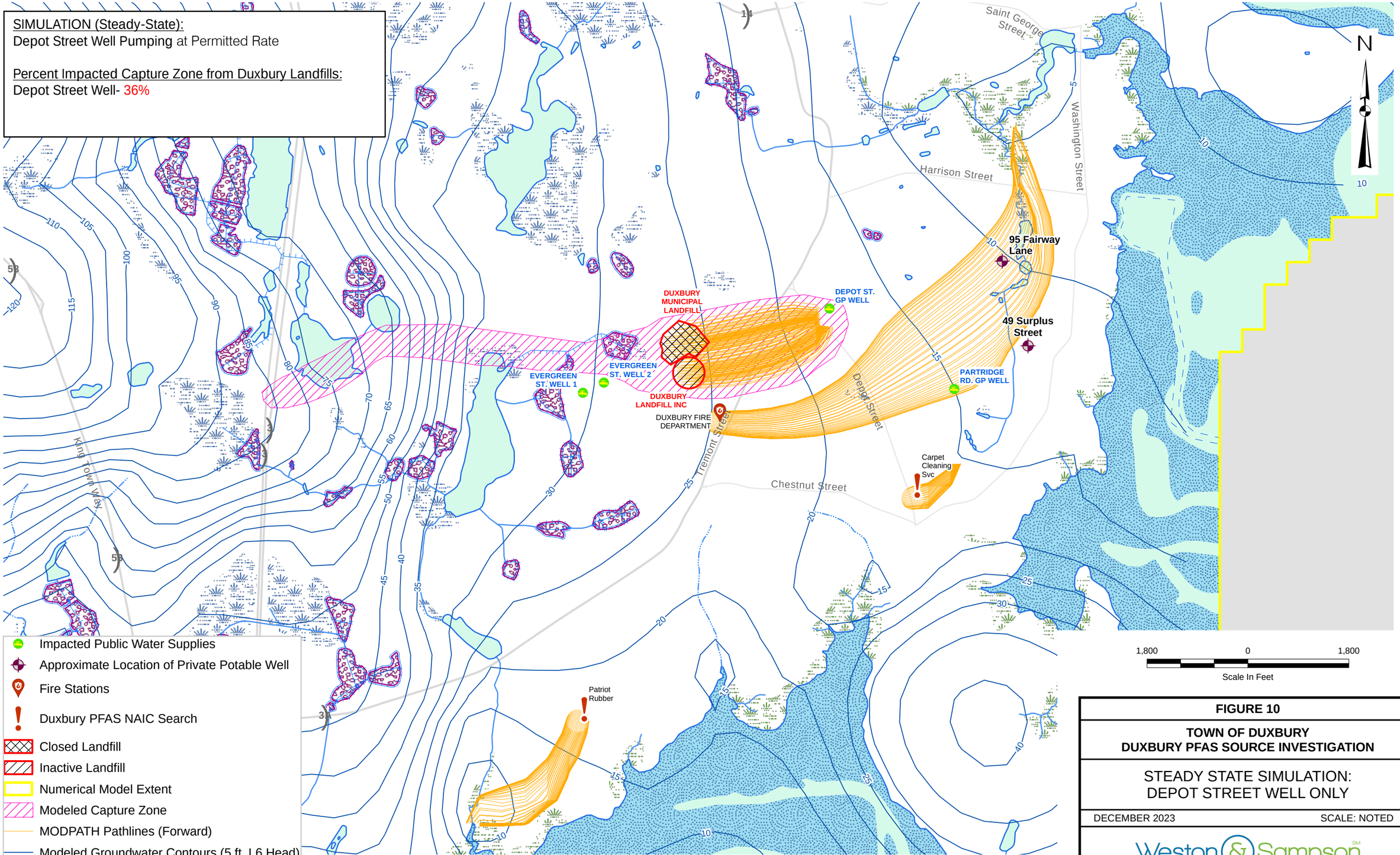


FIGURE 10

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION:
DEPOT STREET WELL ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 6- Depot Only SS.aprx **Map:** Model Domain **User:** Getchell **Saved:** 1/11/2024 11:20 AM **Opened:** 1/11/2024 11:21 AM

SIMULATION (Steady-State):
Partridge Road Well Pumping at Permitted Rate

Percent Impacted Capture Zone from Duxbury Landfills:
Partridge Road Well- 16%

DUXBURY MUNICIPAL LANDFILL
DEPOT ST. GP WELL
95 Fairway Lane
49 Surplus Street
EVERGREEN ST. WELL 1
EVERGREEN ST. WELL 2
DUXBURY LANDFILL INC
DUXBURY FIRE DEPARTMENT
PARTRIDGE RD. GP WELL
Carpet Cleaning Svc
Patriot Rubber
Saint George Street
Washington Street
Harrison Street
Depot Street
Tremont Street
Chestnut Street
King Town Way

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- Modeled Groundwater Contours (5 ft, L6 Head)
- MODPATH Pathlines (Forward)

N

1,800 0 1,800
Scale In Feet

FIGURE 11

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION:
PARTRIDGE ROAD WELL ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG\23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 7- Partridge Only SS.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/11/2024 11:38 AM **Opened:** 1/11/2024 11:41 AM

SIMULATION (Steady-State):
Evergreen Street Wells Pumping at Permitted Rates

Percent Impacted Capture Zone from Duxbury Landfills:
Evergreen Street Well #1- 0%
Evergreen Street Well #2- 2%

DUXBURY MUNICIPAL LANDFILL
EVERGREEN ST. WELL 2
EVERGREEN ST. WELL 1
DUXBURY LANDFILL-INC
DUXBURY FIRE DEPARTMENT
DEPOT ST. GP WELL
95 Fairway Lane
49 Surplus Street
PARTRIDGE RD. GP WELL
Carpet Cleaning Svc
Patriot Rubber
Harrison Street
Depot Street
Tremont Street
Chestnut Street
King Town Way

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- Modeled Groundwater Contours (5 ft, L6 Head)
- MODPATH Pathlines (Forward)

N

1,800 0 1,800
Scale In Feet

FIGURE 12

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION:
EVERGREEN STREET WELLS ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MAENG\23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 8- Evergreen Only SS.aprx Map: Model Domain User: Getchell Saved: 1/11/2024 11:44 AM Opened: 1/11/2024 11:45 AM

SIMULATION (Steady-State):
Partridge Road Well and Depot Street Well Pumping at Permitted Rates
Percent Impacted Capture Zone from Duxbury Landfills:
Partridge Road Well- 0%
Depot Street Well- 35%

N

DUXBURY MUNICIPAL LANDFILL
DEPOT ST. GP WELL
EVERGREEN ST. WELL 1
EVERGREEN ST. WELL 2
DUXBURY LANDFILL INC
DUXBURY FIRE DEPARTMENT
PARTRIDGE RD. GP WELL
95 Fairway Lane
49 Surplus Street
Carpet Cleaning Svc
Patriot Rubber
Harrison Street
Chestnut Street
Depot Street
Tremont Street
King Town Way

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- MODPATH Pathlines (Forward)
- Modeled Groundwater Contours (5 ft, L6 Head)

1,800 0 1,800
Scale In Feet

FIGURE 13

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION: PARTRIDGE ROAD & DEPOT STREET WELL ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson SM

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 9- partridge and depot SS.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/11/2024 12:01 PM **Opened:** 1/11/2024 12:08 PM

SIMULATION (Steady-State):
Evergreen Street Wells #1 & #2 and Partridge Road Well Pumping at Permitted Rates

Percent Impacted Capture Zone from Duxbury Landfills:
Evergreen Street Well #1- 0%
Evergreen Street Well #2- 2%
Partridge Road Well- 1%

DUXBURY MUNICIPAL LANDFILL
EVERGREEN ST. WELL 2
EVERGREEN ST. WELL 1
DUXBURY LANDFILL INC
DUXBURY FIRE DEPARTMENT
DEPOT ST. GP WELL
PARTRIDGE RD. GP WELL
95 Fairway Lane
49 Surplus Street
Carpet Cleaning Svc
Patriot Rubber
Harrison Street
Depot Street
Tremont Street
Chestnut Street
King Town Way

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- Modeled Groundwater Contours (5 ft, L6 Head)
- MODPATH Pathlines (Forward)

N

1,800 0 1,800
Scale In Feet

FIGURE 14

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION: EVERGREEN STREET & PARTRIDGE ROAD WELLS ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 10- Evergreen and depot SS.aprx Map: Model Domain User: Getchellu Saved: 1/11/2024 12:20 PM Opened: 1/11/2024 12:22 PM

SIMULATION (Steady-State):
Evergreen Street Wells #1 & #2 and Partridge Road Well Pumping at Permitted Rates

Percent Impacted Capture Zone from Duxbury Landfills:
Evergreen Street Well #1- 0%
Evergreen Street Well #2- 2%
Partridge Road Well- 1%

N

West Street
Harrison Street
Washington Street
Depot Street
Tremont Street
Chestnut Street
King Town Way

DUXBURY MUNICIPAL LANDFILL
EVERGREEN ST. WELL 2
EVERGREEN ST. WELL 1
DUXBURY LANDFILL-INC
DUXBURY FIRE DEPARTMENT
DEPOT ST. GP WELL
PARTRIDGE RD. GP WELL
95 Fairway Lane
49 Surplus Street
Carpet Cleaning Svc
Patriot Rubber

- Impacted Public Water Supplies
- Approximate Location of Private Potable Well
- Fire Stations
- Duxbury PFAS NAIC Search
- Closed Landfill
- Inactive Landfill
- Numerical Model Extent
- Modeled Capture Zone
- Modeled Groundwater Contours (5 ft, L6 Head)
- MODPATH Pathlines (Forward)

1,700 0 1,700
Scale In Feet

FIGURE 15

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

STEADY STATE SIMULATION: EVERGREEN STREET & PARTRIDGE ROAD WELLS ONLY

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 11- Evergreen and Partridge SS.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/11/2024 12:34 PM **Opened:** 1/11/2024 12:39 PM

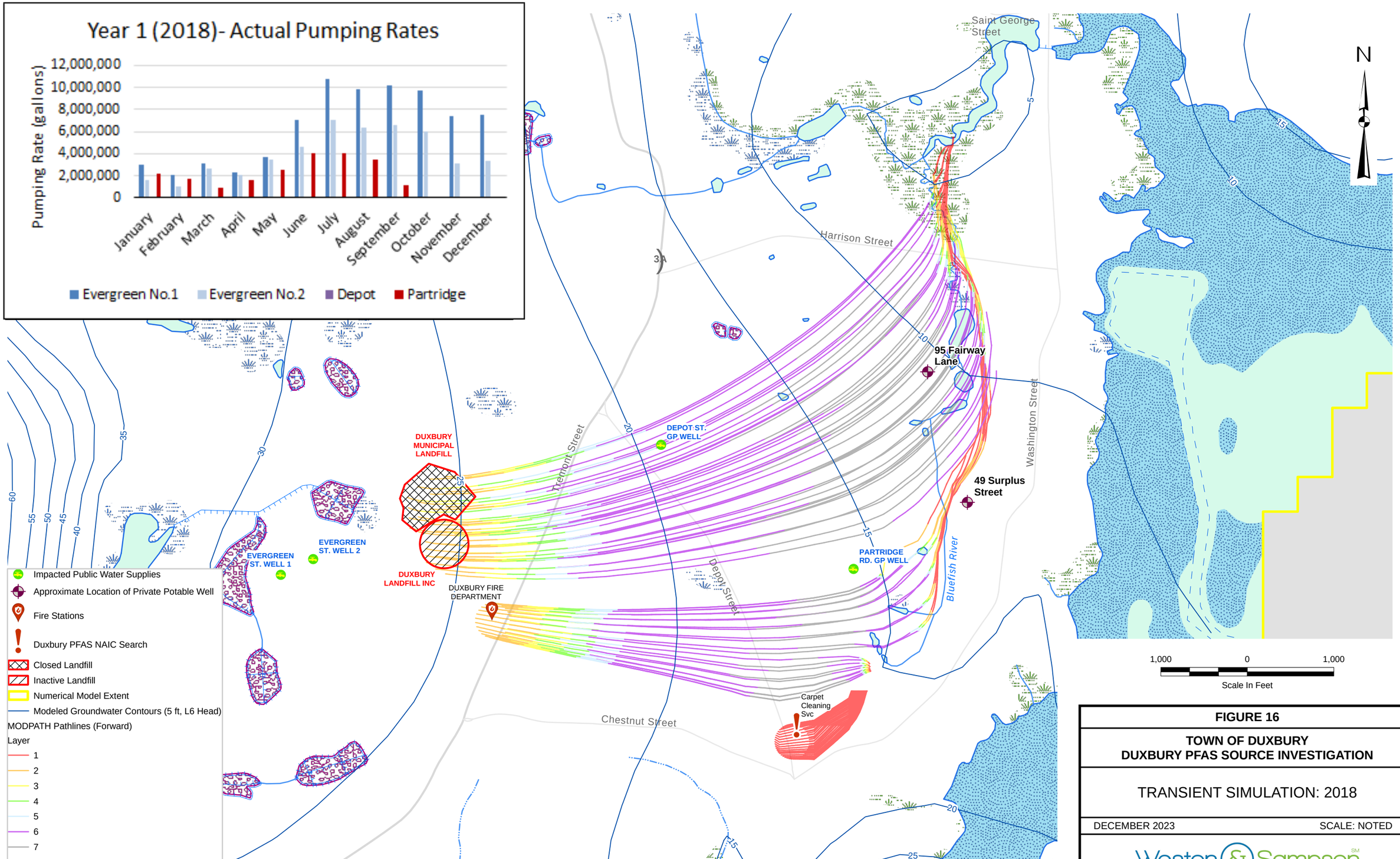


FIGURE 16

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

TRANSIENT SIMULATION: 2018

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 12- 2018.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 12/21/2023 9:37 PM **Opened:** 1/11/2024 12:45 PM

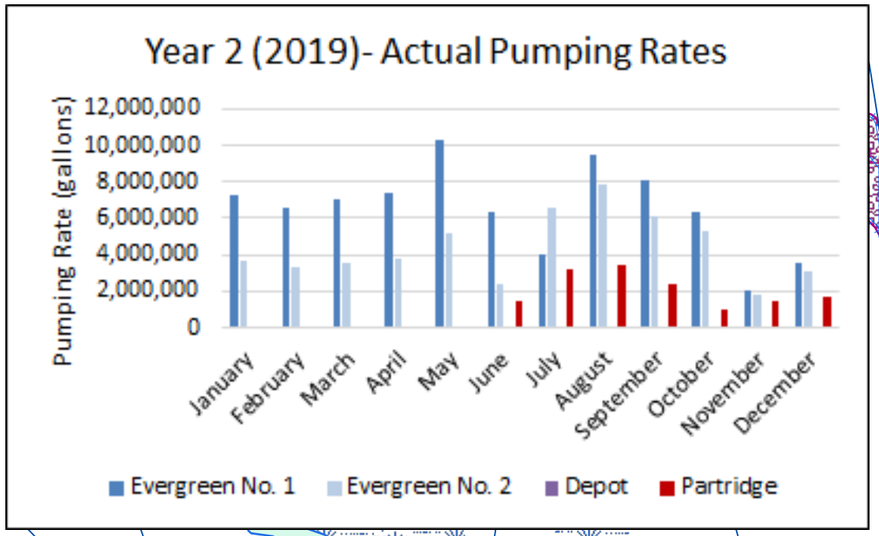


FIGURE 17

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

TRANSIENT SIMULATION: 2019

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 13- 2019.aprx **Map:** Model Domain **User:** Getchell **Saved:** 1/11/2024 12:58 PM **Opened:** 1/11/2024 1:26 PM

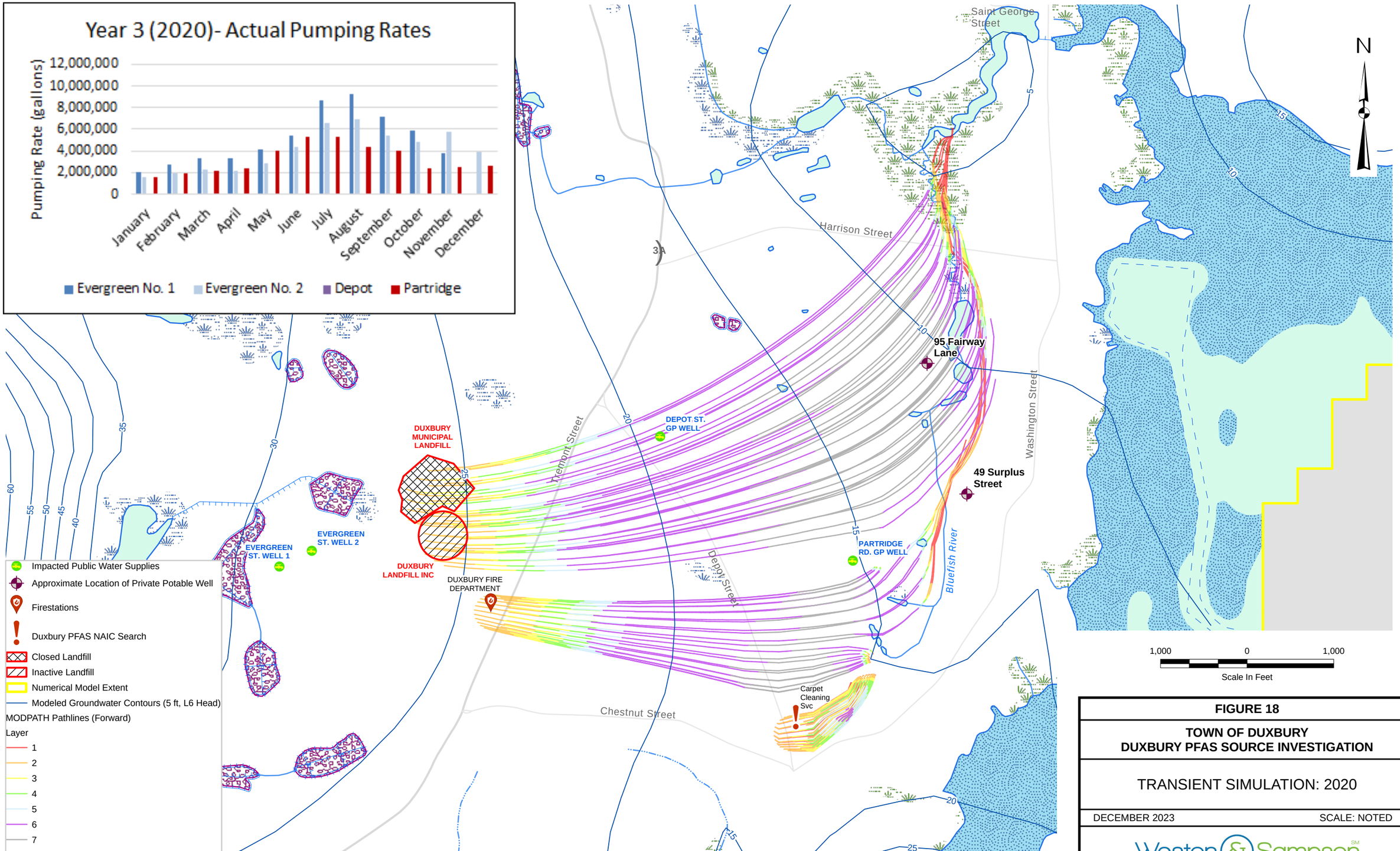


FIGURE 18

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

TRANSIENT SIMULATION: 2020

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 14- 2020.aprx **Map:** Model Domain **User:** GetchellJ **Saved:** 1/11/2024 12:57 PM **Opened:** 1/11/2024 12:58 PM

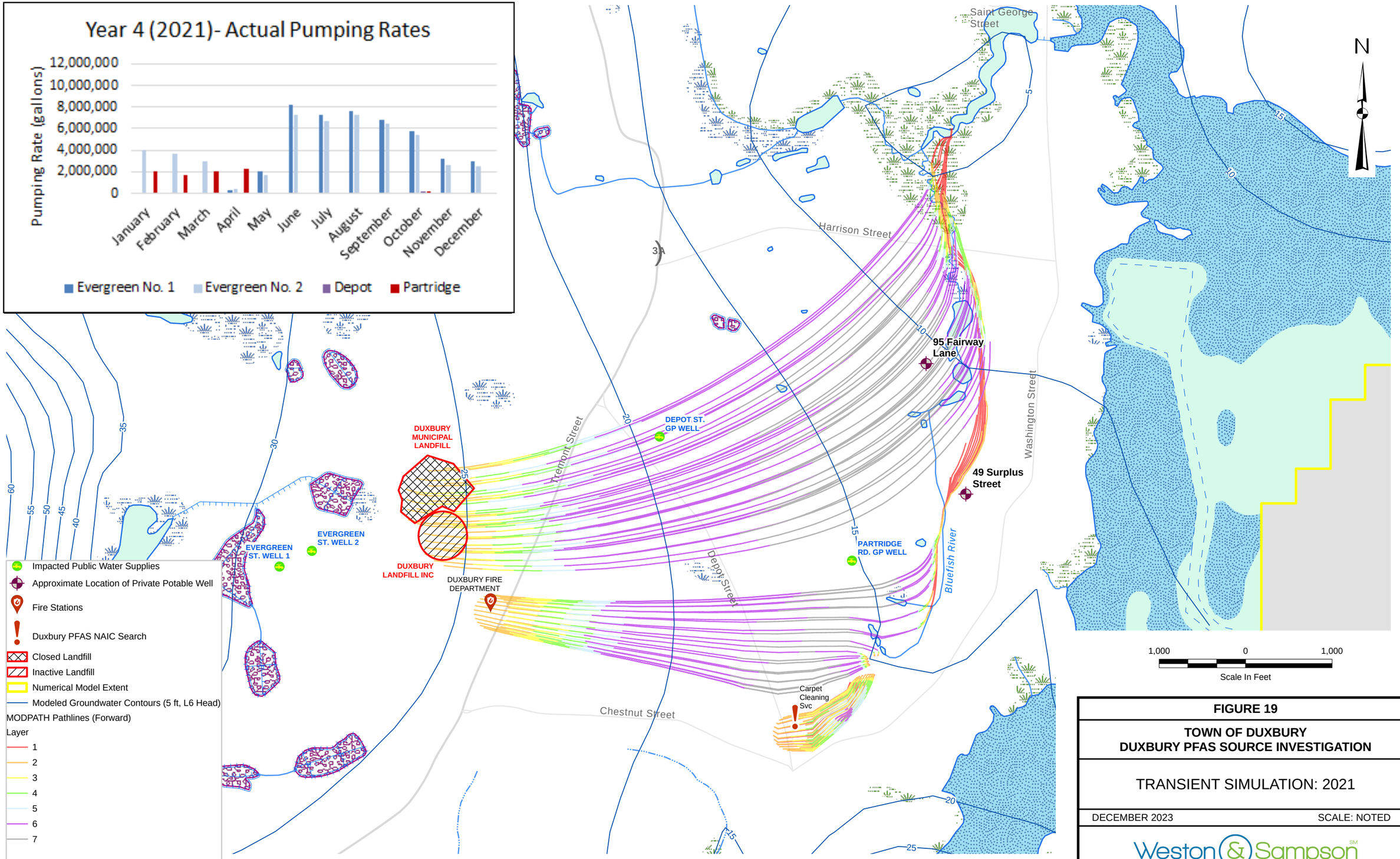


FIGURE 19

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

TRANSIENT SIMULATION: 2021

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 15- 2021.aprx **Map:** Model Domain **User:** Getchell **Saved:** 12/21/2023 10:06 PM **Opened:** 1/11/2024 1:07 PM

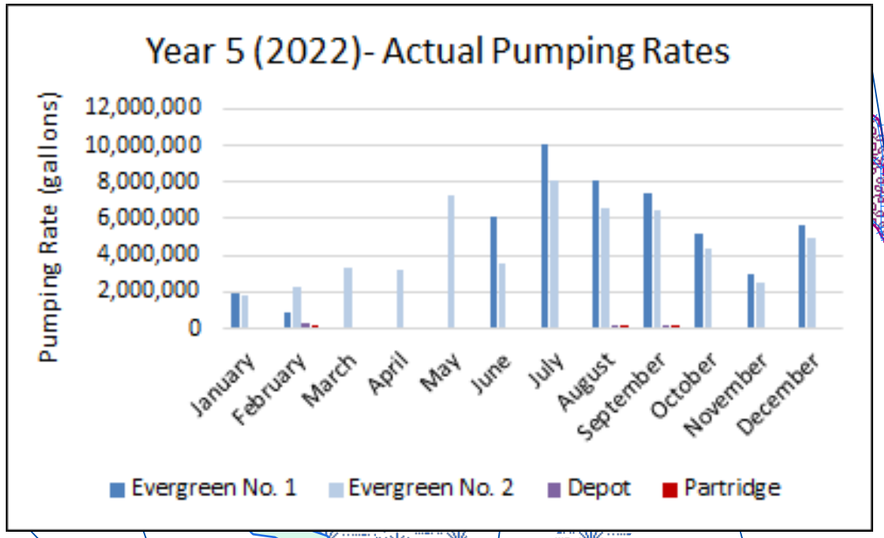


FIGURE 20

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

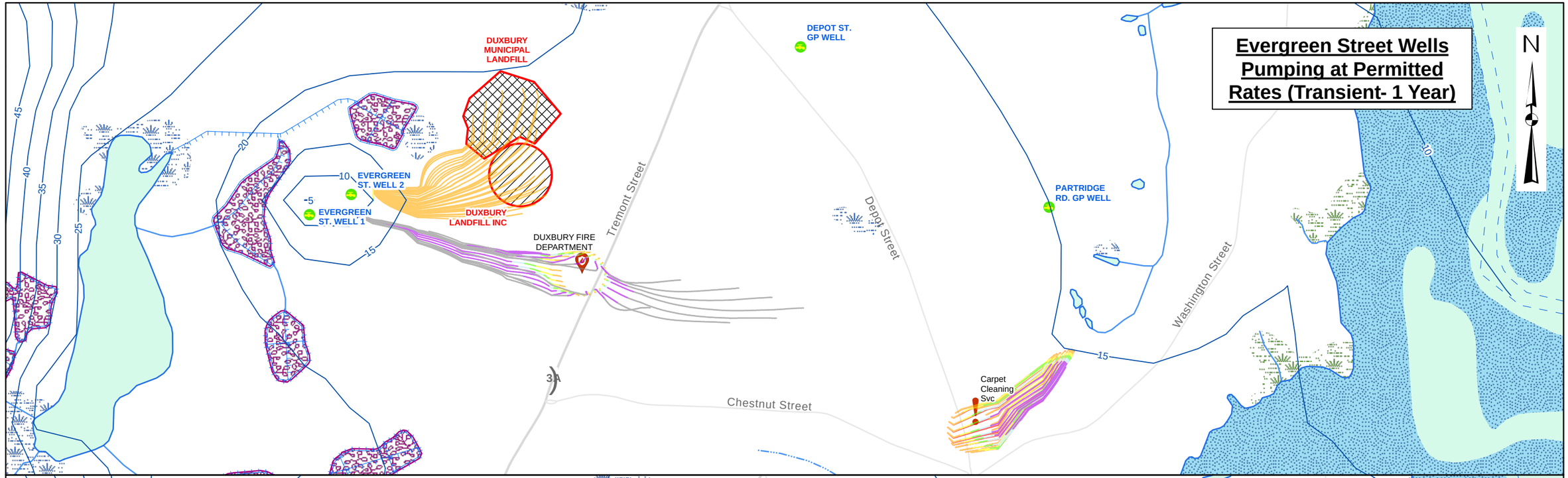
TRANSIENT SIMULATION: 2022

DECEMBER 2023 SCALE: NOTED

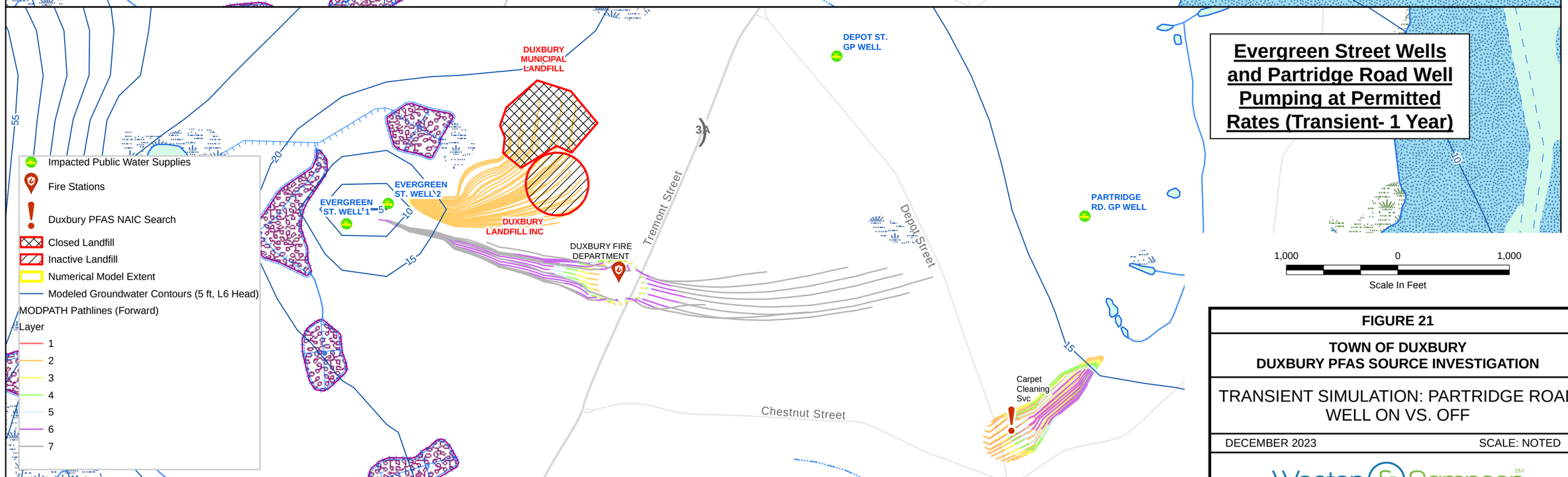
Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\ReportFigure 16- 2022.aprx **Map:** Model Domain **User:** Getchell **Saved:** 1/11/2024 1:14 PM **Opened:** 1/11/2024 1:17 PM

Evergreen Street Wells Pumping at Permitted Rates (Transient- 1 Year)



Evergreen Street Wells and Partridge Road Well Pumping at Permitted Rates (Transient- 1 Year)



1,000 0 1,000

Scale In Feet

FIGURE 21

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

TRANSIENT SIMULATION: PARTRIDGE ROAD WELL ON VS. OFF

DECEMBER 2023 SCALE: NOTED

Weston & Sampson SM

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 17- Transient Evergreen Permitted 1 year.aprx User: GetchellJ Saved: 1/11/2024 2:21 PM Opened: 1/11/2024 2:22 PM

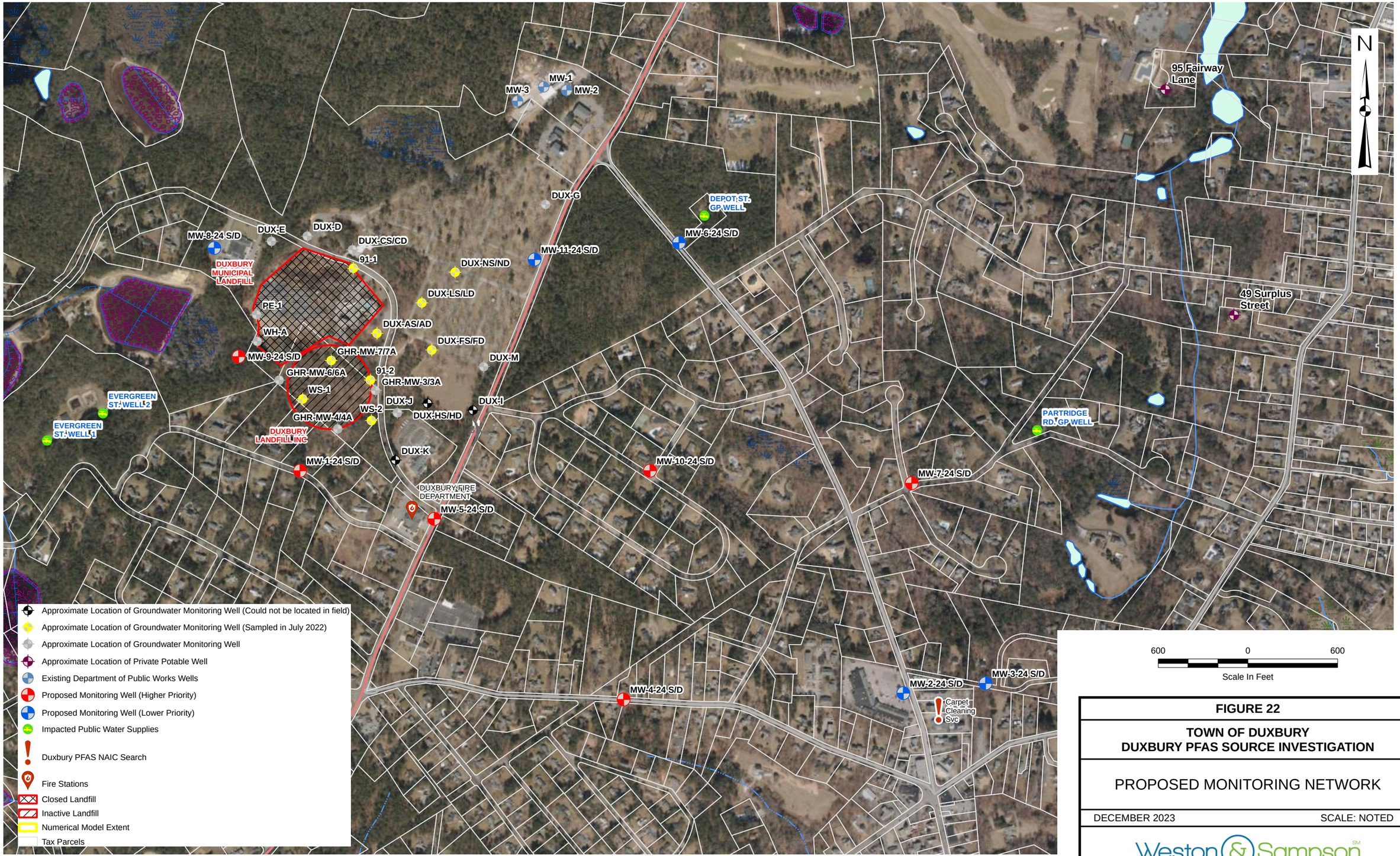


FIGURE 22

TOWN OF DUXBURY
DUXBURY PFAS SOURCE INVESTIGATION

PROPOSED MONITORING NETWORK

DECEMBER 2023 SCALE: NOTED

Weston & Sampson

Path: P:\MA\Duxbury MA\ENG23-0392 PFAS Source Investigation\007 GIS\Mapfiles\Report\Figure 22- Proposed Monitoring Network.aprx **Map:** Model Domain **User:** Getchell **Saved:** 2/28/2024 12:29 PM **Opened:** 2/28/2024 12:34 PM

ATTACHMENT 2
Laboratory Reports

ANALYTICAL REPORT

Lab Number:	L2347692
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Mark Cloud
Phone:	(781) 934-1100
Project Name:	DUXBURY PWS
Project Number:	4082000
Report Date:	08/28/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110) , NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2347692-01	10000 DEPOT ST WELL	DW	DUXBURY, MA	08/16/23 10:27	08/17/23
L2347692-02	10003 LAKESHORE WELL	DW	DUXBURY, MA	08/16/23 08:38	08/17/23
L2347692-03	10005 MILLBROOK WELL	DW	DUXBURY, MA	08/16/23 09:57	08/17/23
L2347692-04	10006 PARTRIDGE WELL	DW	DUXBURY, MA	08/16/23 10:48	08/17/23
L2347692-05	100070 TREMONT WELLS	DW	DUXBURY, MA	08/16/23 10:10	08/17/23
L2347692-06	100071 MAYFLOWER WELLS	DW	DUXBURY, MA	08/16/23 09:00	08/17/23
L2347692-07	100072 EVERGREEN WELLS	DW	DUXBURY, MA	08/16/23 08:10	08/17/23
L2347692-08	100073 DAMON WELLS	DW	DUXBURY, MA	08/16/23 09:43	08/17/23
L2347692-09	10000 FB	DW	DUXBURY, MA	08/16/23 10:27	08/17/23
L2347692-10	10003 FB	DW	DUXBURY, MA	08/16/23 08:38	08/17/23
L2347692-11	10005 FB	DW	DUXBURY, MA	08/16/23 09:57	08/17/23
L2347692-12	10006 FB	DW	DUXBURY, MA	08/16/23 10:48	08/17/23
L2347692-13	100070 FB	DW	DUXBURY, MA	08/16/23 10:10	08/17/23
L2347692-14	100071 FB	DW	DUXBURY, MA	08/16/23 09:00	08/17/23
L2347692-15	100072 FB	DW	DUXBURY, MA	08/16/23 08:10	08/17/23
L2347692-16	100073 FB	DW	DUXBURY, MA	08/16/23 09:43	08/17/23

Project Name:	DUXBURY PWS	**Lab Number:**	L2347692
Project Number:	4082000	**Report Date:**	08/28/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: DUXBURY PWS **Lab Number:** L2347692
Project Number: 4082000 **Report Date:** 08/28/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by EPA 537.1

L2347692-02R, -10R, -12R, -14R, and WG1818085-4R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

L2347692-06RE, -07RE, and -08RE: The sample was re-extracted within holding time due to QC failures in the original extraction. The results of the re-extraction are reported.

WG1818085-1: The surrogate recovery is above the acceptance criteria for perfluoro-n-[1,2-13c2]decanoic acid (13c-pfda) (132%). Since the blank was non-detect for all associated target analytes, The results of the original analysis is reported.

WG1818085-3: The Matrix Spike level is at the Reporting Limit (RL); any detections below the RL in the native sample are not included in the % Recovery calculation.

The WG1818085-3 MS recovery, performed on L2347692-01, is outside the acceptance criteria fo perfluorooctanesulfonic acid (pfos) (157%).

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Ashley Boucher Ashley Boucher

Title: Technical Director/Representative Date: 08/28/23

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-01
Client ID: 10000 DEPOT ST WELL
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 10:27
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 04:24
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.684	1
Perfluorohexanoic Acid (PFHxA)	1.27	J	ng/l	2.00	0.684	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.684	1
Perfluoroheptanoic Acid (PFHpA)	1.35	J	ng/l	2.00	0.684	1
Perfluorohexanesulfonic Acid (PFHxS)	0.942	J	ng/l	2.00	0.684	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.684	1
Perfluorooctanoic Acid (PFOA)	5.94		ng/l	2.00	0.684	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.684	1
Perfluorooctanesulfonic Acid (PFOS)	1.06	JZ	ng/l	2.00	0.684	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.684	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.684	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.684	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.684	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.684	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.684	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.684	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.684	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.684	1
PFAS, Total (6)	5.94		ng/l	2.00	0.684	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	85		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	109		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-02 R
Client ID: 10003 LAKESHORE WELL
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 08:38
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 03:27
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.84	J	ng/l	2.00	0.654	1
Perfluorohexanoic Acid (PFHxA)	2.23		ng/l	2.00	0.654	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.654	1
Perfluoroheptanoic Acid (PFHpA)	1.17	J	ng/l	2.00	0.654	1
Perfluorohexanesulfonic Acid (PFHxS)	1.02	J	ng/l	2.00	0.654	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.654	1
Perfluorooctanoic Acid (PFOA)	4.11		ng/l	2.00	0.654	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.654	1
Perfluorooctanesulfonic Acid (PFOS)	2.62		ng/l	2.00	0.654	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.654	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.654	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.654	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.654	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.654	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.654	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.654	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.654	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.654	1
PFAS, Total (6)	6.73		ng/l	2.00	0.654	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	128		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-03
Client ID: 10005 MILLBROOK WELL
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:57
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 04:59
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.39	J	ng/l	2.00	0.662	1
Perfluorohexanoic Acid (PFHxA)	2.22		ng/l	2.00	0.662	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.662	1
Perfluoroheptanoic Acid (PFHpA)	1.11	J	ng/l	2.00	0.662	1
Perfluorohexanesulfonic Acid (PFHxS)	0.792	J	ng/l	2.00	0.662	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.662	1
Perfluorooctanoic Acid (PFOA)	3.49		ng/l	2.00	0.662	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.662	1
Perfluorooctanesulfonic Acid (PFOS)	1.98	J	ng/l	2.00	0.662	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.662	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.662	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.662	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.662	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.662	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.662	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.662	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.662	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.662	1
PFAS, Total (6)	3.49		ng/l	2.00	0.662	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	84		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	125		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-04
Client ID: 10006 PARTRIDGE WELL
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 10:48
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 05:08
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	3.61		ng/l	2.00	0.648	1
Perfluorohexanoic Acid (PFHxA)	28.0		ng/l	2.00	0.648	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.648	1
Perfluoroheptanoic Acid (PFHpA)	6.36		ng/l	2.00	0.648	1
Perfluorohexanesulfonic Acid (PFHxS)	34.2		ng/l	2.00	0.648	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.648	1
Perfluorooctanoic Acid (PFOA)	6.28		ng/l	2.00	0.648	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.648	1
Perfluorooctanesulfonic Acid (PFOS)	23.9		ng/l	2.00	0.648	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.648	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.648	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.648	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.648	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.648	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.648	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.648	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.648	1
PFAS, Total (6)	70.7		ng/l	2.00	0.648	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	87		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	123		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-05
Client ID: 100070 TREMONT WELLS
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 10:10
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 05:17
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.631	1
Perfluorohexanoic Acid (PFHxA)	0.680	J	ng/l	2.00	0.631	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.631	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.631	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.631	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.631	1
Perfluorooctanoic Acid (PFOA)	1.10	J	ng/l	2.00	0.631	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.631	1
Perfluorooctanesulfonic Acid (PFOS)	1.55	J	ng/l	2.00	0.631	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.631	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.631	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.631	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.631	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.631	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.631	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.631	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.631	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.631	1
PFAS, Total (6)	ND		ng/l	2.00	0.631	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	86		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	127		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-06 RE
Client ID: 100071 MAYFLOWER WELLS
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:00
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 16:35
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 08/24/23 02:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.24	J	ng/l	2.00	0.671	1
Perfluorohexanoic Acid (PFHxA)	1.85	J	ng/l	2.00	0.671	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.671	1
Perfluoroheptanoic Acid (PFHpA)	0.884	J	ng/l	2.00	0.671	1
Perfluorohexanesulfonic Acid (PFHxS)	0.763	J	ng/l	2.00	0.671	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.671	1
Perfluorooctanoic Acid (PFOA)	2.97		ng/l	2.00	0.671	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.671	1
Perfluorooctanesulfonic Acid (PFOS)	2.41		ng/l	2.00	0.671	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.671	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.671	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.671	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.671	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.671	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.671	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.671	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.671	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.671	1
PFAS, Total (6)	5.38		ng/l	2.00	0.671	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	87		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	104		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		70-130

Project Name: DUXBURY PWS
Lab Number: L2347692
Project Number: 4082000
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-07 RE
Client ID: 100072 EVERGREEN WELLS
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 08:10
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 16:43
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 08/24/23 02:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.820	J	ng/l	2.00	0.652	1
Perfluorohexanoic Acid (PFHxA)	1.29	J	ng/l	2.00	0.652	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.652	1
Perfluoroheptanoic Acid (PFHpA)	0.703	J	ng/l	2.00	0.652	1
Perfluorohexanesulfonic Acid (PFHxS)	0.781	J	ng/l	2.00	0.652	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.652	1
Perfluorooctanoic Acid (PFOA)	2.15		ng/l	2.00	0.652	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.652	1
Perfluorooctanesulfonic Acid (PFOS)	1.05	J	ng/l	2.00	0.652	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.652	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.652	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.652	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.652	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.652	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.652	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.652	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.652	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.652	1
PFAS, Total (6)	2.15		ng/l	2.00	0.652	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	109		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		70-130

Project Name: DUXBURY PWS
Lab Number: L2347692
Project Number: 4082000
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-08 RE
Client ID: 100073 DAMON WELLS
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:43
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 16:52
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 08/24/23 02:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.63	J	ng/l	2.00	0.635	1
Perfluorohexanoic Acid (PFHxA)	3.61		ng/l	2.00	0.635	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.635	1
Perfluoroheptanoic Acid (PFHpA)	1.10	J	ng/l	2.00	0.635	1
Perfluorohexanesulfonic Acid (PFHxS)	0.988	J	ng/l	2.00	0.635	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.635	1
Perfluorooctanoic Acid (PFOA)	3.53		ng/l	2.00	0.635	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.635	1
Perfluorooctanesulfonic Acid (PFOS)	2.28		ng/l	2.00	0.635	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.635	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.635	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.635	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.635	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.635	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.635	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.635	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.635	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.635	1
PFAS, Total (6)	5.81		ng/l	2.00	0.635	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	108		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-09
Client ID: 10000 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 10:27
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 05:51
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.633	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.633	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.633	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.633	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.633	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.633	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.633	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.633	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.633	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.633	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.633	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.633	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.633	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.633	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.633	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.633	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.633	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.633	1
PFAS, Total (6)	ND		ng/l	2.00	0.633	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	84		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	125		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-10 R
Client ID: 10003 FB
Sample Location: DUXBURY, MA

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 18:47
Analyst: JPW

Date Collected: 08/16/23 08:38
Date Received: 08/17/23
Field Prep: Not Specified

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.637	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.637	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.637	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.637	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.637	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.637	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.637	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.637	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.637	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.637	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.637	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.637	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.637	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.637	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.637	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.637	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.637	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.637	1
PFAS, Total (6)	ND		ng/l	2.00	0.637	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	100		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	105		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	105		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-11
Client ID: 10005 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:57
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 06:35
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.627	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.627	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.627	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.627	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.627	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.627	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.627	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.627	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.627	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.627	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.627	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.627	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.627	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.627	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.627	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.627	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.627	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.627	1
PFAS, Total (6)	ND		ng/l	2.00	0.627	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	101		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	128		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-12 R
Client ID: 10006 FB
Sample Location: DUXBURY, MA

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 18:56
Analyst: JPW

Date Collected: 08/16/23 10:48
Date Received: 08/17/23
Field Prep: Not Specified

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.650	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.650	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.650	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.650	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.650	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.650	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.650	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.650	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.650	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.650	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.650	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.650	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.650	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.650	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.650	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.650	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.650	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.650	1
PFAS, Total (6)	ND		ng/l	2.00	0.650	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	106		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-13
Client ID: 100070 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 10:10
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 06:52
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.626	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.626	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.626	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.626	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.626	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.626	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.626	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.626	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.626	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.626	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.626	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.626	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.626	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.626	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.626	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.626	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.626	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.626	1
PFAS, Total (6)	ND		ng/l	2.00	0.626	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	130		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		70-130

Project Name: DUXBURY PWS
Lab Number: L2347692
Project Number: 4082000
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-14 R
Client ID: 100071 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:00
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/24/23 19:04
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.637	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.637	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.637	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.637	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.637	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.637	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.637	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.637	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.637	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.637	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.637	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.637	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.637	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.637	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.637	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.637	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.637	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.637	1
PFAS, Total (6)	ND		ng/l	2.00	0.637	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	112		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-15
Client ID: 100072 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 08:10
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 07:09
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.626	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.626	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.626	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.626	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.626	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.626	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.626	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.626	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.626	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.626	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.626	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.626	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.626	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.626	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.626	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.626	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.626	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.626	1
PFAS, Total (6)	ND		ng/l	2.00	0.626	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	129		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

SAMPLE RESULTS

Lab ID: L2347692-16
Client ID: 100073 FB
Sample Location: DUXBURY, MA

Date Collected: 08/16/23 09:43
Date Received: 08/17/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 08/23/23 07:18
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.634	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.634	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.634	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.634	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.634	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.634	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.634	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.634	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.634	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.634	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.634	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.634	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.634	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.634	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.634	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.634	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.634	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.634	1
PFAS, Total (6)	ND		ng/l	2.00	0.634	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	86		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	126		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 08/23/23 04:07
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-05,09-16 Batch: WG1818085-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 08/23/23 04:07
Analyst: JPW

Extraction Method: EPA 537.1
Extraction Date: 08/20/23 01:20

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-05,09-16 Batch: WG1818085-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	101		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	**132**	Q	70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		70-130

Project Name: DUXBURY PWS
Project Number: 4082000
Lab Number: L2347692
Report Date: 08/28/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 08/24/23 16:26
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 08/24/23 02:00

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 06-08 Batch: WG1819421-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	90		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	116		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-05,09-16 Batch: WG1818085-2								
Perfluorobutanesulfonic Acid (PFBS)	104		-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	120		-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	102		-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	124		-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	107		-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	121		-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	126		-		50-150	-		30
Perfluorononanoic Acid (PFNA)	146		-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	121		-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	144		-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	116		-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	130		-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	142		-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	116		-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	146		-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	110		-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	136		-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	104		-		50-150	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-05,09-16 Batch: WG1818085-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	102				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	128				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103				70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 Batch: WG1819421-2								
Perfluorobutanesulfonic Acid (PFBS)	91		-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	98		-		70-130	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	92		-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	102		-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	100		-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	106		-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	91		-		70-130	-		30
Perfluorononanoic Acid (PFNA)	110		-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	101		-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	106		-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	102		-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	96		-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	106		-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	100		-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	103		-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	100		-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	106		-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	85		-		70-130	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 Batch: WG1819421-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	96				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	110				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab 10000 DEPOT ST WELL	Associated sample(s): 01-05,09-16		QC Batch ID: WG1818085-3			QC Sample: L2347692-01			Client ID:			
Perfluorobutanesulfonic Acid (PFBS)	ND	1.75	2.05	117		-	-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	1.27J	1.97	2.87	146		-	-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	1.97	1.85J	94		-	-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	1.35J	1.97	2.68	136		-	-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.942J	1.8	2.64	147		-	-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	1.86	1.97J	106		-	-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	5.94	1.97	7.72	90		-	-		50-150	-		30
Perfluorononanoic Acid (PFNA)	ND	1.97	2.72	138		-	-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.06JZ	1.83	2.87	**157**	Q	-	-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	ND	1.97	2.32	118		-	-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	1.84	1.73J	94		-	-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	1.97	1.54J	78		-	-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	1.97	2.20	112		-	-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	1.97	1.46J	74		-	-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	ND	1.97	2.05	104		-	-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	1.86	1.50J	81		-	-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	1.97	2.05	104		-	-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	1.97	1.81J	92		-	-		50-150	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-05,09-16 QC Batch ID: WG1818085-3 QC Sample: L2347692-01 Client ID: 10000 DEPOT ST WELL												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	73				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	116				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	84				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 QC Batch ID: WG1819421-3 QC Sample: L2348802-01 Client ID: MS Sample												
Perfluorobutanesulfonic Acid (PFBS)	ND	126	113	90		-	-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	ND	142	136	96		-	-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	142	128	90		-	-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	142	128	90		-	-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	130	129	100		-	-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	134	138	103		-	-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	142	127	90		-	-		70-130	-		30
Perfluorononanoic Acid (PFNA)	ND	142	154	109		-	-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	ND	132	133	101		-	-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	ND	142	150	106		-	-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	132	133	101		-	-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	142	137	97		-	-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	142	147	104		-	-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	142	142	100		-	-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	ND	142	148	104		-	-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	134	131	98		-	-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	142	148	104		-	-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	142	122	86		-	-		70-130	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY PWS

Project Number: 4082000

Lab Number: L2347692

Report Date: 08/28/23

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 QC Batch ID: WG1819421-3 QC Sample: L2348802-01 Client ID: MS Sample												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	95				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	116				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-05,09-16 QC Batch ID: WG1818085-4 QC Sample: L2347692-02 Client ID: 10003 LAKESHORE WELL						
Perfluorobutanesulfonic Acid (PFBS)	1.84J	1.85J	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	2.23	2.00	ng/l	11		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	1.17J	1.10J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	1.02J	0.983J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.11	3.82	ng/l	7		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.62	2.38	ng/l	10		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-05,09-16 QC Batch ID: WG1818085-4 QC Sample: L2347692-02
Client ID: 10003 LAKESHORE WELL

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		83		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	128		128		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		92		70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 QC Batch ID: WG1819421-4 QC Sample: L2348753-02 Client ID: DUP Sample						
Perfluorobutanesulfonic Acid (PFBS)	1.39J	1.40J	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	1.06J	1.07J	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	0.954J	0.999J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	2.72	2.85	ng/l	5		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.20	2.22	ng/l	1		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 06-08 QC Batch ID: WG1819421-4 QC Sample: L2348753-02 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		88		70-130
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	92		88		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	109		100		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92		89		70-130

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2347692-01A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-01B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-02A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-02B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-03A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-03B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-04A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-04B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-05A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-05B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-06A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-06B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-07A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-07B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-08A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-08B	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-09A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-10A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-11A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-12A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-13A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-14A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)
L2347692-15A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2347692-16A	Plastic 250ml Trizma preserved	A	NA		2.9	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY PWS
Project Number: 4082000

Lab Number: L2347692
Report Date: 08/28/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name: DUXBURY PWS **Lab Number:** L2347692

Project Number: 4082000 **Report Date:** 08/28/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY PWS	**Lab Number:**	L2347692
Project Number:	4082000	**Report Date:**	08/28/23

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY PWS	**Lab Number:**	L2347692
Project Number:	4082000	**Report Date:**	08/28/23

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page 1 of 1

Date Rec'd in Lab: 8/17/23

ALPHA Job # L2347692

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 508-822-3288

Project Information

Project Name: DUXBURY PWS
PWS Name: DUXBURY WATER DEPT
Project Location: DUXBURY, MA
Project PWS ID# 4082600
Project Manager: MARK CLOUD
ALPHA Quote #:

Turn-Around Time

Standard ☒ Due Date:
Rush (only if pre approved) ☐ Time:

Report Information — ☐ FAX ☐ ADEx

Data Deliverables — ☒ EMAIL ☒ Add'l Deliverables

Billing Information — ☒ Same as Client Info; PO #

Please Indicate PWS Class Below

☒ COM ☐ NTNC ☐ TNC

SUBJECT TO MCL REPORTING

Client Information

Client: DUXBURY WATER
Address: 878 TEMPLE ST. DUXBURY MA 02332
Phone: 781.934.1100 x 5520
Fax:
Email: MCLOUD@DUXBURY-MA.GOV

These samples have been previously analyzed by Alpha ☒

Other Project Specific Requirements/ Comments/Detection Limits

* EACH LOCATION INCLUDES BLANK FOR ANALYSIS.

ANALYSIS

PFAS

Sample Filtration

☐ Done ☐ Lab to do

Preservation ☐ Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name *	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
47692-01	10000	DEPOT ST. WELL	08/16/23	10:27	DW	SN	X		X		X	X		2
-02	10003	LAKE SERENE WELL		08:38			X		X		X	X		2
-03	10005	MILLBROOK WELL		09:57			X		X		X	X		2
-04	10006	PONDBRIDGE WELL		10:48			X		X		X	X		2
-05	100070	TREASURY WELLS		10:10			X	X			X	X		2
-06	100071	MAYFLOWER WELL		09:00			X	X			X	X		2
-07	100072	EVERGREEN WELL		08:10			X	X			X	X		2
-08	100073	DAMON WELLS		09:43			X	X			X	X		2

Container Type: PL
Preservative: ✓

Container Code: P = Plastic; A = Amber Glass; V = Vial; G = Glass; B = Bacteria Cup; C = Cube; O = Other; E = Encore; D = BOD Bottle

Preservative Code: A = None; B = HCl; C = HNO3; D = H2SO4; E = NaOH; F = MeOH; G = NaHSO4; H = Na2S2O3; I = Ascorbic Acid; J = NH4Cl; K = Zn Acetate; O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Relinquished By:	Date/Time	Received By:	Date/Time
S. NAVARRO	11:53 8/17/23	[illegible] ASL	8/17/23 1153
[illegible] ASL	8/17/23 1620	[illegible]	8/17 1620
[illegible] Mendoza ASL	8/17/23 1930	[illegible] Mendoza ASL	8/17 1935
[illegible] Mendoza ASL	8/17/23 2040	[illegible] ASL	8/17/23 20:40

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

ANALYTICAL REPORT

Lab Number:	L2237316
Client:	Weston & Sampson 100 Foxboro Blvd. Suite 250 Foxborough, MA 02035
ATTN:	Sean Healey
Phone:	(508) 698-3034
Project Name:	MCNEIL LANDFILL
Project Number:	Not Specified
Report Date:	08/22/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NH NELAP (2064), CT (PH-0574), IL (200077), ME (MA00086), MD (348), NJ (MA935), NY (11148), NC (25700/666), PA (68-03671), RI (LAO00065), TX (T104704476), VT (VT-0935), VA (460195), USDA (Permit #P330-17-00196).

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193 800-624-9220 - www.alphalab.com

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2237316-01	MW-91-2	WATER	DUXBURY, MA	07/13/22 14:47	07/13/22
L2237316-02	WS-2	WATER	DUXBURY, MA	07/13/22 12:30	07/13/22
L2237316-03	WS-2	WATER	DUXBURY, MA	07/14/22 14:45	07/14/22
L2237316-04	MW-91-2	WATER	DUXBURY, MA	07/14/22 14:30	07/14/22
L2237316-05	WS-1	WATER	DUXBURY, MA	07/13/22 19:00	07/14/22
L2237316-06	GHR-MW-7	WATER	DUXBURY, MA	07/13/22 17:45	07/14/22

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316
Project Number: Not Specified **Report Date:** 08/22/22

Case Narrative (continued)

Report Revision

August 22, 2022: At the client's request, the following changes have been made to this report:

The MCP Questionnaire has been removed.

L2237316-01 and -02: The metals element list was amended.

L2237316-03 and -04 were created in order to report the results of the 1,4-Dioxane by 8270-SIM analysis previously reported on Alpha Samples L2237728-12 and -13. These results are reported without CAM protocols.

L2237316-05 and -06 were created in order to report the results of all analyses previously reported on Alpha Samples L2237728-05 and -11. The Metals are now reported as Dissolved. These results are reported without CAM protocols.

L2237316-06: The Client ID was changed.

Report Submission

August 03, 2022: This final report includes the results of all requested analyses.

July 27, 2022: This is a preliminary report.

MCP Related Narratives

Volatile Organics

L2237316-01 and -02: Initial calibration utilized a quadratic fit for: naphthalene, 1,2,4-trichlorobenzene, 1,2,3-trichlorobenzene

L2237316-01 and -02: Initial Calibration did not meet:

Lowest Calibration Standard Minimum Response Factor: 1,4-dioxane (0.0008)

Average Response Factor: 1,4-dioxane

L2237316-01 and -02: The associated continuing calibration standard is outside the acceptance criteria for several compounds; however, it is within overall method allowances. Associated results are considered to be biased high if the %D is negative and biased low if the %D is positive. A copy of the continuing calibration standard is included as an addendum to this report.

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

Case Narrative (continued)

Dissolved Metals

L2237316-01 and -02 were analyzed for a subset of MCP elements per the Chain of Custody.

Non-MCP Related Narratives

Perfluorinated Alkyl Acids by Isotope Dilution

L2237316-01 and -05: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2237316-01: The MeOH fraction of the extraction is reported for perfluorooctanesulfonamide (fosa) due to better extraction efficiency of the perfluoro[13c8]octanesulfonamide (m8fosa) Extracted Internal Standard.

The WG1664461-1 Method Blank, associated with L2237316-01 and -02, has a concentration above the reporting limit for 6:2FTS. Since the associated sample concentrations are non-detect to the RL, no corrective action is required.

Dissolved Metals

The WG1676281-1 Method Blank, associated with L2237316-05 and -06, has a concentration above the reporting limit for mercury. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Kelly Stenstrom

Title: Technical Director/Representative Date: 08/22/22

ORGANICS

VOLATILES

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 141,8260D
Analytical Date: 07/19/22 10:47
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
Trichlorofluoromethane	ND		ug/l	2.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.40	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.40	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.40	--	1
1,1-Dichloropropene	ND		ug/l	2.0	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Bromomethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316

Project Number: Not Specified **Report Date:** 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01 Date Collected: 07/13/22 14:47

Client ID: MW-91-2 Date Received: 07/13/22

Sample Location: DUXBURY, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
Methyl tert butyl ether	ND		ug/l	2.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dibromomethane	ND		ug/l	2.0	--	1
1,2,3-Trichloropropane	ND		ug/l	2.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	2.0	--	1
Methyl ethyl ketone	ND		ug/l	5.0	--	1
Methyl isobutyl ketone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.0	--	1
Tetrahydrofuran	ND		ug/l	2.0	--	1
2,2-Dichloropropane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Bromobenzene	ND		ug/l	2.0	--	1
n-Butylbenzene	ND		ug/l	2.0	--	1
sec-Butylbenzene	ND		ug/l	2.0	--	1
tert-Butylbenzene	ND		ug/l	2.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
Isopropylbenzene	ND		ug/l	2.0	--	1
p-Isopropyltoluene	ND		ug/l	2.0	--	1
Naphthalene	ND		ug/l	2.0	--	1
n-Propylbenzene	ND		ug/l	2.0	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--	1
Diethyl ether	ND		ug/l	2.0	--	1
Diisopropyl Ether	ND		ug/l	2.0	--	1
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1
1,4-Dioxane	ND		ug/l	250	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	98		70-130
Toluene-d8	96		70-130
4-Bromofluorobenzene	102		70-130
Dibromofluoromethane	104		70-130

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02
Client ID: WS-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 12:30
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 141,8260D
Analytical Date: 07/19/22 11:12
Analyst: NLK

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Methylene chloride	ND		ug/l	2.0	--	1
1,1-Dichloroethane	ND		ug/l	1.0	--	1
Chloroform	ND		ug/l	1.0	--	1
Carbon tetrachloride	ND		ug/l	1.0	--	1
1,2-Dichloropropane	ND		ug/l	1.0	--	1
Dibromochloromethane	ND		ug/l	1.0	--	1
1,1,2-Trichloroethane	ND		ug/l	1.0	--	1
Tetrachloroethene	ND		ug/l	1.0	--	1
Chlorobenzene	ND		ug/l	1.0	--	1
Trichlorofluoromethane	ND		ug/l	2.0	--	1
1,2-Dichloroethane	ND		ug/l	1.0	--	1
1,1,1-Trichloroethane	ND		ug/l	1.0	--	1
Bromodichloromethane	ND		ug/l	1.0	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.40	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.40	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.40	--	1
1,1-Dichloropropene	ND		ug/l	2.0	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	1.0	--	1
Ethylbenzene	ND		ug/l	1.0	--	1
Chloromethane	ND		ug/l	2.0	--	1
Bromomethane	ND		ug/l	2.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	2.0	--	1
1,1-Dichloroethene	ND		ug/l	1.0	--	1
trans-1,2-Dichloroethene	ND		ug/l	1.0	--	1

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316

Project Number: Not Specified **Report Date:** 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02 Date Collected: 07/13/22 12:30

Client ID: WS-2 Date Received: 07/13/22

Sample Location: DUXBURY, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
Trichloroethene	ND		ug/l	1.0	--	1
1,2-Dichlorobenzene	ND		ug/l	1.0	--	1
1,3-Dichlorobenzene	ND		ug/l	1.0	--	1
1,4-Dichlorobenzene	ND		ug/l	1.0	--	1
Methyl tert butyl ether	ND		ug/l	2.0	--	1
p/m-Xylene	ND		ug/l	2.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	1.0	--	1
1,2-Dichloroethene, Total	ND		ug/l	1.0	--	1
Dibromomethane	ND		ug/l	2.0	--	1
1,2,3-Trichloropropane	ND		ug/l	2.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	2.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	2.0	--	1
Methyl ethyl ketone	ND		ug/l	5.0	--	1
Methyl isobutyl ketone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.0	--	1
Tetrahydrofuran	ND		ug/l	2.0	--	1
2,2-Dichloropropane	ND		ug/l	2.0	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.0	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--	1
Bromobenzene	ND		ug/l	2.0	--	1
n-Butylbenzene	ND		ug/l	2.0	--	1
sec-Butylbenzene	ND		ug/l	2.0	--	1
tert-Butylbenzene	ND		ug/l	2.0	--	1
o-Chlorotoluene	ND		ug/l	2.0	--	1
p-Chlorotoluene	ND		ug/l	2.0	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--	1
Hexachlorobutadiene	ND		ug/l	0.60	--	1
Isopropylbenzene	ND		ug/l	2.0	--	1
p-Isopropyltoluene	ND		ug/l	2.0	--	1
Naphthalene	ND		ug/l	2.0	--	1
n-Propylbenzene	ND		ug/l	2.0	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02
Client ID: WS-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 12:30
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
MCP Volatile Organics - Westborough Lab						
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--	1
Diethyl ether	ND		ug/l	2.0	--	1
Diisopropyl Ether	ND		ug/l	2.0	--	1
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--	1
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--	1
1,4-Dioxane	ND		ug/l	250	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	101		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	104		70-130
Dibromofluoromethane	107		70-130

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 07/26/22 01:00
Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Chloroform	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,2-Dichloropropane	ND		ug/l	1.8	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
Chlorobenzene	ND		ug/l	0.50	--	1
Trichlorofluoromethane	ND		ug/l	2.5	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.5	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Chloromethane	ND		ug/l	2.5	--	1
Bromomethane	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
trans-1,2-Dichloroethene	ND		ug/l	0.75	--	1

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316

Project Number: Not Specified **Report Date:** 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05 Date Collected: 07/13/22 19:00

Client ID: WS-1 Date Received: 07/14/22

Sample Location: DUXBURY, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2-Dichloroethene, Total	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Dibromomethane	ND		ug/l	5.0	--	1
1,4-Dichlorobutane	ND		ug/l	5.0	--	1
1,2,3-Trichloropropane	ND		ug/l	5.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	5.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
Vinyl acetate	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Ethyl methacrylate	ND		ug/l	5.0	--	1
Acrylonitrile	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.5	--	1
Tetrahydrofuran	ND		ug/l	5.0	--	1
2,2-Dichloropropane	ND		ug/l	2.5	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.5	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Bromobenzene	ND		ug/l	2.5	--	1
n-Butylbenzene	ND		ug/l	0.50	--	1
sec-Butylbenzene	ND		ug/l	0.50	--	1
tert-Butylbenzene	ND		ug/l	2.5	--	1
o-Chlorotoluene	ND		ug/l	2.5	--	1
p-Chlorotoluene	ND		ug/l	2.5	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	--	1
p-Isopropyltoluene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	2.5	--	1
n-Propylbenzene	ND		ug/l	0.50	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--	1
Ethyl ether	ND		ug/l	2.5	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	109		70-130

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 07/26/22 01:20
Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Chloroform	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,2-Dichloropropane	ND		ug/l	1.8	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
Chlorobenzene	ND		ug/l	0.50	--	1
Trichlorofluoromethane	ND		ug/l	2.5	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.5	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Chloromethane	ND		ug/l	2.5	--	1
Bromomethane	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
trans-1,2-Dichloroethene	ND		ug/l	0.75	--	1

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316

Project Number: Not Specified **Report Date:** 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06 Date Collected: 07/13/22 17:45

Client ID: GHR-MW-7 Date Received: 07/14/22

Sample Location: DUXBURY, MA Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2-Dichloroethene, Total	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Dibromomethane	ND		ug/l	5.0	--	1
1,4-Dichlorobutane	ND		ug/l	5.0	--	1
1,2,3-Trichloropropane	ND		ug/l	5.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	5.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
Vinyl acetate	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Ethyl methacrylate	ND		ug/l	5.0	--	1
Acrylonitrile	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.5	--	1
Tetrahydrofuran	ND		ug/l	5.0	--	1
2,2-Dichloropropane	ND		ug/l	2.5	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.5	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Bromobenzene	ND		ug/l	2.5	--	1
n-Butylbenzene	ND		ug/l	0.50	--	1
sec-Butylbenzene	ND		ug/l	0.50	--	1
tert-Butylbenzene	ND		ug/l	2.5	--	1
o-Chlorotoluene	ND		ug/l	2.5	--	1
p-Chlorotoluene	ND		ug/l	2.5	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	--	1
p-Isopropyltoluene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	2.5	--	1
n-Propylbenzene	ND		ug/l	0.50	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--	1
Ethyl ether	ND		ug/l	2.5	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	110		70-130

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 141,8260D
Analytical Date: 07/19/22 07:31
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02 Batch: WG1665260-5					
Methylene chloride	ND		ug/l	2.0	--
1,1-Dichloroethane	ND		ug/l	1.0	--
Chloroform	ND		ug/l	1.0	--
Carbon tetrachloride	ND		ug/l	1.0	--
1,2-Dichloropropane	ND		ug/l	1.0	--
Dibromochloromethane	ND		ug/l	1.0	--
1,1,2-Trichloroethane	ND		ug/l	1.0	--
Tetrachloroethene	ND		ug/l	1.0	--
Chlorobenzene	ND		ug/l	1.0	--
Trichlorofluoromethane	ND		ug/l	2.0	--
1,2-Dichloroethane	ND		ug/l	1.0	--
1,1,1-Trichloroethane	ND		ug/l	1.0	--
Bromodichloromethane	ND		ug/l	1.0	--
trans-1,3-Dichloropropene	ND		ug/l	0.40	--
cis-1,3-Dichloropropene	ND		ug/l	0.40	--
1,3-Dichloropropene, Total	ND		ug/l	0.40	--
1,1-Dichloropropene	ND		ug/l	2.0	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	1.0	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	1.0	--
Ethylbenzene	ND		ug/l	1.0	--
Chloromethane	ND		ug/l	2.0	--
Bromomethane	ND		ug/l	2.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	2.0	--
1,1-Dichloroethene	ND		ug/l	1.0	--
trans-1,2-Dichloroethene	ND		ug/l	1.0	--
Trichloroethene	ND		ug/l	1.0	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 141,8260D
Analytical Date: 07/19/22 07:31
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02 Batch: WG1665260-5					
1,2-Dichlorobenzene	ND		ug/l	1.0	--
1,3-Dichlorobenzene	ND		ug/l	1.0	--
1,4-Dichlorobenzene	ND		ug/l	1.0	--
Methyl tert butyl ether	ND		ug/l	2.0	--
p/m-Xylene	ND		ug/l	2.0	--
o-Xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	1.0	--
1,2-Dichloroethene, Total	ND		ug/l	1.0	--
Dibromomethane	ND		ug/l	2.0	--
1,2,3-Trichloropropane	ND		ug/l	2.0	--
Styrene	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	2.0	--
Acetone	ND		ug/l	5.0	--
Carbon disulfide	ND		ug/l	2.0	--
Methyl ethyl ketone	ND		ug/l	5.0	--
Methyl isobutyl ketone	ND		ug/l	5.0	--
2-Hexanone	ND		ug/l	5.0	--
Bromochloromethane	ND		ug/l	2.0	--
Tetrahydrofuran	ND		ug/l	2.0	--
2,2-Dichloropropane	ND		ug/l	2.0	--
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.0	--
1,1,1,2-Tetrachloroethane	ND		ug/l	1.0	--
Bromobenzene	ND		ug/l	2.0	--
n-Butylbenzene	ND		ug/l	2.0	--
sec-Butylbenzene	ND		ug/l	2.0	--
tert-Butylbenzene	ND		ug/l	2.0	--
o-Chlorotoluene	ND		ug/l	2.0	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 141,8260D
Analytical Date: 07/19/22 07:31
Analyst: MM

Parameter	Result	Qualifier	Units	RL	MDL
MCP Volatile Organics - Westborough Lab for sample(s): 01-02 Batch: WG1665260-5					
p-Chlorotoluene	ND		ug/l	2.0	--
1,2-Dibromo-3-chloropropane	ND		ug/l	2.0	--
Hexachlorobutadiene	ND		ug/l	0.60	--
Isopropylbenzene	ND		ug/l	2.0	--
p-Isopropyltoluene	ND		ug/l	2.0	--
Naphthalene	ND		ug/l	2.0	--
n-Propylbenzene	ND		ug/l	2.0	--
1,2,3-Trichlorobenzene	ND		ug/l	2.0	--
1,2,4-Trichlorobenzene	ND		ug/l	2.0	--
1,3,5-Trimethylbenzene	ND		ug/l	2.0	--
1,2,4-Trimethylbenzene	ND		ug/l	2.0	--
Diethyl ether	ND		ug/l	2.0	--
Diisopropyl Ether	ND		ug/l	2.0	--
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--
1,4-Dioxane	ND		ug/l	250	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	100		70-130
Toluene-d8	97		70-130
4-Bromofluorobenzene	100		70-130
Dibromofluoromethane	108		70-130

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05-06 Batch: WG1667600-5					
Methylene chloride	ND		ug/l	3.0	--
1,1-Dichloroethane	ND		ug/l	0.75	--
Chloroform	ND		ug/l	0.75	--
Carbon tetrachloride	ND		ug/l	0.50	--
1,2-Dichloropropane	ND		ug/l	1.8	--
Dibromochloromethane	ND		ug/l	0.50	--
1,1,2-Trichloroethane	ND		ug/l	0.75	--
Tetrachloroethene	ND		ug/l	0.50	--
Chlorobenzene	ND		ug/l	0.50	--
Trichlorofluoromethane	ND		ug/l	2.5	--
1,2-Dichloroethane	ND		ug/l	0.50	--
1,1,1-Trichloroethane	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
1,1-Dichloropropene	ND		ug/l	2.5	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	0.75	--
Ethylbenzene	ND		ug/l	0.50	--
Chloromethane	ND		ug/l	2.5	--
Bromomethane	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	0.50	--
trans-1,2-Dichloroethene	ND		ug/l	0.75	--
1,2-Dichloroethene, Total	ND		ug/l	0.50	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05-06 Batch: WG1667600-5					
Trichloroethene	ND		ug/l	0.50	--
1,2-Dichlorobenzene	ND		ug/l	2.5	--
1,3-Dichlorobenzene	ND		ug/l	2.5	--
1,4-Dichlorobenzene	ND		ug/l	2.5	--
Methyl tert butyl ether	ND		ug/l	1.0	--
p/m-Xylene	ND		ug/l	1.0	--
o-Xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	0.50	--
Dibromomethane	ND		ug/l	5.0	--
1,4-Dichlorobutane	ND		ug/l	5.0	--
1,2,3-Trichloropropane	ND		ug/l	5.0	--
Styrene	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	5.0	--
Acetone	ND		ug/l	5.0	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	5.0	--
Vinyl acetate	ND		ug/l	5.0	--
4-Methyl-2-pentanone	ND		ug/l	5.0	--
2-Hexanone	ND		ug/l	5.0	--
Ethyl methacrylate	ND		ug/l	5.0	--
Acrolein	ND		ug/l	5.0	--
Acrylonitrile	ND		ug/l	5.0	--
Bromochloromethane	ND		ug/l	2.5	--
Tetrahydrofuran	ND		ug/l	5.0	--
2,2-Dichloropropane	ND		ug/l	2.5	--
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.5	--
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05-06 Batch: WG1667600-5					
Bromobenzene	ND		ug/l	2.5	--
n-Butylbenzene	ND		ug/l	0.50	--
sec-Butylbenzene	ND		ug/l	0.50	--
tert-Butylbenzene	ND		ug/l	2.5	--
o-Chlorotoluene	ND		ug/l	2.5	--
p-Chlorotoluene	ND		ug/l	2.5	--
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--
Hexachlorobutadiene	ND		ug/l	0.50	--
Isopropylbenzene	ND		ug/l	0.50	--
p-Isopropyltoluene	ND		ug/l	0.50	--
Naphthalene	ND		ug/l	2.5	--
n-Propylbenzene	ND		ug/l	0.50	--
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--
1,3,5-Trichlorobenzene	ND		ug/l	2.0	--
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--
Halothane	ND		ug/l	2.5	--
Ethyl ether	ND		ug/l	2.5	--
Methyl Acetate	ND		ug/l	10	--
Ethyl Acetate	ND		ug/l	10	--
Isopropyl Ether	ND		ug/l	2.0	--
Cyclohexane	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	10	--
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--
1,4-Dioxane	ND		ug/l	250	--
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		ug/l	10	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05-06 Batch: WG1667600-5					
Methyl cyclohexane	ND		ug/l	10	--
p-Diethylbenzene	ND		ug/l	2.0	--
4-Ethyltoluene	ND		ug/l	2.0	--
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	110		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG1665260-3 WG1665260-4								
Methylene chloride	100		97		70-130	3		20
1,1-Dichloroethane	99		97		70-130	2		20
Chloroform	100		99		70-130	1		20
Carbon tetrachloride	100		100		70-130	0		20
1,2-Dichloropropane	96		98		70-130	2		20
Dibromochloromethane	99		96		70-130	3		20
1,1,2-Trichloroethane	100		98		70-130	2		20
Tetrachloroethene	110		110		70-130	0		20
Chlorobenzene	100		100		70-130	0		20
Trichlorofluoromethane	110		100		70-130	10		20
1,2-Dichloroethane	90		89		70-130	1		20
1,1,1-Trichloroethane	100		99		70-130	1		20
Bromodichloromethane	95		95		70-130	0		20
trans-1,3-Dichloropropene	96		90		70-130	6		20
cis-1,3-Dichloropropene	96		95		70-130	1		20
1,1-Dichloropropene	96		97		70-130	1		20
Bromoform	95		94		70-130	1		20
1,1,2,2-Tetrachloroethane	92		90		70-130	2		20
Benzene	100		100		70-130	0		20
Toluene	100		98		70-130	2		20
Ethylbenzene	100		98		70-130	2		20
Chloromethane	84		81		70-130	4		20
Bromomethane	**61**	Q	**61**	Q	70-130	0		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG1665260-3 WG1665260-4								
Vinyl chloride	110		100		70-130	10		20
Chloroethane	120		120		70-130	0		20
1,1-Dichloroethene	100		100		70-130	0		20
trans-1,2-Dichloroethene	100		100		70-130	0		20
Trichloroethene	100		100		70-130	0		20
1,2-Dichlorobenzene	99		99		70-130	0		20
1,3-Dichlorobenzene	100		100		70-130	0		20
1,4-Dichlorobenzene	100		98		70-130	2		20
Methyl tert butyl ether	91		93		70-130	2		20
p/m-Xylene	110		110		70-130	0		20
o-Xylene	110		110		70-130	0		20
cis-1,2-Dichloroethene	100		100		70-130	0		20
Dibromomethane	99		97		70-130	2		20
1,2,3-Trichloropropane	94		92		70-130	2		20
Styrene	110		105		70-130	5		20
Dichlorodifluoromethane	93		90		70-130	3		20
Acetone	120		120		70-130	0		20
Carbon disulfide	100		99		70-130	1		20
Methyl ethyl ketone	100		100		70-130	0		20
Methyl isobutyl ketone	81		80		70-130	1		20
2-Hexanone	89		91		70-130	2		20
Bromochloromethane	110		100		70-130	10		20
Tetrahydrofuran	87		87		70-130	0		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG1665260-3 WG1665260-4								
2,2-Dichloropropane	100		99		70-130	1		20
1,2-Dibromoethane	100		96		70-130	4		20
1,3-Dichloropropane	98		96		70-130	2		20
1,1,1,2-Tetrachloroethane	100		99		70-130	1		20
Bromobenzene	95		94		70-130	1		20
n-Butylbenzene	88		92		70-130	4		20
sec-Butylbenzene	99		99		70-130	0		20
tert-Butylbenzene	96		96		70-130	0		20
o-Chlorotoluene	100		100		70-130	0		20
p-Chlorotoluene	98		96		70-130	2		20
1,2-Dibromo-3-chloropropane	97		96		70-130	1		20
Hexachlorobutadiene	100		98		70-130	2		20
Isopropylbenzene	92		96		70-130	4		20
p-Isopropyltoluene	87		89		70-130	2		20
Naphthalene	85		90		70-130	6		20
n-Propylbenzene	98		97		70-130	1		20
1,2,3-Trichlorobenzene	92		94		70-130	2		20
1,2,4-Trichlorobenzene	86		89		70-130	3		20
1,3,5-Trimethylbenzene	100		100		70-130	0		20
1,2,4-Trimethylbenzene	90		90		70-130	0		20
Diethyl ether	94		93		70-130	1		20
Diisopropyl Ether	86		88		70-130	2		20
Ethyl-Tert-Butyl-Ether	93		94		70-130	1		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics - Westborough Lab Associated sample(s): 01-02 Batch: WG1665260-3 WG1665260-4								
Tertiary-Amyl Methyl Ether	88		91		70-130	3		20
1,4-Dioxane	114		106		70-130	7		20

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	93		94		70-130
Toluene-d8	100		99		70-130
4-Bromofluorobenzene	92		92		70-130
Dibromofluoromethane	104		101		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06 Batch: WG1667600-3 WG1667600-4								
Methylene chloride	100		100		70-130	0		20
1,1-Dichloroethane	110		100		70-130	10		20
Chloroform	99		100		70-130	1		20
Carbon tetrachloride	92		95		63-132	3		20
1,2-Dichloropropane	100		100		70-130	0		20
Dibromochloromethane	87		88		63-130	1		20
1,1,2-Trichloroethane	95		97		70-130	2		20
Tetrachloroethene	96		97		70-130	1		20
Chlorobenzene	100		100		75-130	0		25
Trichlorofluoromethane	120		120		62-150	0		20
1,2-Dichloroethane	100		100		70-130	0		20
1,1,1-Trichloroethane	97		100		67-130	3		20
Bromodichloromethane	98		99		67-130	1		20
trans-1,3-Dichloropropene	90		90		70-130	0		20
cis-1,3-Dichloropropene	90		92		70-130	2		20
1,1-Dichloropropene	99		98		70-130	1		20
Bromoform	80		74		54-136	8		20
1,1,2,2-Tetrachloroethane	99		96		67-130	3		20
Benzene	100		97		70-130	3		25
Toluene	100		100		70-130	0		25
Ethylbenzene	110		100		70-130	10		20
Chloromethane	100		100		64-130	0		20
Bromomethane	110		110		39-139	0		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06 Batch: WG1667600-3 WG1667600-4								
Vinyl chloride	110		110		55-140	0		20
Chloroethane	**180**	Q	**170**	Q	55-138	6		20
1,1-Dichloroethene	98		100		61-145	2		25
trans-1,2-Dichloroethene	100		97		70-130	3		20
Trichloroethene	99		99		70-130	0		25
1,2-Dichlorobenzene	100		95		70-130	5		20
1,3-Dichlorobenzene	100		100		70-130	0		20
1,4-Dichlorobenzene	100		98		70-130	2		20
Methyl tert butyl ether	81		86		63-130	6		20
p/m-Xylene	105		105		70-130	0		20
o-Xylene	100		105		70-130	5		20
cis-1,2-Dichloroethene	100		96		70-130	4		20
Dibromomethane	96		94		70-130	2		20
1,4-Dichlorobutane	97		97		70-130	0		20
1,2,3-Trichloropropane	98		94		64-130	4		20
Styrene	105		105		70-130	0		20
Dichlorodifluoromethane	110		110		36-147	0		20
Acetone	92		110		58-148	18		20
Carbon disulfide	110		110		51-130	0		20
2-Butanone	66		70		63-138	6		20
Vinyl acetate	93		97		70-130	4		20
4-Methyl-2-pentanone	83		75		59-130	10		20
2-Hexanone	71		74		57-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06 Batch: WG1667600-3 WG1667600-4								
Ethyl methacrylate	73		77		70-130	5		20
Acrolein	77		**62**	Q	70-130	**22**	Q	20
Acrylonitrile	84		80		70-130	5		20
Bromochloromethane	100		96		70-130	4		20
Tetrahydrofuran	63		81		58-130	**25**	Q	20
2,2-Dichloropropane	110		100		63-133	10		20
1,2-Dibromoethane	90		91		70-130	1		20
1,3-Dichloropropane	97		98		70-130	1		20
1,1,1,2-Tetrachloroethane	91		88		64-130	3		20
Bromobenzene	97		92		70-130	5		20
n-Butylbenzene	110		110		53-136	0		20
sec-Butylbenzene	110		110		70-130	0		20
tert-Butylbenzene	100		100		70-130	0		20
o-Chlorotoluene	110		100		70-130	10		20
p-Chlorotoluene	110		100		70-130	10		20
1,2-Dibromo-3-chloropropane	70		64		41-144	9		20
Hexachlorobutadiene	95		94		63-130	1		20
Isopropylbenzene	100		100		70-130	0		20
p-Isopropyltoluene	100		100		70-130	0		20
Naphthalene	79		78		70-130	1		20
n-Propylbenzene	110		110		69-130	0		20
1,2,3-Trichlorobenzene	84		83		70-130	1		20
1,2,4-Trichlorobenzene	88		85		70-130	3		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06 Batch: WG1667600-3 WG1667600-4								
1,3,5-Trimethylbenzene	110		100		64-130	10		20
1,3,5-Trichlorobenzene	94		91		70-130	3		20
1,2,4-Trimethylbenzene	110		100		70-130	10		20
trans-1,4-Dichloro-2-butene	96		76		70-130	**23**	Q	20
Halothane	93		96		70-130	3		20
Ethyl ether	92		89		59-134	3		20
Methyl Acetate	87		76		70-130	13		20
Ethyl Acetate	**64**	Q	**65**	Q	70-130	2		20
Isopropyl Ether	95		96		70-130	1		20
Cyclohexane	99		100		70-130	1		20
Tert-Butyl Alcohol	78		76		70-130	3		20
Ethyl-Tert-Butyl-Ether	87		88		70-130	1		20
Tertiary-Amyl Methyl Ether	80		80		66-130	0		20
1,4-Dioxane	104		104		56-162	0		20
1,1,2-Trichloro-1,2,2-Trifluoroethane	100		100		70-130	0		20
Methyl cyclohexane	100		100		70-130	0		20
p-Diethylbenzene	100		100		70-130	0		20
4-Ethyltoluene	110		100		70-130	10		20
1,2,4,5-Tetramethylbenzene	92		90		70-130	2		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05-06 Batch: WG1667600-3 WG1667600-4								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	105		107		70-130
Toluene-d8	105		102		70-130
4-Bromofluorobenzene	98		97		70-130
Dibromofluoromethane	103		102		70-130

SEMIVOLATILES

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/28/22 07:53
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.82	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.82	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.82	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.82	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.82	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.82	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.82	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.82	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.82	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.82	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.82	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.82	--	1
Perfluorooctanesulfonic Acid (PFOS)	11.0		ng/l	1.82	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.82	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.82	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.82	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.82	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	**18**	Q	58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	**18**	Q	62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**21**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	30		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**14**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	**14**	Q	60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	**22**	Q	71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	**14**	Q	62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	20		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	**13**	Q	59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	**22**	Q	69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	**14**	Q	62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	14		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	**12**	Q	24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	**16**	Q	55-137
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	**11**	Q	27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	**16**	Q	48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	**11**	Q	22-136

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 09:34
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.82	--	1

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	81		5-112

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02
Client ID: WS-2
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 12:30
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/28/22 08:09
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.84	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.84	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.84	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.84	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.84	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.84	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.84	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.84	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.84	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.84	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.84	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.84	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.84	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.84	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.84	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.84	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.84	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.84	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.84	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.84	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.84	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.84	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.84	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.84	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02
Client ID: WS-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 12:30
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	84		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	118		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	77		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	68		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	73		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	93		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	15		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	77		22-136

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-03
Client ID: WS-2
Sample Location: DUXBURY, MA

Date Collected: 07/14/22 14:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:33
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	134	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	46		15-110

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-04
Client ID: MW-91-2
Sample Location: DUXBURY, MA

Date Collected: 07/14/22 14:30
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:57
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	134	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	49		15-110

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 01:46
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	139	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	48		15-110

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 16:58
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.71	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.71	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.71	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.71	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.71	--	1
Perfluoroheptanoic Acid (PFHpA)	2.00		ng/l	1.71	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2.75	F	ng/l	1.71	--	1
Perfluorooctanoic Acid (PFOA)	9.84		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.71	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.71	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.71	--	1
Perfluorooctanesulfonic Acid (PFOS)	54.2		ng/l	1.71	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.71	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.71	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.71	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.71	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.71	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.71	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.71	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.71	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.71	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.71	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	102		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	83		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**184**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	78		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	83		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**165**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	52		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	77		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	12		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	65		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	63		22-136

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:09
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	139	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	48		15-110

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 18:53
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.79	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.79	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.79	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.79	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.79	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.79	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.79	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.79	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.79	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.79	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.79	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.79	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.79	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.79	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.79	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.79	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.79	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.79	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.79	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.79	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.79	--	1

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	115		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	81		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	81		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	5		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	79		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73		22-136

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/28/22 01:48
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1664461-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.20		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/28/22 01:48
Analyst: SG

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1664461-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	121		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	74		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	78		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	104		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	106		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	93		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	74		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	40		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	83		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	102		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	106		22-136

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 09:20
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/19/22 05:10

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-02 Batch: WG1664461-1					
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	81		5-112

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 10:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 05-06 Batch: WG1665348-1					
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	70		5-112

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 13:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 05-06 Batch: WG1665348-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 13:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 05-06 Batch: WG1665348-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	123		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	100		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	103		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	106		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	100		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	110		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	109		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	101		22-136

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 07/18/22 18:13
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL
1,4 Dioxane by 8270E-SIM - Mansfield Lab for sample(s): 03-06 Batch: WG1675432-1					
1,4-Dioxane	ND		ng/l	150	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	51		15-110

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1664461-2								
Perfluorobutanoic Acid (PFBA)	100		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	102		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	98		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	107		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	101		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	99		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	101		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	113		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	105		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	120		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	96		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	98		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	112		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	111		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	105		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	114		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	99		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	106		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	109		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	109		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	103		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	105		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1664461-2								
Perfluorotridecanoic Acid (PFTrDA)	112		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	98		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	116				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	80				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	92				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	95				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	100				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	82				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	106				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	103				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	84				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	44				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab	Associated sample(s): 01-02		Batch: WG1664461-2					
Perfluorooctanesulfonamide (FOSA)	96		-		46-170	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	82				5-112

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab	Associated sample(s): 05-06		Batch: WG1665348-2					
Perfluorooctanesulfonamide (FOSA)	97		-		46-170	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	67				5-112

Lab Control Sample Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 05-06 Batch: WG1665348-2								
Perfluorobutanoic Acid (PFBA)	102		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	103		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	112		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	100		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	113		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	101		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	118		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	100		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	119		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	106		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	92		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	112		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	100		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	124		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	106		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	114		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	112		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	109		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	104		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	110		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	99		-		67-153	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 05-06 Batch: WG1665348-2								
Perfluorotridecanoic Acid (PFTrDA)	106		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	102		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	108				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	106				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	109				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	113				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	83				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88				22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
1,4 Dioxane by 8270E-SIM - Mansfield Lab	Associated sample(s): 03-06		Batch: WG1675432-2 WG1675432-3					
1,4-Dioxane	108		109		40-140	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,4-Dioxane-d8	46		50		15-110

Matrix Spike Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1664461-3 QC Sample: L2236554-01 Client ID: MS Sample												
Perfluoroheptanoic Acid (PFHpA)	2.92	39.8	44.4	104		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	36.3	44.9	119		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	2.19F	39.8	43.9	105		-	-		63-159	-		30
Perfluorononanoic Acid (PFNA)	ND	39.8	40.8	103		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	12.2	36.9	54.5	115		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	39.8	44.3	111		-	-		63-171	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84				62-124
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				71-134
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	85				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93				59-139

Matrix Spike Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1665348-3 WG1665348-4 QC Sample: L2237589-02 Client ID: MS Sample												
Perfluorooctanesulfonamide (FOSA)	ND	43.6	40.6	93		32.3	90		46-170	23		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	59		69		5-112

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1665348-3 WG1665348-4 QC Sample: L2237589-02 Client ID: MS Sample												
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	41.6	45.6	110		39.3	115		49-187	15		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	91		111		14-147

Lab Duplicate Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 QC Batch ID: WG1664461-4 QC Sample: L2236554-03 Client ID: DUP Sample						
Perfluoroheptanoic Acid (PFHpA)	2.89	3.17	ng/l	9		30
Perfluorohexanesulfonic Acid (PFHxS)	262	260	ng/l	1		30
Perfluorooctanoic Acid (PFOA)	6.27	5.86	ng/l	7		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	179	179	ng/l	0		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	79		79		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		110		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		89		62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		92		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		108		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		87		62-124

METALS

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-01
Client ID: MW-91-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 14:47
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Barium, Dissolved	0.057		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.004	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Chromium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Iron, Dissolved	0.108		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Lead, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Manganese, Dissolved	0.018		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Mercury, Dissolved	ND		mg/l	0.0002	--	1	08/16/22 02:20	08/17/22 11:55	EPA 7470A	97,7470A	DMB
Selenium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Silver, Dissolved	ND		mg/l	0.007	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 12:30	EPA 3005A	97,6010D	EW

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-02
Client ID: WS-2
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 12:30
Date Received: 07/13/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Barium, Dissolved	0.022		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.004	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Chromium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Iron, Dissolved	ND		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Lead, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Manganese, Dissolved	0.091		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Mercury, Dissolved	ND		mg/l	0.0002	--	1	08/16/22 02:20	08/17/22 11:58	EPA 7470A	97,7470A	DMB
Selenium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Silver, Dissolved	ND		mg/l	0.007	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 13:07	EPA 3005A	97,6010D	EW

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-05
Client ID: WS-1
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Barium, Dissolved	0.045		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Chromium, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Iron, Dissolved	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Lead, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Manganese, Dissolved	0.127		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Mercury, Dissolved	ND		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 18:08	EPA 7470A	1,7470A	AW
Selenium, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/18/22 00:06	EPA 3005A	1,6010D	NB
Silver, Dissolved	ND		mg/l	0.007	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number: Not Specified
Report Date: 08/22/22

SAMPLE RESULTS

Lab ID: L2237316-06
Client ID: GHR-MW-7
Sample Location: DUXBURY, MA
Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Refer to COC

Sample Depth:
Matrix: Water

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab											
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Barium, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Chromium, Dissolved	0.015		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Iron, Dissolved	0.267		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Lead, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Manganese, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Mercury, Dissolved	ND		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 18:11	EPA 7470A	1,7470A	AW
Selenium, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/18/22 00:38	EPA 3005A	1,6010D	NB
Silver, Dissolved	ND		mg/l	0.007	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 05-06 Batch: WG1675527-1										
Arsenic, Dissolved	ND		mg/l	0.005	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Barium, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Cadmium, Dissolved	ND		mg/l	0.005	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Chromium, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Copper, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Iron, Dissolved	ND		mg/l	0.050	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Lead, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Manganese, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Selenium, Dissolved	ND		mg/l	0.010	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Silver, Dissolved	ND		mg/l	0.007	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB
Zinc, Dissolved	ND		mg/l	0.050	--	1	08/15/22 23:24	08/17/22 23:30	1,6010D	NB

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1675530-1										
Mercury, Dissolved	ND		mg/l	0.0002	--	1	08/16/22 02:20	08/17/22 11:45	97,7470A	DMB

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 05-06 Batch: WG1676263-1										
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Barium, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Chromium, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW

Project Name: MCNEIL LANDFILL **Lab Number:** L2237316

Project Number: Not Specified **Report Date:** 08/22/22

Method Blank Analysis
Batch Quality Control

Iron, Dissolved	ND	mg/l	0.050	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Lead, Dissolved	ND	mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Manganese, Dissolved	ND	mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Silver, Dissolved	ND	mg/l	0.007	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Zinc, Dissolved	ND	mg/l	0.050	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW

Prep Information

Digestion Method: EPA 3005A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Dissolved Metals - Mansfield Lab for sample(s): 05-06 Batch: WG1676281-1										
Mercury, Dissolved	0.00031		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 17:15	1,7470A	AW

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
MCP Dissolved Metals - Mansfield Lab for sample(s): 01-02 Batch: WG1676395-1										
Arsenic, Dissolved	ND		mg/l	0.005	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Barium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Cadmium, Dissolved	ND		mg/l	0.004	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Chromium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Copper, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Iron, Dissolved	ND		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Lead, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Manganese, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Selenium, Dissolved	ND		mg/l	0.010	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Silver, Dissolved	ND		mg/l	0.007	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW
Zinc, Dissolved	ND		mg/l	0.050	--	1	07/18/22 09:52	08/01/22 12:12	97,6010D	EW

Project Name: MCNEIL LANDFILL
Project Number: Not Specified
Lab Number: L2237316
Report Date: 08/22/22

Method Blank Analysis
Batch Quality Control

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 Batch: WG1675527-2								
Arsenic, Dissolved	109		-		80-120	-		
Barium, Dissolved	102		-		80-120	-		
Cadmium, Dissolved	107		-		80-120	-		
Chromium, Dissolved	106		-		80-120	-		
Copper, Dissolved	98		-		80-120	-		
Iron, Dissolved	106		-		80-120	-		
Lead, Dissolved	102		-		80-120	-		
Manganese, Dissolved	87		-		80-120	-		
Selenium, Dissolved	102		-		80-120	-		
Silver, Dissolved	106		-		80-120	-		
Zinc, Dissolved	102		-		80-120	-		
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1675530-2 WG1675530-3								
Mercury, Dissolved	93		97		80-120	4		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 Batch: WG1676263-2					
Arsenic, Dissolved	105	-	80-120	-	
Barium, Dissolved	99	-	80-120	-	
Cadmium, Dissolved	104	-	80-120	-	
Chromium, Dissolved	91	-	80-120	-	
Copper, Dissolved	106	-	80-120	-	
Iron, Dissolved	110	-	80-120	-	
Lead, Dissolved	101	-	80-120	-	
Manganese, Dissolved	100	-	80-120	-	
Silver, Dissolved	100	-	80-120	-	
Zinc, Dissolved	97	-	80-120	-	
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 Batch: WG1676281-2					
Mercury, Dissolved	103	-	80-120	-	

Lab Control Sample Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	LCS %Recovery	LCSD %Recovery	%Recovery Limits	RPD	RPD Limits
MCP Dissolved Metals - Mansfield Lab Associated sample(s): 01-02 Batch: WG1676395-2 WG1676395-3					
Arsenic, Dissolved	117	103	80-120	13	20
Barium, Dissolved	102	102	80-120	0	20
Cadmium, Dissolved	101	100	80-120	1	20
Chromium, Dissolved	100	98	80-120	2	20
Copper, Dissolved	100	99	80-120	1	20
Iron, Dissolved	101	100	80-120	1	20
Lead, Dissolved	112	98	80-120	13	20
Manganese, Dissolved	96	95	80-120	1	20
Selenium, Dissolved	120	103	80-120	15	20
Silver, Dissolved	100	99	80-120	1	20
Zinc, Dissolved	99	98	80-120	1	20

Matrix Spike Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1675527-3 QC Sample: L2237316-05 Client ID: WS-1												
Arsenic, Dissolved	ND	0.12	0.135	112		-	-		75-125	-		20
Barium, Dissolved	0.050	2	1.93	94		-	-		75-125	-		20
Cadmium, Dissolved	ND	0.053	0.056	105		-	-		75-125	-		20
Chromium, Dissolved	ND	0.2	0.209	104		-	-		75-125	-		20
Copper, Dissolved	ND	0.25	0.249	100		-	-		75-125	-		20
Iron, Dissolved	ND	1	1.01	101		-	-		75-125	-		20
Lead, Dissolved	ND	0.53	0.531	100		-	-		75-125	-		20
Manganese, Dissolved	0.127	0.5	0.509	76		-	-		75-125	-		20
Selenium, Dissolved	ND	0.12	0.124	103		-	-		75-125	-		20
Silver, Dissolved	ND	0.05	0.054	107		-	-		75-125	-		20
Zinc, Dissolved	ND	0.5	0.516	103		-	-		75-125	-		20

Matrix Spike Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1676263-3 QC Sample: L2200081-67 Client ID: MS Sample									
Arsenic, Dissolved	ND	0.12	0.130	108	-	-	75-125	-	20
Barium, Dissolved	0.194	2	2.17	99	-	-	75-125	-	20
Cadmium, Dissolved	ND	0.053	0.053	100	-	-	75-125	-	20
Chromium, Dissolved	ND	0.2	0.183	92	-	-	75-125	-	20
Copper, Dissolved	ND	0.25	0.279	112	-	-	75-125	-	20
Iron, Dissolved	1.19	1	2.22	103	-	-	75-125	-	20
Lead, Dissolved	ND	0.53	0.523	99	-	-	75-125	-	20
Manganese, Dissolved	0.637	0.5	1.10	93	-	-	75-125	-	20
Silver, Dissolved	ND	0.05	0.052	103	-	-	75-125	-	20
Zinc, Dissolved	ND	0.5	0.472	94	-	-	75-125	-	20
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1676263-4 QC Sample: L2200081-67 Client ID: MS Sample									
Arsenic, Dissolved	ND	0.12	0.127	106	-	-	75-125	-	20
Barium, Dissolved	0.194	2	2.13	97	-	-	75-125	-	20
Cadmium, Dissolved	ND	0.053	0.052	98	-	-	75-125	-	20
Chromium, Dissolved	ND	0.2	0.182	91	-	-	75-125	-	20
Copper, Dissolved	ND	0.25	0.277	111	-	-	75-125	-	20
Iron, Dissolved	1.19	1	2.17	98	-	-	75-125	-	20
Lead, Dissolved	ND	0.53	0.518	98	-	-	75-125	-	20
Manganese, Dissolved	0.637	0.5	1.07	87	-	-	75-125	-	20
Silver, Dissolved	ND	0.05	0.051	102	-	-	75-125	-	20
Zinc, Dissolved	ND	0.5	0.464	93	-	-	75-125	-	20

Matrix Spike Analysis
Batch Quality Control

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	MSD Found	MSD %Recovery	Recovery Limits	RPD	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1676281-3 WG1676281-4 QC Sample: L2200081-67 Client ID: MS Sample									
Mercury, Dissolved	ND	0.005	0.00460	92	0.00470	94	75-125	2	20

Lab Duplicate Analysis

Batch Quality Control

Project Name: MCNEIL LANDFILL

Project Number: Not Specified

Lab Number: L2237316

Report Date: 08/22/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Dissolved Metals - Mansfield Lab Associated sample(s): 05-06 QC Batch ID: WG1675527-4 QC Sample: L2237316-05 Client ID: WS-1						
Selenium, Dissolved	ND	ND	mg/l	NC		20

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent
A1	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2237316-01A	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-01B	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-01C	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-01D	Plastic 250ml unpreserved	A	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2237316-01E	Plastic 250ml unpreserved	A	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2237316-01F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		MCP-CD-6010S-10(180),MCP-FE-6010S-10(180),MCP-7470S-10(28),MCP-AG-6010S-10(180),MCP-ZN-6010S-10(180),MCP-AS-6010S-10(180),MCP-CR-6010S-10(180),MCP-BA-6010S-10(180),MCP-MN-6010S-10(180),MCP-PB-6010S-10(180),MCP-CU-6010S-10(180),MCP-SE-6010S-10(180)
L2237316-02A	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-02B	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-02C	Vial HCl preserved	A	NA		3.9	Y	Absent		MCP-8260-21(14)
L2237316-02D	Plastic 250ml unpreserved	A	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2237316-02E	Plastic 250ml unpreserved	A	NA		3.9	Y	Absent		A2-537-ISOTOPE(14)
L2237316-02F	Plastic 250ml HNO3 preserved	A	<2	<2	3.9	Y	Absent		MCP-CD-6010S-10(180),MCP-FE-6010S-10(180),MCP-7470S-10(28),MCP-AG-6010S-10(180),MCP-ZN-6010S-10(180),MCP-AS-6010S-10(180),MCP-CR-6010S-10(180),MCP-BA-6010S-10(180),MCP-MN-6010S-10(180),MCP-PB-6010S-10(180),MCP-CU-6010S-10(180),MCP-SE-6010S-10(180)
L2237316-05A	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-05B	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-05C	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-05D	Plastic 250ml unpreserved	A1	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: MCNEIL LANDFILL
Project Number: Not Specified

Lab Number: L2237316
Report Date: 08/22/22

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2237316-05E	Plastic 250ml unpreserved	A1	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237316-05F	Plastic 500ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		PB-SI(180),FE-SI(180),BA-SI(180),CU-SI(180),AS-SI(180),MN-SI(180),AG-SI(180),CD-SI(180),CR-SI(180),HG-S(28),SE-SI(180),ZN-SI(180)
L2237316-05G	Amber 250ml unpreserved	A1	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237316-06A	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-06B	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-06C	Vial HCl preserved	A1	NA		2.8	Y	Absent		8260(14)
L2237316-06D	Plastic 250ml unpreserved	A1	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237316-06E	Plastic 250ml unpreserved	A1	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237316-06F	Amber 250ml unpreserved	A1	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237316-06G	Amber 250ml unpreserved	A1	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237316-06H	Plastic 500ml HNO3 preserved	A1	<2	<2	2.8	Y	Absent		PB-SI(180),FE-SI(180),BA-SI(180),AG-SI(180),AS-SI(180),MN-SI(180),CU-SI(180),CD-SI(180),CR-SI(180),ZN-SI(180),SE-SI(180),HG-S(28)

*Values in parentheses indicate holding time in days

Project Name: MCNEIL LANDFILL
Lab Number: L2237316
Project Number:
Report Date: 08/22/22

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

Data Qualifiers

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	MCNEIL LANDFILL	**Lab Number:**	L2237316
Project Number:	Not Specified	**Report Date:**	08/22/22

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIIC, IIID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

141 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA and IIB, November 2021.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

Serial_No:08222213:07

CHAIN OF CUSTODY

PAGE 1 OF 1

Date Rec'd in Lab: 7/13/22

ALPHA Job #: L2237316

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: WESTON & SAMPSON
Address: 100 FOXBOROUGH BLVD. FOXBOROUGH MA
Phone: 1800 SAMPSON
Fax:
Email: HEALEYS@WSEINC.COM
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: MCNEIL LANDFILL
Project Location: DUXBURY, MA
Project #:
Project Manager: SEAN HEALEY
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	ANALYSIS: 8260	14 METALS	PFAS	SAMPLE HANDLING	TOTAL # BOTTLES
37316-01	MW-91-2	7/13/22	1447	GW	PTL	X	X	X		
-02	WS-2	7/13/22	1230	GW	PTL	X	X	X		

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)
Sample Specific Comments

Container Type																			
Preservative																			

Relinquished By:	Date/Time	Received By:	Date/Time
Parker Lawson	7/13/22	[illegible] AAL	7/13/22 15:30
[illegible]	7/13/22 17:13	[illegible]	7/13/22 17:13
[illegible]	7/13/22 19:00	[illegible]	7/13/22 15W
[illegible]	7/13/22 23W	ARC - AAL	7/13/22 2000

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

CHAIN OF CUSTODY

PAGE 2 OF 2

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

ALPHA Job #: L2237316 ED 8/12/22

Client Information

Client: WESTON & SAMPSON
Address: 55 WALKUP DR. READING MA
Phone: 1800 SAMPSON
Email: MCGRATHL@WSELNC.COM

Project Information

Project Name: DUXBURY LF
Project Location:
Project #:
Project Manager: LOREN MCGRATH
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due:

Additional Project Information:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ANALYSIS: VOC: 8260 ☐ 624 ☐ 524.2 | SVOC: ☐ ABN ☐ PAH | METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15 | METALS: ☐ RCRA8 ☐ RCRA8 ☐ PP13 | EPH: ☐ Ranges & Targets ☐ Ranges Only | VPH: ☐ Ranges & Targets ☐ Ranges Only | ☐ PCB ☐ PEST | TPH: ☐ Quant Only ☐ Fingerprint | 1,4 DIOXANE | PFAS 537.1 | SAMPLE INFO: Filtration ☒ Field ☐ Lab to do; Preservation ☐ Lab to do | TOTAL # BOTTLES | Sample Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	TPH: Quant Only	1,4 DIOXANE	PFAS 537.1	TOTAL # BOTTLES
-11	GMR-MW-7	7/13	1745	GW	PTR	X	X	X	3
	~~WS-2~~	~~7/13~~	~~1445~~	~~GW~~	~~PTR~~	~~X~~			
37316	~~MW-91-2~~	7/13	193						
03 -12	WS-2	7/14	1445	GW	PTR	X			1
04 -13	MW-91-2	7/14	1430	GW	PTR	X			1

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

	Container Type																			
	Preservative																			

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	7/14 1600	[illegible] AAL	7-14-22 1140
[illegible] AAL	7-14-22 1740	[illegible]	7/14/22 1740
[illegible]	7/14 2000	[illegible]	7-14-22 2000
[illegible]	7-14-22 2130		

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

7/14/22 2130

Method Blank Summary
Form 4
Volatiles

Client	: Weston & Sampson	**Lab Number**	: L2237316
Project Name	: MCNEIL LANDFILL	**Project Number**	:
Lab Sample ID	: WG1665260-5	**Lab File ID**	: V16220719C05
Instrument ID	: VOA116		
Matrix	: WATER	**Analysis Date**	: 07/19/22 07:31

Client Sample No.	Lab Sample ID	Analysis Date
WG1665260-3LCS	WG1665260-3	07/19/22 05:53
WG1665260-4LCSD	WG1665260-4	07/19/22 06:18
MW-91-2	L2237316-01	07/19/22 10:47
WS-2	L2237316-02	07/19/22 11:12

Calibration Verification Summary
Form 7
Volatiles

Client	: Weston & Sampson	**Lab Number**	: L2237316
Project Name	: MCNEIL LANDFILL	**Project Number**	:
Instrument ID	: VOA116	**Calibration Date**	: 07/19/22 05:53
Lab File ID	: V16220719C01	**Init. Calib. Date(s)**	: 07/07/22 07/07/22
Sample No	: WG1665260-2	**Init. Calib. Times**	: 08:30 13:19
Channel	:		

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
Fluorobenzene	1	1	-	0	20	71	0
Dichlorodifluoromethane	0.248	0.23	-	7.3	20	62	0
Chloromethane	0.24	0.201	-	16.2	20	55	0
Vinyl chloride	0.199	0.217	-	-9	20	71	0
Bromomethane	0.112	0.068	-	39.3*	20	48	0
Chloroethane	0.129	0.148	-	-14.7	20	77	0
Trichlorofluoromethane	0.326	0.353	-	-8.3	20	72	0
Ethyl ether	0.104	0.098	-	5.8	20	68	0
1,1-Dichloroethene	0.206	0.211	-	-2.4	20	69	0
Carbon disulfide	0.633	0.649	-	-2.5	20	70	0
Freon-113	0.237	0.256	-	-8	20	73	0
Methylene chloride	0.263	0.266	-	-1.1	20	72	0
Acetone	10	12.581	-	-25.8*	20	82	0
trans-1,2-Dichloroethene	0.229	0.236	-	-3.1	20	70	0
Methyl acetate	0.101	0.095	-	5.9	20	63	0
Methyl tert-butyl ether	0.463	0.421	-	9.1	20	64	0
tert-Butyl alcohol	0.0097	0.01047	-	-7.9	20	73	0
Diisopropyl ether	0.571	0.491	-	14	20	59	0
1,1-Dichloroethane	0.437	0.432	-	1.1	20	67	0
Halothane	0.193	0.206	-	-6.7	20	73	0
Acrylonitrile	0.053	0.049	-	7.5	20	64	0
Ethyl tert-butyl ether	0.557	0.517	-	7.2	20	63	0
Vinyl acetate	0.364	0.323	-	11.3	20	61	0
cis-1,2-Dichloroethene	0.253	0.254	-	-0.4	20	69	0
2,2-Dichloropropane	0.334	0.341	-	-2.1	20	72	0
Bromochloromethane	0.117	0.127	-	-8.5	20	72	0
Cyclohexane	0.388	0.349	-	10.1	20	62	0
Chloroform	0.461	0.46	-	0.2	20	71	0
Ethyl acetate	0.128	0.117	-	8.6	20	62	0
Carbon tetrachloride	0.322	0.336	-	-4.3	20	70	0
Tetrahydrofuran	0.043	0.037	-	14	20	60	0
Dibromofluoromethane	0.285	0.296	-	-3.9	20	75	0
1,1,1-Trichloroethane	0.347	0.348	-	-0.3	20	69	0
2-Butanone	0.055	0.058	-	-5.5	20	70	0
1,1-Dichloropropene	0.294	0.283	-	3.7	20	64	0
Benzene	0.958	0.974	-	-1.7	20	69	0
tert-Amyl methyl ether	0.506	0.446	-	11.9	20	64	0
1,2-Dichloroethane-d4	0.286	0.267	-	6.6	20	68	0
1,2-Dichloroethane	0.287	0.259	-	9.8	20	61	0
Methyl cyclohexane	0.402	0.401	-	0.2	20	65	0
Trichloroethene	0.244	0.253	-	-3.7	20	69	0
Dibromomethane	0.132	0.131	-	0.8	20	69	0
1,2-Dichloropropane	0.267	0.257	-	3.7	20	64	0

* Value outside of QC limits.

Calibration Verification Summary
Form 7
Volatiles

Client	: Weston & Sampson		**Lab Number**	: L2237316	
Project Name	: MCNEIL LANDFILL		**Project Number**	:	
Instrument ID	: VOA116		**Calibration Date**	: 07/19/22 05:53	
Lab File ID	: V16220719C01		**Init. Calib. Date(s)**	: 07/07/22	07/07/22
Sample No	: WG1665260-2		**Init. Calib. Times**	: 08:30	13:19
Channel	:				

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
2-Chloroethyl vinyl ether	0.105	0.09	-	14.3	20	63	0
Bromodichloromethane	0.354	0.338	-	4.5	20	68	0
1,4-Dioxane	0.00093	0.00106*	-	-14	20	91	0
cis-1,3-Dichloropropene	0.329	0.318	-	3.3	20	68	0
Chlorobenzene-d5	1	1	-	0	20	73	0
Toluene-d8	1.318	1.313	-	0.4	20	70	0
Toluene	0.79	0.789	-	0.1	20	67	0
4-Methyl-2-pentanone	0.067	0.055	-	17.9	20	61	0
Tetrachloroethene	0.357	0.387	-	-8.4	20	73	0
trans-1,3-Dichloropropene	0.417	0.4	-	4.1	20	67	0
Ethyl methacrylate	0.292	0.249	-	14.7	20	62	0
1,1,2-Trichloroethane	0.222	0.226	-	-1.8	20	70	0
Chlorodibromomethane	0.309	0.307	-	0.6	20	70	0
1,3-Dichloropropane	0.44	0.429	-	2.5	20	68	0
1,2-Dibromoethane	0.244	0.244	-	0	20	68	0
2-Hexanone	0.093	0.083	-	10.8	20	63	0
Chlorobenzene	0.861	0.865	-	-0.5	20	69	0
Ethylbenzene	1.347	1.347	-	0	20	65	0
1,1,1,2-Tetrachloroethane	0.325	0.332	-	-2.2	20	71	0
p/m Xylene	0.506	0.57	-	-12.6	20	70	0
o Xylene	0.477	0.519	-	-8.8	20	68	0
Styrene	20	21.971	-	-9.9	20	69	0
1,4-Dichlorobenzene-d4	1	1	-	0	20	75	0
Bromoform	0.343	0.327	-	4.7	20	71	0
Isopropylbenzene	2.329	2.144	-	7.9	20	64	0
4-Bromofluorobenzene	0.852	0.784	-	8	20	70	0
Bromobenzene	0.648	0.617	-	4.8	20	71	0
n-Propylbenzene	2.953	2.902	-	1.7	20	67	0
1,4-Dichlorobutane	0.724	0.656	-	9.4	20	64	0
1,1,2,2-Tetrachloroethane	0.582	0.534	-	8.2	20	69	0
4-Ethyltoluene	2.344	2.282	-	2.6	20	67	0
2-Chlorotoluene	2.082	2.102	-	-1	20	68	0
1,3,5-Trimethylbenzene	2.021	2.04	-	-0.9	20	69	0
1,2,3-Trichloropropane	0.44	0.414	-	5.9	20	68	0
trans-1,4-Dichloro-2-buten	0.136	0.167	-	-22.8*	20	86	0
4-Chlorotoluene	1.82	1.792	-	1.5	20	68	0
tert-Butylbenzene	1.68	1.608	-	4.3	20	67	0
1,2,4-Trimethylbenzene	10	9.016	-	9.8	20	67	0
sec-Butylbenzene	10	9.938	-	0.6	20	69	0
p-Isopropyltoluene	10	8.743	-	12.6	20	66	0
1,3-Dichlorobenzene	1.261	1.315	-	-4.3	20	73	0
1,4-Dichlorobenzene	1.265	1.268	-	-0.2	20	72	0
p-Diethylbenzene	1.289	1.09	-	15.4	20	65	0

* Value outside of QC limits.

Calibration Verification Summary
Form 7
Volatiles

Client	: Weston & Sampson	**Lab Number**	: L2237316
Project Name	: MCNEIL LANDFILL	**Project Number**	:
Instrument ID	: VOA116	**Calibration Date**	: 07/19/22 05:53
Lab File ID	: V16220719C01	**Init. Calib. Date(s)**	: 07/07/22 07/07/22
Sample No	: WG1665260-2	**Init. Calib. Times**	: 08:30 13:19
Channel	:		

Compound	Ave. RRF	RRF	Min RRF	%D	Max %D	Area%	Dev(min)
n-Butylbenzene	10	8.819	-	11.8	20	64	0
1,2-Dichlorobenzene	1.136	1.126	-	0.9	20	71	0
1,2,4,5-Tetramethylbenzene	10	7.54	-	24.6*	20	62	0
1,2-Dibromo-3-chloropropan	0.075	0.073	-	2.7	20	75	0
1,3,5-Trichlorobenzene	0.825	0.812	-	1.6	20	71	0
Hexachlorobutadiene	0.335	0.34	-	-1.5	20	73	0
1,2,4-Trichlorobenzene	10	8.656	-	13.4	20	68	0
Naphthalene	10	8.535	-	14.6	20	65	0
1,2,3-Trichlorobenzene	10	9.247	-	7.5	20	70	0

* Value outside of QC limits.

ANALYTICAL REPORT

Lab Number:	L2237728
Client:	Weston & Sampson 100 International Drive Suite 152 Portsmouth, NH 03801
ATTN:	Loren McGrath
Phone:	(603) 431-3937
Project Name:	DUXBURY LF
Project Number:	Not Specified
Report Date:	08/04/22

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2237728-01	EB	WATER	DUXBURY MA	07/14/22 12:30	07/14/22
L2237728-02	MW-DUX-FD	WATER	DUXBURY MA	07/14/22 14:50	07/14/22
L2237728-03	MW-DUX NS	WATER	DUXBURY MA	07/14/22 12:00	07/14/22
L2237728-04	MW-DUX ND	WATER	DUXBURY MA	07/14/22 13:00	07/14/22
L2237728-05	WS-1	WATER	DUXBURY MA	07/13/22 19:00	07/14/22
L2237728-06	MW-DUX-LS	WATER	DUXBURY MA	07/14/22 10:15	07/14/22
L2237728-07	DUP-1	WATER	DUXBURY MA	07/14/22 00:00	07/14/22
L2237728-08	MW-DUX-LD	WATER	DUXBURY MA	07/14/22 10:00	07/14/22
L2237728-09	MW-DUX-FS	WATER	DUXBURY MA	07/14/22 15:10	07/14/22
L2237728-10	FIELD BLANK	WATER	DUXBURY MA	07/14/22 12:00	07/14/22
L2237728-11	GMR-MW-7	WATER	DUXBURY MA	07/13/22 17:45	07/14/22
L2237728-12	WS-2	WATER	DUXBURY MA	07/14/22 14:45	07/14/22
L2237728-13	MW-91-2	WATER	DUXBURY MA	07/14/22 14:30	07/14/22

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

Case Narrative (continued)

Perfluorinated Alkyl Acids by Isotope Dilution

L2237728-02 through -05, -07, -08, and -09: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2237728-08: The sample was centrifuged and decanted prior to extraction due to sample matrix.

Total Metals

The WG1663410-1 Method Blank, associated with L2237728-05 and -11, has a concentration above the reporting limit for mercury. Since the associated sample concentrations are either greater than 10x the blank concentration or non-detect to the RL for this target analyte, no corrective action is required. Any results detected below the reporting limit are qualified with a "B".

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Kelly Stenstrom

Title: Technical Director/Representative Date: 08/04/22

ORGANICS

VOLATILES

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 07/26/22 01:00
Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Chloroform	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,2-Dichloropropane	ND		ug/l	1.8	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
Chlorobenzene	ND		ug/l	0.50	--	1
Trichlorofluoromethane	ND		ug/l	2.5	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.5	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Chloromethane	ND		ug/l	2.5	--	1
Bromomethane	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
trans-1,2-Dichloroethene	ND		ug/l	0.75	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2-Dichloroethene, Total	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Dibromomethane	ND		ug/l	5.0	--	1
1,4-Dichlorobutane	ND		ug/l	5.0	--	1
1,2,3-Trichloropropane	ND		ug/l	5.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	5.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
Vinyl acetate	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Ethyl methacrylate	ND		ug/l	5.0	--	1
Acrylonitrile	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.5	--	1
Tetrahydrofuran	ND		ug/l	5.0	--	1
2,2-Dichloropropane	ND		ug/l	2.5	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.5	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Bromobenzene	ND		ug/l	2.5	--	1
n-Butylbenzene	ND		ug/l	0.50	--	1
sec-Butylbenzene	ND		ug/l	0.50	--	1
tert-Butylbenzene	ND		ug/l	2.5	--	1
o-Chlorotoluene	ND		ug/l	2.5	--	1
p-Chlorotoluene	ND		ug/l	2.5	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	--	1
p-Isopropyltoluene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	2.5	--	1
n-Propylbenzene	ND		ug/l	0.50	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--	1
Ethyl ether	ND		ug/l	2.5	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	100		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	109		70-130

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA
Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8260C
Analytical Date: 07/26/22 01:20
Analyst: MV

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Methylene chloride	ND		ug/l	3.0	--	1
1,1-Dichloroethane	ND		ug/l	0.75	--	1
Chloroform	ND		ug/l	0.75	--	1
Carbon tetrachloride	ND		ug/l	0.50	--	1
1,2-Dichloropropane	ND		ug/l	1.8	--	1
Dibromochloromethane	ND		ug/l	0.50	--	1
1,1,2-Trichloroethane	ND		ug/l	0.75	--	1
Tetrachloroethene	ND		ug/l	0.50	--	1
Chlorobenzene	ND		ug/l	0.50	--	1
Trichlorofluoromethane	ND		ug/l	2.5	--	1
1,2-Dichloroethane	ND		ug/l	0.50	--	1
1,1,1-Trichloroethane	ND		ug/l	0.50	--	1
Bromodichloromethane	ND		ug/l	0.50	--	1
trans-1,3-Dichloropropene	ND		ug/l	0.50	--	1
cis-1,3-Dichloropropene	ND		ug/l	0.50	--	1
1,3-Dichloropropene, Total	ND		ug/l	0.50	--	1
1,1-Dichloropropene	ND		ug/l	2.5	--	1
Bromoform	ND		ug/l	2.0	--	1
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Benzene	ND		ug/l	0.50	--	1
Toluene	ND		ug/l	0.75	--	1
Ethylbenzene	ND		ug/l	0.50	--	1
Chloromethane	ND		ug/l	2.5	--	1
Bromomethane	ND		ug/l	1.0	--	1
Vinyl chloride	ND		ug/l	1.0	--	1
Chloroethane	ND		ug/l	1.0	--	1
1,1-Dichloroethene	ND		ug/l	0.50	--	1
trans-1,2-Dichloroethene	ND		ug/l	0.75	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA
Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
1,2-Dichloroethene, Total	ND		ug/l	0.50	--	1
Trichloroethene	ND		ug/l	0.50	--	1
1,2-Dichlorobenzene	ND		ug/l	2.5	--	1
1,3-Dichlorobenzene	ND		ug/l	2.5	--	1
1,4-Dichlorobenzene	ND		ug/l	2.5	--	1
Methyl tert butyl ether	ND		ug/l	1.0	--	1
p/m-Xylene	ND		ug/l	1.0	--	1
o-Xylene	ND		ug/l	1.0	--	1
Xylenes, Total	ND		ug/l	1.0	--	1
cis-1,2-Dichloroethene	ND		ug/l	0.50	--	1
Dibromomethane	ND		ug/l	5.0	--	1
1,4-Dichlorobutane	ND		ug/l	5.0	--	1
1,2,3-Trichloropropane	ND		ug/l	5.0	--	1
Styrene	ND		ug/l	1.0	--	1
Dichlorodifluoromethane	ND		ug/l	5.0	--	1
Acetone	ND		ug/l	5.0	--	1
Carbon disulfide	ND		ug/l	5.0	--	1
2-Butanone	ND		ug/l	5.0	--	1
Vinyl acetate	ND		ug/l	5.0	--	1
4-Methyl-2-pentanone	ND		ug/l	5.0	--	1
2-Hexanone	ND		ug/l	5.0	--	1
Ethyl methacrylate	ND		ug/l	5.0	--	1
Acrylonitrile	ND		ug/l	5.0	--	1
Bromochloromethane	ND		ug/l	2.5	--	1
Tetrahydrofuran	ND		ug/l	5.0	--	1
2,2-Dichloropropane	ND		ug/l	2.5	--	1
1,2-Dibromoethane	ND		ug/l	2.0	--	1
1,3-Dichloropropane	ND		ug/l	2.5	--	1
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--	1
Bromobenzene	ND		ug/l	2.5	--	1
n-Butylbenzene	ND		ug/l	0.50	--	1
sec-Butylbenzene	ND		ug/l	0.50	--	1
tert-Butylbenzene	ND		ug/l	2.5	--	1
o-Chlorotoluene	ND		ug/l	2.5	--	1
p-Chlorotoluene	ND		ug/l	2.5	--	1
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--	1
Hexachlorobutadiene	ND		ug/l	0.50	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA
Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Volatile Organics by GC/MS - Westborough Lab						
Isopropylbenzene	ND		ug/l	0.50	--	1
p-Isopropyltoluene	ND		ug/l	0.50	--	1
Naphthalene	ND		ug/l	2.5	--	1
n-Propylbenzene	ND		ug/l	0.50	--	1
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--	1
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--	1
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--	1
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--	1
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--	1
Ethyl ether	ND		ug/l	2.5	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	110		70-130
Toluene-d8	102		70-130
4-Bromofluorobenzene	98		70-130
Dibromofluoromethane	110		70-130

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,11 Batch: WG1667600-5					
Methylene chloride	ND		ug/l	3.0	--
1,1-Dichloroethane	ND		ug/l	0.75	--
Chloroform	ND		ug/l	0.75	--
Carbon tetrachloride	ND		ug/l	0.50	--
1,2-Dichloropropane	ND		ug/l	1.8	--
Dibromochloromethane	ND		ug/l	0.50	--
1,1,2-Trichloroethane	ND		ug/l	0.75	--
Tetrachloroethene	ND		ug/l	0.50	--
Chlorobenzene	ND		ug/l	0.50	--
Trichlorofluoromethane	ND		ug/l	2.5	--
1,2-Dichloroethane	ND		ug/l	0.50	--
1,1,1-Trichloroethane	ND		ug/l	0.50	--
Bromodichloromethane	ND		ug/l	0.50	--
trans-1,3-Dichloropropene	ND		ug/l	0.50	--
cis-1,3-Dichloropropene	ND		ug/l	0.50	--
1,3-Dichloropropene, Total	ND		ug/l	0.50	--
1,1-Dichloropropene	ND		ug/l	2.5	--
Bromoform	ND		ug/l	2.0	--
1,1,2,2-Tetrachloroethane	ND		ug/l	0.50	--
Benzene	ND		ug/l	0.50	--
Toluene	ND		ug/l	0.75	--
Ethylbenzene	ND		ug/l	0.50	--
Chloromethane	ND		ug/l	2.5	--
Bromomethane	ND		ug/l	1.0	--
Vinyl chloride	ND		ug/l	1.0	--
Chloroethane	ND		ug/l	1.0	--
1,1-Dichloroethene	ND		ug/l	0.50	--
trans-1,2-Dichloroethene	ND		ug/l	0.75	--
1,2-Dichloroethene, Total	ND		ug/l	0.50	--

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,11 Batch: WG1667600-5					
Trichloroethene	ND		ug/l	0.50	--
1,2-Dichlorobenzene	ND		ug/l	2.5	--
1,3-Dichlorobenzene	ND		ug/l	2.5	--
1,4-Dichlorobenzene	ND		ug/l	2.5	--
Methyl tert butyl ether	ND		ug/l	1.0	--
p/m-Xylene	ND		ug/l	1.0	--
o-Xylene	ND		ug/l	1.0	--
Xylenes, Total	ND		ug/l	1.0	--
cis-1,2-Dichloroethene	ND		ug/l	0.50	--
Dibromomethane	ND		ug/l	5.0	--
1,4-Dichlorobutane	ND		ug/l	5.0	--
1,2,3-Trichloropropane	ND		ug/l	5.0	--
Styrene	ND		ug/l	1.0	--
Dichlorodifluoromethane	ND		ug/l	5.0	--
Acetone	ND		ug/l	5.0	--
Carbon disulfide	ND		ug/l	5.0	--
2-Butanone	ND		ug/l	5.0	--
Vinyl acetate	ND		ug/l	5.0	--
4-Methyl-2-pentanone	ND		ug/l	5.0	--
2-Hexanone	ND		ug/l	5.0	--
Ethyl methacrylate	ND		ug/l	5.0	--
Acrolein	ND		ug/l	5.0	--
Acrylonitrile	ND		ug/l	5.0	--
Bromochloromethane	ND		ug/l	2.5	--
Tetrahydrofuran	ND		ug/l	5.0	--
2,2-Dichloropropane	ND		ug/l	2.5	--
1,2-Dibromoethane	ND		ug/l	2.0	--
1,3-Dichloropropane	ND		ug/l	2.5	--
1,1,1,2-Tetrachloroethane	ND		ug/l	0.50	--

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,11 Batch: WG1667600-5					
Bromobenzene	ND		ug/l	2.5	--
n-Butylbenzene	ND		ug/l	0.50	--
sec-Butylbenzene	ND		ug/l	0.50	--
tert-Butylbenzene	ND		ug/l	2.5	--
o-Chlorotoluene	ND		ug/l	2.5	--
p-Chlorotoluene	ND		ug/l	2.5	--
1,2-Dibromo-3-chloropropane	ND		ug/l	2.5	--
Hexachlorobutadiene	ND		ug/l	0.50	--
Isopropylbenzene	ND		ug/l	0.50	--
p-Isopropyltoluene	ND		ug/l	0.50	--
Naphthalene	ND		ug/l	2.5	--
n-Propylbenzene	ND		ug/l	0.50	--
1,2,3-Trichlorobenzene	ND		ug/l	2.5	--
1,2,4-Trichlorobenzene	ND		ug/l	2.5	--
1,3,5-Trimethylbenzene	ND		ug/l	2.5	--
1,3,5-Trichlorobenzene	ND		ug/l	2.0	--
1,2,4-Trimethylbenzene	ND		ug/l	2.5	--
trans-1,4-Dichloro-2-butene	ND		ug/l	2.5	--
Halothane	ND		ug/l	2.5	--
Ethyl ether	ND		ug/l	2.5	--
Methyl Acetate	ND		ug/l	10	--
Ethyl Acetate	ND		ug/l	10	--
Isopropyl Ether	ND		ug/l	2.0	--
Cyclohexane	ND		ug/l	10	--
Tert-Butyl Alcohol	ND		ug/l	10	--
Ethyl-Tert-Butyl-Ether	ND		ug/l	2.0	--
Tertiary-Amyl Methyl Ether	ND		ug/l	2.0	--
1,4-Dioxane	ND		ug/l	250	--
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		ug/l	10	--

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8260C
Analytical Date: 07/25/22 21:12
Analyst: KJD

Parameter	Result	Qualifier	Units	RL	MDL
Volatile Organics by GC/MS - Westborough Lab for sample(s): 05,11 Batch: WG1667600-5					
Methyl cyclohexane	ND		ug/l	10	--
p-Diethylbenzene	ND		ug/l	2.0	--
4-Ethyltoluene	ND		ug/l	2.0	--
1,2,4,5-Tetramethylbenzene	ND		ug/l	2.0	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,2-Dichloroethane-d4	115		70-130
Toluene-d8	101		70-130
4-Bromofluorobenzene	96		70-130
Dibromofluoromethane	110		70-130

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,11 Batch: WG1667600-3 WG1667600-4								
Methylene chloride	100		100		70-130	0		20
1,1-Dichloroethane	110		100		70-130	10		20
Chloroform	99		100		70-130	1		20
Carbon tetrachloride	92		95		63-132	3		20
1,2-Dichloropropane	100		100		70-130	0		20
Dibromochloromethane	87		88		63-130	1		20
1,1,2-Trichloroethane	95		97		70-130	2		20
Tetrachloroethene	96		97		70-130	1		20
Chlorobenzene	100		100		75-130	0		25
Trichlorofluoromethane	120		120		62-150	0		20
1,2-Dichloroethane	100		100		70-130	0		20
1,1,1-Trichloroethane	97		100		67-130	3		20
Bromodichloromethane	98		99		67-130	1		20
trans-1,3-Dichloropropene	90		90		70-130	0		20
cis-1,3-Dichloropropene	90		92		70-130	2		20
1,1-Dichloropropene	99		98		70-130	1		20
Bromoform	80		74		54-136	8		20
1,1,2,2-Tetrachloroethane	99		96		67-130	3		20
Benzene	100		97		70-130	3		25
Toluene	100		100		70-130	0		25
Ethylbenzene	110		100		70-130	10		20
Chloromethane	100		100		64-130	0		20
Bromomethane	110		110		39-139	0		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,11 Batch: WG1667600-3 WG1667600-4								
Vinyl chloride	110		110		55-140	0		20
Chloroethane	**180**	Q	**170**	Q	55-138	6		20
1,1-Dichloroethene	98		100		61-145	2		25
trans-1,2-Dichloroethene	100		97		70-130	3		20
Trichloroethene	99		99		70-130	0		25
1,2-Dichlorobenzene	100		95		70-130	5		20
1,3-Dichlorobenzene	100		100		70-130	0		20
1,4-Dichlorobenzene	100		98		70-130	2		20
Methyl tert butyl ether	81		86		63-130	6		20
p/m-Xylene	105		105		70-130	0		20
o-Xylene	100		105		70-130	5		20
cis-1,2-Dichloroethene	100		96		70-130	4		20
Dibromomethane	96		94		70-130	2		20
1,4-Dichlorobutane	97		97		70-130	0		20
1,2,3-Trichloropropane	98		94		64-130	4		20
Styrene	105		105		70-130	0		20
Dichlorodifluoromethane	110		110		36-147	0		20
Acetone	92		110		58-148	18		20
Carbon disulfide	110		110		51-130	0		20
2-Butanone	66		70		63-138	6		20
Vinyl acetate	93		97		70-130	4		20
4-Methyl-2-pentanone	83		75		59-130	10		20
2-Hexanone	71		74		57-130	4		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,11 Batch: WG1667600-3 WG1667600-4								
Ethyl methacrylate	73		77		70-130	5		20
Acrolein	77		**62**	Q	70-130	**22**	Q	20
Acrylonitrile	84		80		70-130	5		20
Bromochloromethane	100		96		70-130	4		20
Tetrahydrofuran	63		81		58-130	**25**	Q	20
2,2-Dichloropropane	110		100		63-133	10		20
1,2-Dibromoethane	90		91		70-130	1		20
1,3-Dichloropropane	97		98		70-130	1		20
1,1,1,2-Tetrachloroethane	91		88		64-130	3		20
Bromobenzene	97		92		70-130	5		20
n-Butylbenzene	110		110		53-136	0		20
sec-Butylbenzene	110		110		70-130	0		20
tert-Butylbenzene	100		100		70-130	0		20
o-Chlorotoluene	110		100		70-130	10		20
p-Chlorotoluene	110		100		70-130	10		20
1,2-Dibromo-3-chloropropane	70		64		41-144	9		20
Hexachlorobutadiene	95		94		63-130	1		20
Isopropylbenzene	100		100		70-130	0		20
p-Isopropyltoluene	100		100		70-130	0		20
Naphthalene	79		78		70-130	1		20
n-Propylbenzene	110		110		69-130	0		20
1,2,3-Trichlorobenzene	84		83		70-130	1		20
1,2,4-Trichlorobenzene	88		85		70-130	3		20

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,11 Batch: WG1667600-3 WG1667600-4								
1,3,5-Trimethylbenzene	110		100		64-130	10		20
1,3,5-Trichlorobenzene	94		91		70-130	3		20
1,2,4-Trimethylbenzene	110		100		70-130	10		20
trans-1,4-Dichloro-2-butene	96		76		70-130	**23**	Q	20
Halothane	93		96		70-130	3		20
Ethyl ether	92		89		59-134	3		20
Methyl Acetate	87		76		70-130	13		20
Ethyl Acetate	**64**	Q	**65**	Q	70-130	2		20
Isopropyl Ether	95		96		70-130	1		20
Cyclohexane	99		100		70-130	1		20
Tert-Butyl Alcohol	78		76		70-130	3		20
Ethyl-Tert-Butyl-Ether	87		88		70-130	1		20
Tertiary-Amyl Methyl Ether	80		80		66-130	0		20
1,4-Dioxane	104		104		56-162	0		20
1,1,2-Trichloro-1,2,2-Trifluoroethane	100		100		70-130	0		20
Methyl cyclohexane	100		100		70-130	0		20
p-Diethylbenzene	100		100		70-130	0		20
4-Ethyltoluene	110		100		70-130	10		20
1,2,4,5-Tetramethylbenzene	92		90		70-130	2		20

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY LF

Project Number: Not Specified

Lab Number: L2237728

Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits

Volatile Organics by GC/MS - Westborough Lab Associated sample(s): 05,11 Batch: WG1667600-3 WG1667600-4

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,2-Dichloroethane-d4	105		107		70-130
Toluene-d8	105		102		70-130
4-Bromofluorobenzene	98		97		70-130
Dibromofluoromethane	103		102		70-130

SEMIVOLATILES

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-01
Client ID: EB
Sample Location: DUXBURY MA

Date Collected: 07/14/22 12:30
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 15:51
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.74	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.74	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.74	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.74	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.74	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.74	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.74	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.74	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.74	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.74	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.74	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.74	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.74	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.74	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.74	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.74	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.74	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.74	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.74	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.74	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.74	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.74	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.74	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.74	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-01
Client ID: EB
Sample Location: DUXBURY MA
Date Collected: 07/14/22 12:30
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	111		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	105		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	92		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	98		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	84		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	99		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	102		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	75		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	100		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	18		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	93		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	85		22-136

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-02
Client ID: MW-DUX-FD
Sample Location: DUXBURY MA

Date Collected: 07/14/22 14:50
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 16:08
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.86	--	1
Perfluoropentanoic Acid (PFPeA)	4.58		ng/l	1.86	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.86	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.86	--	1
Perfluorohexanoic Acid (PFHxA)	3.56		ng/l	1.86	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.86	--	1
Perfluoroheptanoic Acid (PFHpA)	4.90		ng/l	1.86	--	1
Perfluorohexanesulfonic Acid (PFHxS)	4.22	F	ng/l	1.86	--	1
Perfluorooctanoic Acid (PFOA)	40.2		ng/l	1.86	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.86	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.86	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.86	--	1
Perfluorooctanesulfonic Acid (PFOS)	14.0		ng/l	1.86	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.86	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.86	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.86	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.86	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.86	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.86	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.86	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.86	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.86	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.86	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.86	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-02
Client ID: MW-DUX-FD
Sample Location: DUXBURY MA
Date Collected: 07/14/22 14:50
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	95		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	98		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**206**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	135		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	83		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	80		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	10		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	59		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	69		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-03
Client ID: MW-DUX NS
Sample Location: DUXBURY MA

Date Collected: 07/14/22 12:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 00:57
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	378.		ng/l	144	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	51		15-110

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-03
Client ID: MW-DUX NS
Sample Location: DUXBURY MA

Date Collected: 07/14/22 12:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 16:24
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.58		ng/l	1.78	--	1
Perfluoropentanoic Acid (PFPeA)	7.83		ng/l	1.78	--	1
Perfluorobutanesulfonic Acid (PFBS)	2.58		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	--	1
Perfluorohexanoic Acid (PFHxA)	7.70		ng/l	1.78	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	--	1
Perfluoroheptanoic Acid (PFHpA)	5.57		ng/l	1.78	--	1
Perfluorohexanesulfonic Acid (PFHxS)	3.71	F	ng/l	1.78	--	1
Perfluorooctanoic Acid (PFOA)	18.6		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.76		ng/l	1.78	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.99		ng/l	1.78	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-03
Client ID: MW-DUX NS
Sample Location: DUXBURY MA
Date Collected: 07/14/22 12:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	85		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	91		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**218**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	88		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	83		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**181**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	77		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	104		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	39		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	66		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	6		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	39		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	62		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	67		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-04
Client ID: MW-DUX ND
Sample Location: DUXBURY MA

Date Collected: 07/14/22 13:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 01:21
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	479.		ng/l	139	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	48		15-110

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-04
Client ID: MW-DUX ND
Sample Location: DUXBURY MA

Date Collected: 07/14/22 13:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 16:41
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.24		ng/l	1.81	--	1
Perfluoropentanoic Acid (PFPeA)	7.73		ng/l	1.81	--	1
Perfluorobutanesulfonic Acid (PFBS)	2.12		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.81	--	1
Perfluorohexanoic Acid (PFHxA)	7.10		ng/l	1.81	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.81	--	1
Perfluoroheptanoic Acid (PFHpA)	5.70		ng/l	1.81	--	1
Perfluorohexanesulfonic Acid (PFHxS)	4.64	F	ng/l	1.81	--	1
Perfluorooctanoic Acid (PFOA)	20.0		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.81	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.81	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.81	--	1
Perfluorooctanesulfonic Acid (PFOS)	3.32		ng/l	1.81	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.81	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.81	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.81	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.81	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.81	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.81	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.81	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.81	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.81	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.81	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-04
Client ID: MW-DUX ND
Sample Location: DUXBURY MA
Date Collected: 07/14/22 13:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	103		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	116		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**240**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	79		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**212**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	106		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	87		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	116		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	55		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	77		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	60		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	66		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	74		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 01:46
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	139	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	48		15-110

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 16:58
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.71	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.71	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.71	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.71	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.71	--	1
Perfluoroheptanoic Acid (PFHpA)	1.95		ng/l	1.71	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2.75	F	ng/l	1.71	--	1
Perfluorooctanoic Acid (PFOA)	9.84		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.71	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.71	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.71	--	1
Perfluorooctanesulfonic Acid (PFOS)	54.1		ng/l	1.71	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.71	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.71	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.71	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.71	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.71	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.71	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.71	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.71	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.71	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.71	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.71	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA
Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	102		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	83		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**184**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	78		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	83		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**165**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	89		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	94		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	91		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	52		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	77		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	12		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	55		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	65		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	63		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-06
Client ID: MW-DUX-LS
Sample Location: DUXBURY MA

Date Collected: 07/14/22 10:15
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 17:14
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.80	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.80	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.80	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	3.07		ng/l	1.80	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.80	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.80	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-06
Client ID: MW-DUX-LS
Sample Location: DUXBURY MA
Date Collected: 07/14/22 10:15
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	74		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	87		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	97		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	120		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	80		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	90		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	77		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	80		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	80		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	89		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	73		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	52		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	8		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	78		22-136

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-07
Client ID: DUP-1
Sample Location: DUXBURY MA

Date Collected: 07/14/22 00:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 17:31
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.75		ng/l	1.80	--	1
Perfluoropentanoic Acid (PFPeA)	5.78		ng/l	1.80	--	1
Perfluorobutanesulfonic Acid (PFBS)	2.27		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.80	--	1
Perfluorohexanoic Acid (PFHxA)	7.10		ng/l	1.80	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.80	--	1
Perfluoroheptanoic Acid (PFHpA)	5.88		ng/l	1.80	--	1
Perfluorohexanesulfonic Acid (PFHxS)	3.45		ng/l	1.80	--	1
Perfluorooctanoic Acid (PFOA)	19.1		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.64		ng/l	1.80	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.80	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonic Acid (PFOS)	1.92		ng/l	1.80	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.80	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.80	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.80	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.80	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.80	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.80	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.80	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.80	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.80	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.80	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.80	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-07
Client ID: DUP-1
Sample Location: DUXBURY MA
Date Collected: 07/14/22 00:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	83		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	85		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**213**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	66		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**196**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	84		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	81		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	95		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	48		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	74		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	10		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	51		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	61		22-136

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-08
Client ID: MW-DUX-LD
Sample Location: DUXBURY MA

Date Collected: 07/14/22 10:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 18:04
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 16:07

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	2.58		ng/l	1.85	--	1
Perfluoropentanoic Acid (PFPeA)	4.52		ng/l	1.85	--	1
Perfluorobutanesulfonic Acid (PFBS)	2.24		ng/l	1.85	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.85	--	1
Perfluorohexanoic Acid (PFHxA)	5.11		ng/l	1.85	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.85	--	1
Perfluoroheptanoic Acid (PFHpA)	5.60		ng/l	1.85	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2.11		ng/l	1.85	--	1
Perfluorooctanoic Acid (PFOA)	18.9		ng/l	1.85	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.85	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.85	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.85	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.85	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.85	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.85	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.85	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.85	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.85	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.85	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.85	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.85	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.85	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.85	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.85	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-08
Client ID: MW-DUX-LD
Sample Location: DUXBURY MA
Date Collected: 07/14/22 10:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	91		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	94		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	95		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**221**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	74		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	82		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	91		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	87		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**186**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	90		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	93		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	48		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	80		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	54		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	72		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	71		22-136

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-09
Client ID: MW-DUX-FS
Sample Location: DUXBURY MA

Date Collected: 07/14/22 15:10
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 18:20
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 16:07

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	4.79		ng/l	1.81	--	1
Perfluoropentanoic Acid (PFPeA)	4.67		ng/l	1.81	--	1
Perfluorobutanesulfonic Acid (PFBS)	4.32		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.81	--	1
Perfluorohexanoic Acid (PFHxA)	5.58		ng/l	1.81	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.81	--	1
Perfluoroheptanoic Acid (PFHpA)	5.66		ng/l	1.81	--	1
Perfluorohexanesulfonic Acid (PFHxS)	5.03		ng/l	1.81	--	1
Perfluorooctanoic Acid (PFOA)	22.7		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.81	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.81	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.81	--	1
Perfluorooctanesulfonic Acid (PFOS)	7.02		ng/l	1.81	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.81	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.81	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.81	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.81	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.81	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.81	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.81	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.81	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.81	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.81	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.81	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-09
Client ID: MW-DUX-FS
Sample Location: DUXBURY MA
Date Collected: 07/14/22 15:10
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	73		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	93		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**161**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	72		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	73		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	89		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	72		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	97		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	67		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	93		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	63		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	73		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	41		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	66		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	5		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	50		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	66		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-10
Client ID: FIELD BLANK
Sample Location: DUXBURY MA

Date Collected: 07/14/22 12:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 18:37
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 16:07

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.78	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.78	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.78	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.78	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.78	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.78	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.78	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.78	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.78	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-10
Client ID: FIELD BLANK
Sample Location: DUXBURY MA
Date Collected: 07/14/22 12:00
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	118		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	81		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	97		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	95		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	95		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	76		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	97		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	95		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	84		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	71		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	91		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	22		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	75		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:09
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	139	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	48		15-110

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 18:53
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 16:08

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.79	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	1.79	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.79	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.79	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.79	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.79	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.79	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.79	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.79	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.79	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.79	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.79	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.79	--	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.79	--	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.79	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.79	--	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.79	--	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.79	--	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.79	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.79	--	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.79	--	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.79	--	1

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA
Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	100		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	115		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	97		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	90		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	81		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	93		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	90		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	81		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	84		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	5		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	79		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	73		22-136

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-12
Client ID: WS-2
Sample Location: DUXBURY MA

Date Collected: 07/14/22 14:45
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:33
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	134	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	46		15-110

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-13
Client ID: MW-91-2
Sample Location: DUXBURY MA

Date Collected: 07/14/22 14:30
Date Received: 07/14/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 1,8270E-SIM
Analytical Date: 07/19/22 02:57
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,4 Dioxane by 8270E-SIM - Mansfield Lab						
1,4-Dioxane	ND		ng/l	134	--	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	49		15-110

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 1,8270E-SIM
Analytical Date: 07/18/22 18:13
Analyst: DB

Extraction Method: EPA 3510C
Extraction Date: 07/17/22 09:15

Parameter	Result	Qualifier	Units	RL	MDL
1,4 Dioxane by 8270E-SIM - Mansfield Lab for sample(s): 03-05,11-13 Batch: WG1663784-1					
1,4-Dioxane	ND		ng/l	150	--

Surrogate	%Recovery	Qualifier	Acceptance Criteria
1,4-Dioxane-d8	51		15-110

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 10:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-11 Batch: WG1665348-1					
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	70		5-112

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 13:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-11 Batch: WG1665348-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	--
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	--
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	--
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	--
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	--

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 08/03/22 13:55
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/20/22 15:53

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-11 Batch: WG1665348-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	123		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	100		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	103		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	101		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	106		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	100		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	110		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	103		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	109		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	89		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	112		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	13		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	101		22-136

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY LF

Project Number: Not Specified

Lab Number: L2237728

Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
1,4 Dioxane by 8270E-SIM - Mansfield Lab	Associated sample(s): 03-05,11-13		Batch: WG1663784-2		WG1663784-3			
1,4-Dioxane	108		109		40-140	1		30

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
1,4-Dioxane-d8	46		50		15-110

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY LF

Project Number: Not Specified

Lab Number: L2237728

Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab	Associated sample(s): 01-11		Batch: WG1665348-2					
Perfluorooctanesulfonamide (FOSA)	97		-		46-170	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	67				5-112

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-11 Batch: WG1665348-2								
Perfluorobutanoic Acid (PFBA)	102		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	100		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	103		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	112		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	100		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	113		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	101		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	118		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	100		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	119		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	106		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	92		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	112		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	100		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	124		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	106		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	114		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	112		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	109		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	104		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	110		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	99		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-11 Batch: WG1665348-2								
Perfluorotridecanoic Acid (PFTrDA)	106		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	102		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	99				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	107				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	108				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	98				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	106				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	109				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	98				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	113				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	83				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	98				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88				22-136

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1665348-3 WG1665348-4 QC Sample: L2237589-02 Client ID: MS Sample												
Perfluorooctanesulfonamide (FOSA)	ND	43.6	40.6	93		32.3	90		46-170	23		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	59		69		5-112

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-11 QC Batch ID: WG1665348-3 WG1665348-4 QC Sample: L2237589-02 Client ID: MS Sample												
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	41.6	45.6	110		39.3	115		49-187	15		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	91		111		14-147

METALS

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-05
Client ID: WS-1
Sample Location: DUXBURY MA
Sample Depth:
Matrix: Water

Date Collected: 07/13/22 19:00
Date Received: 07/14/22
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Barium, Total	0.045		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Cadmium, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Chromium, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Copper, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Iron, Total	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Lead, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Manganese, Total	0.127		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Mercury, Total	ND		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 18:08	EPA 7470A	1,7470A	AW
Silver, Total	ND		mg/l	0.007	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Sodium, Total	21.0		mg/l	2.00	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW
Zinc, Total	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:32	EPA 3005A	1,6010D	EW

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237728-11
Client ID: GMR-MW-7
Sample Location: DUXBURY MA
Sample Depth:
Matrix: Water

Date Collected: 07/13/22 17:45
Date Received: 07/14/22
Field Prep: Not Specified

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Prep Method	Analytical Method	Analyst
Total Metals - Mansfield Lab											
Arsenic, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Barium, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Cadmium, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Chromium, Total	0.015		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Copper, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Iron, Total	0.267		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Lead, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Manganese, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Mercury, Total	ND		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 18:11	EPA 7470A	1,7470A	AW
Silver, Total	ND		mg/l	0.007	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Sodium, Total	12.8		mg/l	2.00	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW
Zinc, Total	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 11:37	EPA 3005A	1,6010D	EW

Project Name: DUXBURY LF
Project Number: Not Specified
Lab Number: L2237728
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 05,11 Batch: WG1663410-1										
Mercury, Total	0.00031		mg/l	0.00020	--	1	07/15/22 23:13	08/02/22 17:15	1,7470A	AW

Prep Information

Digestion Method: EPA 7470A

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
Total Metals - Mansfield Lab for sample(s): 05,11 Batch: WG1663529-1										
Arsenic, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Barium, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Cadmium, Total	ND		mg/l	0.005	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Chromium, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Copper, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Iron, Total	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Lead, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Manganese, Total	ND		mg/l	0.010	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Silver, Total	ND		mg/l	0.007	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Sodium, Total	ND		mg/l	2.00	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW
Zinc, Total	ND		mg/l	0.050	--	1	07/15/22 20:44	08/02/22 10:04	1,6010D	EW

Prep Information

Digestion Method: EPA 3005A

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY LF

Project Number: Not Specified

Lab Number: L2237728

Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 05,11 Batch: WG1663410-2								
Mercury, Total	103		-		80-120	-		
Total Metals - Mansfield Lab Associated sample(s): 05,11 Batch: WG1663529-2								
Arsenic, Total	105		-		80-120	-		
Barium, Total	99		-		80-120	-		
Cadmium, Total	104		-		80-120	-		
Chromium, Total	91		-		80-120	-		
Copper, Total	106		-		80-120	-		
Iron, Total	110		-		80-120	-		
Lead, Total	101		-		80-120	-		
Manganese, Total	100		-		80-120	-		
Silver, Total	100		-		80-120	-		
Sodium, Total	104		-		80-120	-		
Zinc, Total	97		-		80-120	-		

Matrix Spike Analysis
Batch Quality Control

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 05,11 QC Batch ID: WG1663410-3 WG1663410-4 QC Sample: L2237368-03 Client ID: MS Sample												
Mercury, Total	ND	0.005	0.00460	92		0.00470	94		75-125	2		20
Total Metals - Mansfield Lab Associated sample(s): 05,11 QC Batch ID: WG1663529-3 WG1663529-4 QC Sample: L2237368-03 Client ID: MS Sample												
Arsenic, Total	ND	0.12	0.130	108		0.127	106		75-125	2		20
Barium, Total	0.194	2	2.17	99		2.13	97		75-125	2		20
Cadmium, Total	ND	0.053	0.053	100		0.052	98		75-125	2		20
Chromium, Total	ND	0.2	0.183	92		0.182	91		75-125	1		20
Copper, Total	ND	0.25	0.279	112		0.277	111		75-125	1		20
Iron, Total	1.19	1	2.22	103		2.17	98		75-125	2		20
Lead, Total	ND	0.53	0.523	99		0.518	98		75-125	1		20
Manganese, Total	0.637	0.5	1.10	93		1.07	87		75-125	3		20
Silver, Total	ND	0.05	0.052	103		0.051	102		75-125	1		20
Sodium, Total	224	10	225	**10**	Q	221	**0**	Q	75-125	2		20
Zinc, Total	ND	0.5	0.472	94		0.464	93		75-125	2		20

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Serial Dilution Analysis
Batch Quality Control

Lab Number: L2237728
Report Date: 08/04/22

Parameter	Native Sample	Serial Dilution	Units	% D	Qual	RPD Limits
Total Metals - Mansfield Lab Associated sample(s): 05,11 QC Batch ID: WG1663529-6 QC Sample: L2237368-03 Client ID: DUP Sample						
Manganese, Total	0.637	0.640	mg/l	0		20
Sodium, Total	224	224	mg/l	0		20

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2237728-01A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-01B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-02A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-02B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-03A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-03B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-03C	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-04A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-04B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-04C	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-05A	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-05B	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-05C	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-05D	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-05E	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-05F	Plastic 500ml HNO3 preserved	A	<2	<2	2.8	Y	Absent		AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),ZN-TI(180),CU-TI(180),PB-TI(180),MN-TI(180),HG-T(28),FE-TI(180),CD-TI(180),NA-TI(180)
L2237728-05G	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-06A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-06B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-07A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-07B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-08A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY LF
Project Number: Not Specified

Lab Number: L2237728
Report Date: 08/04/22

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2237728-08B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-09A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-09B	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-10A	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-11A	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-11B	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-11C	Vial HCl preserved	A	NA		2.8	Y	Absent		8260(14)
L2237728-11D	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-11E	Plastic 250ml unpreserved	A	NA		2.8	Y	Absent		A2-537-ISOTOPE(14)
L2237728-11F	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-11G	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-11H	Plastic 500ml HNO3 preserved	A	<2	<2	2.8	Y	Absent		AS-TI(180),BA-TI(180),AG-TI(180),CR-TI(180),PB-TI(180),ZN-TI(180),CU-TI(180),HG-T(28),FE-TI(180),MN-TI(180),CD-TI(180),NA-TI(180)
L2237728-12A	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)
L2237728-13A	Amber 250ml unpreserved	A	7	7	2.8	Y	Absent		A2-1,4-DIOXANE-SIM(7)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY LF
Project Number:

Lab Number: L2237728
Report Date: 08/04/22

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Report Format: Data Usability Report

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

Data Qualifiers

ND - Not detected at the reporting limit (RL) for the sample.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: Data Usability Report

Project Name:	DUXBURY LF	**Lab Number:**	L2237728
Project Number:	Not Specified	**Report Date:**	08/04/22

REFERENCES

1 Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Third Edition. Updates I - VI, 2018.

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab: 7/14/22

ALPHA Job #: L2237728

Client Information

Client: WESTON & SAMPSON

Address: 55 WALKERS BROOK DR. READING

Phone: 1800 SAMPSON

Email:

Project Information

Project Name: DUXBURY LF

Project Location:

Project #:

Project Manager: LOREN McGRATH

ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due:

Additional Project Information:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
PFAS 537.1 ISOTOPE
1,4 DIOXANE 8270
METALS, DISSOLVED BARIUM ONLY
CUSTOM COPPER, IRON, LEAD
MANG., MAGNESIUM, SODIUM ONLY
DRINKING WATER

SAMPLE INFO
Filtration
☒ Field
☐ Lab to do
Preservation
☐ Lab to do

Sample Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	SVOC	METALS	METALS	EPH	VPH	PCB	TPH	PFAS	1,4 DIOXANE	METALS, DISSOLVED BARIUM ONLY	CUSTOM COPPER, IRON, LEAD	MANG., MAGNESIUM, SODIUM ONLY	DRINKING WATER	Sample Comments	TOTAL # BOTTLES
37728-01	EB	7/14	1230	GW										X							
-02	MW-DUX-FD	7/14	1450	GW										X							
-03	MW DUX NS	7/14	1200	GW										X	X						
-04	MW-DUX ND	7/14	1300	GW										X	X						
-05	WS-1	7/13	1900	GW		X								X	X	X					
-06	MW-DUX-LS	7/14	1015	GW										X							
-07	DUP-1	7/14		GW										X							
-08	MW-DUX-LD	7/14	10:00	GW										X							
-09	MW DUX-FS	7/14	1510	GW										X							
-10	FIELD BLANK	7/14	1200											X							

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H= $Na_2S_2O_3$
I= Ascorbic Acid
J= NH_4Cl
K= Zn Acetate
O= Other

	Container Type																				
	Preservative																				

Relinquished By:	Date/Time	Received By:	Date/Time
	7/14/22 1600	ADX	7/14/22 1600
ADX	7-14-22 1740		7/14/22 1740
	7/14 2000		7-14-22 2000
	7-14-22 2130		

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

MCL MAL 7/14/22 213

CHAIN OF CUSTODY

PAGE 2 OF 2

ALPHA ANALYTICAL
8 Walkup Drive, Westboro, MA 01581, Tel: 508-898-9220
320 Forbes Blvd, Mansfield, MA 02048, Tel: 508-822-9300

Date Rec'd in Lab:

ALPHA Job #:

Client Information

Client: WESTON & SAMPSON

Address: 55 WALKUP BROOK DR. RANDOLPH MA

Phone: 1600 SAMPSON

Email: MCGRATHL@WSEINC.COM

Project Information

Project Name: DUXBURY LF

Project Location:

Project #:

Project Manager: LOREN MCGRATH

ALPHA Quote #:

Report Information - Data Deliverables

☐ ADEx ☒ EMAIL

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements & Project Information Requirements

☐ Yes ☐ No MA MCP Analytical Methods ☐ Yes ☐ No CT RCP Analytical Methods
☐ Yes ☐ No Matrix Spike Required on this SDG? (Required for MCP Inorganics)
☐ Yes ☐ No GW1 Standards (Info Required for Metals & EPH with Targets)
☐ Yes ☐ No NPDES RGP
☐ Other State /Fed Program _____ Criteria _____

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)

Date Due:

Additional Project Information:

ANALYSIS

VOC: ☐ 8260 ☐ 624 ☐ 524.2
SVOC: ☐ ABN ☐ PAH
METALS: ☐ MCP 13 ☐ MCP 14 ☐ RCP 15
METALS: ☐ RCRA5 ☐ RCRA8 ☐ PP13
EPH: ☐ Ranges & Targets ☐ Ranges Only
VPH: ☐ Ranges & Targets ☐ Ranges Only
☐ PCB ☐ PEST
TPH: ☐ Quant Only ☐ Fingerprint
METALS: SAME AS ABOVE
1,4 DIOXANE
PFAS 537.1

SAMPLE INFO

Filtration
☒ Field
☐ Lab to do
Preservation
☐ Lab to do

Sample Comments

TOTAL # BOTTLES

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler Initials	VOC	METALS	1,4 DIOXANE	PFAS 537.1	TOTAL # BOTTLES
-11	GMR-MW-7	7/13	1745	GW	PTK	X	X	X	X	21
	~~WS-2~~	~~7/13~~	~~1445~~	~~GW~~	~~PTK~~	~~X~~				
	~~MW91-2~~	~~7/13~~	~~1930~~							
-12	WS-2	7/14	1445	GW	PTK		X			3
-13	MW91-2	7/14	1430	GW	PTK		X			3

Container Type
P= Plastic
A= Amber glass
V= Vial
G= Glass
B= Bacteria cup
C= Cube
O= Other
E= Encore
D= BOD Bottle

Preservative
A= None
B= HCl
C= HNO_3
D= H_2SO_4
E= NaOH
F= MeOH
G= $NaHSO_4$
H = $Na_2S_2O_3$
I= Ascorbic Acid
J = NH_4Cl
K= Zn Acetate
O= Other

Container Type											
Preservative											

Relinquished By:	Date/Time	Received By:	Date/Time
[illegible]	7/14 1600	[illegible] AAL	7-14-22 1200
[illegible] AAL	7-14-22 1740	[illegible]	7/14/22 1740
[illegible]	7/14 2000	[illegible]	7-14-22 2000
[illegible]	7-14-22 2130		

All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 12-Mar-2012)

7/14/22 2130 AAL

ANALYTICAL REPORT

Lab Number:	L2237892
Client:	Weston & Sampson 55 Walkers Brook Drive Suite 100 Reading, MA 01867
ATTN:	Loren McGrath
Phone:	(978) 532-1900
Project Name:	DUXBURY WP
Project Number:	Not Specified
Report Date:	08/04/22

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2237892-01	MW-DUX-AD	WATER	DUXBURY MA	07/15/22 09:15	07/15/22
L2237892-02	MW-DUX-AS	WATER	DUXBURY MA	07/15/22 08:50	07/15/22
L2237892-03	MW-91-1	WATER	DUXBURY MA	07/15/22 11:45	07/15/22
L2237892-04	FIELD BLANK	WATER	DUXBURY MA	07/15/22 11:30	07/15/22

Project Name:	DUXBURY WP	**Lab Number:**	L2237892
Project Number:	Not Specified	**Report Date:**	08/04/22

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	DUXBURY WP	**Lab Number:**	L2237892
Project Number:	Not Specified	**Report Date:**	08/04/22

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by Isotope Dilution

L2237892-01, -02, and -03: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

L2237892-03: The sample was centrifuged and decanted prior to extraction due to sample matrix.

WG1666007-3 and WG1666007-4: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Susan E O'Neil Susan O' Neil

Title: Technical Director/Representative Date: 08/04/22

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-01
Client ID: MW-DUX-AD
Sample Location: DUXBURY MA

Date Collected: 07/15/22 09:15
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 01:51
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	6.52		ng/l	1.78	0.362	1
Perfluoropentanoic Acid (PFPeA)	11.8		ng/l	1.78	0.352	1
Perfluorobutanesulfonic Acid (PFBS)	3.23		ng/l	1.78	0.211	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.78	0.401	1
Perfluorohexanoic Acid (PFHxA)	12.7		ng/l	1.78	0.291	1
Perfluoropentanesulfonic Acid (PFPeS)	3.19		ng/l	1.78	0.218	1
Perfluoroheptanoic Acid (PFHpA)	21.8		ng/l	1.78	0.200	1
Perfluorohexanesulfonic Acid (PFHxS)	16.7		ng/l	1.78	0.334	1
Perfluorooctanoic Acid (PFOA)	233		ng/l	1.78	0.210	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.78	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	2.93		ng/l	1.78	0.611	1
Perfluorononanoic Acid (PFNA)	0.860	J	ng/l	1.78	0.277	1
Perfluorooctanesulfonic Acid (PFOS)	39.4		ng/l	1.78	0.448	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.78	0.270	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.78	1.08	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.78	0.995	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.78	0.576	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.78	0.231	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.78	0.870	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.78	0.515	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.78	0.714	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.78	0.330	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.78	0.291	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.78	0.220	1

Project Name: DUXBURY WP
Lab Number: L2237892
Project Number: Not Specified
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-01
Client ID: MW-DUX-AD
Sample Location: DUXBURY MA
Date Collected: 07/15/22 09:15
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	90		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**68**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**148**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	61		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	77		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	74		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**173**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	105		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	82		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	125		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	50		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	70		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	19		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	52		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	57		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	62		22-136

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-02
Client ID: MW-DUX-AS
Sample Location: DUXBURY MA

Date Collected: 07/15/22 08:50
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 02:24
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	1.63	J	ng/l	1.76	0.360	1
Perfluoropentanoic Acid (PFPeA)	2.86		ng/l	1.76	0.350	1
Perfluorobutanesulfonic Acid (PFBS)	1.68	J	ng/l	1.76	0.210	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.76	0.399	1
Perfluorohexanoic Acid (PFHxA)	2.06		ng/l	1.76	0.290	1
Perfluoropentanesulfonic Acid (PFPeS)	0.526	J	ng/l	1.76	0.216	1
Perfluoroheptanoic Acid (PFHpA)	3.73		ng/l	1.76	0.199	1
Perfluorohexanesulfonic Acid (PFHxS)	3.18		ng/l	1.76	0.332	1
Perfluorooctanoic Acid (PFOA)	31.3		ng/l	1.76	0.208	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1.30	J	ng/l	1.76	1.18	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.76	0.607	1
Perfluorononanoic Acid (PFNA)	0.328	J	ng/l	1.76	0.275	1
Perfluorooctanesulfonic Acid (PFOS)	10.5		ng/l	1.76	0.445	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.76	0.268	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.76	1.07	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.76	0.989	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.76	0.572	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.76	0.230	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.76	0.865	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.76	0.512	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.76	0.710	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.76	0.328	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.76	0.289	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.76	0.219	1

Project Name: DUXBURY WP
Project Number: Not Specified
Lab Number: L2237892
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-02
Client ID: MW-DUX-AS
Sample Location: DUXBURY MA
Date Collected: 07/15/22 08:50
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	80		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**150**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	65		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	80		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	105		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	76		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	46		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	58		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	66		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	72		22-136

Project Name: DUXBURY WP
Project Number: Not Specified
Lab Number: L2237892
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-03
Client ID: MW-91-1
Sample Location: DUXBURY MA

Date Collected: 07/15/22 11:45
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 02:57
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	15.0		ng/l	1.82	0.372	1
Perfluoropentanoic Acid (PFPeA)	28.9		ng/l	1.82	0.361	1
Perfluorobutanesulfonic Acid (PFBS)	8.66		ng/l	1.82	0.217	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.82	0.412	1
Perfluorohexanoic Acid (PFHxA)	21.6		ng/l	1.82	0.299	1
Perfluoropentanesulfonic Acid (PFPeS)	0.645	JF	ng/l	1.82	0.224	1
Perfluoroheptanoic Acid (PFHpA)	13.3		ng/l	1.82	0.205	1
Perfluorohexanesulfonic Acid (PFHxS)	5.18	F	ng/l	1.82	0.343	1
Perfluorooctanoic Acid (PFOA)	18.8		ng/l	1.82	0.215	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	4.00		ng/l	1.82	1.21	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.82	0.627	1
Perfluorononanoic Acid (PFNA)	0.634	J	ng/l	1.82	0.284	1
Perfluorooctanesulfonic Acid (PFOS)	10.0		ng/l	1.82	0.460	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.82	0.277	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.82	1.10	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.82	1.02	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.82	0.591	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.82	0.237	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.82	0.893	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.82	0.529	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.82	0.733	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.82	0.339	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.82	0.298	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.82	0.226	1

Project Name: DUXBURY WP **Lab Number:** L2237892

Project Number: Not Specified **Report Date:** 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-03 Date Collected: 07/15/22 11:45

Client ID: MW-91-1 Date Received: 07/15/22

Sample Location: DUXBURY MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	102		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	**68**	Q	70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**150**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	**56**	Q	57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	74		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**228**	Q	14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	121		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	**240**	Q	10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	92		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	97		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	39		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	81		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	84		22-136

Project Name: DUXBURY WP
Project Number: Not Specified
Lab Number: L2237892
Report Date: 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-04
Client ID: FIELD BLANK
Sample Location: DUXBURY MA

Date Collected: 07/15/22 11:30
Date Received: 07/15/22
Field Prep: Not Specified

Sample Depth:
Matrix: Water
Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 03:30
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	1.90	0.387	1
Perfluoropentanoic Acid (PFPeA)	0.440	J	ng/l	1.90	0.376	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	1.90	0.226	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	1.90	0.429	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	1.90	0.311	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	1.90	0.233	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	1.90	0.214	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	1.90	0.357	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	1.90	0.224	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	1.90	1.26	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	1.90	0.653	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	1.90	0.296	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	1.90	0.478	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	1.90	0.288	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	1.90	1.15	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	1.90	1.06	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	1.90	0.615	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	1.90	0.247	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	1.90	0.930	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	1.90	0.550	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	1.90	0.763	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	1.90	0.353	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	1.90	0.310	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	1.90	0.235	1

Project Name: DUXBURY WP **Lab Number:** L2237892

Project Number: Not Specified **Report Date:** 08/04/22

SAMPLE RESULTS

Lab ID: L2237892-04 Date Collected: 07/15/22 11:30

Client ID: FIELD BLANK Date Received: 07/15/22

Sample Location: DUXBURY MA Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	93		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	112		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	83		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	52		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	89		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	78		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	49		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	107		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	61		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	57		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	85		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	35		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	77		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	79		22-136

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 01:18
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-04 Batch: WG1666007-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	0.408
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	0.396
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.238
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	0.452
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.328
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	0.245
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.225
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.376
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.236
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	1.33
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	0.688
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.312
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.504
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.304
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	1.21
Perfluorononanesulfonic Acid (PFNS)	ND		ng/l	2.00	1.12
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.648
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.260
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/l	2.00	0.980
Perfluorooctanesulfonamide (FOSA)	ND		ng/l	2.00	0.580
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.804
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.372
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.327
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.248

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Method Blank Analysis
Batch Quality Control

Analytical Method: 134,LCMSMS-ID
Analytical Date: 07/27/22 01:18
Analyst: MP

Extraction Method: ALPHA 23528
Extraction Date: 07/22/22 06:49

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab for sample(s): 01-04 Batch: WG1666007-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	94		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	115		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	84		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	55		12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	82		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	54		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	109		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	104		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	101		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	69		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	64		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	93		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	47		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	61		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	85		48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89		22-136

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 Batch: WG1666007-2								
Perfluorobutanoic Acid (PFBA)	92		-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	94		-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	96		-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	102		-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	93		-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	100		-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	93		-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	109		-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	89		-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	109		-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	80		-		61-179	-		30
Perfluorononanoic Acid (PFNA)	83		-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	92		-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	87		-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	125		-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	78		-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	98		-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	111		-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	81		-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	94		-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	95		-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	93		-		67-153	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified
Lab Number: L2237892
Report Date: 08/04/22

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 Batch: WG1666007-2								
Perfluorotridecanoic Acid (PFTrDA)	89		-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	82		-		59-182	-		30

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	117				62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	88				70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	59				12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	83				71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101				62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	56				14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	111				59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	106				69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100				62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	69				10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	58				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	90				55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	48				5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	68				27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	90				22-136

Matrix Spike Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified
Lab Number: L2237892
Report Date: 08/04/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1666007-3 QC Sample: L2237892-01 Client ID: MW-DUX-AD												
Perfluorobutanoic Acid (PFBA)	6.52	36.5	40.9	94		-	-		67-148	-		30
Perfluoropentanoic Acid (PFPeA)	11.8	36.5	47.0	96		-	-		63-161	-		30
Perfluorobutanesulfonic Acid (PFBS)	3.23	32.4	35.8	101		-	-		65-157	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	34.2	35.4	103		-	-		37-219	-		30
Perfluorohexanoic Acid (PFHxA)	12.7	36.5	46.6	93		-	-		69-168	-		30
Perfluoropentanesulfonic Acid (PFPeS)	3.19	34.4	38.9	104		-	-		52-156	-		30
Perfluoroheptanoic Acid (PFHpA)	21.8	36.5	57.6	98		-	-		58-159	-		30
Perfluorohexanesulfonic Acid (PFHxS)	16.7	33.3	58.1	124		-	-		69-177	-		30
Perfluorooctanoic Acid (PFOA)	233	36.5	267	93		-	-		63-159	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	34.7	36.6	105		-	-		49-187	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	2.93	34.8	30.4	79		-	-		61-179	-		30
Perfluorononanoic Acid (PFNA)	0.860J	36.5	32.5	87		-	-		68-171	-		30
Perfluorooctanesulfonic Acid (PFOS)	39.4	33.8	71.3	94		-	-		52-151	-		30
Perfluorodecanoic Acid (PFDA)	ND	36.5	32.3	89		-	-		63-171	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	35	40.7F	116		-	-		56-173	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	35.1	24.7	70		-	-		48-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	36.5	32.0	88		-	-		60-166	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	36.5	41.4	114		-	-		60-153	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	35.2	22.6	64		-	-		38-156	-		30
Perfluorooctanesulfonamide (FOSA)	ND	36.5	32.6F	89		-	-		46-170	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	36.5	37.8	104		-	-		45-170	-		30
Perfluorododecanoic Acid (PFDoA)	ND	36.5	33.0	90		-	-		67-153	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1666007-3 QC Sample: L2237892-01 Client ID: MW-DUX-AD												
Perfluorotridecanoic Acid (PFTrDA)	ND	36.5	32.5	89		-	-		48-158	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	36.5	30.7	84		-	-		59-182	-		30

Surrogate (Extracted Internal Standard)	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	114				10-162
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**163**	Q			12-142
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	**178**	Q			14-147
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	47				27-126
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	54				24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68				55-137
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	80				62-124
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	62				57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	77				60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	73				71-134
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	58				48-131
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	64				22-136
Perfluoro[13C4]Butanoic Acid (MPFBA)	90				58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	81				62-163
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	21				5-112
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	98				69-131
Perfluoro[13C8]Octanoic Acid (M8PFOA)	91				62-129
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103				59-139
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	73				70-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1666007-4 QC Sample: L2237892-02 Client ID: MW-DUX-AS						
Perfluorobutanoic Acid (PFBA)	1.63J	1.58J	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	2.86	2.66	ng/l	7		30
Perfluorobutanesulfonic Acid (PFBS)	1.68J	1.60J	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	2.06	1.96	ng/l	5		30
Perfluoropentanesulfonic Acid (PFPeS)	0.526J	0.525J	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	3.73	3.06	ng/l	20		30
Perfluorohexanesulfonic Acid (PFHxS)	3.18	3.15	ng/l	1		30
Perfluorooctanoic Acid (PFOA)	31.3	28.7	ng/l	9		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	1.30J	1.79J	ng/l	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	0.328J	0.292J	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	10.5	9.87	ng/l	6		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1666007-4 QC Sample: L2237892-02 Client ID: MW-DUX-AS						
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	79		84		58-132
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	83		87		62-163
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	80		83		70-131
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	**150**	Q	**150**	Q	12-142
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	65		67		57-129
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	74		77		60-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	80		85		71-134
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		85		62-129
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	105		105		14-147
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	87		88		59-139
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105		106		69-131
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	84		79		62-124
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	76		67		10-162
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	46		43		24-116
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	76		70		55-137
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	14		16		5-112
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	58		58		27-126
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	66		64		48-131

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1666007-4 QC Sample: L2237892-02 Client ID: MW-DUX-AS						

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	72		72		22-136

Project Name: DUXBURY WP
Project Number: Not Specified

Lab Number: L2237892
Report Date: 08/04/22

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2237892-01A	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-01B	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-02A	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-02B	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-03A	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-03B	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)
L2237892-04A	Plastic 250ml unpreserved	A	NA		3.1	Y	Absent		A2-537-ISOTOPE(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WP
Project Number:

Lab Number: L2237892
Report Date: 08/04/22

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name:	DUXBURY WP	**Lab Number:**	L2237892
Project Number:	Not Specified	**Report Date:**	08/04/22

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WP	**Lab Number:**	L2237892
Project Number:	Not Specified	**Report Date:**	08/04/22

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WP	**Lab Number:**	L2237892
Project Number:	Not Specified	**Report Date:**	08/04/22

Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

REFERENCES

134 Determination of Selected Perfluorinated Alkyl Acids in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) using Isotope Dilution. Alpha SOP 23528.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

1

CHAIN OF CUSTODY

PAGE 1 OF 1

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab: 7/15/22

ALPHA Job #: L2237892

Client Information

Client: WESTON & SAMPSON
Address: 55 WALKERS BROOK DR. READING MA
Phone: 1 800 SAMPSON
Fax:
Email: MCGRATHL@WSEINC.COM
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: DUXBURY LF
Project Location: DUXBURY MA
Project #:
Project Manager: LORRAN MC GRATH
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Regulatory Requirements/Report Limits

State /Fed Program	Criteria

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAS 537.1 ISOTOPE

SAMPLE HANDLING

Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do
(Please specify below)

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	TOTAL # BOTTLES	Sample Specific Comments
37892-01	DUX MW-AD	7/15	9:15	GW	PTK	X	
-02	MW-DUX-AS	7/15	8:50	GW	PTK	X	
-03	MW-91-1	7/15	11:45	GW	PTK	X	
-04	FIELD BLANK	7/15	11:30	GW	PTK	X	

Container Type	
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	7/15 1200		7/15-22 1320
	7-15-22 1725		7/15/22 1725
	7/15 2000		7-15-22 20100
	7-15-22 2100		7/15/22 2100

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-01 (rev. 14-OCT-07)

ANALYTICAL REPORT

Lab Number:	L2304159
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Peter Mackin
Phone:	(781) 934-1100
Project Name:	DUXBURY WATER DEPARTMENT
Project Number:	4082000
Report Date:	02/08/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2304159-01	100072 EVERGREEN 1+2	DW	Not Specified	01/24/23 08:20	01/25/23
L2304159-02	100070 TREMONT 1+2	DW	Not Specified	01/24/23 08:37	01/25/23
L2304159-03	100071 MAYFLOWER 1+2	DW	Not Specified	01/24/23 10:22	01/25/23
L2304159-04	100073 DAMON 1+2	DW	Not Specified	01/24/23 09:16	01/25/23
L2304159-05	10003 LAKESHORE	DW	Not Specified	01/24/23 09:54	01/25/23
L2304159-06	10005 MILLBROOK	DW	Not Specified	01/24/23 08:51	01/25/23
L2304159-07	10006 PARTRIDGE	DW	Not Specified	01/24/23 11:05	01/25/23
L2304159-08	10000 DEPOT	DW	Not Specified	01/24/23 11:39	01/25/23
L2304159-09	100072 FB	DW	Not Specified	01/24/23 08:20	01/25/23
L2304159-10	100070 FB	DW	Not Specified	01/24/23 08:37	01/25/23
L2304159-11	100071 FB	DW	Not Specified	01/24/23 10:22	01/25/23
L2304159-12	100073 FB	DW	Not Specified	01/24/23 09:16	01/25/23
L2304159-13	10003 FB	DW	Not Specified	01/24/23 09:54	01/25/23
L2304159-14	10005 FB	DW	Not Specified	01/24/23 08:51	01/25/23
L2304159-15	10006 FB	DW	Not Specified	01/24/23 11:05	01/25/23
L2304159-16	10000 FB	DW	Not Specified	01/24/23 11:39	01/25/23

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
Project Number:	4082000	**Report Date:**	02/08/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
Project Number:	4082000	**Report Date:**	02/08/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2304159-09: A sample identified as "100072 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-10: A sample identified as "100070 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-11: A sample identified as "100071 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-12: A sample identified as "100073 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-13: A sample identified as "10003 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-14: A sample identified as "10005 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-15: A sample identified as "10006 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2304159-16: A sample identified as "10000 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Darian Dailey

Title: Technical Director/Representative Date: 02/08/23

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-01
Client ID: 100072 EVERGREEN 1+2
Sample Location: Not Specified

Date Collected: 01/24/23 08:20
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 19:54
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.698	J	ng/l	2.00	0.613	1
Perfluorohexanoic Acid (PFHxA)	0.955	J	ng/l	2.00	0.613	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.613	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.613	1
Perfluorohexanesulfonic Acid (PFHxS)	0.698	J	ng/l	2.00	0.613	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.613	1
Perfluorooctanoic Acid (PFOA)	1.87	J	ng/l	2.00	0.613	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.613	1
Perfluorooctanesulfonic Acid (PFOS)	1.06	J	ng/l	2.00	0.613	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.613	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.613	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.613	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.613	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.613	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.613	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.613	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.613	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.613	1
PFAS, Total (6)	ND		ng/l	2.00	0.613	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	84		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	84		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	98		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-02
Client ID: 100070 TREMONT 1+2
Sample Location: Not Specified

Date Collected: 01/24/23 08:37
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 20:03
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.601	1
Perfluorohexanoic Acid (PFHxA)	0.720	J	ng/l	2.00	0.601	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.601	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.601	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.601	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.601	1
Perfluorooctanoic Acid (PFOA)	1.04	J	ng/l	2.00	0.601	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.601	1
Perfluorooctanesulfonic Acid (PFOS)	1.15	J	ng/l	2.00	0.601	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.601	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.601	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.601	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.601	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.601	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.601	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.601	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.601	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.601	1
PFAS, Total (6)	ND		ng/l	2.00	0.601	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	100		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-03
Client ID: 100071 MAYFLOWER 1+2
Sample Location: Not Specified

Date Collected: 01/24/23 10:22
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 20:12
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.39	J	ng/l	2.00	0.597	1
Perfluorohexanoic Acid (PFHxA)	1.46	J	ng/l	2.00	0.597	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.597	1
Perfluoroheptanoic Acid (PFHpA)	0.679	J	ng/l	2.00	0.597	1
Perfluorohexanesulfonic Acid (PFHxS)	0.643	J	ng/l	2.00	0.597	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.597	1
Perfluorooctanoic Acid (PFOA)	2.54		ng/l	2.00	0.597	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.597	1
Perfluorooctanesulfonic Acid (PFOS)	2.04		ng/l	2.00	0.597	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.597	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.597	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.597	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.597	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.597	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.597	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.597	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.597	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.597	1
PFAS, Total (6)	4.58		ng/l	2.00	0.597	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	105		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	110		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-04
Client ID: 100073 DAMON 1+2
Sample Location: Not Specified

Date Collected: 01/24/23 09:16
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 20:20
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.99	J	ng/l	2.00	0.604	1
Perfluorohexanoic Acid (PFHxA)	3.65		ng/l	2.00	0.604	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.604	1
Perfluoroheptanoic Acid (PFHpA)	1.23	J	ng/l	2.00	0.604	1
Perfluorohexanesulfonic Acid (PFHxS)	1.05	J	ng/l	2.00	0.604	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.604	1
Perfluorooctanoic Acid (PFOA)	4.49		ng/l	2.00	0.604	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.604	1
Perfluorooctanesulfonic Acid (PFOS)	2.75		ng/l	2.00	0.604	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.604	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.604	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.604	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.604	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.604	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.604	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.604	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.604	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.604	1
PFAS, Total (6)	7.24		ng/l	2.00	0.604	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	88		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	111		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-05
Client ID: 10003 LAKESHORE
Sample Location: Not Specified

Date Collected: 01/24/23 09:54
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 20:29
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	2.26		ng/l	2.00	0.599	1
Perfluorohexanoic Acid (PFHxA)	2.19		ng/l	2.00	0.599	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.599	1
Perfluoroheptanoic Acid (PFHpA)	1.18	J	ng/l	2.00	0.599	1
Perfluorohexanesulfonic Acid (PFHxS)	1.04	J	ng/l	2.00	0.599	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.599	1
Perfluorooctanoic Acid (PFOA)	4.23		ng/l	2.00	0.599	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.599	1
Perfluorooctanesulfonic Acid (PFOS)	2.22		ng/l	2.00	0.599	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.599	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.599	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.599	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.599	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.599	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.599	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.599	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.599	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.599	1
PFAS, Total (6)	6.45		ng/l	2.00	0.599	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	100		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	110		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-06
Client ID: 10005 MILLBROOK
Sample Location: Not Specified

Date Collected: 01/24/23 08:51
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 20:38
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.84	J	ng/l	2.00	0.616	1
Perfluorohexanoic Acid (PFHxA)	1.48	J	ng/l	2.00	0.616	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.616	1
Perfluoroheptanoic Acid (PFHpA)	0.738	J	ng/l	2.00	0.616	1
Perfluorohexanesulfonic Acid (PFHxS)	0.775	J	ng/l	2.00	0.616	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.616	1
Perfluorooctanoic Acid (PFOA)	3.21		ng/l	2.00	0.616	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.616	1
Perfluorooctanesulfonic Acid (PFOS)	3.25		ng/l	2.00	0.616	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.616	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.616	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.616	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.616	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.616	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.616	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.616	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.616	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.616	1
PFAS, Total (6)	6.46		ng/l	2.00	0.616	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	94		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-07
Client ID: 10006 PARTRIDGE
Sample Location: Not Specified

Date Collected: 01/24/23 11:05
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 21:15
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	4.52		ng/l	2.00	0.599	1
Perfluorohexanoic Acid (PFHxA)	29.2		ng/l	2.00	0.599	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.599	1
Perfluoroheptanoic Acid (PFHpA)	7.53		ng/l	2.00	0.599	1
Perfluorohexanesulfonic Acid (PFHxS)	36.1		ng/l	2.00	0.599	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.599	1
Perfluorooctanoic Acid (PFOA)	7.82		ng/l	2.00	0.599	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.599	1
Perfluorooctanesulfonic Acid (PFOS)	21.2		ng/l	2.00	0.599	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.599	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.599	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.599	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.599	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.599	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.599	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.599	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.599	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.599	1
PFAS, Total (6)	72.7		ng/l	2.00	0.599	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-08
Client ID: 10000 DEPOT
Sample Location: Not Specified

Date Collected: 01/24/23 11:39
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 21:23
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.631	J	ng/l	2.00	0.620	1
Perfluorohexanoic Acid (PFHxA)	1.37	J	ng/l	2.00	0.620	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.620	1
Perfluoroheptanoic Acid (PFHpA)	1.63	J	ng/l	2.00	0.620	1
Perfluorohexanesulfonic Acid (PFHxS)	0.890	J	ng/l	2.00	0.620	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.620	1
Perfluorooctanoic Acid (PFOA)	7.57		ng/l	2.00	0.620	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.620	1
Perfluorooctanesulfonic Acid (PFOS)	1.26	J	ng/l	2.00	0.620	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.620	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.620	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.620	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.620	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.620	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.620	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.620	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.620	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.620	1
PFAS, Total (6)	7.57		ng/l	2.00	0.620	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	97		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-11
Client ID: 100071 FB
Sample Location: Not Specified

Date Collected: 01/24/23 10:22
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 21:49
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.608	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.608	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.608	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.608	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.608	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.608	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.608	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.608	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.608	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.608	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.608	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.608	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.608	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.608	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.608	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.608	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.608	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.608	1
PFAS, Total (6)	ND		ng/l	2.00	0.608	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	108		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-12
Client ID: 100073 FB
Sample Location: Not Specified

Date Collected: 01/24/23 09:16
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 21:58
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.620	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.620	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.620	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.620	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.620	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.620	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.620	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.620	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.620	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.620	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.620	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.620	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.620	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.620	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.620	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.620	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.620	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.620	1
PFAS, Total (6)	ND		ng/l	2.00	0.620	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	102		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-13
Client ID: 10003 FB
Sample Location: Not Specified

Date Collected: 01/24/23 09:54
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 22:07
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.586	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.586	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.586	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.586	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.586	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.586	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.586	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.586	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.586	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.586	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.586	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.586	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.586	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.586	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.586	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.586	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.586	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.586	1
PFAS, Total (6)	ND		ng/l	2.00	0.586	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	109		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	107		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-14
Client ID: 10005 FB
Sample Location: Not Specified

Date Collected: 01/24/23 08:51
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 22:15
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.620	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.620	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.620	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.620	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.620	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.620	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.620	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.620	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.620	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.620	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.620	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.620	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.620	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.620	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.620	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.620	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.620	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.620	1
PFAS, Total (6)	ND		ng/l	2.00	0.620	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	90		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	103		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-15
Client ID: 10006 FB
Sample Location: Not Specified

Date Collected: 01/24/23 11:05
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 22:24
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.604	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.604	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.604	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.604	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.604	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.604	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.604	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.604	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.604	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.604	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.604	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.604	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.604	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.604	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.604	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.604	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.604	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.604	1
PFAS, Total (6)	ND		ng/l	2.00	0.604	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	99		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

SAMPLE RESULTS

Lab ID: L2304159-16
Client ID: 10000 FB
Sample Location: Not Specified

Date Collected: 01/24/23 11:39
Date Received: 01/25/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/01/23 22:33
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.591	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.591	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.591	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.591	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.591	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.591	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.591	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.591	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.591	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.591	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.591	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.591	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.591	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.591	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.591	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.591	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.591	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.591	1
PFAS, Total (6)	ND		ng/l	2.00	0.591	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	101		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 02/01/23 18:45
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-08,11-16 Batch: WG1739477-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2304159

Project Number: 4082000 **Report Date:** 02/08/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 02/01/23 18:45
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/01/23 08:40

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-08,11-16 Batch: WG1739477-1					

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	99		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	111		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	110		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2304159

Report Date: 02/08/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 Batch: WG1739477-2								
Perfluorobutanesulfonic Acid (PFBS)	93		-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	99		-		70-130	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	101		-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	109		-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	100		-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	119		-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	109		-		70-130	-		30
Perfluorononanoic Acid (PFNA)	117		-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	100		-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	112		-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	105		-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	107		-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	125		-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	104		-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	118		-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	106		-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	126		-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	122		-		70-130	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2304159

Report Date: 02/08/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 Batch: WG1739477-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	105				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2304159

Report Date: 02/08/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 QC Batch ID: WG1739477-3 QC Sample: L2303937-01 Client ID: MS Sample												
Perfluorobutanesulfonic Acid (PFBS)	1.97J	36.1	35.5	98		-	-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	ND	40.6	40.2	99		-	-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	40.6	39.2	96		-	-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	40.6	42.4	104		-	-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.739J	37.1	37.7	102		-	-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	38.4	44.8	117		-	-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	1.64J	40.6	45.8	113		-	-		70-130	-		30
Perfluorononanoic Acid (PFNA)	ND	40.6	45.2	111		-	-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.48J	37.7	38.2	101		-	-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	ND	40.6	43.5	107		-	-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	37.9	39.0	103		-	-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	40.6	40.7	100		-	-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	40.6	45.9	113		-	-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	40.6	39.8	98		-	-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	ND	40.6	45.0	111		-	-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	38.4	38.4	100		-	-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	40.6	48.1	118		-	-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	40.6	45.7	112		-	-		70-130	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2304159

Report Date: 02/08/23

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 QC Batch ID: WG1739477-3 QC Sample: L2303937-01 Client ID: MS Sample												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	93				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	102				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 QC Batch ID: WG1739477-4 QC Sample: L2303937-03 Client ID: DUP Sample						
Perfluorobutanesulfonic Acid (PFBS)	2.43	2.52	ng/l	4		30
Perfluorohexanoic Acid (PFHxA)	1.09J	1.12J	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	1.01J	0.952J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	1.01J	1.03J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	3.35	3.39	ng/l	1		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.89	2.86	ng/l	1		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-08,11-16 QC Batch ID: WG1739477-4 QC Sample: L2303937-03 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95		97		70-130
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	94		94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	101		98		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		97		70-130

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2304159-01A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-01B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-02A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-02B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-03A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-03B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-04A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-04B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-05A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-05B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-06A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-06B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-07A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-07B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-08A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-08B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-09A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-L-EXT-537(14)
L2304159-10A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-L-EXT-537(14)
L2304159-11A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-12A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-13A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-14A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2304159-15A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

Container Information

Container ID	*Container Type*	*Cooler*	*Initial pH*	*Final pH*	*Temp deg C*	*Pres*	*Seal*	*Frozen Date/Time*	*Analysis(*)*
L2304159-16A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000
Lab Number: L2304159
Report Date: 02/08/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2304159
Report Date: 02/08/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
Project Number:	4082000	**Report Date:**	02/08/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
Project Number:	4082000	**Report Date:**	02/08/23

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
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Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2304159
Project Number:	4082000	**Report Date:**	02/08/23

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page 1 of 1

Date Rec'd in Lab: 1/25/23

ALPHA Job # L2304159

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193

Mansfield, MA TEL: 508-822-9300 508-822-3288

Project Information

Project Name: Duxbury Water Department

PWS Name:

Project Location:

Project PWS ID# 4082000

Project Manager:

ALPHA Quote #:

Turn-Around Time

Standard ☒ Due Date:

Rush (only if pre approved) ☐ Time:

Report Information — Data Deliverables

☐ FAX ☒ EMAIL

☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client Info

PO #

Please Indicate PWS Class Below

☒ COM ☐ NTNC ☐ TNC

SUBJECT TO MCL REPORTING

Client Information

Client: Duxbury Water

Address: 878 Tremont ST Duxbury, MA 02332

Phone: 781 561 5481

Fax: 781 934 9278

Email: Mackan@duxbury-ma.gov

These samples have been previously analyzed by Alpha ☐

Other Project Specific Requirements/ Comments/Detection Limits

ANALYSIS

Sample Filtration

☐ Done ☐ Lab to do

Preservation

☐ Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Finished	Single Source	Multiple Source					Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
04159-01	100072	Evergreen 1+2	1.24.23	8:20		PM	X	X		X											
-02	100070	Tremont 1+2		8:37		PM	X	X		XX											
-03	100071	May Flower 1+2		10:22		PM	X	X		XX											
-04	100073	Damon 1+2		9:16		PM	X	X		X											
-05	10003	Lake Shore		9:54		PM	X	X	X												
-06	10005	Millbrook		8:51		PM	X	X	X												
-07	10006	Partridge		11:05		PM	X	X	X												
-08	10000	Depot		11:39		PM	X	X	X												
								/													

Container Type

Preservative

Container Code: P = Plastic, A = Amber Glass, V = Vial, G = Glass, B = Bacteria Cup, C = Cube, O = Other, E = Encore, D = BOD Bottle

Preservative Code: A = None, B = HCl, C = HNO3, D = H2SO4, E = NaOH, F = MeOH, G = NaHSO4, H = Na2S2O3, I = Ascorbic Acid, J = NH4Cl, K = Zn Acetate, O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Relinquished By:	Date/Time	Received By:	Date/Time
	1/24/23		1/25/23 11:19
	1/25/23 1040		1/25/23 1140
	1/24/23 19:30 1/25/23 2040		1/25/23 1950 1/25/23 20:40

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

Alpha Analytical, Inc.
Facility: **Company-wide**
Department: **Reporting**
Title: **MADEP State Form Required Information**

ID No.:**18068**
Revision 1
Published Date: 6/5/2015 2:30:28 PM

The following information must be supplied in order to process the State Form:

PWS ID: 4082000

City/Town: Duxbury, MA

PWS Name: Duxbury Water Dept.

PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP Location ID	DEP Location Name	Sample Information			Date Collected	Collected By
		Multiple or Single*	Raw or Finished	Routine or Special**		
100072	Evergreen 1+2	M	F	R	1/24/23	Peter Malkin
100070	Tremont 1+2	M	F	R	↓	PM
100071	Mayflower 1+2	M	F	R		PM
100073	Damon 1+2	M	F	R		PM
10003	Lake Shore	S	F	R		PM
10005	Millbrook	S	F	R		PM
10006	Partridge	S	F	R		PM
10000	Depot	S	F	R		PM

*** If Sample source is *MULTIPLE*, please list the connected sources:**

_____

**** If DEP sample type is *SPECIAL*, please explain below:**

_____

Document Type: Form

Pre-Qualtrax Document ID: 09-08

ANALYTICAL REPORT

Lab Number:	L2405292
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Mark Cloud
Phone:	(781) 934-1100
Project Name:	DUXBURY WATER DEPT
Project Number:	4082000
Report Date:	02/13/24

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110) , NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2405292
Report Date: 02/13/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2405292-01	10000 DEPOT	DW	DUXBURY	01/30/24 10:03	01/31/24
L2405292-02	10003 LAKE SHORE	DW	DUXBURY	01/30/24 08:54	01/31/24
L2405292-03	10005 MILLBROOK	DW	DUXBURY	01/30/24 09:26	01/31/24
L2405292-04	10006 PARTRIDGE	DW	DUXBURY	01/30/24 10:35	01/31/24
L2405292-05	100070 TREMONT 1&2	DW	DUXBURY	01/30/24 09:47	01/31/24
L2405292-06	100071 MAYFLOWER 1&2	DW	DUXBURY	01/30/24 09:09	01/31/24
L2405292-07	100072 EVERGREEN 1&2	DW	DUXBURY	01/30/24 08:40	01/31/24
L2405292-08	10000 FIELD BLANK	DW	DUXBURY	01/30/24 10:03	01/31/24
L2405292-09	10003 FIELD BLANK	DW	DUXBURY	01/30/24 08:54	01/31/24
L2405292-10	10005 FIELD BLANK	DW	DUXBURY	01/30/24 09:26	01/31/24
L2405292-11	10006 FIELD BLANK	DW	DUXBURY	01/30/24 10:35	01/31/24
L2405292-12	100070 FIELD BLANK	DW	DUXBURY	01/30/24 09:47	01/31/24
L2405292-13	100071 FIELD BLANK	DW	DUXBURY	01/30/24 09:09	01/31/24
L2405292-14	100072 FIELD BLANK	DW	DUXBURY	01/30/24 08:40	01/31/24

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2405292
Project Number:	4082000	**Report Date:**	02/13/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: DUXBURY WATER DEPT **Lab Number:** L2405292
Project Number: 4082000 **Report Date:** 02/13/24

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2405292-08: A sample identified as "10000 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-09: A sample identified as "10003 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-10: A sample identified as "10005 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-11: A sample identified as "10006 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-12: A sample identified as "100070 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-13: A sample identified as "100071 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2405292-14: A sample identified as "100072 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

Perfluorinated Alkyl Acids by EPA 537.1

L2405292-04R: The sample has a detection that exceeds the Maximum Contaminant Level (MCL).

L2405292-04R, WG1882936-1R, and WG1882936-2R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

The WG1882936-3 MS recovery, performed on L2405292-01, is outside the acceptance criteria for perfluoroheptanoic acid (pfhpa) (186%), perfluorohexanesulfonic acid (pfhxs) (157%), and perfluorooctanesulfonic acid (pfos) (179%).

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2405292
Project Number:	4082000	**Report Date:**	02/13/24

Case Narrative (continued)

WG1882936-3: The Matrix Spike level is at the Reporting Limit (RL); any detections below the RL in the native sample are not included in the % Recovery calculation.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Ashley Boucher

Title: Technical Director/Representative Date: 02/13/24

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-01
Client ID: 10000 DEPOT
Sample Location: DUXBURY

Date Collected: 01/30/24 10:03
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 17:46
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.794	J	ng/l	2.00	0.611	1
Perfluorohexanoic Acid (PFHxA)	1.08	J	ng/l	2.00	0.611	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.611	1
Perfluoroheptanoic Acid (PFHpA)	1.69	JZ	ng/l	2.00	0.611	1
Perfluorohexanesulfonic Acid (PFHxS)	1.09	JZ	ng/l	2.00	0.611	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.611	1
Perfluorooctanoic Acid (PFOA)	8.32		ng/l	2.00	0.611	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.611	1
Perfluorooctanesulfonic Acid (PFOS)	1.41	JZ	ng/l	2.00	0.611	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.611	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.611	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.611	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.611	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.611	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.611	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.611	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.611	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.611	1
PFAS, Total (6)	8.32		ng/l	2.00	0.611	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	83		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	82		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	91		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-02
Client ID: 10003 LAKE SHORE
Sample Location: DUXBURY

Date Collected: 01/30/24 08:54
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 18:04
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	3.21		ng/l	2.00	0.610	1
Perfluorohexanoic Acid (PFHxA)	2.59		ng/l	2.00	0.610	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.610	1
Perfluoroheptanoic Acid (PFHpA)	1.71	J	ng/l	2.00	0.610	1
Perfluorohexanesulfonic Acid (PFHxS)	1.00	J	ng/l	2.00	0.610	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.610	1
Perfluorooctanoic Acid (PFOA)	4.92		ng/l	2.00	0.610	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.610	1
Perfluorooctanesulfonic Acid (PFOS)	2.56		ng/l	2.00	0.610	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.610	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.610	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.610	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.610	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.610	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.610	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.610	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.610	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.610	1
PFAS, Total (6)	7.48		ng/l	2.00	0.610	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	89		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	91		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-03
Client ID: 10005 MILLBROOK
Sample Location: DUXBURY

Date Collected: 01/30/24 09:26
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 18:21
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.86	J	ng/l	2.00	0.611	1
Perfluorohexanoic Acid (PFHxA)	2.72		ng/l	2.00	0.611	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.611	1
Perfluoroheptanoic Acid (PFHpA)	1.52	J	ng/l	2.00	0.611	1
Perfluorohexanesulfonic Acid (PFHxS)	0.893	J	ng/l	2.00	0.611	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.611	1
Perfluorooctanoic Acid (PFOA)	4.57		ng/l	2.00	0.611	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.611	1
Perfluorooctanesulfonic Acid (PFOS)	2.43		ng/l	2.00	0.611	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.611	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.611	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.611	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.611	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.611	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.611	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.611	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.611	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.611	1
PFAS, Total (6)	7.00		ng/l	2.00	0.611	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	87		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	87		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	85		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-04 R
Client ID: 10006 PARTRIDGE
Sample Location: DUXBURY

Date Collected: 01/30/24 10:35
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/09/24 04:02
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	3.90		ng/l	2.00	0.621	1
Perfluorohexanoic Acid (PFHxA)	34.7		ng/l	2.00	0.621	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.621	1
Perfluoroheptanoic Acid (PFHpA)	11.0		ng/l	2.00	0.621	1
Perfluorohexanesulfonic Acid (PFHxS)	37.5		ng/l	2.00	0.621	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.621	1
Perfluorooctanoic Acid (PFOA)	7.12		ng/l	2.00	0.621	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.621	1
Perfluorooctanesulfonic Acid (PFOS)	28.0		ng/l	2.00	0.621	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.621	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.621	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.621	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.621	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.621	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.621	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.621	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.621	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.621	1
PFAS, Total (6)	83.6		ng/l	2.00	0.621	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	84		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	93		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	79		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-05
Client ID: 100070 TREMONT 1&2
Sample Location: DUXBURY

Date Collected: 01/30/24 09:47
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 18:39
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.611	1
Perfluorohexanoic Acid (PFHxA)	0.699	J	ng/l	2.00	0.611	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.611	1
Perfluoroheptanoic Acid (PFHpA)	0.720	J	ng/l	2.00	0.611	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.611	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.611	1
Perfluorooctanoic Acid (PFOA)	1.17	J	ng/l	2.00	0.611	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.611	1
Perfluorooctanesulfonic Acid (PFOS)	1.92	J	ng/l	2.00	0.611	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.611	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.611	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.611	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.611	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.611	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.611	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.611	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.611	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.611	1
PFAS, Total (6)	ND		ng/l	2.00	0.611	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	89		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	90		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-06
Client ID: 100071 MAYFLOWER 1&2
Sample Location: DUXBURY

Date Collected: 01/30/24 09:09
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 18:47
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.33	J	ng/l	2.00	0.623	1
Perfluorohexanoic Acid (PFHxA)	1.34	J	ng/l	2.00	0.623	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.623	1
Perfluoroheptanoic Acid (PFHpA)	0.869	J	ng/l	2.00	0.623	1
Perfluorohexanesulfonic Acid (PFHxS)	0.757	J	ng/l	2.00	0.623	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.623	1
Perfluorooctanoic Acid (PFOA)	2.82		ng/l	2.00	0.623	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.623	1
Perfluorooctanesulfonic Acid (PFOS)	2.45		ng/l	2.00	0.623	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.623	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.623	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.623	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.623	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.623	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.623	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.623	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.623	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.623	1
PFAS, Total (6)	5.27		ng/l	2.00	0.623	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	85		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	86		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-07
Client ID: 100072 EVERGREEN 1&2
Sample Location: DUXBURY

Date Collected: 01/30/24 08:40
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 18:56
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.889	J	ng/l	2.00	0.621	1
Perfluorohexanoic Acid (PFHxA)	1.32	J	ng/l	2.00	0.621	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.621	1
Perfluoroheptanoic Acid (PFHpA)	0.870	J	ng/l	2.00	0.621	1
Perfluorohexanesulfonic Acid (PFHxS)	0.777	J	ng/l	2.00	0.621	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.621	1
Perfluorooctanoic Acid (PFOA)	2.30		ng/l	2.00	0.621	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.621	1
Perfluorooctanesulfonic Acid (PFOS)	1.37	J	ng/l	2.00	0.621	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.621	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.621	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.621	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.621	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.621	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.621	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.621	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.621	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.621	1
PFAS, Total (6)	2.30		ng/l	2.00	0.621	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	88		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	85		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	98		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-08
Client ID: 10000 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 10:03
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 19:05
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.642	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.642	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.642	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.642	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.642	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.642	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.642	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.642	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.642	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.642	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.642	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.642	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.642	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.642	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.642	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.642	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.642	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.642	1
PFAS, Total (6)	ND		ng/l	2.00	0.642	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	95		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-09
Client ID: 10003 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 08:54
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 19:13
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.646	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.646	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.646	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.646	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.646	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.646	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.646	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.646	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.646	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.646	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.646	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.646	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.646	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.646	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.646	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.646	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.646	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.646	1
PFAS, Total (6)	ND		ng/l	2.00	0.646	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	100		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	93		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-10
Client ID: 10005 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 09:26
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 19:22
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.626	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.626	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.626	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.626	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.626	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.626	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.626	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.626	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.626	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.626	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.626	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.626	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.626	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.626	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.626	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.626	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.626	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.626	1
PFAS, Total (6)	ND		ng/l	2.00	0.626	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	101		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	92		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-11
Client ID: 10006 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 10:35
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 20:13
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.637	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.637	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.637	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.637	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.637	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.637	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.637	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.637	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.637	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.637	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.637	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.637	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.637	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.637	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.637	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.637	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.637	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.637	1
PFAS, Total (6)	ND		ng/l	2.00	0.637	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	95		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-12
Client ID: 100070 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 09:47
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 20:22
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.642	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.642	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.642	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.642	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.642	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.642	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.642	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.642	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.642	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.642	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.642	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.642	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.642	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.642	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.642	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.642	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.642	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.642	1
PFAS, Total (6)	ND		ng/l	2.00	0.642	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	101		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	94		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2405292
Project Number: 4082000
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-13
Client ID: 100071 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 09:09
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 20:31
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.640	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.640	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.640	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.640	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.640	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.640	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.640	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.640	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.640	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.640	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.640	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.640	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.640	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.640	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.640	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.640	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.640	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.640	1
PFAS, Total (6)	ND		ng/l	2.00	0.640	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	89		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	92		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

SAMPLE RESULTS

Lab ID: L2405292-14
Client ID: 100072 FIELD BLANK
Sample Location: DUXBURY

Date Collected: 01/30/24 08:40
Date Received: 01/31/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 02/08/24 20:39
Analyst: LMV

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.633	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.633	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.633	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.633	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.633	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.633	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.633	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.633	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.633	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.633	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.633	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.633	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.633	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.633	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.633	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.633	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.633	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.633	1
PFAS, Total (6)	ND		ng/l	2.00	0.633	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	85		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	80		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	86		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	91		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 02/09/24 07:03
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 02/08/24 09:55

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-14 Batch: WG1882936-1 R					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	88		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	99		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	92		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2405292

Report Date: 02/13/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 Batch: WG1882936-2								
Perfluorobutanesulfonic Acid (PFBS)	69		-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	78		-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	71		-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	90		-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	81		-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	91		-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	81		-		50-150	-		30
Perfluorononanoic Acid (PFNA)	88		-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	83		-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	87		-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	67		-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	87		-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	85		-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	71		-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	81		-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	74		-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	85		-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	102		-		50-150	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2405292

Report Date: 02/13/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 Batch: WG1882936-2

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	88				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	86				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	90				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	87				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2405292

Report Date: 02/13/24

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab DEPOT	Associated sample(s): 01-14	QC Batch ID: WG1882936-3		QC Sample: L2405292-01		Client ID: 10000						
Perfluorobutanesulfonic Acid (PFBS)	0.794J	1.66	2.22	134		-	-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	1.08J	1.87	2.54	136		-	-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	1.87	1.42J	76		-	-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	1.69JZ	1.87	3.47	**186**	Q	-	-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.09JZ	1.71	2.68	**157**	Q	-	-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	1.77	1.51J	86		-	-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	8.32	1.87	9.55	66		-	-		50-150	-		30
Perfluorononanoic Acid (PFNA)	ND	1.87	2.16	116		-	-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.41JZ	1.73	3.10	**179**	Q	-	-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	ND	1.87	1.72J	92		-	-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	1.74	1.47J	84		-	-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	1.87	1.33J	71		-	-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	1.87	1.78J	95		-	-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	1.87	1.22J	65		-	-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	ND	1.87	1.72J	92		-	-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	1.76	1.37J	78		-	-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	1.87	1.63J	87		-	-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	1.87	1.78J	95		-	-		50-150	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2405292

Report Date: 02/13/24

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab DEPOT	Associated sample(s): 01-14		QC Batch ID: WG1882936-3			QC Sample: L2405292-01			Client ID: 10000			

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	74				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	80				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	77				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	75				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2405292
Report Date: 02/13/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1882936-4 QC Sample: L2405292-02 Client ID: 10003 LAKE SHORE						
Perfluorobutanesulfonic Acid (PFBS)	3.21	3.20	ng/l	0		30
Perfluorohexanoic Acid (PFHxA)	2.59	2.52	ng/l	3		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	1.71J	1.66J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	1.00J	0.984J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.92	4.87	ng/l	1		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.56	2.62	ng/l	2		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2405292
Report Date: 02/13/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1882936-4 QC Sample: L2405292-02 Client ID: 10003 LAKE SHORE

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	89		85		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	91		91		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		88		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2405292
Report Date: 02/13/24

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2405292-01A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-01B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-02A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-02B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-03A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-03B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-04A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-04B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-05A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-05B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-06A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-06B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-07A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-07B	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-08A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-09A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-10A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-11A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-12A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-13A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)
L2405292-14A	Plastic 250ml Trizma preserved	A	NA		5.6	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2405292
Report Date: 02/13/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2405292
Report Date: 02/13/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2405292
Project Number:	4082000	**Report Date:**	02/13/24

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2405292
Project Number:	4082000	**Report Date:**	02/13/24

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2405292
Project Number:	4082000	**Report Date:**	02/13/24

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page of

Date Rec'd in Lab: 1/31/24

ALPHA Job # L2405292

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 508-822-3288

Client Information

Client: TOWN OF DUXBURY
Address: 878 TREMONT ST
DUXBURY MA 02332
Phone: (781) 934-1100
Fax:
Email: MCLOUD@DUXBURY-MA.GOV

Project Information

Project Name: DUXBURY WATER DEPT
PWS Name: DUXBURY MA
Project Location:
Project PWS ID# 4082000
Project Manager:
ALPHA Quote #:

Turn-Around Time

Standard ☒ Due Date:
Rush (only if pre approved) ☐ Time:

These samples have been previously analyzed by Alpha ☐

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☒ Same as Client Info
PO #

Please Indicate PWS Class Below

☒ COM
☐ NTNC
☐ TNC

SUBJECT TO MCL REPORTING

Other Project Specific Requirements/ Comments/Detection Limits

100073 DAMON 1&2 IS DOWN FOR REPAIR

ANALYSIS

PFAS

Sample Filtration

☐ Done
☐ Lab to do
Preservation
☐ Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
05292-01	10000	DEPOT	1/30/24	10:03	✓	SN	x		X		X	X		
-02	10003	LAKE SHORE	1/30/24	8:54	✓	SN	x		X		X	X		
-03	10005	MILLBROOK	1/30/24	9:26	✓	SN	x		X		X	X		
-04	10006	PARTRIDGE	1/30/24	10:35	✓	SN	x		X		X	X		
-05	100070	TREMONT 1&2	1/30/24	9:47	✓	SN	x	X			X	X		
-06	100071	MAYFLOWER 1&2	1/30/24	9:09	✓	SN	x	X			X	X		
-07	100072	EVERGREEN 1&2	1/30/24	8:40	✓	SN	x	X			X	X		

Container Type: P
Preservative:

Container Code: P = Plastic, A = Amber Glass, V = Vial, G = Glass, B = Bacteria Cup, C = Cube, O = Other, E = Encore, D = BOD Bottle

Preservative Code: A = None, B = HCl, C = HNO3, D = H2SO4, E = NaOH, F = MeOH, G = NaHSO4, H = Na2S2O3, I = Ascorbic Acid, J = NH4Cl, K = Zn Acetate, O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Relinquished By:	Date/Time	Received By:	Date/Time
Brock Hopkinson	1/31/24 1:00	Bridgin Z HL	1/31 17:00
Bridgin Z HL	1/31 17:20	[illegible]	1/31 1720
[illegible]	1/31 1930	Ed Mendoza ABL	1/31 1935
Ed Mendoza ABL	1/31/24 2110	[illegible]	1/31/24 2110

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

Alpha Analytical, Inc.
Facility: **Company-wide**
Department: **Reporting**
Title: **MADEP State Form Required Information**

ID No.:**18068**
Revision 1
Published Date: 6/5/2015 2:30:28 PM

The following information must be supplied in order to process the State Form:

PWS ID: 4082000

City/Town: DUXBURY

PWS Name: DUXBURY WATER

PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP Location ID	DEP Location Name	Sample Information			Date Collected	Collected By
		Multiple or Single*	Raw or Finished	Routine or Special**		
10000	DEPOT	S	F	R	1/30/2024	S.NAVARRO
10003	LAKE SHORE	S	F	R	1/30/2024	S.NAVARRO
10005	MILLBROOK	S	F	R	1/30/2024	S.NAVARRO
10006	PARTRIDGE	S	F	R	1/30/2024	S.NAVARRO
100070	TREMONT 1 & 2	M	F	R	1/30/2024	S.NAVARRO
100071	MAYFLOWER 1 & 2	M	F	R	1/30/2024	S.NAVARRO
100072	EVERGREEN 1 & 2	M	F	R	1/30/2024	S.NAVARRO
*100073	DAMON 1 & 2	M	F	R	* DOWN FOR REPAIR *	

* **If Sample source is *MULTIPLE*, please list the connected sources:**

_____

** **If DEP sample type is *SPECIAL*, please explain below:**

_____

ANALYTICAL REPORT

Lab Number:	L2432941
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Mark Cloud
Phone:	(781) 934-1100
Project Name:	4082000
Project Number:	4082000
Report Date:	06/27/24

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (9110), MN (025-999-495), NJ (MA015), NY (11627), NC (685), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708A1), USFWS (Permit #A24920).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2432941-01	10005 MILLBROOK	DW	Not Specified	06/10/24 08:54	06/12/24
L2432941-02	100070 TREMONT 1+2	DW	Not Specified	06/10/24 09:22	06/12/24
L2432941-03	100071 MAYFLOWER 1+2	DW	Not Specified	06/10/24 10:10	06/12/24
L2432941-04	10003 LAKESHORE	DW	Not Specified	06/10/24 10:57	06/12/24
L2432941-05	100072 EVERGREEN 1+2	DW	Not Specified	06/10/24 11:20	06/12/24
L2432941-06	10006 PARTRIDGE	DW	Not Specified	06/10/24 13:15	06/12/24
L2432941-07	10000 DEPOT	DW	Not Specified	06/10/24 13:52	06/12/24
L2432941-08	10005 FIELD BLANK	DW	Not Specified	06/10/24 08:54	06/12/24
L2432941-09	100070 FIELD BLANK	DW	Not Specified	06/10/24 09:22	06/12/24
L2432941-10	100071 FIELD BLANK	DW	Not Specified	06/10/24 10:10	06/12/24
L2432941-11	10003 FIELD BLANK	DW	Not Specified	06/10/24 10:57	06/12/24
L2432941-12	100072 FIELD BLANK	DW	Not Specified	06/10/24 11:20	06/12/24
L2432941-13	10006 FIELD BLANK	DW	Not Specified	06/10/24 13:15	06/12/24
L2432941-14	10000 FIELD BLANK	DW	Not Specified	06/10/24 13:52	06/12/24

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2432941-08: A sample identified as "10005 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-09: A sample identified as "100070 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-10: A sample identified as "100071 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-11: A sample identified as "10003 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-12: A sample identified as "100072 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-13: A sample identified as "10006 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2432941-14: A sample identified as "10000 FIELD BLANK" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

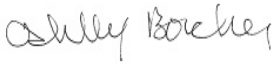
Perfluorinated Alkyl Acids by EPA 537.1

L2432941-06: The sample has a detection that exceeds the Maximum Contaminant Level (MCL).

The WG1937487-3 MS recoveries, performed on L2432941-01, are outside the acceptance criteria for perfluorobutanesulfonic acid (pfbs) (188%), perfluoroheptanoic acid (pfhpa) (183%), and perfluorohexanesulfonic acid (pfhxs) (161%).

WG1937487-3: The Matrix Spike level is at the Reporting Limit (RL); any detections below the RL in the native sample are not included in the % Recovery calculation.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Ashley Boucher

Title: Technical Director/Representative Date: 06/27/24

ORGANICS

SEMIVOLATILES

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-01
Client ID: 10005 MILLBROOK
Sample Location: Not Specified

Date Collected: 06/10/24 08:54
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 15:07
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.48	JZ	ng/l	2.00	0.623	1
Perfluorohexanoic Acid (PFHxA)	2.34		ng/l	2.00	0.623	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.623	1
Perfluoroheptanoic Acid (PFHpA)	1.08	JZ	ng/l	2.00	0.623	1
Perfluorohexanesulfonic Acid (PFHxS)	0.888	JZ	ng/l	2.00	0.623	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.623	1
Perfluorooctanoic Acid (PFOA)	3.89		ng/l	2.00	0.623	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.623	1
Perfluorooctanesulfonic Acid (PFOS)	2.34		ng/l	2.00	0.623	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.623	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.623	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.623	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.623	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.623	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.623	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.623	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.623	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.623	1
PFAS, Total (6)	6.23		ng/l	2.00	0.623	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	88		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	89		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-02
Client ID: 100070 TREMONT 1+2
Sample Location: Not Specified

Date Collected: 06/10/24 09:22
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 15:24
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.620	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.620	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.620	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.620	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.620	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.620	1
Perfluorooctanoic Acid (PFOA)	1.04	J	ng/l	2.00	0.620	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.620	1
Perfluorooctanesulfonic Acid (PFOS)	1.47	J	ng/l	2.00	0.620	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.620	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.620	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.620	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.620	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.620	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.620	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.620	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.620	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.620	1
PFAS, Total (6)	ND		ng/l	2.00	0.620	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	86		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	81		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	79		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-03
Client ID: 100071 MAYFLOWER 1+2
Sample Location: Not Specified

Date Collected: 06/10/24 10:10
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 15:33
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.31	J	ng/l	2.00	0.586	1
Perfluorohexanoic Acid (PFHxA)	1.69	J	ng/l	2.00	0.586	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.586	1
Perfluoroheptanoic Acid (PFHpA)	0.929	J	ng/l	2.00	0.586	1
Perfluorohexanesulfonic Acid (PFHxS)	0.891	J	ng/l	2.00	0.586	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.586	1
Perfluorooctanoic Acid (PFOA)	3.68		ng/l	2.00	0.586	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.586	1
Perfluorooctanesulfonic Acid (PFOS)	3.28		ng/l	2.00	0.586	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.586	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.586	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.586	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.586	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.586	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.586	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.586	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.586	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.586	1
PFAS, Total (6)	6.96		ng/l	2.00	0.586	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	122		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-04
Client ID: 10003 LAKESHORE
Sample Location: Not Specified

Date Collected: 06/10/24 10:57
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 15:51
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	3.28		ng/l	2.00	0.614	1
Perfluorohexanoic Acid (PFHxA)	2.52		ng/l	2.00	0.614	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.614	1
Perfluoroheptanoic Acid (PFHpA)	1.46	J	ng/l	2.00	0.614	1
Perfluorohexanesulfonic Acid (PFHxS)	0.886	J	ng/l	2.00	0.614	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.614	1
Perfluorooctanoic Acid (PFOA)	4.68		ng/l	2.00	0.614	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.614	1
Perfluorooctanesulfonic Acid (PFOS)	2.44		ng/l	2.00	0.614	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.614	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.614	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.614	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.614	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.614	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.614	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.614	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.614	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.614	1
PFAS, Total (6)	7.12		ng/l	2.00	0.614	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	103		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	101		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-05
Client ID: 100072 EVERGREEN 1+2
Sample Location: Not Specified

Date Collected: 06/10/24 11:20
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:00
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.809	J	ng/l	2.00	0.609	1
Perfluorohexanoic Acid (PFHxA)	1.03	J	ng/l	2.00	0.609	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.609	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.609	1
Perfluorohexanesulfonic Acid (PFHxS)	0.751	J	ng/l	2.00	0.609	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.609	1
Perfluorooctanoic Acid (PFOA)	1.70	J	ng/l	2.00	0.609	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.609	1
Perfluorooctanesulfonic Acid (PFOS)	1.12	J	ng/l	2.00	0.609	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.609	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.609	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.609	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.609	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.609	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.609	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.609	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.609	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.609	1
PFAS, Total (6)	ND		ng/l	2.00	0.609	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	103		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-06
Client ID: 10006 PARTRIDGE
Sample Location: Not Specified

Date Collected: 06/10/24 13:15
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:08
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	3.42		ng/l	2.00	0.604	1
Perfluorohexanoic Acid (PFHxA)	23.9		ng/l	2.00	0.604	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.604	1
Perfluoroheptanoic Acid (PFHpA)	6.85		ng/l	2.00	0.604	1
Perfluorohexanesulfonic Acid (PFHxS)	28.7		ng/l	2.00	0.604	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.604	1
Perfluorooctanoic Acid (PFOA)	5.72		ng/l	2.00	0.604	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.604	1
Perfluorooctanesulfonic Acid (PFOS)	19.7		ng/l	2.00	0.604	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.604	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.604	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.604	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.604	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.604	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.604	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.604	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.604	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.604	1
PFAS, Total (6)	61.0		ng/l	2.00	0.604	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	84		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	84		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-07
Client ID: 10000 DEPOT
Sample Location: Not Specified

Date Collected: 06/10/24 13:52
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:17
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.595	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.595	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.595	1
Perfluoroheptanoic Acid (PFHpA)	0.763	J	ng/l	2.00	0.595	1
Perfluorohexanesulfonic Acid (PFHxS)	0.692	J	ng/l	2.00	0.595	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.595	1
Perfluorooctanoic Acid (PFOA)	4.96		ng/l	2.00	0.595	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.595	1
Perfluorooctanesulfonic Acid (PFOS)	1.13	J	ng/l	2.00	0.595	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.595	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.595	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.595	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.595	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.595	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.595	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.595	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.595	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.595	1
PFAS, Total (6)	4.96		ng/l	2.00	0.595	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	87		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	86		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-08
Client ID: 10005 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 08:54
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:26
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.645	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.645	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.645	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.645	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.645	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.645	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.645	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.645	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.645	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.645	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.645	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.645	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.645	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.645	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.645	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.645	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.645	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.645	1
PFAS, Total (6)	ND		ng/l	2.00	0.645	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	96		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-09
Client ID: 100070 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 09:22
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:35
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.652	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.652	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.652	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.652	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.652	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.652	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.652	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.652	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.652	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.652	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.652	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.652	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.652	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.652	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.652	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.652	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.652	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.652	1
PFAS, Total (6)	ND		ng/l	2.00	0.652	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	108		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	101		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	102		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-10
Client ID: 100071 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 10:10
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 16:43
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.643	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.643	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.643	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.643	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.643	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.643	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.643	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.643	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.643	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.643	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.643	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.643	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.643	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.643	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.643	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.643	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.643	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.643	1
PFAS, Total (6)	ND		ng/l	2.00	0.643	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	86		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	83		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	82		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-11
Client ID: 10003 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 10:57
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 17:01
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.650	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.650	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.650	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.650	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.650	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.650	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.650	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.650	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.650	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.650	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.650	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.650	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.650	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.650	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.650	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.650	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.650	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.650	1
PFAS, Total (6)	ND		ng/l	2.00	0.650	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	78		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	73		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	71		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	78		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-12
Client ID: 100072 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 11:20
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 17:10
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.646	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.646	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.646	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.646	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.646	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.646	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.646	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.646	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.646	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.646	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.646	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.646	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.646	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.646	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.646	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.646	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.646	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.646	1
PFAS, Total (6)	ND		ng/l	2.00	0.646	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	102		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	99		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	96		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-13
Client ID: 10006 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 13:15
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 17:18
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.640	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.640	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.640	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.640	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.640	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.640	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.640	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.640	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.640	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.640	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.640	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.640	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.640	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.640	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.640	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.640	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.640	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.640	1
PFAS, Total (6)	ND		ng/l	2.00	0.640	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	87		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

SAMPLE RESULTS

Lab ID: L2432941-14
Client ID: 10000 FIELD BLANK
Sample Location: Not Specified

Date Collected: 06/10/24 13:52
Date Received: 06/12/24
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 06/26/24 17:27
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.655	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.655	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.655	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.655	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.655	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.655	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.655	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.655	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.655	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.655	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.655	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.655	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.655	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.655	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.655	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.655	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.655	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.655	1
PFAS, Total (6)	ND		ng/l	2.00	0.655	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	91		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	85		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	87		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	82		70-130

Project Name: 4082000 **Lab Number:** L2432941

Project Number: 4082000 **Report Date:** 06/27/24

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 06/26/24 14:50
Analyst: AC

Extraction Method: EPA 537.1
Extraction Date: 06/21/24 09:15

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-14 Batch: WG1937487-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	88		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	95		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	89		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: 4082000

Project Number: 4082000

Lab Number: L2432941

Report Date: 06/27/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 Batch: WG1937487-2								
Perfluorobutanesulfonic Acid (PFBS)	102		-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	113		-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	102		-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	112		-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	108		-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	126		-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	115		-		50-150	-		30
Perfluorononanoic Acid (PFNA)	120		-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	117		-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	106		-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	103		-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	105		-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	115		-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	112		-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	119		-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	105		-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	114		-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	107		-		50-150	-		30

Lab Control Sample Analysis
Batch Quality Control

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 Batch: WG1937487-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	99				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	93				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: 4082000 ***Lab Number:*** L2432941

Project Number: 4082000 ***Report Date:*** 06/27/24

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab MILLBROOK	Associated sample(s): 01-14		QC Batch ID: WG1937487-3			QC Sample: L2432941-01			Client ID: 10005			
Perfluorobutanesulfonic Acid (PFBS)	1.48JZ	1.63	3.06	**188**	Q	-	-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	2.34	1.84	4.46	115		-	-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	1.84	1.89J	103		-	-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	1.08JZ	1.84	3.37	**183**	Q	-	-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.888JZ	1.68	2.70	**161**	Q	-	-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	1.74	2.18	126		-	-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	3.89	1.84	6.45	139		-	-		50-150	-		30
Perfluorononanoic Acid (PFNA)	ND	1.84	2.59	141		-	-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	2.34	1.7	3.92	93		-	-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	ND	1.84	2.06	112		-	-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	1.71	1.91J	111		-	-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	1.84	1.96J	107		-	-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	1.84	2.13	116		-	-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	1.84	2.27	124		-	-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	ND	1.84	2.18	119		-	-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	1.73	1.80J	104		-	-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	1.84	2.20	120		-	-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	1.84	2.12	115		-	-		50-150	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1937487-3 QC Sample: L2432941-01 Client ID: 10005 MILLBROOK												

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	99				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	98				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1937487-4 QC Sample: L2432941-03 Client ID: 100071 MAYFLOWER 1+2						
Perfluorobutanesulfonic Acid (PFBS)	1.31J	1.55J	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	1.69J	1.87J	ng/l	NC		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	0.929J	0.980J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	0.891J	1.04J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	3.68	3.94	ng/l	7		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	3.28	3.28	ng/l	0		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-14 QC Batch ID: WG1937487-4 QC Sample: L2432941-03 Client ID: 100071 MAYFLOWER 1+2

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105		97		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		104		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	122		103		70-130

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2432941-01A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-01B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-02A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-02B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-03A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-03B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-04A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-04B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-05A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-05B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-06A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-06B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-07A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-07B	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-08A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-09A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-10A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-11A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-12A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-13A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)
L2432941-14A	Plastic 250ml Trizma preserved	A	NA		3.4	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: 4082000
Project Number: 4082000

Lab Number: L2432941
Report Date: 06/27/24

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Project Name:	4082000	**Lab Number:**	L2432941
Project Number:	4082000	**Report Date:**	06/27/24

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol, Azobenzene; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Nonpotable Water: EPA RSK-175 Dissolved Gases
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

STATE FORM - CHAIN OF CUSTODY

PAGE _____ OF _____

Date Rec'd in Lab: 6/12/24

ALPHA Job #: L2432941

ALPHA ANALYTICAL
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193
MANSFIELD, MA TEL: 508-822-9300 FAX: 508-822-3288

Client Information

Client: DUXBURY WATER
Address: 878 TREMONT ST
DUXBURY MA
Phone:
Fax:
Email: MCLOUD@DUXBURY-MA.GOV
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: 4082000
Project Location:
Project/PWS ID#: 4082000
Project Manager:
ALPHA Quote #:

Turn-Around Time

☐ Standard ☐ RUSH (only confirmed if pre-approved)
Date Due: Time:

Report Information - Data Deliverables

☐ FAX ☐ EMAIL
☐ ADEx ☐ Add'l Deliverables

Billing Information

☐ Same as Client info PO #:

Please Indicate PWS Class Below

☒ COM
☐ NTNC
☐ TNC

Other Project Specific Requirements/Comments/Detection Limits:

ANALYSIS: PFAS

SAMPLE HANDLING
Filtration
☐ Done
☐ Not needed
☐ Lab to do
Preservation
☐ Lab to do

(PLEASE CHECK BELOW)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	TOTAL # BOTTLES
32941-01	10005	MILLBROOK	6/10/24	8:54A		SN	X		S		F	R		
-02	100070	TREMONT 1&2	6/10/24	9:22A		SN	X	M			F	R		
-03	100071	MAYFLOWER 1&2	6/10/24	10:10A		SN	X	M			F	R		
-04	10003	LAKESHORE	6/10/24	10:57A		SN	X		S		F	R		
-05	100072	EVERGREEN 1&2	6/10/24	11:20A		SN	X	M			F	R		
-06	10006	PARTRIDGE	6/10/24	1:15P		SN	X		S		F	R		
-07	10000	DEPOT	6/10/24	1:52P		SN	X		S		F	R		

(1) If Source is Multiple, please list connected sources
(2) If Sample type is special please explain

Container Type														
Preservative														

Relinquished By:	Date/Time	Received By:	Date/Time
DAVIS	6/12/24 12:55	DAVIS	6/12/24 12:55
	6/12/24 1525		6/12/24 1525
Mendoza AAL	6/12/24 1930	Mendoza AAL	6/12/24 1930
	6/12/24 2130		6/12/24 2130

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

FORM NO: 01-15 (rev. 16-NOV-10)

DOC ID: 51975
Revision: 1
Published: 11/11/2022 12:17:45 PM

Massachusetts DEP Drinking Water Microbiological Sample Guide

The following information must be supplied in order to process the MADEP State Forms

This information must be included on the Chain-of-Custody

Project Information
Project Location (Town/City):
Project PWS ID#:
PWS Name:

Sample Information
Sample Type:
DEP Location Code:
DEP Location Name:
Collection Date:
Collection Time:
Sample: ☐ Single ☐ Multiple List connected sources
Sample: ☐ Routine ☐ Special
Special Sample Reason:
Sampler's Initials:

Residual Chlorine Type (1)	
Analytical Method ID used:	
☐ Combined Chlorine:	mg/L
☐ Free Chlorine:	mg/L
☐ Total Chlorine:	mg/L

1) If Residual Chlorine is reported, please indicate the Analytical Method ID, Type (Combined, Free or Total) and the Result in mg/L. ***If no residual chlorine information is provided, the report will be finalized without it.***

Please call our Client Services Department at 800-624-9220 for additional guidance.
Thank you for using Alpha Analytical!

Serial_No:06272409:36

Alpha Analytical, Inc.
Facility: Company-wide
Department: Reporting
Title: MADEP State Form Required Information

ID No.:18068
Revision 1
Published Date: 6/5/2015 2:30:28 PM

The following information must be supplied in order to process the State Form:

PWS ID: 4082000

City/Town: DUXBURY

PWS Name: DUXBURY WATER

PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP Location ID	DEP Location Name	Sample Information			Date Collected	Collected By
		Multiple or Single*	Raw or Finished	Routine or Special**		
10000	DEPOT ST WELL	S	F	R	6/10/24	SN
10003	LAKE SHORE DRIVE WELL	S	F	R	6/10/24	SN
10005	MILLBROOK WELL	S	F	R	6/10/24	SN
10006	PARTRIDGE WELL	S	F	R	6/10/24	SN
100070	TREMONT WELL #2	M	F	R	6/10/24	SN
100071	MAYFLOWER WELL #2	M	F	R	6/10/24	SN
100072	EVERGREEN WELL #2	M	F	R	6/10/24	SN

* If Sample source is *MULTIPLE*, please list the connected sources:

_____

** If DEP sample type is *SPECIAL*, please explain below:

_____

Document Type: Form

Pre-Qualtrax Document ID: 09-08

Serial_No:06272409:36

ANALYTICAL REPORT

Lab Number:	L2335461
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Mark Cloud
Phone:	(781) 934-1100
Project Name:	DUXBURY WATER DEPT
Project Number:	4082000
Report Date:	07/12/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110) , NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2335461
Report Date: 07/12/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2335461-01	100072 EVERGREEN 1&2	DW	Not Specified	06/20/23 11:07	06/21/23
L2335461-02	100070 TREMONT 1&2	DW	Not Specified	06/20/23 10:20	06/21/23
L2335461-03	100071 MAYFLOWER 1&2	DW	Not Specified	06/20/23 10:47	06/21/23
L2335461-04	100073 DAMON 1&2	DW	Not Specified	06/20/23 09:50	06/21/23
L2335461-05	10003 LAKESHORE	DW	Not Specified	06/20/23 08:45	06/21/23
L2335461-06	10005 MILLBROOK	DW	Not Specified	06/20/23 10:05	06/21/23
L2335461-07	100072 FB	DW	Not Specified	06/20/23 11:07	06/21/23
L2335461-08	100070 FB	DW	Not Specified	06/20/23 10:20	06/21/23
L2335461-09	100071 FB	DW	Not Specified	06/20/23 10:47	06/21/23
L2335461-10	100073 FB	DW	Not Specified	06/20/23 09:50	06/21/23
L2335461-11	10003 FB	DW	Not Specified	06/20/23 08:45	06/21/23
L2335461-12	10005 FB	DW	Not Specified	06/20/23 10:05	06/21/23

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
Project Number:	4082000	**Report Date:**	07/12/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
Project Number:	4082000	**Report Date:**	07/12/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Perfluorinated Alkyl Acids by EPA 537.1

WG1798240-1: The surrogate recovery is above the acceptance criteria for perfluoro-n-[1,2-13c2]decanoic acid (13c-pfda) (131%). Since the sample was non-detect for all associated target analytes, re-analysis was not required.

WG1798240-3: The Matrix Spike level is at the Reporting Limit (RL); any detections below the RL in the native sample are not included in the % Recovery calculation.

The WG1798240-3 MS recoveries, performed on L2335461-01, are outside the acceptance criteria for perfluorobutanesulfonic acid (pfbs) (155%), perfluorohexanoic acid (pfhxa) (162%), perfluorohexanesulfonic acid (pfhxs) (155%), and perfluorooctanesulfonic acid (pfos) (222%).

The WG1798240-4 Laboratory Duplicate RPD for perfluorooctanesulfonic acid (pfos) (59%), performed on L2335461-02, is outside the acceptance criteria.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Darian Dailey

Title: Technical Director/Representative Date: 07/12/23

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WATER DEPT
Lab Number: L2335461
Project Number: 4082000
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-01
Client ID: 100072 EVERGREEN 1&2
Sample Location: Not Specified

Date Collected: 06/20/23 11:07
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 18:38
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.806	JZ	ng/l	2.00	0.585	1
Perfluorohexanoic Acid (PFHxA)	0.911	JZ	ng/l	2.00	0.585	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.585	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.585	1
Perfluorohexanesulfonic Acid (PFHxS)	0.701	JZ	ng/l	2.00	0.585	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.585	1
Perfluorooctanoic Acid (PFOA)	2.00		ng/l	2.00	0.585	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.585	1
Perfluorooctanesulfonic Acid (PFOS)	1.96	JZ	ng/l	2.00	0.585	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.585	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.585	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.585	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.585	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.585	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.585	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.585	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.585	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.585	1
PFAS, Total (6)	2.00		ng/l	2.00	0.585	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	87		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	86		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-02
Client ID: 100070 TREMONT 1&2
Sample Location: Not Specified

Date Collected: 06/20/23 10:20
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 18:55
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.609	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.609	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.609	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.609	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.609	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.609	1
Perfluorooctanoic Acid (PFOA)	0.912	J	ng/l	2.00	0.609	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.609	1
Perfluorooctanesulfonic Acid (PFOS)	2.12	Z	ng/l	2.00	0.609	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.609	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.609	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.609	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.609	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.609	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.609	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.609	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.609	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.609	1
PFAS, Total (6)	2.12	Z	ng/l	2.00	0.609	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	111		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-03
Client ID: 100071 MAYFLOWER 1&2
Sample Location: Not Specified

Date Collected: 06/20/23 10:47
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:12
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.10	J	ng/l	2.00	0.613	1
Perfluorohexanoic Acid (PFHxA)	1.03	J	ng/l	2.00	0.613	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.613	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.613	1
Perfluorohexanesulfonic Acid (PFHxS)	0.624	J	ng/l	2.00	0.613	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.613	1
Perfluorooctanoic Acid (PFOA)	2.50		ng/l	2.00	0.613	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.613	1
Perfluorooctanesulfonic Acid (PFOS)	2.35		ng/l	2.00	0.613	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.613	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.613	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.613	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.613	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.613	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.613	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.613	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.613	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.613	1
PFAS, Total (6)	4.85		ng/l	2.00	0.613	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	99		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	114		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-04
Client ID: 100073 DAMON 1&2
Sample Location: Not Specified

Date Collected: 06/20/23 09:50
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:21
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.54	J	ng/l	2.00	0.599	1
Perfluorohexanoic Acid (PFHxA)	2.98		ng/l	2.00	0.599	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.599	1
Perfluoroheptanoic Acid (PFHpA)	0.860	J	ng/l	2.00	0.599	1
Perfluorohexanesulfonic Acid (PFHxS)	0.932	J	ng/l	2.00	0.599	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.599	1
Perfluorooctanoic Acid (PFOA)	3.69		ng/l	2.00	0.599	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.599	1
Perfluorooctanesulfonic Acid (PFOS)	2.47		ng/l	2.00	0.599	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.599	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.599	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.599	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.599	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.599	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.599	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.599	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.599	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.599	1
PFAS, Total (6)	6.16		ng/l	2.00	0.599	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	89		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	87		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	94		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2335461
Project Number: 4082000
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-05
Client ID: 10003 LAKESHORE
Sample Location: Not Specified

Date Collected: 06/20/23 08:45
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:30
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	2.00		ng/l	2.00	0.608	1
Perfluorohexanoic Acid (PFHxA)	1.86	J	ng/l	2.00	0.608	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.608	1
Perfluoroheptanoic Acid (PFHpA)	0.947	J	ng/l	2.00	0.608	1
Perfluorohexanesulfonic Acid (PFHxS)	1.02	J	ng/l	2.00	0.608	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.608	1
Perfluorooctanoic Acid (PFOA)	4.12		ng/l	2.00	0.608	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.608	1
Perfluorooctanesulfonic Acid (PFOS)	2.55		ng/l	2.00	0.608	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.608	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.608	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.608	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.608	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.608	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.608	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.608	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.608	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.608	1
PFAS, Total (6)	6.67		ng/l	2.00	0.608	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	108		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-06
Client ID: 10005 MILLBROOK
Sample Location: Not Specified

Date Collected: 06/20/23 10:05
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:38
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.48	J	ng/l	2.00	0.619	1
Perfluorohexanoic Acid (PFHxA)	2.34		ng/l	2.00	0.619	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.619	1
Perfluoroheptanoic Acid (PFHpA)	0.964	J	ng/l	2.00	0.619	1
Perfluorohexanesulfonic Acid (PFHxS)	0.816	J	ng/l	2.00	0.619	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.619	1
Perfluorooctanoic Acid (PFOA)	3.82		ng/l	2.00	0.619	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.619	1
Perfluorooctanesulfonic Acid (PFOS)	2.67		ng/l	2.00	0.619	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.619	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.619	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.619	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.619	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.619	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.619	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.619	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.619	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.619	1
PFAS, Total (6)	6.49		ng/l	2.00	0.619	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-07
Client ID: 100072 FB
Sample Location: Not Specified

Date Collected: 06/20/23 11:07
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:47
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.632	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.632	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.632	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.632	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.632	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.632	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.632	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.632	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.632	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.632	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.632	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.632	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.632	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.632	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.632	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.632	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.632	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.632	1
PFAS, Total (6)	ND		ng/l	2.00	0.632	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	99		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	115		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-08
Client ID: 100070 FB
Sample Location: Not Specified

Date Collected: 06/20/23 10:20
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 19:56
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.622	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.622	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.622	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.622	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.622	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.622	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.622	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.622	1
Perfluorooctanesulfonic Acid (PFOS)	1.00	J	ng/l	2.00	0.622	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.622	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.622	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.622	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.622	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.622	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.622	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.622	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.622	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.622	1
PFAS, Total (6)	ND		ng/l	2.00	0.622	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	100		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	113		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-09
Client ID: 100071 FB
Sample Location: Not Specified

Date Collected: 06/20/23 10:47
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 20:04
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.607	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.607	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.607	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.607	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.607	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.607	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.607	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.607	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.607	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.607	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.607	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.607	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.607	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.607	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.607	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.607	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.607	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.607	1
PFAS, Total (6)	ND		ng/l	2.00	0.607	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	104		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	119		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	111		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-10
Client ID: 100073 FB
Sample Location: Not Specified

Date Collected: 06/20/23 09:50
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 20:13
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.623	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.623	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.623	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.623	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.623	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.623	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.623	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.623	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.623	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.623	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.623	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.623	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.623	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.623	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.623	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.623	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.623	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.623	1
PFAS, Total (6)	ND		ng/l	2.00	0.623	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	98		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	110		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-11
Client ID: 10003 FB
Sample Location: Not Specified

Date Collected: 06/20/23 08:45
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 20:30
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.629	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.629	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.629	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.629	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.629	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.629	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.629	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.629	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.629	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.629	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.629	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.629	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.629	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.629	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.629	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.629	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.629	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.629	1
PFAS, Total (6)	ND		ng/l	2.00	0.629	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	95		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	105		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2335461
Project Number: 4082000
Report Date: 07/12/23

SAMPLE RESULTS

Lab ID: L2335461-12
Client ID: 10005 FB
Sample Location: Not Specified

Date Collected: 06/20/23 10:05
Date Received: 06/21/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 07/02/23 20:39
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.628	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.628	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.628	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.628	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.628	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.628	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.628	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.628	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.628	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.628	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.628	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.628	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.628	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.628	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.628	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.628	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.628	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.628	1
PFAS, Total (6)	ND		ng/l	2.00	0.628	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	100		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	97		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	110		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	105		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 07/02/23 18:20
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 06/30/23 11:18

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-12 Batch: WG1798240-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	111		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	112		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	**131**	Q	70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	112		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2335461

Report Date: 07/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-12 Batch: WG1798240-2								
Perfluorobutanesulfonic Acid (PFBS)	119		-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	122		-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	112		-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	116		-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	116		-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	140		-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	136		-		50-150	-		30
Perfluorononanoic Acid (PFNA)	138		-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	138		-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	132		-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	109		-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	106		-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	142		-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	112		-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	148		-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	108		-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	120		-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	130		-		50-150	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2335461

Report Date: 07/12/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-12 Batch: WG1798240-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	104				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	95				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2335461

Report Date: 07/12/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab EVERGREEN 1&2	Associated sample(s): 01-12		QC Batch ID: WG1798240-3			QC Sample: L2335461-01			Client ID: 100072			
Perfluorobutanesulfonic Acid (PFBS)	0.806JZ	1.58	2.45	**155**	Q	-	-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	0.911JZ	1.78	2.88	**162**	Q	-	-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	1.78	1.85J	104		-	-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	1.78	2.35	132		-	-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	0.701JZ	1.62	2.52	**155**	Q	-	-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	1.68	2.28	136		-	-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	2.00	1.78	4.23	125		-	-		50-150	-		30
Perfluorononanoic Acid (PFNA)	ND	1.78	2.45	138		-	-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.96JZ	1.65	3.66	**222**	Q	-	-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	ND	1.78	2.24	126		-	-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	1.66	1.71J	103		-	-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	1.78	2.03	114		-	-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	1.78	2.31	130		-	-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	1.78	1.92J	108		-	-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	ND	1.78	2.38	134		-	-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	1.68	1.71J	102		-	-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	1.78	2.13	120		-	-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	1.78	2.10	118		-	-		50-150	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2335461

Report Date: 07/12/23

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1798240-3 QC Sample: L2335461-01 Client ID: 100072 EVERGREEN 1&2												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	93				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	105				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	88				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	88				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2335461
Report Date: 07/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1798240-4 QC Sample: L2335461-02 Client ID: 100070 TREMONT 1&2						
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	0.912J	0.906J	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.12Z	3.88	ng/l	**59**	Q	30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2335461
Report Date: 07/12/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-12 QC Batch ID: WG1798240-4 QC Sample: L2335461-02 Client ID: 100070 TREMONT 1&2

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	93		97		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	93		96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	111		115		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	99		97		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2335461
Report Date: 07/12/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2335461-01A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-01B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-02A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-02B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-03A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-03B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-04A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-04B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-05A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-05B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-06A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-06B	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-07A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-08A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-09A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-10A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-11A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)
L2335461-12A	Plastic 250ml Trizma preserved	A	NA		4.2	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2335461
Report Date: 07/12/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
Project Number:	4082000	**Report Date:**	07/12/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
Project Number:	4082000	**Report Date:**	07/12/23

Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2335461
Project Number:	4082000	**Report Date:**	07/12/23

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page of

Date Rec'd in Lab: 6/21/23

ALPHA Job # L2335461

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 508-822-3288

Client Information

Client: DUXBURY PWS
Address: 878 TREMONT ST. DUXBURY, MA 02332
Phone: 781.934.1103
Fax:
Email: MCLOUD@DUXBURY-MA.GOV

Project Information

Project Name: DUXBURY WATER DEPT
PWS Name:
Project Location:
Project PWS ID# 4082000
Project Manager: MARIE CLOUD
ALPHA Quote #:

Turn-Around Time

Standard ☒ Due Date:
Rush (only if pre approved) ☐ Time:

These samples have been previously analyzed by Alpha ☐

Other Project Specific Requirements/ Comments/Detection Limits

Report Information — Data Deliverables

☐ FAX ☒ EMAIL
☐ ADEx ☐ Add1 Deliverables

Billing Information

☒ Same as Client Info
PO #

Please Indicate PWS Class Below

☒ COM
☐ NTNC
☐ TNC

SUBJECT TO MCL REPORTING

ANALYSIS

PFAS

Sample Filtration

☐ Done
☐ Lab to do
Preservation
☐ Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
5461-01	100072	EVERGREEN 1&2	06/20/23	11:07	DW	RLR	X	X			X		X	
-02	100070	TREMONT 1&2		10:20			X	X			X		X	
-03	100071	MAYFLOWER 1&2		10:47			X	X			X		X	
-04	100073	DAMON 1&2		09:50			X	X			X		X	
-05	10003	LAKESHORE		08:45			X		X		X		X	
-06	10005	MILLBROOK		10:05			X		X		X		X	

Container Type: P
Preservative: ✓

Container Code: P = Plastic, A = Amber Glass, V = Vial, G = Glass, B = Bacteria Cup, C = Cube, O = Other, E = Encore, D = BOD Bottle

Preservative Code: A = None, B = HCl, C = HNO3, D = H2SO4, E = NaOH, F = MeOH, G = NaHSO4, H = Na2S2O3, I = Ascorbic Acid, J = NH4Cl, K = Zn Acetate, O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Relinquished By:	Date/Time	Received By:	Date/Time
ROBERT RELAND	06/20/2023 @ 11:20		1120 6/20/23
Douglas Keuch	6/21/23 10:25	Eric Woods AAL	6/21/23 1025
Eric Woods AAL	6/21/23 1254	Ashley Jackson	6.21.23 14.45
Ashley Jackson	6.21.23 14:50	M. Lee AAL	6-21-23 1500
M. Lee AAL	6-21-23 1400		6/21/23 16:00

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

ANALYTICAL REPORT

Lab Number:	L2322552
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Peter Mackin
Phone:	(781) 934-1100
Project Name:	DUXBURY WATER DEPARTMENT
Project Number:	4082000
Report Date:	05/09/23

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Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0141), DoD (L2474), FL (E87814), IL (200081), LA (85084), ME (MA00030), MD (350), NJ (MA015), NY (11627), NC (685), OH (CL106), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #P330-17-00150), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2322552
Report Date: 05/09/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2322552-01	10000 DEPOT	DW	Not Specified	04/25/23 11:36	04/26/23
L2322552-02	10006 PARTRIDGE	DW	Not Specified	04/25/23 11:17	04/26/23
L2322552-03	10006 PARTRIDGE FIELDBLANK	DW	Not Specified	04/25/23 11:17	04/26/23
L2322552-04	10000 DEPOT FIELDBLANK	DW	Not Specified	04/25/23 11:36	04/26/23

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2322552
Project Number:	4082000	**Report Date:**	05/09/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2322552
Project Number: 4082000 **Report Date:** 05/09/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Darian Dailey

Title: Technical Director/Representative Date: 05/09/23

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WATER DEPARTMENT
Lab Number: L2322552
Project Number: 4082000
Report Date: 05/09/23

SAMPLE RESULTS

Lab ID: L2322552-01
Client ID: 10000 DEPOT
Sample Location: Not Specified

Date Collected: 04/25/23 11:36
Date Received: 04/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 05/07/23 08:30
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 05/05/23 10:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.694	J	ng/l	2.00	0.610	1
Perfluorohexanoic Acid (PFHxA)	1.20	J	ng/l	2.00	0.610	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.610	1
Perfluoroheptanoic Acid (PFHpA)	1.24	J	ng/l	2.00	0.610	1
Perfluorohexanesulfonic Acid (PFHxS)	1.02	J	ng/l	2.00	0.610	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.610	1
Perfluorooctanoic Acid (PFOA)	6.90		ng/l	2.00	0.610	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.610	1
Perfluorooctanesulfonic Acid (PFOS)	1.86	J	ng/l	2.00	0.610	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.610	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.610	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.610	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.610	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.610	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.610	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.610	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.610	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.610	1
PFAS, Total (6)	6.90		ng/l	2.00	0.610	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	79		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	70		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2322552

Project Number: 4082000 **Report Date:** 05/09/23

SAMPLE RESULTS

Lab ID: L2322552-02
Client ID: 10006 PARTRIDGE
Sample Location: Not Specified

Date Collected: 04/25/23 11:17
Date Received: 04/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 05/07/23 08:39
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 05/05/23 10:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	4.30		ng/l	2.00	0.609	1
Perfluorohexanoic Acid (PFHxA)	29.0		ng/l	2.00	0.609	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.609	1
Perfluoroheptanoic Acid (PFHpA)	6.89		ng/l	2.00	0.609	1
Perfluorohexanesulfonic Acid (PFHxS)	35.6		ng/l	2.00	0.609	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.609	1
Perfluorooctanoic Acid (PFOA)	7.22		ng/l	2.00	0.609	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.609	1
Perfluorooctanesulfonic Acid (PFOS)	21.3		ng/l	2.00	0.609	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.609	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.609	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.609	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.609	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.609	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.609	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.609	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.609	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.609	1
PFAS, Total (6)	71.0		ng/l	2.00	0.609	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	92		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	89		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	84		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2322552

Project Number: 4082000 **Report Date:** 05/09/23

SAMPLE RESULTS

Lab ID: L2322552-03
Client ID: 10006 PARTRIDGE FIELDBLANK
Sample Location: Not Specified

Date Collected: 04/25/23 11:17
Date Received: 04/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 05/07/23 08:48
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 05/05/23 10:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.586	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.586	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.586	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.586	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.586	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.586	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.586	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.586	1
Perfluorooctanesulfonic Acid (PFOS)	0.737	J	ng/l	2.00	0.586	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.586	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.586	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.586	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.586	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.586	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.586	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.586	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.586	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.586	1
PFAS, Total (6)	ND		ng/l	2.00	0.586	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	100		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2322552

Project Number: 4082000 **Report Date:** 05/09/23

SAMPLE RESULTS

Lab ID: L2322552-04
Client ID: 10000 DEPOT FIELDBLANK
Sample Location: Not Specified

Date Collected: 04/25/23 11:36
Date Received: 04/26/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 05/07/23 08:56
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 05/05/23 10:39

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.601	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.601	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.601	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.601	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.601	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.601	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.601	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.601	1
Perfluorooctanesulfonic Acid (PFOS)	0.828	J	ng/l	2.00	0.601	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.601	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.601	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.601	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.601	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.601	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.601	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.601	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.601	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.601	1
PFAS, Total (6)	ND		ng/l	2.00	0.601	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	100		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	103		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	97		70-130

Project Name: DUXBURY WATER DEPARTMENT **Lab Number:** L2322552

Project Number: 4082000 **Report Date:** 05/09/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 05/07/23 07:04
Analyst: TBR

Extraction Method: EPA 537.1
Extraction Date: 05/05/23 10:39

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-04 Batch: WG1775106-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	103		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	103		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	104		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	110		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2322552

Report Date: 05/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 Batch: WG1775106-2								
Perfluorobutanesulfonic Acid (PFBS)	94		-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	89		-		70-130	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	87		-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	87		-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	98		-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	93		-		70-130	-		30
Perfluorononanoic Acid (PFNA)	93		-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	91		-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	89		-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	99		-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	92		-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	93		-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	90		-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	94		-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	101		-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	95		-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	92		-		70-130	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2322552

Report Date: 05/09/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 Batch: WG1775106-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	98				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	106				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	108				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2322552

Report Date: 05/09/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1775106-3 QC Sample: L2322470-01 Client ID: MS Sample												
Perfluorobutanesulfonic Acid (PFBS)	3.69	131	117	87		-	-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	6.21	147	136	88		-	-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	147	127	86		-	-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	3.48	147	128	85		-	-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.80J	134	130	97		-	-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	139	136	98		-	-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	10.1	147	152	96		-	-		70-130	-		30
Perfluorononanoic Acid (PFNA)	ND	147	140	95		-	-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	6.04	136	126	88		-	-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	ND	147	132	90		-	-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	137	133	97		-	-		70-130	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	147	129	88		-	-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	147	132	90		-	-		70-130	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	147	127	86		-	-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	ND	147	139	94		-	-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	139	134	96		-	-		70-130	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	147	136	92		-	-		70-130	-		30
Perfluorotetradecanoic Acid (PFTA)	ND	147	129	88		-	-		70-130	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT

Project Number: 4082000

Lab Number: L2322552

Report Date: 05/09/23

Parameter	*Native Sample*	*MS Added*	*MS Found*	*MS %Recovery*	*Qual*	*MSD Found*	*MSD %Recovery*	*Qual*	*Recovery Limits*	*RPD*	*Qual*	*RPD Limits*
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1775106-3 QC Sample: L2322470-01 Client ID: MS Sample												

Surrogate	*MS % Recovery*	*MS Qualifier*	*MSD % Recovery*	*MSD Qualifier*	*Acceptance Criteria*
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	99				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	107				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2322552
Report Date: 05/09/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1775106-4 QC Sample: L2322470-02 Client ID: DUP Sample						
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	0.640J	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	0.675J	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2322552
Report Date: 05/09/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-04 QC Batch ID: WG1775106-4 QC Sample: L2322470-02 Client ID: DUP Sample

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	104		99		70-130
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	102		98		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	95		98		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	88		95		70-130

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000

Lab Number: L2322552
Report Date: 05/09/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2322552-01A	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)
L2322552-01B	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)
L2322552-02A	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)
L2322552-02B	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)
L2322552-03A	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)
L2322552-04A	Plastic 250ml Trizma preserved	A	NA		5.4	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000
Lab Number: L2322552
Report Date: 05/09/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY WATER DEPARTMENT
Project Number: 4082000
Lab Number: L2322552
Report Date: 05/09/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	DUXBURY WATER DEPARTMENT	**Lab Number:**	L2322552
Project Number:	4082000	**Report Date:**	05/09/23

GLOSSARY

Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

Report Format: DU Report with 'J' Qualifiers

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Data Qualifiers

Identified Compounds (TICs).

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers

REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624/624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625/625.1: alpha-Terpineol
EPA 8260C/8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270D/8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS
EPA 8082A: NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 332: Perchlorate; **EPA 524.2:** THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page 1 of 1

Date Rec'd in Lab: 4/26/23

ALPHA Job # L2322552

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 508-822-3288

Client Information

Client: DUXBURY WATER DEPT.
Address: 878 TREMONT ST.
DUXBURY MA 02332
Phone: 617-816-2203
Fax: 781-934-5278
Email: roland r@uswinc.com

Project Information

Project Name: DUXBURY WATER
PWS Name: DEPARTMENT
Project Location:
Project PWS ID# 4082000
Project Manager:
ALPHA Quote #:

Turn-Around Time

Standard [X] Due Date:
Rush (only if pre approved) [ ] Time:

These samples have been previously analyzed by Alpha [ ]

Other Project Specific Requirements/ Comments/Detection Limits

Report Information — Data Deliverables

[ ] FAX [X] EMAIL
[ ] ADEx [ ] Add'l Deliverables

Billing Information

[X] Same as Client Info
PO #

Please Indicate PWS Class Below

[X] COM
[ ] NTNC
[ ] TNC

SUBJECT TO MCL REPORTING

ANALYSIS

PFAS

Sample Filtration

[ ] Done
[ ] Lab to do

Preservation

[ ] Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	PFAS	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
2552-01	10000	DEPOT	4.25.23	11:36		RLA	X		X		X	X		
-02	10006	PARTRIDGE	4.25.23	11:17		RLA	X		X		X	X		

Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Preservative Code:
A = None
B = HCl
C = HNO3
D = H2SO4
E = NaOH
F = MeOH
G = NaHSO4
H = Na2S2O3
I = Ascorbic Acid
J = NH4Cl
K = Zn Acetate
O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Container Type: P
Preservative: B-Trizma

Relinquished By:	Date/Time	Received By:	Date/Time
	04/25/2023 11:40		4/25/23 11:40
	4/26/23 1236	Eric Woods ANL	4/26/23 1236
Eric Woods ANL	4/26/23 1635		4/26/23 1625
4/26/23 1930		4/26/23 1930	
4/26/23 2030			

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

Alpha Analytical, Inc.
Facility: **Company-wide**
Department: **Reporting**
Title: **MADEP State Form Required Information**

ID No.:**18068**
Revision 1
Published Date: 6/5/2015 2:30:28 PM

4/26/23 L2322552

The following information must be supplied in order to process the State Form:

PWS ID: 4082000

City/Town: DUXBURY

PWS Name: DUXBURY WATER DEPARTMENT

PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP Location ID	DEP Location Name	Sample Information			Date Collected	Collected By
		Multiple or Single*	Raw or Finished	Routine or Special**		
10000	DEPOT	S	F	R	04/25/2023	R. ROLAND
10006	PARTRIDGE	S	F	R	04/25/2023	R. ROLAND

* **If Sample source is *MULTIPLE*, please list the connected sources:**

NA

** **If DEP sample type is *SPECIAL*, please explain below:**

NA

ANALYTICAL REPORT

Lab Number:	L2361841
Client:	Duxbury Water Department 878 Tremont Street Duxbury, MA 02332
ATTN:	Mark Cloud
Phone:	(781) 934-1100
Project Name:	DUXBURY WATER DEPT
Project Number:	4082000
Report Date:	10/30/23

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA030), NH NELAP (2062), CT (PH-0825), DoD (L2474), FL (E87814), IL (200081), IN (C-MA-04), KY (KY98046), LA (85084), ME (MA00030), MD (350), MI (99110) , NJ (MA015), NY (11627), NC (685), OH (CL106), OR (MA-0262), PA (68-02089), RI (LAO00299), TX (T104704419), VT (VT-0015), VA (460194), WA (C954), US Army Corps of Engineers, USDA (Permit #525-23-107-88708), USFWS (Permit #206964).

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2361841-01	10000 DEPOT	DW	DUXBURY MA	10/17/23 11:10	10/18/23
L2361841-02	10003 LAKE SHORE	DW	DUXBURY MA	10/17/23 09:15	10/18/23
L2361841-03	10005 MILLBROOK	DW	DUXBURY MA	10/17/23 10:30	10/18/23
L2361841-04	10006 PARTRIDGE	DW	DUXBURY MA	10/17/23 10:58	10/18/23
L2361841-05	100070 TREMONT 1&2	DW	DUXBURY MA	10/17/23 10:46	10/18/23
L2361841-06	100071 MAYFLOWER 1&2	DW	DUXBURY MA	10/17/23 09:40	10/18/23
L2361841-07	100072 EVERGREEN 1&2	DW	DUXBURY MA	10/17/23 11:26	10/18/23
L2361841-08	100073 DAMON 1&2	DW	DUXBURY MA	10/17/23 10:15	10/18/23
L2361841-09	10000 DEPOT FB	DW	DUXBURY MA	10/17/23 11:10	10/18/23
L2361841-10	10003 LAKE SHORE FB	DW	DUXBURY MA	10/17/23 09:15	10/18/23
L2361841-11	10005 MILLBROOK FB	DW	DUXBURY MA	10/17/23 10:30	10/18/23
L2361841-12	10006 PARTRIDGE FB	DW	DUXBURY MA	10/17/23 10:58	10/18/23
L2361841-13	100070 TREMONT 1&2 FB	DW	DUXBURY MA	10/17/23 10:46	10/18/23
L2361841-14	100071 MAYFLOWER 1&2 FB	DW	DUXBURY MA	10/17/23 09:40	10/18/23
L2361841-15	100072 EVERGREEN 1&2 FB	DW	DUXBURY MA	10/17/23 11:26	10/18/23
L2361841-16	100073 DAMON 1&2 FB	DW	DUXBURY MA	10/17/23 10:15	10/18/23

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2361841
Project Number:	4082000	**Report Date:**	10/30/23

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet NELAP requirements for all NELAP accredited parameters unless otherwise noted in the following narrative. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. Tentatively Identified Compounds (TICs), if requested, are reported for compounds identified to be present and are not part of the method/program Target Compound List, even if only a subset of the TCL are being reported. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively.

When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances, the specific failure is not narrated but noted in the associated QC Outlier Summary Report, located directly after the Case Narrative. QC information is also incorporated in the Data Usability Assessment table (Format 11) of our Data Merger tool, where it can be reviewed in conjunction with the sample result, associated regulatory criteria and any associated data usability implications.

Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

HOLD POLICY - For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Alpha Project Manager and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Project Management at 800-624-9220 with any questions.

Project Name: DUXBURY WATER DEPT **Lab Number:** L2361841
Project Number: 4082000 **Report Date:** 10/30/23

Case Narrative (continued)

Report Submission

All non-detect (ND) or estimated concentrations (J-qualified) have been quantitated to the limit noted in the MDL column.

Sample Receipt

L2361841-09: A sample identified as "10000 DEPOT FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-10: A sample identified as "10003 LAKE SHORE FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-11: A sample identified as "10005 MILLBROOK FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-12: A sample identified as "10006 PARTRIDGE FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-13: A sample identified as "100070 TREMONT 1&2 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-14: A sample identified as "100071 MAYFLOWER 1&2 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-15: A sample identified as "100072 EVERGREEN 1&2 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

L2361841-16: A sample identified as "100073 DAMON 1&2 FB" was received, but not listed on the Chain of Custody. At the client's request, this sample was analyzed.

Perfluorinated Alkyl Acids by EPA 537.1

The WG1844851-2 LCS recovery, associated with L2361841-01 through -16, is above the acceptance criteria for perfluorotetradecanoic acid (pfta) (182%); however, the associated samples are non-detect to the RL for this target analyte. The results of the original analysis are reported.

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2361841
Project Number:	4082000	**Report Date:**	10/30/23

Case Narrative (continued)

The WG1844851-3 MS recoveries, performed on L2361841-01, are outside the acceptance criteria for perfluorohexanoic acid (pfhxa) (192%), perfluorohexanesulfonic acid (pfhxs) (163%), perfluorooctanesulfonic acid (pfos) (182%), and perfluorotetradecanoic acid (pfta) (160%).

WG1844851-3: The Matrix Spike level is at the Reporting Limit (RL); any detections below the RL in the native sample are not included in the % Recovery calculation.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Darian Dailey

Title: Technical Director/Representative Date: 10/30/23

ORGANICS

SEMIVOLATILES

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-01
Client ID: 10000 DEPOT
Sample Location: DUXBURY MA

Date Collected: 10/17/23 11:10
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 21:25
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.801	J	ng/l	2.00	0.625	1
Perfluorohexanoic Acid (PFHxA)	1.70	JZ	ng/l	2.00	0.625	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.625	1
Perfluoroheptanoic Acid (PFHpA)	1.89	J	ng/l	2.00	0.625	1
Perfluorohexanesulfonic Acid (PFHxS)	1.20	JZ	ng/l	2.00	0.625	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.625	1
Perfluorooctanoic Acid (PFOA)	8.47		ng/l	2.00	0.625	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.625	1
Perfluorooctanesulfonic Acid (PFOS)	1.49	JZ	ng/l	2.00	0.625	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.625	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.625	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.625	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.625	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.625	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.625	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.625	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.625	1
Perfluorotetradecanoic Acid (PFTA)	ND	Z	ng/l	2.00	0.625	1
PFAS, Total (6)	8.47		ng/l	2.00	0.625	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	100		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	89		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	124		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	101		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-02
Client ID: 10003 LAKE SHORE
Sample Location: DUXBURY MA

Date Collected: 10/17/23 09:15
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 21:43
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	2.22		ng/l	2.00	0.604	1
Perfluorohexanoic Acid (PFHxA)	2.42		ng/l	2.00	0.604	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.604	1
Perfluoroheptanoic Acid (PFHpA)	1.37	J	ng/l	2.00	0.604	1
Perfluorohexanesulfonic Acid (PFHxS)	0.951	J	ng/l	2.00	0.604	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.604	1
Perfluorooctanoic Acid (PFOA)	4.06		ng/l	2.00	0.604	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.604	1
Perfluorooctanesulfonic Acid (PFOS)	2.25		ng/l	2.00	0.604	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.604	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.604	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.604	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.604	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.604	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.604	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.604	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.604	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.604	1
PFAS, Total (6)	6.31		ng/l	2.00	0.604	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	84		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	118		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-03
Client ID: 10005 MILLBROOK
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:30
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:00
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.67	J	ng/l	2.00	0.607	1
Perfluorohexanoic Acid (PFHxA)	2.80		ng/l	2.00	0.607	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.607	1
Perfluoroheptanoic Acid (PFHpA)	1.37	J	ng/l	2.00	0.607	1
Perfluorohexanesulfonic Acid (PFHxS)	0.840	J	ng/l	2.00	0.607	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.607	1
Perfluorooctanoic Acid (PFOA)	4.17		ng/l	2.00	0.607	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.607	1
Perfluorooctanesulfonic Acid (PFOS)	2.28		ng/l	2.00	0.607	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.607	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.607	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.607	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.607	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.607	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.607	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.607	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.607	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.607	1
PFAS, Total (6)	6.45		ng/l	2.00	0.607	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	103		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	126		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-04
Client ID: 10006 PARTRIDGE
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:58
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:09
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	4.21		ng/l	2.00	0.610	1
Perfluorohexanoic Acid (PFHxA)	34.3		ng/l	2.00	0.610	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.610	1
Perfluoroheptanoic Acid (PFHpA)	8.89		ng/l	2.00	0.610	1
Perfluorohexanesulfonic Acid (PFHxS)	34.9		ng/l	2.00	0.610	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.610	1
Perfluorooctanoic Acid (PFOA)	7.59		ng/l	2.00	0.610	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.610	1
Perfluorooctanesulfonic Acid (PFOS)	32.0		ng/l	2.00	0.610	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.610	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.610	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.610	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.610	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.610	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.610	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.610	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.610	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.610	1
PFAS, Total (6)	83.4		ng/l	2.00	0.610	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	91		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	123		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-05
Client ID: 100070 TREMONT 1&2
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:46
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:17
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.620	1
Perfluorohexanoic Acid (PFHxA)	1.02	J	ng/l	2.00	0.620	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.620	1
Perfluoroheptanoic Acid (PFHpA)	0.702	J	ng/l	2.00	0.620	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.620	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.620	1
Perfluorooctanoic Acid (PFOA)	1.25	J	ng/l	2.00	0.620	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.620	1
Perfluorooctanesulfonic Acid (PFOS)	1.70	J	ng/l	2.00	0.620	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.620	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.620	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.620	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.620	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.620	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.620	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.620	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.620	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.620	1
PFAS, Total (6)	ND		ng/l	2.00	0.620	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	130		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-06
Client ID: 100071 MAYFLOWER 1&2
Sample Location: DUXBURY MA

Date Collected: 10/17/23 09:40
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:26
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	1.58	J	ng/l	2.00	0.601	1
Perfluorohexanoic Acid (PFHxA)	2.52		ng/l	2.00	0.601	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.601	1
Perfluoroheptanoic Acid (PFHpA)	1.14	J	ng/l	2.00	0.601	1
Perfluorohexanesulfonic Acid (PFHxS)	0.943	J	ng/l	2.00	0.601	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.601	1
Perfluorooctanoic Acid (PFOA)	3.87		ng/l	2.00	0.601	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.601	1
Perfluorooctanesulfonic Acid (PFOS)	3.14		ng/l	2.00	0.601	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.601	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.601	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.601	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.601	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.601	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.601	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.601	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.601	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.601	1
PFAS, Total (6)	7.01		ng/l	2.00	0.601	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	101		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	90		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	124		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	109		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-07
Client ID: 100072 EVERGREEN 1&2
Sample Location: DUXBURY MA

Date Collected: 10/17/23 11:26
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:35
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	0.922	J	ng/l	2.00	0.608	1
Perfluorohexanoic Acid (PFHxA)	1.64	J	ng/l	2.00	0.608	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.608	1
Perfluoroheptanoic Acid (PFHpA)	0.867	J	ng/l	2.00	0.608	1
Perfluorohexanesulfonic Acid (PFHxS)	0.798	J	ng/l	2.00	0.608	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.608	1
Perfluorooctanoic Acid (PFOA)	2.25		ng/l	2.00	0.608	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.608	1
Perfluorooctanesulfonic Acid (PFOS)	1.31	J	ng/l	2.00	0.608	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.608	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.608	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.608	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.608	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.608	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.608	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.608	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.608	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.608	1
PFAS, Total (6)	2.25		ng/l	2.00	0.608	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	127		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	107		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-08
Client ID: 100073 DAMON 1&2
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:15
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 22:43
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	2.08		ng/l	2.00	0.623	1
Perfluorohexanoic Acid (PFHxA)	4.24		ng/l	2.00	0.623	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.623	1
Perfluoroheptanoic Acid (PFHpA)	1.37	J	ng/l	2.00	0.623	1
Perfluorohexanesulfonic Acid (PFHxS)	1.09	J	ng/l	2.00	0.623	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.623	1
Perfluorooctanoic Acid (PFOA)	4.38		ng/l	2.00	0.623	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.623	1
Perfluorooctanesulfonic Acid (PFOS)	2.91		ng/l	2.00	0.623	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.623	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.623	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.623	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.623	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.623	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.623	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.623	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.623	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.623	1
PFAS, Total (6)	7.29		ng/l	2.00	0.623	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	129		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	105		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-09
Client ID: 10000 DEPOT FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 11:10
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 23:18
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.600	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.600	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.600	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.600	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.600	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.600	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.600	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.600	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.600	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.600	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.600	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.600	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.600	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.600	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.600	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.600	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.600	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.600	1
PFAS, Total (6)	ND		ng/l	2.00	0.600	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	110		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	100		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	126		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-10
Client ID: 10003 LAKE SHORE FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 09:15
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 23:27
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.600	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.600	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.600	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.600	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.600	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.600	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.600	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.600	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.600	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.600	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.600	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.600	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.600	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.600	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.600	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.600	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.600	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.600	1
PFAS, Total (6)	ND		ng/l	2.00	0.600	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	92		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	119		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-11
Client ID: 10005 MILLBROOK FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:30
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 23:35
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:14

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.594	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.594	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.594	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.594	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.594	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.594	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.594	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.594	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.594	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.594	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.594	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.594	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.594	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.594	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.594	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.594	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.594	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.594	1
PFAS, Total (6)	ND		ng/l	2.00	0.594	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	108		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	127		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	107		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-12
Client ID: 10006 PARTRIDGE FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:58
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 23:44
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.603	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.603	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.603	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.603	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.603	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.603	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.603	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.603	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.603	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.603	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.603	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.603	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.603	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.603	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.603	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.603	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.603	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.603	1
PFAS, Total (6)	ND		ng/l	2.00	0.603	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	109		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	122		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	98		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-13
Client ID: 100070 TREMONT 1&2 FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:46
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/27/23 23:52
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.611	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.611	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.611	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.611	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.611	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.611	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.611	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.611	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.611	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.611	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.611	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.611	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.611	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.611	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.611	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.611	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.611	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.611	1
PFAS, Total (6)	ND		ng/l	2.00	0.611	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	111		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	96		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	125		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	106		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-14
Client ID: 100071 MAYFLOWER 1&2 FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 09:40
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/28/23 00:01
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.600	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.600	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.600	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.600	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.600	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.600	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.600	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.600	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.600	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.600	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.600	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.600	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.600	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.600	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.600	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.600	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.600	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.600	1
PFAS, Total (6)	ND		ng/l	2.00	0.600	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	110		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	126		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	103		70-130

Project Name: DUXBURY WATER DEPT
Lab Number: L2361841
Project Number: 4082000
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-15
Client ID: 100072 EVERGREEN 1&2 FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 11:26
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/28/23 00:10
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.599	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.599	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.599	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.599	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.599	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.599	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.599	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.599	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.599	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.599	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.599	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.599	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.599	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.599	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.599	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.599	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.599	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.599	1
PFAS, Total (6)	ND		ng/l	2.00	0.599	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	110		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	125		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	104		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

SAMPLE RESULTS

Lab ID: L2361841-16
Client ID: 100073 DAMON 1&2 FB
Sample Location: DUXBURY MA

Date Collected: 10/17/23 10:15
Date Received: 10/18/23
Field Prep: Not Specified

Sample Depth:
Matrix: Dw
Analytical Method: 133,537.1
Analytical Date: 10/28/23 00:18
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:15

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab						
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.602	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.602	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.602	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.602	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.602	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.602	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.602	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.602	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.602	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.602	1
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.602	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.602	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.602	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.602	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.602	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.602	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.602	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.602	1
PFAS, Total (6)	ND		ng/l	2.00	0.602	1

Surrogate	% Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	110		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	94		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	129		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	106		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

Method Blank Analysis
Batch Quality Control

Analytical Method: 133,537.1
Analytical Date: 10/27/23 20:51
Analyst: CAP

Extraction Method: EPA 537.1
Extraction Date: 10/26/23 23:12

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab for sample(s): 01-16 Batch: WG1844851-1					
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	0.668
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	0.668
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		ng/l	2.00	0.668
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	0.668
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	0.668
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	0.668
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	0.668
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	0.668
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	0.668
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	0.668
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	0.668
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND		ng/l	2.00	0.668
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	0.668
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/l	2.00	0.668
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	0.668
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	0.668
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/l	2.00	0.668
Perfluorotetradecanoic Acid (PFTA)	ND		ng/l	2.00	0.668
PFAS, Total (6)	ND		ng/l	2.00	0.668

Surrogate	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	107		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	90		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	119		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	102		70-130

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2361841

Report Date: 10/30/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-16 Batch: WG1844851-2								
Perfluorobutanesulfonic Acid (PFBS)	109		-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	131		-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	86		-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	125		-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	101		-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	104		-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	119		-		50-150	-		30
Perfluorononanoic Acid (PFNA)	139		-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	112		-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	123		-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	96		-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	95		-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	128		-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	97		-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	138		-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	107		-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	141		-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	**182**	Q	-		50-150	-		30

Lab Control Sample Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2361841

Report Date: 10/30/23

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-16 Batch: WG1844851-2								

Surrogate	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	105				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	89				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	123				70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	100				70-130

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2361841

Report Date: 10/30/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab DEPOT	Associated sample(s): 01-16		QC Batch ID: WG1844851-3			QC Sample: L2361841-01			Client ID: 10000			
Perfluorobutanesulfonic Acid (PFBS)	0.801J	1.68	2.31	137		-	-		50-150	-		30
Perfluorohexanoic Acid (PFHxA)	1.70JZ	1.9	3.64	**192**	Q	-	-		50-150	-		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	1.9	1.62J	85		-	-		50-150	-		30
Perfluoroheptanoic Acid (PFHpA)	1.89J	1.9	3.70	96		-	-		50-150	-		30
Perfluorohexanesulfonic Acid (PFHxS)	1.20JZ	1.73	2.83	**163**	Q	-	-		50-150	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	1.79	1.88J	105		-	-		50-150	-		30
Perfluorooctanoic Acid (PFOA)	8.47	1.9	10.2	91		-	-		50-150	-		30
Perfluorononanoic Acid (PFNA)	ND	1.9	2.65	140		-	-		50-150	-		30
Perfluorooctanesulfonic Acid (PFOS)	1.49JZ	1.76	3.20	**182**	Q	-	-		50-150	-		30
Perfluorodecanoic Acid (PFDA)	ND	1.9	2.24	118		-	-		50-150	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	1.77	1.59J	90		-	-		50-150	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	1.9	1.63J	86		-	-		50-150	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	1.9	2.26	119		-	-		50-150	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	1.9	1.60J	84		-	-		50-150	-		30
Perfluorododecanoic Acid (PFDoA)	ND	1.9	2.35	124		-	-		50-150	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	1.79	1.65J	92		-	-		50-150	-		30
Perfluorotridecanoic Acid (PFTrDA)	ND	1.9	2.19	116		-	-		50-150	-		30
Perfluorotetradecanoic Acid (PFTA)	NDZ	1.9	3.03	**160**	Q	-	-		50-150	-		30

Matrix Spike Analysis

Batch Quality Control

Project Name: DUXBURY WATER DEPT

Project Number: 4082000

Lab Number: L2361841

Report Date: 10/30/23

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qual	Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab DEPOT	Associated sample(s): 01-16	QC Batch ID: WG1844851-3		QC Sample: L2361841-01		Client ID: 10000						

Surrogate	MS % Recovery	MS Qualifier	MSD % Recovery	MSD Qualifier	Acceptance Criteria
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	90				70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	121				70-130
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	97				70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	87				70-130

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-16 QC Batch ID: WG1844851-4 QC Sample: L2361841-02 Client ID: 10003 LAKE SHORE						
Perfluorobutanesulfonic Acid (PFBS)	2.22	2.66	ng/l	18		30
Perfluorohexanoic Acid (PFHxA)	2.42	2.82	ng/l	15		30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	1.37J	1.55J	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	0.951J	1.12J	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	4.06	4.62	ng/l	13		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	2.25	2.65	ng/l	16		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/l	NC		30
Perfluorotetradecanoic Acid (PFTA)	ND	ND	ng/l	NC		30

Lab Duplicate Analysis
Batch Quality Control

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits

Perfluorinated Alkyl Acids by EPA 537.1 - Mansfield Lab Associated sample(s): 01-16 QC Batch ID: WG1844851-4 QC Sample: L2361841-02 Client ID: 10003 LAKE SHORE

Surrogate	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro-n-[1,2-13C2]hexanoic Acid (13C-PFHxA)	94		106		70-130
Tetrafluoro-2-heptafluoropropoxy-[13C3]-propanoic acid (13C3-HFPO-DA)	84		95		70-130
Perfluoro-n-[1,2-13C2]decanoic Acid (13C-PFDA)	118		128		70-130
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	96		109		70-130

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2361841-01A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-01B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-02A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-02B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-03A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-03B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-04A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-04B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-05A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-05B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-06A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-06B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-07A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-07B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-08A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-08B	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-09A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-10A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-11A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-12A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-13A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-14A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)
L2361841-15A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

Container Information

Container ID	Container Type	Cooler	Initial pH	Final pH	Temp deg C	Pres	Seal	Frozen Date/Time	Analysis(*)
L2361841-16A	Plastic 250ml Trizma preserved	A	NA		5.3	Y	Absent		A2-MA-537.1(14)

*Values in parentheses indicate holding time in days

Project Name: DUXBURY WATER DEPT
Project Number: 4082000
Lab Number: L2361841
Report Date: 10/30/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)		
Perfluorooctadecanoic Acid	PFODA	16517-11-6
Perfluorohexadecanoic Acid	PFHxDA	67905-19-5
Perfluorotetradecanoic Acid	PFTA/PFTeDA	376-06-7
Perfluorotridecanoic Acid	PFTrDA	72629-94-8
Perfluorododecanoic Acid	PFDoA	307-55-1
Perfluoroundecanoic Acid	PFUnA	2058-94-8
Perfluorodecanoic Acid	PFDA	335-76-2
Perfluorononanoic Acid	PFNA	375-95-1
Perfluorooctanoic Acid	PFOA	335-67-1
Perfluoroheptanoic Acid	PFHpA	375-85-9
Perfluorohexanoic Acid	PFHxA	307-24-4
Perfluoropentanoic Acid	PFPeA	2706-90-3
Perfluorobutanoic Acid	PFBA	375-22-4
PERFLUOROALKYL SULFONIC ACIDS (PFSAs)		
Perfluorododecanesulfonic Acid	PFDoDS/PFDoS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluorononanesulfonic Acid	PFNS	68259-12-1
Perfluorooctanesulfonic Acid	PFOS	1763-23-1
Perfluoroheptanesulfonic Acid	PFHpS	375-92-8
Perfluorohexanesulfonic Acid	PFHxS	355-46-4
Perfluoropentanesulfonic Acid	PFPeS	2706-91-4
Perfluorobutanesulfonic Acid	PFBS	375-73-5
Perfluoropropanesulfonic Acid	PFPrS	423-41-6
FLUOROTELOMERS		
1H,1H,2H,2H-Perfluorododecanesulfonic Acid	10:2FTS	120226-60-0
1H,1H,2H,2H-Perfluorodecanesulfonic Acid	8:2FTS	39108-34-4
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	6:2FTS	27619-97-2
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	4:2FTS	757124-72-4
PERFLUOROALKANE SULFONAMIDES (FASAs)		
Perfluorooctanesulfonamide	FOSA/PFOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
PERFLUOROALKANE SULFONYL SUBSTANCES		
N-Ethyl Perfluorooctanesulfonamido Ethanol	NEtFOSE	1691-99-2
N-Methyl Perfluorooctanesulfonamido Ethanol	NMeFOSE	24448-09-7
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	NEtFOSAA	2991-50-6
N-Methyl Perfluorooctanesulfonamidoacetic Acid	NMeFOSAA	2355-31-9
PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS		
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
4,8-Dioxa-3h-Perfluorononanoic Acid	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEESA	113507-82-7
PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)		
Perfluoro-3-Methoxypropanoic Acid	PFMPA	377-73-1
Perfluoro-4-Methoxybutanoic Acid	PFMBA	863090-89-5
Nonafluoro-3,6-Dioxaheptanoic Acid	NFDHA	151772-58-6

Project Name: DUXBURY WATER DEPT
Project Number: 4082000

Lab Number: L2361841
Report Date: 10/30/23

PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
FLUOROTELOMER CARBOXYLIC ACIDS (FTCAs)		
3-Perfluoroheptyl Propanoic Acid	7:3FTCA	812-70-4
2H,2H,3H,3H-Perfluorooctanoic Acid	5:3FTCA	914637-49-3
3-Perfluoropropyl Propanoic Acid	3:3FTCA	356-02-5

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2361841
Project Number:	4082000	**Report Date:**	10/30/23

GLOSSARY

Acronyms

DL - Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EMPC - Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LOD - Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

LOQ - Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NDPA/DPA - N-Nitrosodiphenylamine/Diphenylamine.

NI - Not Ignitable.

NP - Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.

NR - No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

STLP - Semi-dynamic Tank Leaching Procedure per EPA Method 1315.

TEF - Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.

TEQ - Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.

TIC - Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2361841
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Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Chlordane: The target compound Chlordane (CAS No. 57-74-9) is reported for GC ECD analyses. Per EPA,this compound "refers to a mixture of chlordane isomers, other chlorinated hydrocarbons and numerous other components." (Reference: USEPA Toxicological Review of Chlordane, In Support of Summary Information on the Integrated Risk Information System (IRIS), December 1997.)

Difference: With respect to Total Oxidizable Precursor (TOP) Assay analysis, the difference is defined as the Post-Treatment value minus the Pre-Treatment value.

Final pH: As it pertains to Sample Receipt & Container Information section of the report, Final pH reflects pH of container determined after adjustment at the laboratory, if applicable. If no adjustment required, value reflects Initial pH.

Frozen Date/Time: With respect to Volatile Organics in soil, Frozen Date/Time reflects the date/time at which associated Reagent Water-preserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'.

Gasoline Range Organics (GRO): Gasoline Range Organics (GRO) results include all chromatographic peaks eluting from Methyl tert butyl ether through Naphthalene, with the exception of GRO analysis in support of State of Ohio programs, which includes all chromatographic peaks eluting from Hexane through Dodecane.

Initial pH: As it pertains to Sample Receipt & Container Information section of the report, Initial pH reflects pH of container determined upon receipt, if applicable.

PAH Total: With respect to Alkylated PAH analyses, the 'PAHs, Total' result is defined as the summation of results for all or a subset of the following compounds: Naphthalene, C1-C4 Naphthalenes, 2-Methylnaphthalene, 1-Methylnaphthalene, Biphenyl, Acenaphthylene, Acenaphthene, Fluorene, C1-C3 Fluorenes, Phenanthrene, C1-C4 Phenanthrenes/Anthracenes, Anthracene, Fluoranthene, Pyrene, C1-C4 Fluoranthenes/Pyrenes, Benz(a)anthracene, Chrysene, C1-C4 Chrysenes, Benzo(b)fluoranthene, Benzo(j)+(k)fluoranthene, Benzo(e)pyrene, Benzo(a)pyrene, Perylene, Indeno(1,2,3-cd)pyrene, Dibenz(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

PFAS Total: With respect to PFAS analyses, the 'PFAS, Total (5)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA and PFOS. In addition, the 'PFAS, Total (6)' result is defined as the summation of results for: PFHpA, PFHxS, PFOA, PFNA, PFDA and PFOS. For MassDEP DW compliance analysis only, the 'PFAS, Total (6)' result is defined as the summation of results at or above the RL. Note: If a 'Total' result is requested, the results of its individual components will also be reported.

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Data Qualifiers

A - Spectra identified as "Aldol Condensates" are byproducts of the extraction/concentration procedures when acetone is introduced in the process.

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

F - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The lower value for the two columns has been reported due to obvious interference.

J - Estimated value. The Target analyte concentration is below the quantitation limit (RL), but above the Method Detection Limit (MDL) or Estimated Detection Limit (EDL) for SPME-related analyses. This represents an estimated concentration for Tentatively

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Data Qualifiers

Identified Compounds (TICs). For calculated parameters, this represents that one or more values used in the calculation were estimated.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

ND - Not detected at the method detection limit (MDL) for the sample, or estimated detection limit (EDL) for SPME-related analyses.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

S - Analytical results are from modified screening analysis.

V - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Z - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

Report Format: DU Report with 'J' Qualifiers

Project Name:	DUXBURY WATER DEPT	**Lab Number:**	L2361841
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REFERENCES

133 Determination of Selected Per- and Polyfluorinated Alkyl Substances in Drinking Water by Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 537.1, EPA/600/R-18/352. Version 1.0, November 2018.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certification Information

The following analytes are not included in our Primary NELAP Scope of Accreditation:

Westborough Facility
EPA 624.1: m/p-xylene, o-xylene, Naphthalene
EPA 625.1: alpha-Terpineol
EPA 8260D: NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.
EPA 8270E: NPW: Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene,1,4-Diphenylhydrazine.
SM4500: NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility
SM 2540D: TSS.
EPA TO-15: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.
Biological Tissue Matrix: EPA 3050B

The following analytes are included in our Massachusetts DEP Scope of Accreditation

Westborough Facility:

Drinking Water
EPA 300.0: Chloride, Nitrate-N, Fluoride, Sulfate; **EPA 353.2**: Nitrate-N, Nitrite-N; **SM4500NO3-F**: Nitrate-N, Nitrite-N; **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B, SM4500NO2-B**
EPA 524.2: THMs and VOCs; **EPA 504.1:** EDB, DBCP.
Microbiology: **SM9215B; SM9223-P/A, SM9223B-Colilert-QT,SM9222D**.

Non-Potable Water
SM4500H,B, EPA 120.1, SM2510B, SM2540C, SM2320B, SM4500CL-E, SM4500F-BC, SM4500NH3-BH: Ammonia-N and Kjeldahl-N, **EPA 350.1**: Ammonia-N, **LACHAT 10-107-06-1-B**: Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2**: Nitrate-N**, SM4500P-E, SM4500P-B, E, SM4500SO4-E, SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300: Chloride, Sulfate, Nitrate.**
EPA 624.1: Volatile Halocarbons & Aromatics,
EPA 608.3: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs
EPA 625.1: SVOC (Acid/Base/Neutral Extractables).
Microbiology: **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

Mansfield Facility:

Drinking Water
EPA 200.7: Al, Ba, Cd, Cr, Cu, Fe, Mn, Ni, Na, Ag, Ca, Zn. **EPA 200.8:** Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, TL, Zn. **EPA 245.1** Hg.
EPA 522, EPA 537.1.

Non-Potable Water
EPA 200.7: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.
EPA 200.8: Al, Sb**,** As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.
EPA 245.1 Hg.
SM2340B

For a complete listing of analytes and methods, please contact your Alpha Project Manager.

MASSDEP DRINKING WATER CHAIN OF CUSTODY

Page of

Date Rec'd in Lab: 10/19/23

ALPHA Job # L2361841

ALPHA

Westborough, MA TEL: 508-898-9220 FAX: 508-898-9193
Mansfield, MA TEL: 508-822-9300 508-822-3288

Client Information

Client: TOWN OF DUXBURY
Address: 878 TREMONT ST.
DUXBURY MA 02332
Phone: 781-934-1100
Fax:
Email: MCLOUD@DUXBURY-MA.GOV

Project Information

Project Name: DUXBURY WATER DEPT
PWS Name: DUXBURY MA
Project Location: 4087000
Project PWS ID#
Project Manager:
ALPHA Quote #:

Turn-Around Time

Standard [X] Due Date:
Rush (only if pre approved) [ ] Time:

These samples have been previously analyzed by Alpha [ ]

Other Project Specific Requirements/ Comments/Detection Limits

Report Information — Data Deliverables

[ ] FAX [X] EMAIL
[ ] ADEx [ ] Add'l Deliverables

Billing Information

[X] Same as Client Info
PO #

Please Indicate PWS Class Below

[X] COM
[ ] NTNC
[ ] TNC

SUBJECT TO MCL REPORTING

ANALYSIS

PFAS

Sample Filtration

[ ] Done
[ ] Lab to do

Preservation

[ ] Lab to do

(Please Check Below)

ALPHA Lab ID (Lab Use Only)	DEP Location Code	DEP Location Name	Collection Date	Collection Time	Sample Matrix	Sampler's Initials	Source(1) Multiple	Source(1) Single	Type Raw	Type Finished	Sample(2) Routine	Sample(2) Special	Total Bottles
L1841													
-01	10000	DEPOT	10-17-23	10:10		SN		X		X	X		
-02	10003	LAKE SHORE	"	9:15		SN		X		X	X		
-03	10005	MILLBROOK	"	10:30		SN		X		X	X		
-04	10006	PARTRIDGE	"	10:58		SN		X		X	X		
-05	100070	TREMONT 1&2	"	10:46		SN							
-06	100071	MAYFLOWER 1&2	"	9:40		SN							
-07	100072	EVERGREEN 1&2	"	11:26		SN							
-08	100073	DAMON 1&2	10-17-23	10:15		SN							

Container Code	Preservative Code:
P = Plastic	A = None
A = Amber Glass	B = HCl
V = Vial	C = HNO3
G = Glass	D = H2SO4
B = Bacteria Cup	E = NaOH
C = Cube	F = MeOH
O = Other	G = NaHSO4
E = Encore	H = Na2S2O3
D = BOD Bottle	I = Ascorbic Acid
	J = NH4Cl
	K = Zn Acetate
	O = Other

(1) List connected sources if Multiple

(2) Explain if sample type is Special

Container Type	P
Preservative	

Relinquished By:	Date/Time	Received By:	Date/Time
	10/18/23 2:40PM	AAL	10-18-23 1840
AAL	10-18-23 1830		10/18/23 1830
10-18-23	19:30	Ed Mendoza AAL	10/18/23 1930
Ed Mendoza AAL	10/18/23 2100	AAL	10/18/23 2100

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-24 HC (rev 18-Sept-2013)

Alpha Analytical, Inc.
Facility: **Company-wide**
Department: **Reporting**
Title: **MADEP State Form Required Information**

ID No.:**18068**
Revision 1
Published Date: 6/5/2015 2:30:28 PM

The following information must be supplied in order to process the State Form:

PWS ID: 4082000

City/Town: DUXBURY

PWS Name: DUXBURY WATER

PWS Class: COM ☒ NTNC ☐ TNC ☐

DEP Location ID	DEP Location Name	Sample Information			Date Collected	Collected By
		Multiple or Single*	Raw or Finished	Routine or Special**		
10060	DEPOT	S	F	R	10-17-2023	SN
10003	LAKE SHORE	S	F	R	10-17-2023	SN
10005	MILLBROOK	S	F	R	10-17-2023	SN
10006	PARTRIDGE	S	F	R	10-17-2023	SN
100070	TREMONT 1 & 2	M	F	R	10-17-2023	SN
100071	MAYFLOWER 1 & 2	M	F	R	10-17-2023	SN
100072	EVERGREEN 1 & 2	M	F	A	10-17-2023	SN
100073	DAMON 1 & 2	M	F	R	10-17-2023	SN

*** If Sample source is *MULTIPLE*, please list the connected sources:**

_____

**** If DEP sample type is *SPECIAL*, please explain below:**

_____

ATTACHMENT 3
Tabulated Analytical Data

Drinking Water Analytical Results

Duxbury Minicipal Drinking Water Supply Wells

Duxbury, MA

Well ID:	Sample Date:	Perfluorobutanesulfonic Acid (PFBS)	Perfluorohexanoic Acid (PFHxA)	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexanesulfonic Acid (PFHxS)	4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	Perfluorooctanoic Acid (PFOA)	Perfluorononanoic Acid (PFNA)	Perfluorooctanesulfonic Acid (PFOS)	Perfluorodecanoic Acid (PFDA)	9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	Perfluoroundecanoic Acid (PFUnA)	N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	Perfluorododecanoic Acid (PFDoA)	11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	Perfluorotridecanoic Acid (PFTrDA)	Perfluorotetradecanoic Acid (PFTA)	Total PFAS	PFAS 6
Depot Street GP Well (Finished)	4/28/2021	1.08	3.04	ND	1.15	4.27	ND	2.56	ND	3.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.70	11.58
Depot Street GP Well (Finished)	5/20/2021	ND	ND	ND	ND	ND	ND	0.784	ND	0.859	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.64	1.643
Depot Street GP Well (Finished)	7/26/2021	0.657	0.986	ND	ND	ND	ND	1.83	ND	1.42	ND	ND	ND	ND	ND	ND	ND	ND	1.83	6.72	3.25
Depot Street GP Well (Finished)	10/20/2021	0.886	1.7	ND	2.1	1.48	ND	9.86	ND	1.51	ND	ND	ND	ND	ND	ND	ND	ND	ND	17.54	14.95
Depot Street GP Well (Finished)	9/20/2022	0.657	1.5	ND	1.9	1.06	ND	8.76	ND	2.66	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.54	14.38
10000 Depot St Well	1/24/2023	0.631	1.37	ND	1.63	0.89	ND	7.57	ND	1.26	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.35	11.35
10000 Depot St Well	4/25/2023	0.694	1.2	ND	1.24	1.02	ND	6.9	ND	1.86	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.91	11.02
10000 Depot St Well	8/16/2023	ND	1.27	ND	1.35	0.942	ND	5.94	ND	1.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.56	9.292
10000 Depot St Well	10/17/2023	0.801	1.7	ND	1.89	1.2	ND	8.47	ND	1.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.55	13.05
10000 Depot St Well	1/30/2024	0.794	1.08	ND	1.69	1.09	ND	8.32	ND	1.41	ND	ND	ND	ND	ND	ND	ND	ND	ND	14.38	12.51
10000 Depot St Well	6/10/2024	ND	ND	ND	0.763	0.692	ND	4.96	ND	1.13	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.55	7.545
Millbrook Po0.0 Well (Finished)	5/20/2021	1.2	1.91	ND	0.712	0.674	ND	3.11	ND	2.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.67	6.556
Millbrook Po0.0 Well (Finished)	7/26/2021	1.41	2	ND	1.06	0.823	ND	3.41	ND	1.72	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.42	7.013
Millbrook Po0.0 Well (Finished)	10/20/2021	1.51	2.2	ND	1.06	0.955	ND	3.67	ND	1.91	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.31	7.595
Millbrook Po0.0 Well (Finished)	9/20/2022	1.65	2.8	ND	1.29	0.862	ND	4.2	ND	2.84	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.64	9.192
10005 Millbrook Well	1/24/2023	1.84	1.48	ND	0.738	0.775	ND	3.21	ND	3.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.29	7.973
10005 Millbrook Well	6/20/2023	1.48	2.34	ND	0.964	0.816	ND	3.82	ND	2.67	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.09	8.27
10005 Millbrook Well	8/16/2023	1.39	2.22	ND	1.11	0.792	ND	3.49	ND	1.98	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.98	7.372
10005 Millbrook Well	10/17/2023	1.67	2.8	ND	1.37	0.84	ND	4.17	ND	2.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.13	8.66
10005 Millbrook Well	1/30/2024	1.86	2.72	ND	1.52	0.893	ND	4.57	ND	2.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.99	9.413
10005 Millbrook Well	6/10/2024	1.48	2.34	ND	1.08	0.888	ND	3.89	ND	2.34	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.02	8.198
Mayflower Well 1 a0.0 2 (Finished)	4/28/2021	1.14	1.14	ND	0.66	0.916	ND	2.24	ND	1.87	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.97	5.686
Mayflower Well 1 (Raw)	4/28/2021	1.72	1.61	ND	0.912	1.23	ND	3.47	ND	2.74	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.68	8.352
Mayflower Well 2 (Raw)	4/28/2021	0.625	0.625	ND	ND	ND	ND	1.14	ND	0.92	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.31	2.06
Mayflower Well 1 a0.0 2 (Finished)	5/20/2021	1.02	0.952	ND	ND	0.733	ND	1.94	ND	1.83	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.48	4.503
Mayflower Well 1 a0.0 2 (Finished)	7/26/2021	0.971	0.854	ND	ND	ND	ND	2.02	ND	1.51	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.36	3.53
Mayflower Well 1 a0.0 2 (Finished)	10/20/2021	0.932	1.04	ND	0.596	0.671	ND	2.2	ND	1.64	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.08	5.107
Mayflower Well 1 a0.0 2 (Finished)	9/20/2022	1.07	1.1	ND	0.662	0.662	ND	2.17	ND	1.95	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.61	5.444
100071 Mayflower 1+2	1/24/2023	1.39	1.46	ND	0.679	0.643	ND	2.54	ND	2.04	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.75	5.902
100071 Mayflower 1+2	6/20/2023	1.1	1.03	ND	ND	0.624	ND	2.5	ND	2.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.60	5.474
100071 Mayflower 1+2	8/16/2023	1.24	1.85	ND	0.884	0.763	ND	2.97	ND	2.41	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.12	7.027
100071 Mayflower 1+2	10/17/2023	1.58	2.52	ND	1.14	0.943	ND	3.87	ND	3.14	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.19	9.093
100071 Mayflower 1+2	1/30/2024	1.33	1.34	ND	0.869	0.757	ND	2.82	ND	2.45	ND	ND	ND	ND	ND	ND	ND	ND	ND	9.57	6.896
100071 Mayflower 1+2	6/10/2024	1.31	1.69	ND	0.929	0.891	ND	3.68	ND	3.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.78	8.78
Tremont Well 1 a0.0 2 (Finished)	4/28/2021	ND	ND	ND	ND	ND	ND	0.743	ND	0.743	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.49	1.486
Tremont Well 1 (Raw)	4/28/2021	ND	0.71	ND	ND	ND	ND	0.923	ND	0.923	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.56	1.846
Tremont Well 2 (Raw)	4/28/2021	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.12	ND	1.3	ND	ND	ND	ND	2.42	ND
Tremont Well 1 a0.0 2 (Finished)	7/26/2021	ND	ND	ND	ND	ND	ND	0.885	ND	0.922	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.81	1.807
Tremont Well 1 a0.0 2 (Finished)	10/20/2021	ND	ND	ND	ND	ND	ND	0.716	ND	1.09	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.81	1.806
Tremont Well 1 a0.0 2 (Finished)	9/20/2022	ND	0.91	ND	0.84	ND	ND	1.4	ND	1.33	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.48	3.57
100070 Tremont 1+2	1/24/2023	ND	0.72	ND	ND	ND	ND	1.04	ND	1.15	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.91	2.19
100070 Tremont 1+2	6/20/2023	ND	ND	ND	ND	ND	ND	0.912	ND	2.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.03	3.032
100070 Tremont 1+2	8/16/2023	ND	0.68	ND	ND	ND	ND	1.1	ND	1.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.33	2.65
100070 Tremont 1+2	10/17/2023	ND	1.02	ND	0.702	ND	0.84	1.25	ND	1.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.51	3.652
100070 Tremont 1+2	1/30/2024	ND	0.699	ND	0.72	ND	ND	1.17	ND	1.92	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.51	3.81
100070 Tremont 1+2	6/10/2024	ND	ND	ND	ND	ND	ND	1.04	ND	1.47	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.51	2.51
Partridge Rd GP Well (Finished)	4/28/2021	5.36	22	ND	6.34	37.9	ND	7.29	ND	24.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	103.29	**75.93**
Partridge Rd GP Well (Finished)	5/20/2021	1.09	1.37	ND	0.598	0.845	ND	2.39	ND	1.86	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.15	5.693
Partridge Rd GP Well (Finished)	6/15/2021	7.8	32.3	ND	8.87	53.4	ND	9.44	ND	33.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	145.31	**105.21**
Partridge Rd GP Well (Raw)	6/15/2021	7.37	29.3	ND	7.73	51.6	ND	8.44	ND	33.4	ND	ND	ND	ND	ND	ND	ND	ND	ND	137.84	**101.17**

Drinking Water Analytical Results

Duxbury Minicipal Drinking Water Supply Wells

Duxbury, MA

Well ID:	Sample Date:	Perfluorobutanesulfonic Acid (PFBS)	Perfluorohexanoic Acid (PFHxA)	Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexanesulfonic Acid (PFHxS)	4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	Perfluorooctanoic Acid (PFOA)	Perfluorononanoic Acid (PFNA)	Perfluorooctanesulfonic Acid (PFOS)	Perfluorodecanoic Acid (PFDA)	9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	Perfluoroundecanoic Acid (PFUnA)	N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	Perfluorododecanoic Acid (PFDoA)	11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	Perfluorotridecanoic Acid (PFTrDA)	Perfluorotetradecanoic Acid (PFTA)	Total PFAS	PFAS 6
Partridge Rd GP Well (Finished)	7/26/2021	5.92	25.7	ND	7.45	39.9	ND	8.1	ND	26.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	113.67	**82.05**
Partridge Rd GP Well (Finished)	10/22/2021	5.51	28.1	ND	7.43	41.8	ND	7.46	ND	23.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	113.50	**79.89**
Partridge Rd GP Well (Finished)	9/20/2022	3.92	16	ND	4.97	30.3	ND	6.42	ND	15.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	76.81	**56.89**
10006 Partridge Well	1/24/2023	4.52	29.2	ND	7.53	36.1	ND	7.82	ND	21.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	106.37	**72.65**
10006 Partridge Well	4/25/2023	4.3	29	ND	6.89	35.6	ND	7.22	ND	21.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	104.31	**71.01**
10006 Partridge Well	8/16/2023	3.61	28	ND	6.36	34.2	ND	6.28	ND	23.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	102.35	**70.74**
10006 Partridge Well	10/17/2023	4.21	34.3	ND	8.89	34.9	ND	7.59	ND	32	ND	ND	ND	ND	ND	ND	ND	ND	ND	121.89	**83.38**
10006 Partridge Well	1/30/2024	3.9	34.7	ND	11	37.5	ND	7.12	ND	28	ND	ND	ND	ND	ND	ND	ND	ND	ND	122.22	**83.62**
10006 Partridge Well	6/10/2024	3.42	23.9	ND	6.85	28.7	ND	5.72	ND	19.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	88.29	**60.97**
Lake Shore Dr Well (Finished)	4/28/2021	2.13	2.13	ND	1.28	1.28	ND	4.08	ND	2.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.25	8.99
Lake Shore Dr Well (Finished)	5/20/2021	1.83	1.76	ND	0.845	1.06	ND	3.63	ND	2.08	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.21	7.615
Lake Shore Dr Well (Finished)	7/26/2021	1.99	1.69	ND	1.18	1.21	ND	3.97	ND	2.17	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.21	8.53
Lake Shore Dr Well (Finished)	10/20/2021	2.27	2.01	ND	1.12	1.23	ND	3.94	ND	2.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.88	8.6
Lake Shore Dr Well (Finished)	9/20/2022	1.08	1.33	ND	0.794	0.794	ND	2.56	ND	1.73	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.29	5.878
10003 Lakeshore Well	1/24/2023	2.26	2.19	ND	1.18	1.04	ND	4.23	ND	2.22	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.12	8.67
10003 Lakeshore Well	6/20/2023	2	1.86	ND	0.947	1.02	ND	4.12	ND	2.55	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.50	8.637
10003 Lakeshore Well	8/16/2023	1.84	2.23	ND	1.17	1.02	ND	4.11	ND	2.62	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.99	8.92
10003 Lakeshore Well	10/17/2023	2.22	2.42	ND	1.37	0.951	ND	4.06	ND	2.25	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.27	8.631
10003 Lakeshore Well	1/30/2024	3.21	2.59	ND	1.71	1	ND	4.92	ND	2.56	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.99	10.19
10003 Lakeshore Well	6/10/2024	3.28	2.52	ND	1.46	0.886	ND	4.68	ND	2.44	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.27	9.466
Evergreen Well 1 a0.0 2 (Finished)	4/28/2021	ND	1.17	ND	0.676	0.604	ND	1.88	ND	0.854	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.18	4.014
Evergreen Well (07G) (Raw)	4/28/2021	ND	1.26	ND	0.628	ND	ND	1.81	ND	0.739	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.44	3.177
Evergreen Well (08G) (Raw)	4/28/2021	0.624	0.918	ND	ND	0.734	ND	1.54	ND	0.734	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.55	3.008
Evergreen Well 1 a0.0 2 (Finished)	5/20/2021	ND	0.608	ND	ND	ND	ND	1.36	ND	0.823	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.79	2.183
Evergreen Well 1 a0.0 2 (Finished)	7/26/2021	0.775	1.16	ND	ND	0.852	ND	2.29	ND	1.16	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.24	4.302
Evergreen Well 1 a0.0 2 (Finished)	10/20/2021	0.821	1.23	ND	0.634	0.933	ND	2.28	ND	1.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.09	5.037
Evergreen Well 1 a0.0 2 (Finished)	9/20/2022	0.794	1.26	ND	0.758	0.758	ND	2.27	ND	1.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.03	4.976
100072 Evergreen 1+2	1/24/2023	0.698	0.955	ND	ND	0.698	ND	1.87	ND	1.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.28	3.628
100072 Evergreen 1+2	6/20/2023	0.806	0.911	ND	ND	0.701	ND	2.00	ND	1.96	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.38	4.661
100072 Evergreen 1+2	8/16/2023	0.82	1.29	ND	0.703	0.781	ND	2.15	ND	1.05	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.79	4.684
100072 Evergreen 1+2	10/17/2023	0.922	1.64	ND	0.867	0.798	ND	2.25	ND	1.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.79	5.225
100072 Evergreen 1+2	1/30/2024	0.889	1.32	ND	0.87	0.777	ND	2.3	ND	1.37	ND	ND	ND	ND	ND	ND	ND	ND	ND	7.53	5.317
100072 Evergreen 1+2	6/10/2024	0.809	1.03	ND	ND	0.751	ND	1.70	ND	1.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.41	3.571
Damon Well 1 a0.0 2 (Finished)	4/28/2021	1.81	2.17	ND	0.905	1.19	ND	3.87	ND	2.61	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.56	8.575
Damon Well 1 (Raw)	4/28/2021	1.74	1.92	ND	0.943	1.05	ND	3.66	ND	2.46	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.77	8.113
Damon Well 2 (Raw)	4/28/2021	1.82	2.21	ND	0.908	1.38	ND	3.85	ND	2.43	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.60	8.568
Damon Well 1 a0.0 2 (Finished)	5/20/2021	1.45	1.99	ND	0.759	1.23	ND	3.36	ND	2.31	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.10	7.659
Damon Well 1 a0.0 2 (Finished)	7/26/2021	1.44	1.85	ND	0.832	1.1	ND	3.44	ND	2.19	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.85	7.562
Damon Well 1 a0.0 2 (Finished)	10/20/2021	1.72	2.46	ND	1.06	1.17	ND	4.04	ND	2.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.80	8.62
Damon Well 1 a0.0 2 (Finished)	9/20/2022	1.62	5.85	ND	1.22	1.08	ND	4.13	ND	2.58	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.48	9.01
100073 Damon Wells 1+2	1/24/2023	1.99	3.65	ND	1.23	1.05	ND	4.49	ND	2.75	ND	ND	ND	ND	ND	ND	ND	ND	ND	15.16	9.52
100073 Damon Wells 1+2	6/10/2023	1.54	2.98	ND	0.86	0.932	ND	3.69	ND	2.47	ND	ND	ND	ND	ND	ND	ND	ND	ND	12.47	7.952
100073 Damon Wells 1+2	8/16/2023	1.63	3.61	ND	1.1	0.988	ND	3.53	ND	2.28	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.14	7.898
100073 Damon Wells 1+2	10/17/2023	2.08	4.24	ND	1.37	1.09	ND	4.38	ND	2.91	ND	ND	ND	ND	ND	ND	ND	ND	ND	16.07	9.75

Notes:
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Units are in nanograms per liter (ng/l)
Bold indicates concentration exceeds regulatory limit of 20 ng/l

Groundwater Analytical Data

Duxbury Municipal Landfill and the McNeil Landfill

Duxbury, MA

Well ID:	Sample Date:	Perfluorobutanesulfonic Acid (PFBS)	Perfluorohexanoic Acid (PFHxA)	Perfluoroheptanoic Acid (PFHpA)	Perfluorohexanesulfonic Acid (PFHxS)	Perfluorooctanoic Acid (PFOA)	Perfluorononanoic Acid (PFNA)	Perfluorooctanesulfonic Acid (PFOS)	Perfluorodecanoic Acid (PFDA)	N-Methyl Perfluorooctanesulfonamido acetic Acid (NMeFOSAA)	Perfluoroundecanoic Acid (PFUnA)	N-Ethyl Perfluorooctanesulfonamido acetic Acid (NEtFOSAA)	Perfluorododecanoic Acid (PFDoA)	11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)
Duxbury Landfill 91-1	7/15/2022	8.66	21.6	13.3	5.18	18.8	0.634	10	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-AS	7/15/2022	1.68	2.06	3.73	3.18	31.3	0.328	10.5	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-AD	7/15/2022	3.23	12.7	21.8	16.7	233	0.86	39.4	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-FS	7/14/2022	4.32	5.58	5.66	5.03	22.7	ND	7.02	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-FD	7/14/2022	ND	3.56	4.9	4.22	40.2	ND	14	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-LS	7/14/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-LD	7/14/2022	2.24	5.11	5.6	2.11	18.9	ND	ND	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-NS	7/14/2022	2.58	7.7	5.57	3.71	18.6	ND	1.99	ND	ND	ND	ND	ND	ND
Duxbury Landfill DUX-ND	7/14/2022	2.12	7.1	5.7	4.64	20	ND	3.32	ND	ND	ND	ND	ND	ND
Duxbury Landfill WS-1	7/13/2022	ND	ND	1.95	2.75	9.84	ND	54.1	ND	ND	ND	ND	ND	ND
Duxbury Landfill EB	7/14/2022	ND	ND	ND	ND	0	ND	ND	ND	ND	ND	ND	ND	ND
Duxbury GMR-MW-7	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
McNeil Dump WS-1	7/13/2022	ND	ND	2	2.75	9.84	ND	54.2	ND	ND	ND	ND	ND	ND
McNeil Dump 91-2	7/13/2022	ND	ND	ND	ND	ND	ND	11	ND	ND	ND	ND	ND	ND
McNeil Dump WS-2	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
McNeil Dump GHR-MW-7	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

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Groundwater Analytical Data

Duxbury Municipal Landfill and the McNeil Landfill

Duxbury, MA

Well ID:	Sample Date:	Perfluorotridecanoic Acid (PFTrDA)	Perfluorotetradecanoic Acid (PFTA)	Perfluorobutanoic Acid (PFBA)	Perfluoropentanoic Acid (PFPeA)	Perfluoropentanesulfonic Acid (PFPeS)	Perfluoroheptanesulfonic Acid (PFHpS)	Perfluorononanesulfonic Acid (PFNS)	Perfluorodecanesulfonic Acid (PFDS)	Perfluorooctanesulfonamide (FOSA)	1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (4:2 FTS)	1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (6:2 FTS)	1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (8:2 FTS)	Total PFAS	PFAS 6
Duxbury Landfill 91-1	7/15/2022	ND	ND	15	28.9	0.645	ND	ND	ND	ND	ND	4	ND	126.72	**47.914**
Duxbury Landfill DUX-AS	7/15/2022	ND	ND	1.63	2.86	0.526	ND	ND	ND	ND	ND	1.3	ND	59.09	**49.038**
Duxbury Landfill DUX-AD	7/15/2022	ND	ND	6.52	11.8	ND	ND	ND	ND	ND	ND	ND	ND	346.01	**311.76**
Duxbury Landfill DUX-FS	7/14/2022	ND	ND	4.79	4.67	ND	ND	ND	ND	ND	ND	ND	ND	59.77	**40.41**
Duxbury Landfill DUX-FD	7/14/2022	ND	ND	ND	4.58	ND	ND	ND	ND	ND	ND	ND	ND	71.46	**63.32**
Duxbury Landfill DUX-LS	7/14/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.07	ND	3.07	ND
Duxbury Landfill DUX-LD	7/14/2022	ND	ND	2.58	4.52	ND	ND	ND	ND	ND	ND	ND	ND	41.06	**26.61**
Duxbury Landfill DUX-NS	7/14/2022	ND	ND	4.58	7.83	ND	ND	ND	ND	ND	ND	4.76	ND	57.32	**29.87**
Duxbury Landfill DUX-ND	7/14/2022	ND	ND	4.24	7.73	ND	ND	ND	ND	ND	ND	ND	ND	54.85	**33.66**
Duxbury Landfill WS-1	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	68.64	**68.64**
Duxbury Landfill EB	7/14/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Duxbury GMR-MW-7	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
McNeil Dump WS-1	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	68.79	**68.79**
McNeil Dump 91-2	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11.00	11
McNeil Dump WS-2	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
McNeil Dump GHR-MW-7	7/13/2022	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Notes:

ND = Not Detected Above Laboratory Reporting Limits

NA = Not Analyzed

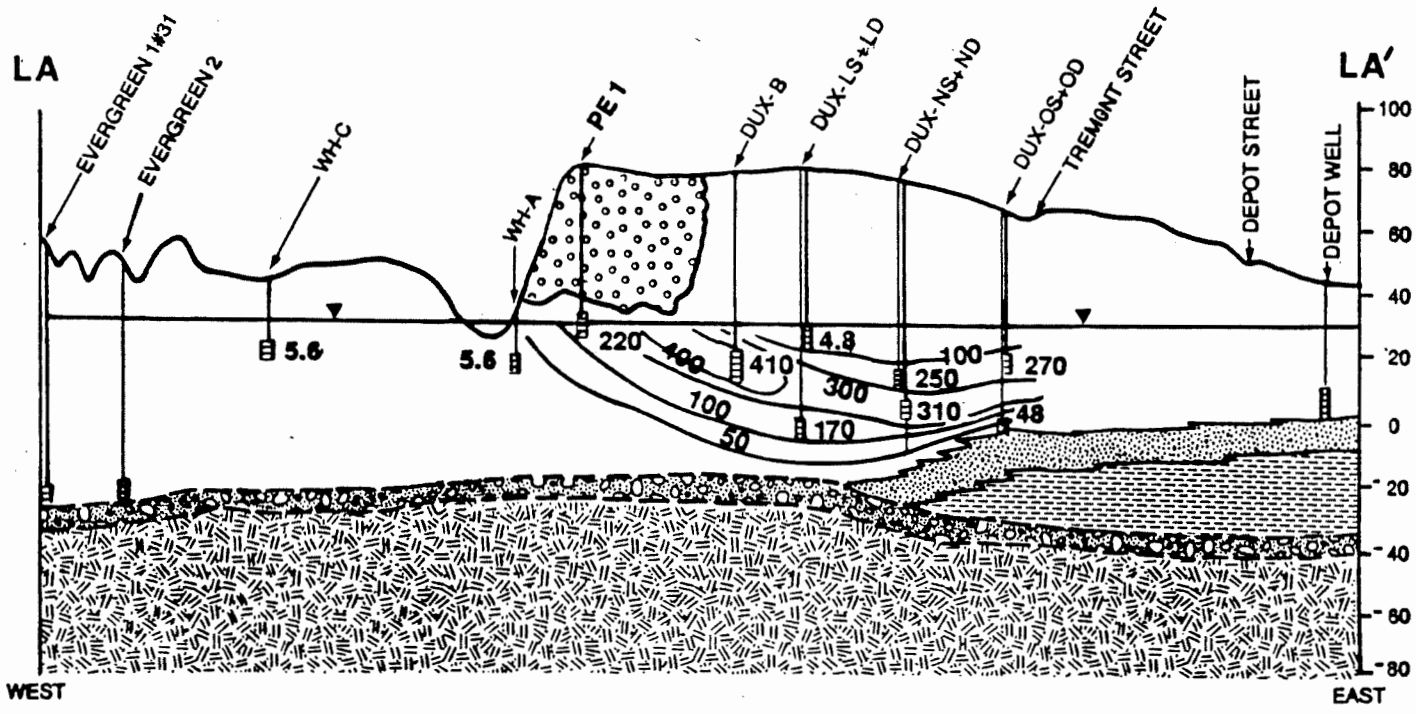
Units are in nanograms per liter (ng/l)

Bold indicates concentration exceeds regulatory limit of 20 ng/l

ATTACHMENT 4
IEP 1988 Report

HYDROGEOLOGIC CONTAMINANT ASSESSMENT OF THE DUXBURY LANDFILLS

DUXBURY,MASSACHUSETTS



—50— *ALKALINITY*

IEP,INC.

SANDWICH,MA.

1988

DUX-1

HYDROGEOLOGIC AND HYDROCHEMICAL CONTAMINANT ASSESSMENT OF THE DUXBURY LANDFILLS

DUXBURY, MASSACHUSETTS

June, 1988

7 of 15

Prepared For:

The Board of Selectmen
Town Hall
Tremont Street
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Prepared By:

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ACKNOWLEDGEMENTS

IEP, Inc., acknowledges George Wadsworth (Water Commissioner) and Ralph Borgeson (Board of Health Chairman) for providing their assistance in commencing this study and review of the Draft Report, Anthony Lally for his review of the Draft Report, William Malcolm (Cemetary Superintendent) for his cooperation and assistance during the field program, and Carlene Regina (Water Department) for providing valuable information.

Project Team

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EXECUTIVE SUMMARY

A hydrogeological contaminant study was conducted to evaluate potential ground water quality impacts from the Duxbury landfill sites. The Duxbury landfill sites consist of a closed and capped municipal landfill, presently the site of the Town's trash transfer station and a private, inactive open dump. The objectives of the field investigation were to define the hydrogeology and to determine the leachate plume's chemical composition and document its vertical and horizontal extent within the aquifer.

Twenty-one multi-level monitoring wells were installed, a water table map was prepared, and ground water samples were analyzed for a suite of inorganic and organic parameters. A leachate plume approximately 1,500 feet wide was mapped a distance of 1,200 feet from the landfills. The plume has elevated concentrations of alkalinity, hardness, sulfate, iron, manganese, sodium, chloride, tannic acid, and specific conductance. Road salting of Mayflower Street has also been identified as an alternative source of sodium and chloride. No significant concentrations of volatile organic compounds were detected indicating that the plume is "free" of industrial related solvents. The landfill sites are downgradient and appear to be out of the area of influence of the Evergreen wellfield. The zone of contribution to the Depot Street well has been realigned according to the new water table information. The landfills are sited directly upgradient of the wellfield and are in its zone of contribution. Review of historical water quality data from the Depot Street well indicates that the well has been impacted by the leachate plume. Although several constituents in the well's production water are elevated above background levels, none except sodium exceed the State's Drinking Water Standard.

The generation of leachate from the landfill sites presents an on-going problem. Seven recommendations, including further assessment of ground water flow to the Partridge Street well, a ground water monitoring program, and geotechnical assessment of the landfills, are presented.

OBJECTIVES AND BACKGROUND

IEP, Inc., was retained by the Duxbury Board of Selectmen to conduct a hydrogeological and hydrochemical assessment of the Duxbury Landfills located on Mayflower Street. The sites are located on a permeable, stratified deposit which constitutes the Duxbury aquifer. The landfill sites are located within 4,500 feet of the three municipal wellfields. The objectives of this study are to develop a detailed understanding of ground water flow, evaluate existing water quality, and determine the current or future impact of the past landfill activity on the Town's water resources. This project was recommended in IEP's Aquifer Protection Study of 1986 and the finding was approved by the Duxbury Annual Town Meeting of 1987.

The report consists of the following sections: Site History, Previous Investigation, Methodology, Hydrogeology, Hydrochemistry, Conclusions and Recommendations.

Site History

The former Duxbury Town Landfill (town site) is now the site of the Town's trash transfer station on Mayflower Road (Figure 1). The Town site occupies approximately 12.4 acres of a 19-acre, Town-owned parcel. The northern 6.6 acres of the parcel are virgin woodland opposite the Town forest. The Town site was first used in 1904 for the disposal of household waste, metal, and leaves. It operated as an open dump until burning ceased in 1968. The site then operated as a sanitary landfill until 1977 when the trash transfer station was completed. The landfill was capped with low-permeable material and was field inspected in 1979. Present activities at the site include trash transfer, disposal and compacting of metal, and leave and brush composting with springtime burnings.

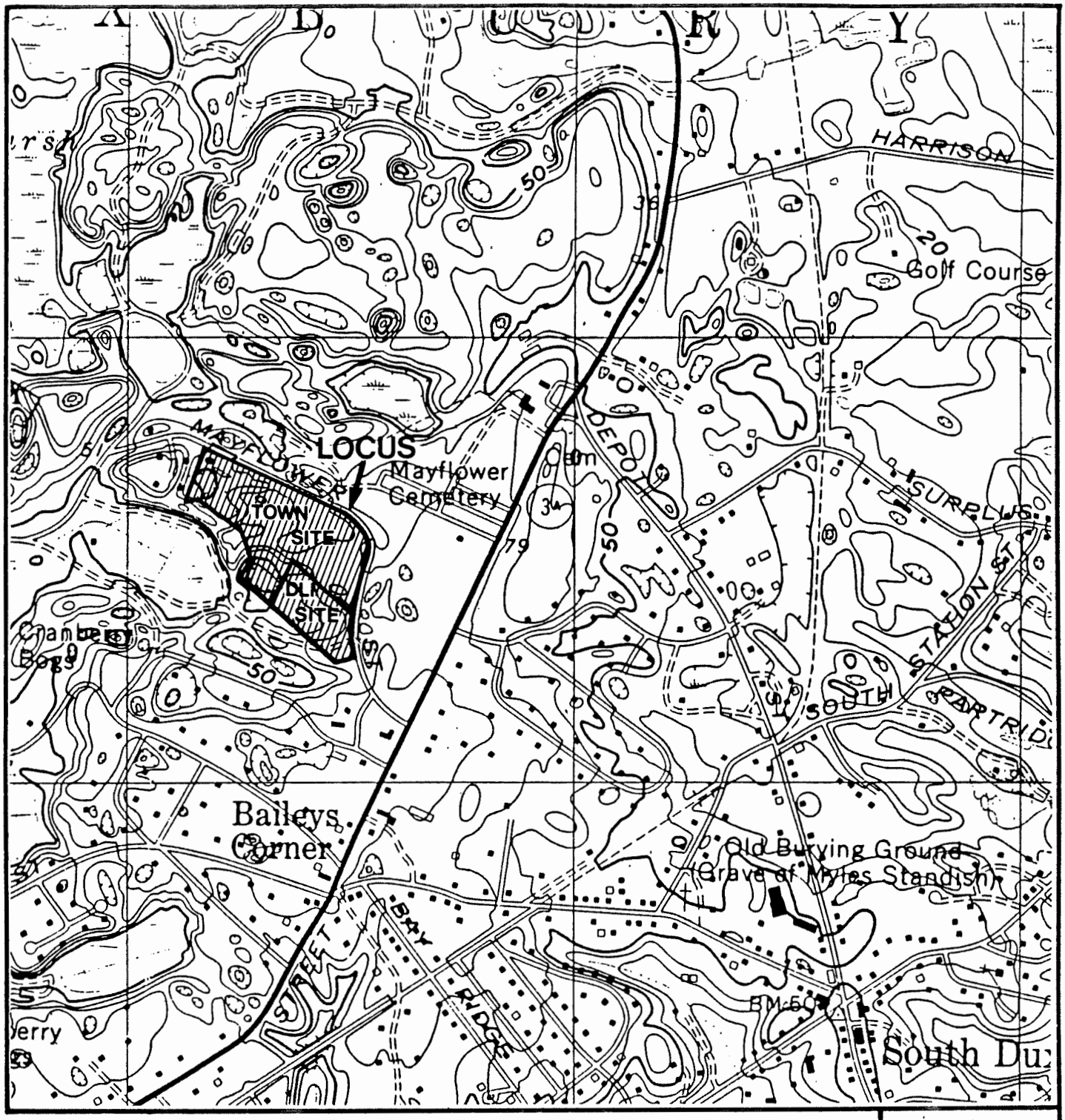


FIGURE 1: LOCUS MAP

SOURCE: U.S.G.S. QUADRANGLE, DUXBURY

LEGEND

SITE

SCALE IN FEET

0 1000 2000

IEP inc.

The former McNeil Landfill, now known as the Duxbury Landfill, Inc. (DLI site), consists of approximately seven acres. It is adjacent to the southern boundary of the Town site. The site was formerly used as an excavation site and began to be used as an open dump during the 1940's. Use of the site has been sporadic since 1968 and there has been no use of the site since 1978. The site was granted an assignment as a dump by the Duxbury Board of Health in October of 1977. When this designation was construed to have been an actual assignment under MGL 310 CMR chapter 19.28 (DEQE Solid Waste Regulations), various Town boards and citizen groups appealed the DEQE interpretation. On December 13, 1979, the DEQE General Counsel reached a final decision upholding the site assignment. This decision was appealed by the Duxbury Board of Health to Suffolk County Superior Court in 1980. The court issued a ruling upholding the DEQE's final decision. On 20 September 1985, the DLI site operation is now contingent upon MEPA and DEQE site plan approval. A Draft Environmental Impact Report was submitted by DLI to MEPA on December 22, 1987.

Previous Investigations

The area of the landfill sites was first investigated by Whitman and Howard (1954, 1971) for water exploration purposes for the Depot and Evergreen Street wells. These sites found thick deposits of stratified drift with a suitable transmissivity for developing water supply. Whitman and Howard (1973) conducted an investigation of ground water conditions between the landfill and Evergreen street well. No degredation of water quality was detected in ground water samples taken from the test wells installed between the landfill sites and the well. Dr. Ward Motts (1977) compiled a report of the potential environmental effects of the proposed McNeil landfill. Dr. Motts concluded that there was a potential for the Evergreen Street well to change the ground water configuration and potentially induce contaminants to migrate towards the well. He suggested detailed ground water elevations (water table mapping) should be conducted to document seasonal and pumping

influences. IEP (1986) conducted a town-wide Aquifer Protection Study for Duxbury and prepared a regional water table map and delineated zones of contribution to the public water supply wells. Due to the regional scale of this work, IEP recommended that a site-specific or sub-regional hydrogeologic analysis of the landfills be conducted because of their potential direct upgradient location to the Depot and Partridge Street water supply wells. GHR (1987a, 1987b) conducted a detailed hydrogeologic site analysis of the DLI site and a Draft Environmental Impact Report (EIR) to address the DLI's potential environmental impact of the proposed operation of a demolition landfill. The Draft EIR conclusion that there would be no impact to the water supply wells was based upon the results of a conditional ground water flow model.

METHODOLOGY

General Approach

Hydrogeologic monitoring at waste disposal sites should be designed according to the objectives of the study. The objectives of this investigation were to: 1) define the hydrogeology of the site, 2) determine the chemical composition of the leachate plume and, 3) document the leachate plume's vertical and horizontal extent within the aquifer. These objectives were met by: 1) conducting borings to document geologic conditions, 2) installing monitoring wells to obtain water table elevations and prepare a detailed water table map and, 3) install additional monitoring wells within discrete portions of the aquifer to obtain discrete ground water samples for laboratory analyses. Subsequent to a review of the previous investigations, IEP performed an extensive field program. This program was comprised of three separate drilling phases with a total of twenty-one monitoring wells which are summarized below (Plate 1).

The first phase consisted of seven intermediate to deep borings and the installation of monitoring wells. The location of these wells was based in part upon the previous IEP (1986) water table map and the DLI water table map (GHR, 1987a). A second phase of shallow, water table wells was then installed in the area downgradient of the DLI site with an additional deep well clustered at site L. At this time, ground water from wells I, E, D, H, M, J, K and G were sampled for a basic set of three chemical parameters and ground water from wells As and d, Bd, Cd, Fs, Ls and WH-C, were sampled for a full suite of inorganic constituents as well as EPA Method 624 for volatile organic compounds (Table 1). Based upon the results of the water quality analyses and water table contour map, a third and final phase of drilling was conducted consisting of the installation of two downgradient cluster wells (O and N) and clustering two deep wells at two existing

Table 1.

ANALYTICAL PARAMETERS

INORGANIC PARAMETERS

Hydrogen Sulfide
pH
MBAS
Turbidity
Color
Nitrate
Total Dissolved Solids
Ammonia
Chloride
Sulfate
Specific Conductance
Alkalinity
Tannin-like Substances
Hardness

METALS

Calcium
Copper
Iron
Manganese
Sodium
Lead
Zinc

VOLATILE PARAMETERS

Chloromethane
Bromomethane
Vinyl Chloride
Chloroethane
Methylene Chloride
Acetone
Carbon Disulfide
1,1-Dichloroethene
Tetrahydrofuran
1,1-Dichloroethane
1,2-Dichloroethene (total)
Chloroform
Methyl Ethyl Ketone
1,2-Dichloroethane
1,1,1-Trichloroethane
Carbon Tetrachloride
Vinyl Acetate
Bromodichloromethane
CIS-1, 3-Dichloropropene
Trans-1,3-Dichloropropene
Trichloroethene
Benzene
Dibromochloromethane
1,1,2-Trichloroethane
1,2-Dichloropropane
2-Chloroethylvinylether
Bromoform
Methyl Isobutyl Ketone
2-Hexanone
1,1,2,2-Tetrachloroethane
Tetrachloroethene
Toluene
Chlorobenzene
Ethylbenzene
m-Xylene
o,p-Xylenes
Styrene

shallow sites (H and L). Subsequent to their installation, a second phase of ground water sampling was conducted at wells G, Os and d, Ns and d, and Ld for the full parameter test, wells M, Cs, and PE-1 for the basic set, and well J for volatile organics. The field program also included surveying the elevation of the wells, relative to the National Geodetic Vertical Datum (mean sea level), several sets of water table measurements, and slug injection tests.

Well Installation and Construction

The borings were drilled with eight-inch diameter, hollow-stem augers. During the first phase of drilling, split-spoon samples were taken every ten feet or upon the discretion of the project geologist. Depth of borings and well installation were predetermined in order to maximize the chances of intercepting a contaminant plume. Basal till, however, was encountered in two borings. Coring through the till into bedrock was not conducted because the high silty-clay content of the till effectively defines the bottom of the more permeable stratified drift aquifer. Boring logs and well construction details are included in Appendix A.

The wells were constructed of two-inch diameter, flush-threaded, joint PVC casing and ten-slot screen. Screen lengths varied from 20-foot lengths at the water table, to ten and five-foot lengths to screen discrete zones in the aquifer. Construction details for each well are included on the boring logs in Appendix A. Sand packs around the well screens were not necessary since the coarse aquifer matrix easily provides flow to the well. Bentonite pellets were used to provide a seal above the well screens. Clustered well sites were constructed by conducting two separate borings and well installations. In several locations, placement of the second shallow well was accomplished in the same boring as the deep well. All IEP well sites have alphabetic labels. The clustered sites are labeled As and Ad to designate shallow and deep wells, respectively. Use was also made from

twelve existing wells on the DLI site, five Whitman and Howard test wells, and two 1 1/2-inch steel wells. Including both the existing and study wells, there was a total of 40 well sites consisting of 14 deep wells and 26 intermediate and shallow wells. The full monitoring well network is illustrated on Plate 1.

Ground Water Sampling

Ground water was sampled from monitoring wells for both inorganic and organic chemical constituents. The inorganic parameters listed on Table 1 were selected for their previous characterization as indicators of landfill leachate (Kimmel and Braids, 1980), they readily migrate through sand and gravel aquifers and can be used as tracers of landfill leachate. The inorganic analysis was split into basic and full parameter test. The basic analysis, comprised only of specific conductance, alkalinity and chloride, was used as a "first-cut" indication of ground water quality degradation. The organic analysis was performed according to EPA Method 624 for purgeable volatile organics (Table 1).

Ground water samples were taken from the wells with the use of a conventional PVC bailer. Pumping the wells off with the use of a centrifugal pump was not an option since the average depth to ground water (40 feet) is below suction limits of 28 feet. A total of three-well volumes were purged from each well prior to sampling. The bailer was washed with Alconox and rinsed prior to each use. Bottles were rinsed three times with the ground water sample prior to taking the final sample. Sampling for the full set of parameters required five bottles. Ground water samples for metal analysis were filtered in the field and preserved with nitric acid and samples for sulfide were preserved with zinc-acetate. A third bottle without preservatives was used for general hydrochemical parameters such as specific conductance and alkalinity. A duplicate set of Teflon-capped vials was used for volatile organic analysis. All samples were immediately stored

with ice in insulated containers and Expressed Mailed to Resource Analysts, Inc., of Hampton, New Hampshire. The laboratory analyses including chain of custody forms are included in Appendix C.

HYDROGEOLOGY

Duxbury is located in the New England coastal lowland zone and its present landscape and topography is a direct function of the Winconsinan glaciation which occurred between 26,000 and 12,000 years before present. Glaciation had two direct effects: 1) the pre-existing bedrock was eroded and scoured, and 2) the bedrock was covered by varying thickness of unconsolidated sediments.

Bedrock in Duxbury consists of granites of the Milford-Dedham zone (Zen, 1983) which outcrops in several locations but is generally overlain by as much as 200 feet of unconsolidated, glacial sediments. There are two broad classes of glacial deposits: till and stratified drift. Till is deposited directly by the glacial ice with little or no interaction with meltwater. Till is comprised of all the material incorporated into the glacier as it advanced and is, therefore, a poorly sorted, compact mixture of boulders, gravel, sand, silt, and clay. Till forms a nearly uniform mantle of approximately 20 feet over the pre-existing bedrock surface. It may also occur in elongate till hills known as drumlins within a thickness up to 200 feet. Because of its compact and poorly sorted nature, till has a low permeability.

Stratified drift refers to material that was transported away from the glacier and effectively sorted by grain size in glacial meltwater streams. Coarse sediment (boulder, cobble, gravel, and sand) were deposited near the ice margin in fast-flowing meltwaters whereas finer sediments (sand, silt, and clay) were winnowed from the coarse material and deposited further downstream. Silt and clays typically accumulated in still water glacial lake environments. Thus, stratified drift can be further categorized into coarse glaciofluvial and fine glaciolacustrine deposits. The coarse glaciofluvial deposits typically have large pore spaces which allows water

to easily flow through them. Because ground water flows easily through glaciofluvial deposits, they usually yield large volumes of water to wells and are, therefore, highly desirable for water supply purposes. However, the very same reason that makes glaciofluvial deposits excellent aquifers, also makes them highly susceptible to contamination.

The landfill sites are located on a thick, ice-contact, stratified drift deposit as is evident from earlier studies conducted by Chute (1965). The prominant scarp on the west side of the landfill is referred to as an ice-contact scarp and marks the position where drift was deposited against glacial-ice. This feature is also referred to as a head-of-outwash and marks a major ice-recessional position. The ice-contact deposits in this local are approximately 100 feet thick.

Subsurface Geology

The subsurface geology was investigated by reviewing existing boring logs and conducting over 12 deep borings for the study. The borings confirm the surficial stratified drift interpretation of the area and the findings are presented in Section LA-LA' which is a longitudinal section through the study area between the Evergreen and Depot Street wells (Figure 2). The ice-contact scarp and the sloping delta surface extending towards Duxbury Bay are evident in the section. Stratified drift ranges from 60 to 100 feet thick and generally overlies basal till on the west side of the section. Stratified drift on the east side of the section is underlain by a glaciolacustrine deposit.

The glaciolacustrine deposits in this region were previously reported by IEP (1986) in a Town-wide study. The presence and position of these deposits indicate an inland margin of the Cape Cod Bay pro-glacial lake. The lake was subsequently filled by the sands and gravels of an advancing glacial delta that built up the thick overlying stratified drift deposits.

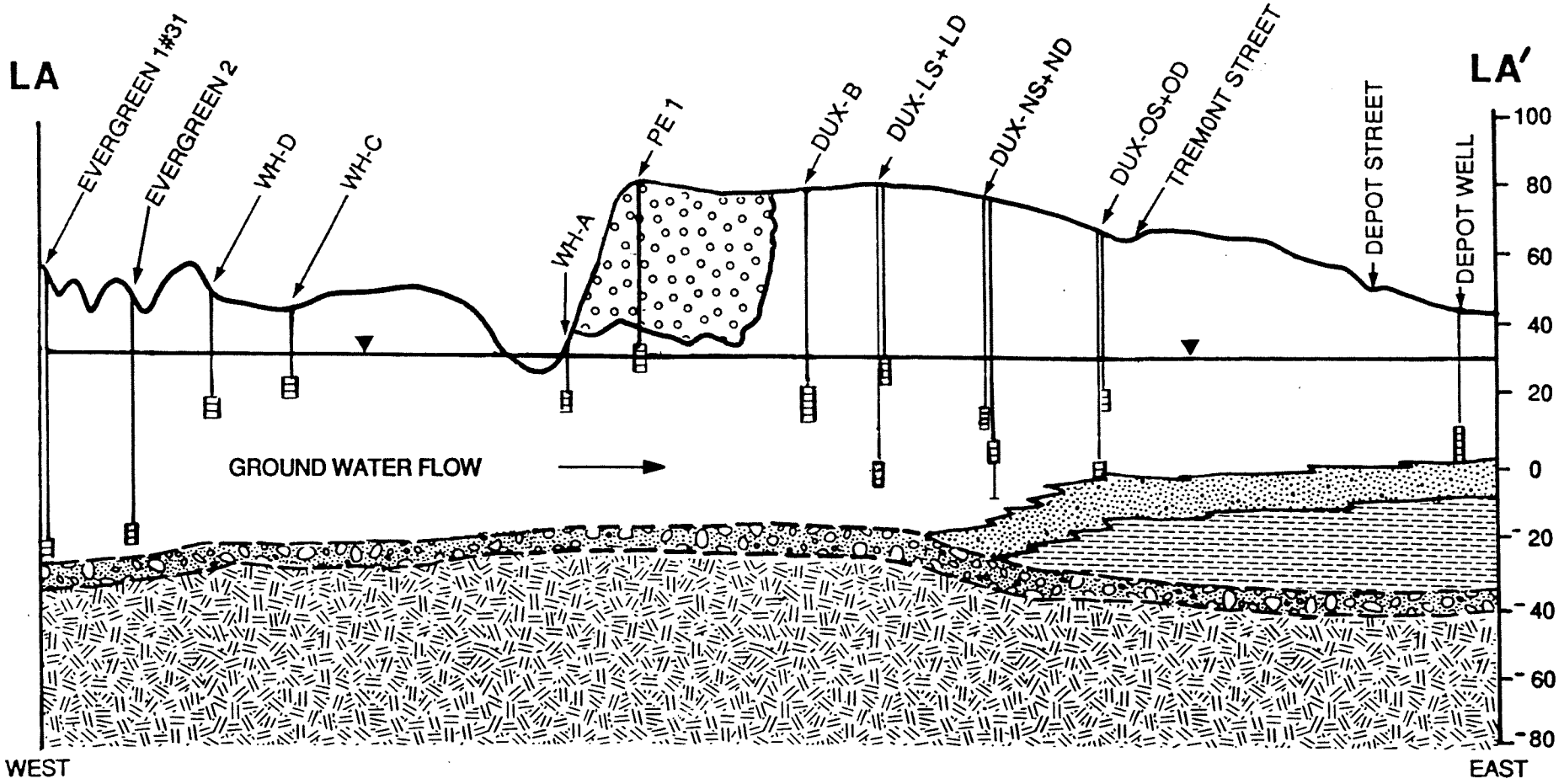


FIGURE 2 : HYDROGEOLOGIC CROSS- SECTION

LEGEND

STRATIFIED DRIFT
TILL
REFUSE
GLACIOLACUSTRINE
BEDROCK

SCALE IN FEET

0 600 1200

IEP inc.

The glaciolacustrine deposits are comprised of fine sand, silt, and clay, and therefore, has a permeability several orders of magnitude lower than the overlying stratified drift. Thus, the top glaciolacustrine deposits effectively defines the bottom of the permeable aquifer.

Hydrology

The principle aquifer of Duxbury is unconfined and resides in the pore spaces of the permeable, stratified drift deposits. The water table marks the top of the saturated zone in the stratified drift and mapping the surface of the water table constitutes a major phase of this hydrogeologic investigation. The surface of the water table, in general, is a subdued reflection of the surface topography.

Several sets of water table measurements were taken during the course of this study corresponding to the three drilling phases described in the methodology and are included in Appendix B. Water table measurements were taken with a chalked-steel tape which has an accuracy of one-hundredth of a foot. Measurements were taken on 16 September, 9 October, and 3 November 1987. The 9 October measurements also included the full array of wells at the DLI site with permission of the site owner. Six existing wells in the study area were also utilized: WHA, WHC and WHD from the Whitman and Howard (1971) investigation, EG-S at the Evergreen Wellfield, and two one-inch diameter steel wells, PE-1 and CS. Well WHD was found to be plugged and of no use. The elevation of the water table fluctuates throughout the year due to seasonal variations in recharge. During the summer and fall, evapotranspiration reduces the amount of recharge to the aquifer and the water table surface declines. The water table in the study area declined an average of 2.4 feet from September to November. Water table measurements taken during a sampling round in December indicate a water table recovery of approximately one foot from November.

The water-table map was developed from measurements taken during the day of 3 November 1987 (Plate 2, Figure 3). The average decline of the water table from September was 0.47 feet. Since wells on the DLI site were not remeasured for the November round, the water table elevations of these wells were corrected by 0.47 feet for November water table conditions. Ground water flows directly perpendicular to the mapped water table contours. Therefore, ground water flows across the study area from the west to the east. The easterly ground water flow path is realigned approximately 17 degrees to the north of the original southeasterly flow path as indicated in the previous Town-wide aquifer study of IEP (1986).

The water-table map clearly indicates that the Evergreen Street wells are upgradient from the landfill sites and that groundwater flows from the landfill sites in the opposite direction from the Evergreen wells. It is also clear from the map that the Depot Street well is directly downgradient of the landfills. In addition, although the contours cannot be extended to the south for lack of data points, the regional ground water flow patterns indicate a distinct possibility that the Partridge Street well is also downgradient of the landfills.

Comparison of water-table measurements at shallow and deep clustered wells, indicate negligible vertical hydraulic gradients across the saturated thickness. Thus, ground water flow is essentially horizontal across the study area. The saturated thickness across the study area decreases from 55 feet beneath the landfill where the aquifer bottom is till, to 30 feet beneath the Depot Street well where the aquifer bottom is the fine-grained glaciolacustrine deposits (Figure 2).

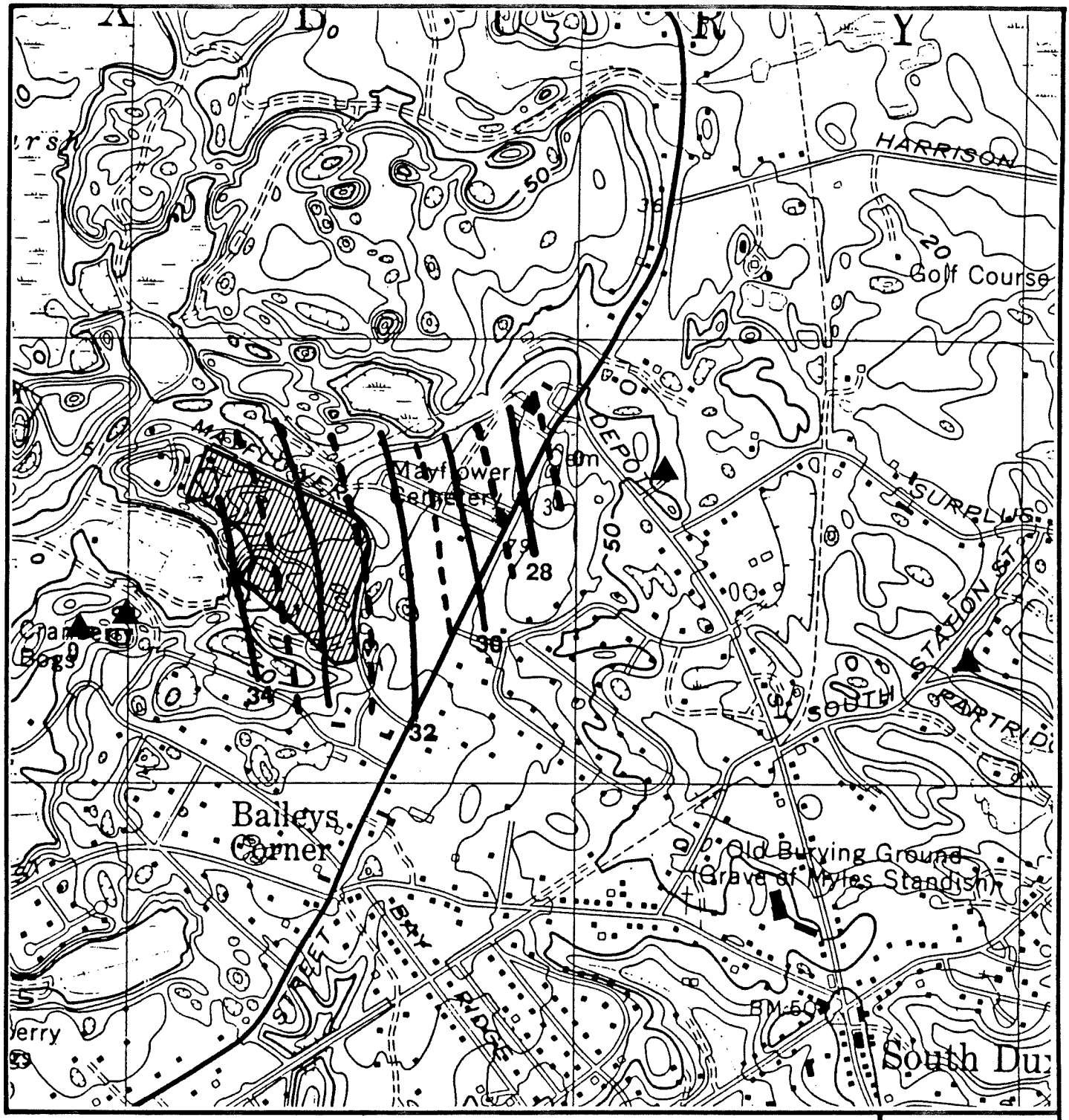


FIGURE 3: WATERTABLE MAP

LEGEND

- *WATERTABLE CONTOUR (FEET ABOVE MSL)*
- *PUBLIC WATER SUPPLY WELL*
- *SITE*

SCALE IN FEET

0 1000 2000

IEP inc.

Hydraulic Conductivity

Hydraulic conductivity is a measure of the permeability of, or relative ease of water to flow through the aquifer matrix. It is directly proportional to the grain size of the matrix. Slug tests were performed on seven wells in the study area in an effort to determine the hydraulic conductivity of the aquifer matrix. Slug-tests are conducted by introducing a slug of water into a well and then observing the response or change in water table elevation. The relation of the aquifer response to time is then used in a graphical solution to solve for hydraulic conductivity (Hvorslev, 1951). Slug injection testing of highly permeable aquifers is difficult to perform due to extremely rapid response. A 25 psi pressure transducer and data logger by Envirolab of Grendile, California, model DL-120MCP, were used to conduct the slug tests. The data and an example graphical solution, are included in the Appendix.

The slug test data, when analyzed, indicates exceedingly low hydraulic conductivities of less than five feet per day. These values conflict with reported hydraulic conductivities of 50 to 500 feet per day for coarse to medium sand (Freeze and Cherry, 1979). In addition, several of the monitoring wells, including example Bd of Appendix C, were developed with a jet pump subsequent to installation. Average yields of 20 gallons per minute over a 40-foot lift indicates a much higher hydraulic conductivity than the slug test data. The exceedingly low conductivity values calculated from the slug-test data are a likely function of the non-instantaneous nature of pouring a slug of water into a well and the long (five to ten-foot) screen lengths which result in a period of non-equilibrium during the critical initial seconds of the test (Tepper and Johnson, 1988). It was therefore concluded that the hydraulic conductivity values calculated from the slug-test data are not representative of the coarse to medium sand matrix of the stratified drift aquifer of the study area.

In lieu of slug test determination of hydraulic conductivity, IEP reviewed and calculated hydraulic conductivity values from the well performance test data for the Evergreen and Depot Street wellfields (Whitman and Howard, 1971 and 1954). Specific capacity is defined as the discharge of the well divided by the drawdown of the well once it reaches equilibrium. Transmissivity can be calculated from the specific capacity data with a method described by Theis, et al., (1963). IEP utilized a short computer program which uses a method that corrects for the effect of partial penetration (Bradbury and Rothschild, 1985). The hydraulic conductivity of the Evergreen Street wells are 400 feet per day and the Depot Street well has a hydraulic conductivity of 250 feet/day. This decrease in hydraulic conductivity is a function of the glacial deposition of the stratified drift and indicates a general decrease of aquifer matrix particle size from the head of the outwash to the distal area from the ice margin.

Ground Water Discharge

The average linear discharge of an aquifer is calculated by a modified Darcy equation where:

$$q = Kib$$

Where q is the average linear discharge, K is the hydraulic conductivity, b is the aquifer thickness, and i is the hydraulic gradient as measured on the water-table map. The water table contour map (Plate 2) illustrates a fairly uniform change in slope at the downgradient site boundary from .0016 to .004.

Since these two water table slopes are contiguous, the average linear discharge for the two sectors should be equal or balance. If the discharges are equal, review of the equation suggests that the change is slope should also be accompanied by a change in either hydraulic conductivity and/or

aquifer thickness. Indeed, a decrease of both hydraulic conductity, from 400 to 250 feet per day, and of aquifer thickness from 55 to 35 feet is noted from the previous section and the hydrogeologic cross-section.

Gentle Slope $q = Kib$
$= 400\ (.0016)\ 55$
$= 35.2\ feet^2/day$

Steep Slope $q = Kib$
$= 250\ (.004)\ 35$
$35\ feet^2/day$

The discharge calculations are within one percent of each other indicating a balance or equal volumes of discharge per sector.

Ground Water Flow Velocity

The ground water flow velocity is calculated by a modified Darcy equation, where:

$$\overline{v} = Ki/n$$

$\overline{v}$ is the average linear ground water flow velocity, K is the hydraulic conductivity, n is the percent void space of the sand matrix (approximately 30% for coarse-medium sands), and i is the hydraulic gradient as measured on the water table map. Two flow velocities were calculated for the study area. The velocity subject to the gentle western gradient and the steeper eastern gradient is 2.13 and 3.33 feet per day respectively.

Gentle Slope: $i = .0016$

$\bar{v} = 400\ (.0016)/.30$

$\bar{v} = 2.13$ feet/day

Steeper Slope: $i = .004$

$\bar{v} = 250\ (.004)/.30$

$\bar{v} = 3.33$ feet/day

Ground water travel times were calculated for the distances of 2,500 and 4,500 feet from the landfill sites to the Depot and Partridge Street wells, respectively, using the steep slope velocity.

Depot Street Travel Time = 2,500/3.33
= 750 days
= 2.05 years

Partridge Street Travel Time = 4,500/3.33
= 1,351 days
= 3.7 years

The calculations indicate that ground water will migrate the distance from the landfill to the Deport and Partridge Street wells in 2.05 and 3.7 years respectively.

HYDROCHEMISTRY

The disposal of municipal solid-waste to landfills generally results in a degradation of ground water quality caused by leachate. Leachate is a liquid that is highly concentrated with an abundance of dissolved ionic substances. Leachate is generated by the release of decomposing organic matter to rain-water that percolates through the refuse. Once leachate reaches the water table, the ground water becomes contaminated and is characterized by a much higher concentration of dissolved ionic substances than the regional or ambient ground water. This contaminated ground water then becomes entrained with the regional flow and migrates along flow paths in a downgradient direction. The extent of contamination forms a discrete zone within the aquifer that is referred to as a plume (LeGrand, 1965).

Leachate-contaminated ground water was detected in ground water sampled from several monitoring wells in the study area. The leachate is characterized by high total dissolved solids, color, specific conductance, alkalinity, hardness, sodium, chloride, sulfate, manganese, calcium, and tannin and lignin like substances (Table 2).

The characterization and extent of leachate-contaminated ground water was evaluated by illustrating the distribution of the leachate parameters by the use of maps and sections. Map views illustrate a projection of the core of the plume onto the surface. The cross sections are taken across those lines shown on Plate 1, the data point map. The lines of section include two longitudinal sections parallel to ground water flow and three transverse sections perpendicular to ground water flow. The data presented in the sections illustrates the length and width of the plume as interpreted from the data points. Since the data points are actually the water quality analyses of ground water taken from the screened zone of the aquifer, it is necessary to interpret water quality data between data points and to qualify

Table 2.

LEACHATE CONTAMINATED GROUND WATER
AT WELL Bd

Inorganic Parameters	Well Bd	Water Quality Standards
Hydrogen Sulfide (mg/L)	< 1	-----
pH (units)	6.35	6.5 - 8.5
MBAS (mg/L)	< 0.4	0.5
Turbidity (NTU)	1,600	-----
Color (units)	15	15.0
Total Dissolved Solids	930	-----
Chloride (mg/L)	61	250.0
Sulfate (mg/L)	370	250.0
Specific Conductance (umhos/cm)	1,500	-----
Alkalinity (mg/L)	410	-----
Tannin-like Substances	3.5	0.4
Hardness	550	-----
Metals		
Calcium	130	-----
Copper	< 0.02	1.0
Iron	< 0.03	0.3
Manganese	8.3	0.05
Sodium	59	20.0
Lead	< .05	0.05
Zinc	< .02	5.0

them. Monitoring wells with five-foot screen lengths sample a discrete portion of the aquifer and are, therefore, accurate data points. Longer well screens, such as the 30-foot lengths used at the DLI site, sample a greater width of the aquifer. The analytical results from these data points represent more of a diagnostic characterization of water quality than a discrete sample and are, therefore, subject to more interpretation.

Specific Conductance

Specific conductance is a measure of water's ability to conduct an electrical current and is directly proportional to the concentration of dissolved ionic substances. In general, ground water in glacial stratified drift has a low specific conductance of less than 100 umho/cm. Leachate contaminated ground water at well Bd has a conductance of 1,500 umho/cm. A plume of specific conductance has been mapped approximately 1,200 feet downgradient of the landfill sites and is approximately 1,700 feet wide (Figures 4, 5 and 6). The plume width corresponds well with the approximate 1,500-foot wide source area of the landfills.

The area of affected ground water as defined by a specific conductance of 100 umho/cm and is oriented in a general easterly direction along the dominant ground water flow path. These data indicate that the contaminants are being carried from the sites by flowing ground water. This process of contaminant transport and is referred to as advection.

Dispersion is a secondary transport process and refers to the spreading of contaminants as it flows through the aquifer. Dispersion has a negligible effect on contaminant concentrations in fast ground water flow regimes such as exhibited in Duxbury. Contaminant plumes in this type of flow regime will tend to maintain their source concentration along a flow path with little dilution (Anderson, 1979). Little dilution is exhibited along the LA longitudinal section (Figure 5) where specific conductance is maintained at

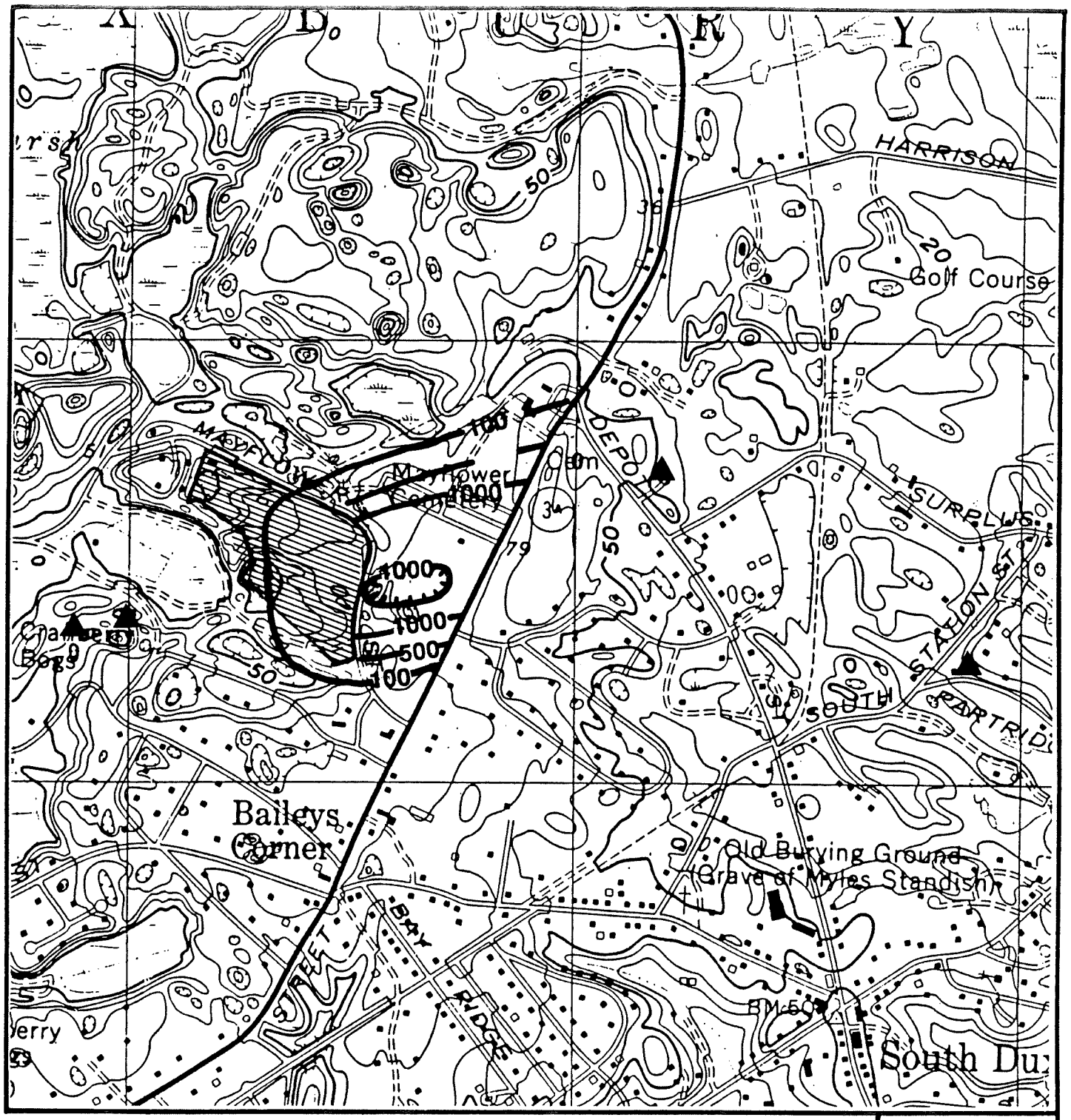


FIGURE 4: MAP OF SPECIFIC CONDUCTANCE IN GROUNDWATER

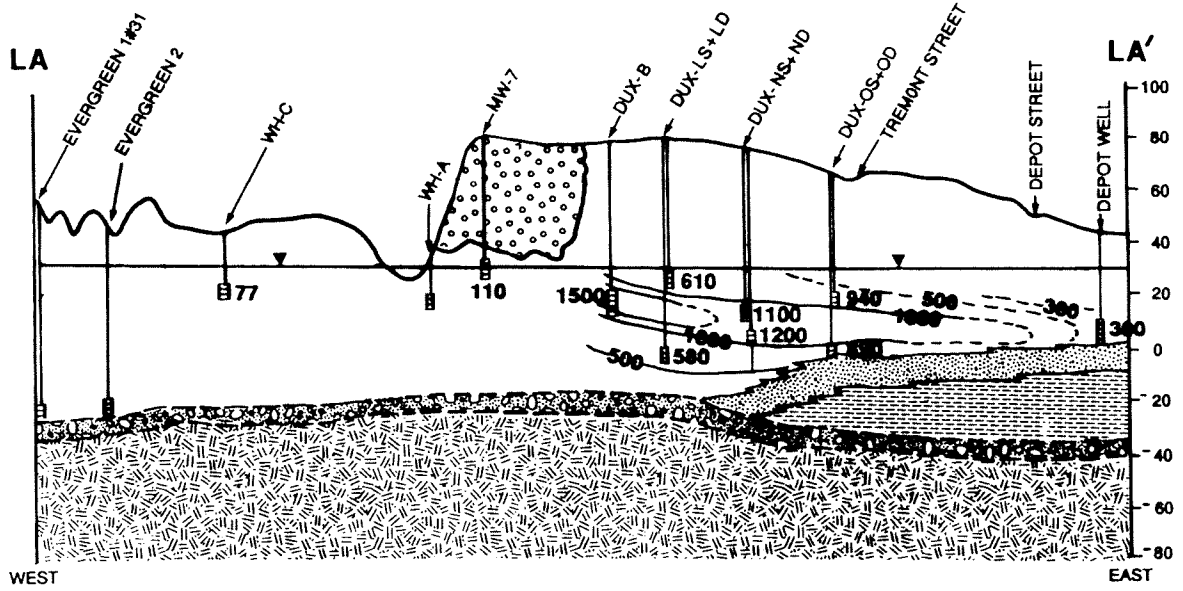
LEGEND

- LINE OF EQUAL SPECIFIC CONDUCTANCE (umho / cm)
- PUBLIC WATER SUPPLY WELL
- SITE

SCALE IN FEET

0 1000 2000

IEP inc.



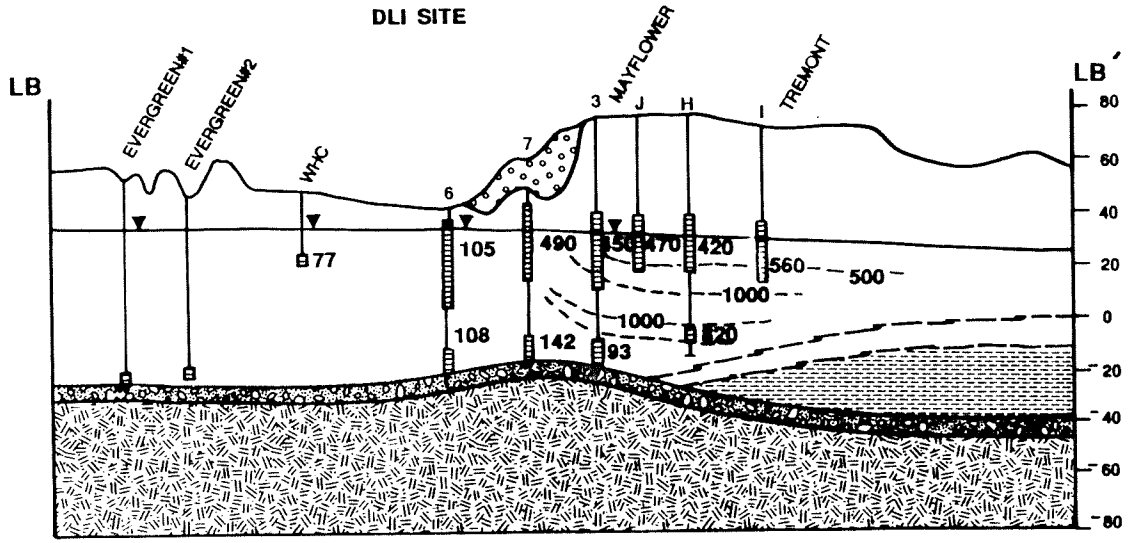


FIGURE 5: SPECIFIC CONDUCTANCE CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL SPECIFIC CONDUCTANCE*

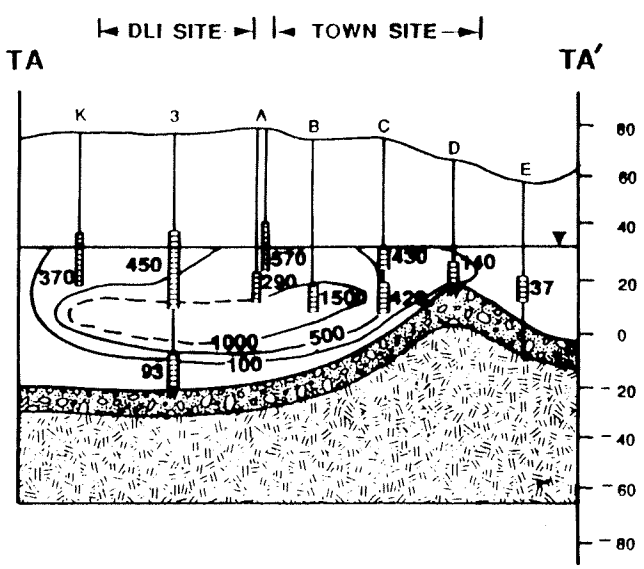
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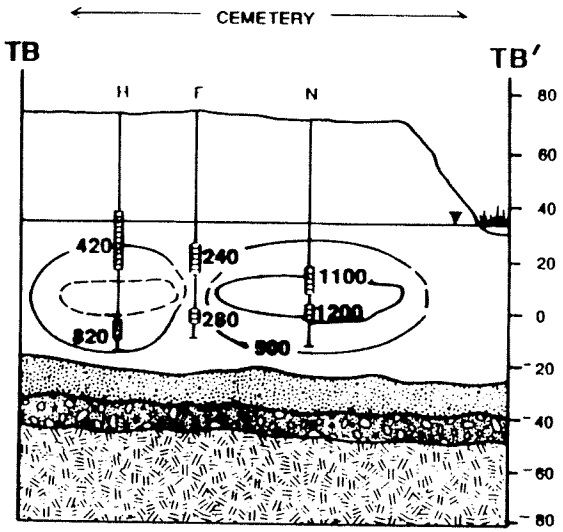
MONITOR WELL, SCREENED INTERVAL AND ALKALINITY

SCALE IN FEET

0 600 1200

IEP inc.





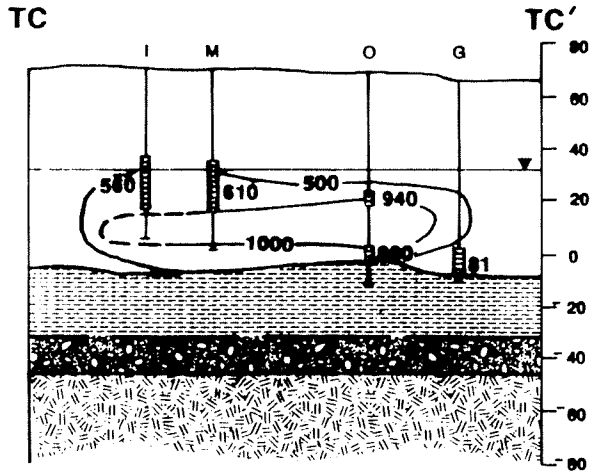


FIGURE 6: : SPECIFIC CONDUCTANCE CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL SPECIFIC CONDUCTANCE*

DASHED WHERE INFERRED

MONITER WELL,SCREEN INTERVAL AND ALKALINITY SPECIFIC CONDUCTANCE

SCALE IN FEET

0 600 1200

IEP inc.

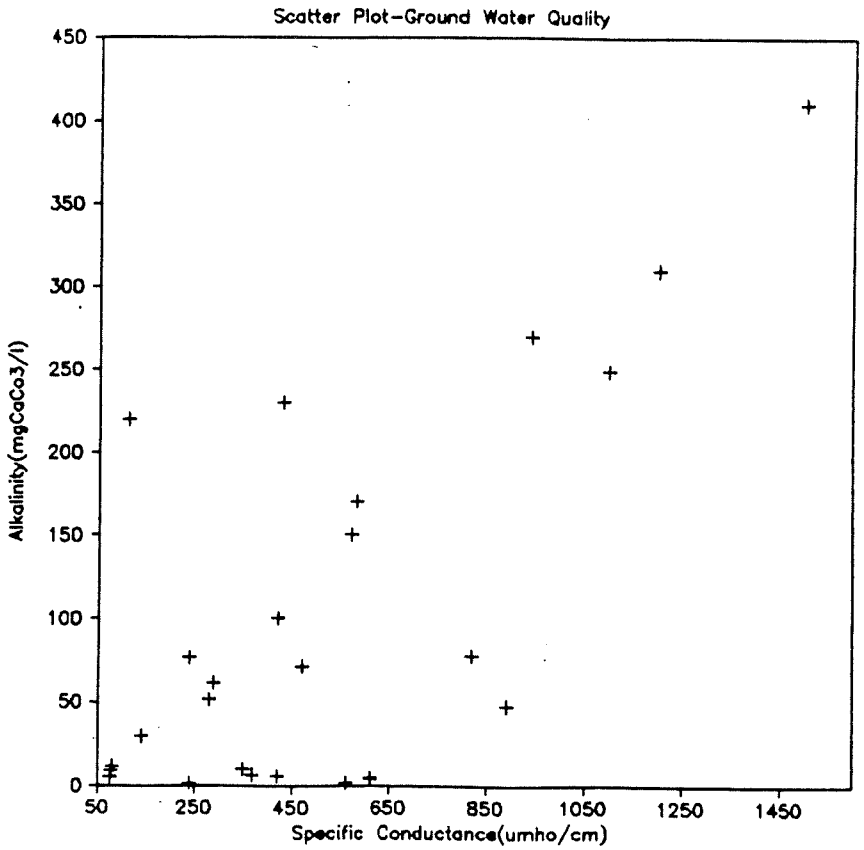
1,000 umho/cm over a 1,200-foot distance. Although the plume exhibits a uniform concentration distribution, an area of low specific conductance was noted at well site F. This area of low conductance is probably an artifact of the pulsing nature of leachate introduction to the ground water (Kimmel and Braids, 1979). Since leachate generation is dependent upon the transient nature of percolating rainfall, it is reasonable to encounter slugs of either higher or lower concentration within an established leachate plume. Considering that the presentation of chemical data in these maps and section is only a "snap-shot" of the plume in time, it is also reasonable that an area of low concentration will be detected as it migrates across the vicinity of well F.

The longitudinal sections show that the contaminant plume is approximately 20 to 30 feet wide in the vertical direction. The bottom of the plume coincides with the top of the less permeable till and glaciolacustrine deposits. The core of the plume is found approximately 20 to 25 feet below the water table. The top of the plume is overlain by 10 to 15 feet of uncontaminated ground water. Recharge derived from precipitation is the most probable source of this uncontaminated ground water. This overlying wedge of uncontaminated water usually becomes thicker with increasing distance from the source (LeBlanc, 1984; Cambareri, 1986). However, in this case, the top of the glaciolacustrine unit prevents the contaminant plume from descending any deeper. This same phenomena could also be responsible for the seemingly anomalously high position that the northern portion of the plume exhibits over the till high in section TA. It has been reported that the greater density of contaminated ground water in a landfill plume will also cause it to descend through an aquifer (Kimmel and Braids, 1980). Given the relatively fast ground water flow velocity of three feet per day, the plume has undoubtedly migrated beyond the mapped length. In fact, recent water quality data of the Depot Street well reveals that its production water has a specific conductance of 300 umho/cm. This is further discussed in a following section.

Alkalinity

Ground water in stratified drift aquifers of southeast New England exhibit a low alkalinity due to a paucity of carbonate material in the aquifer matrix. Ambient alkalinity in Duxbury is less than 10 ppm at the upgradient well WH-C. The alkalinity of the plume ranges from 50 to 410 ppm (Figure 7). This high alkalinity is primarily due to a high concentration of bicarbonate and to lesser degree, other dissolved ionic substances of the leachate. Kimmel and Braids (1980) report that bicarbonate, one of the best tracers of landfill leachate, is indirectly generated by anaerobic decomposition of organic matter. This process produces CO_2 which yields carbonic acid which, in turn, dissociates to bicarbonate ion. High alkalinity is associated with an increase of pH. Ambient pH is approximately 5.2 and the plume pH is approximately 6.2.

The distribution of alkalinity in ground water is similar to specific conductance indicating similar source and contaminant transport processes (Plate 3, Figures 8, 9 and 10). This similarity is supported by the apparent linear relationship of alkalinity and specific conductance as shown in the scatterplot (Figure 7). The core of the plume is interpreted to be 1,500 feet wide as determined by alkalinity greater than 100 ppm. A 500-foot wide area of greater than 300 ppm alkalinity is evident on the northern portion of the plume (Figure 10). This portion of the plume is directly downgradient of the town site. The area of lower alkalinity downgradient of the DLI site most likely reflects a lack of discrete data points within the plume.



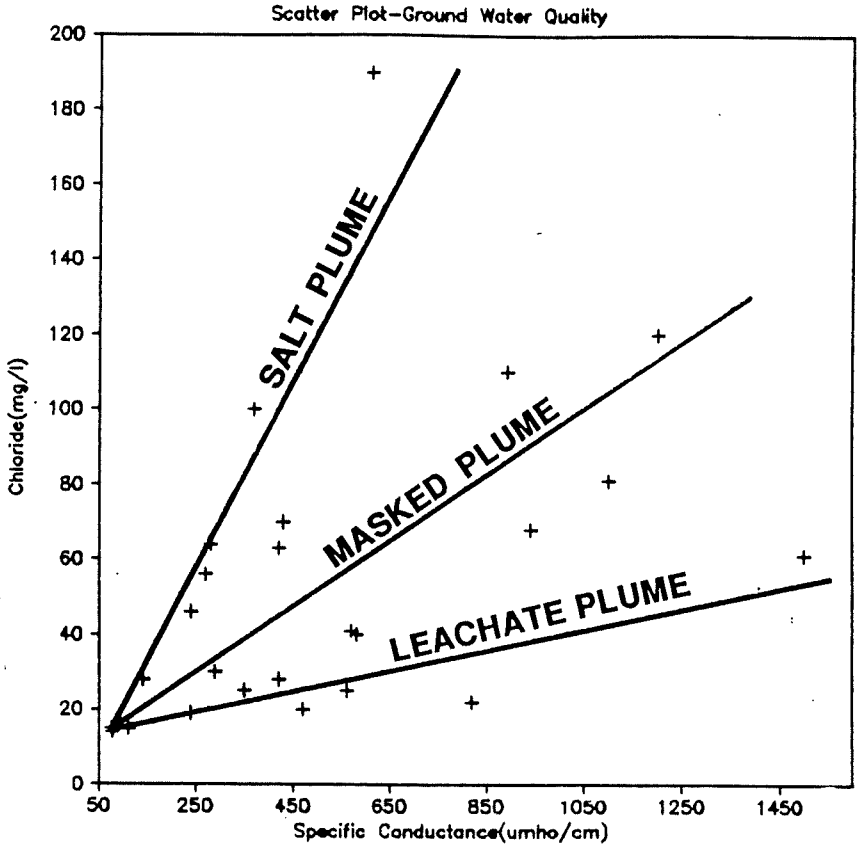


FIGURE 7: SCATTER PLOT OF ALKALINITY AND CHLORIDE VS. SPECIFIC CONDUCTANCE

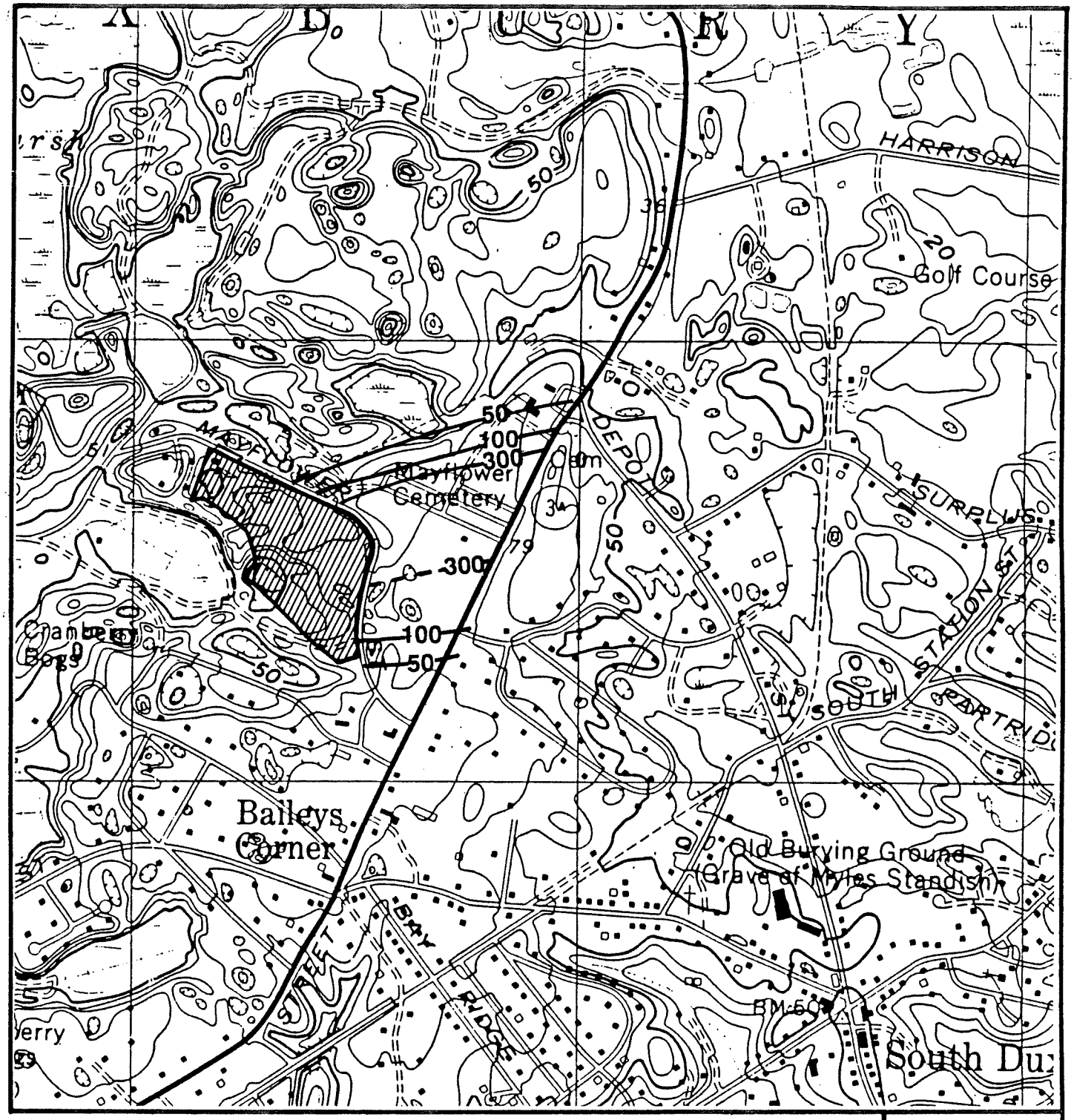


FIGURE 8: MAP OF ALKALINITY

LEGEND

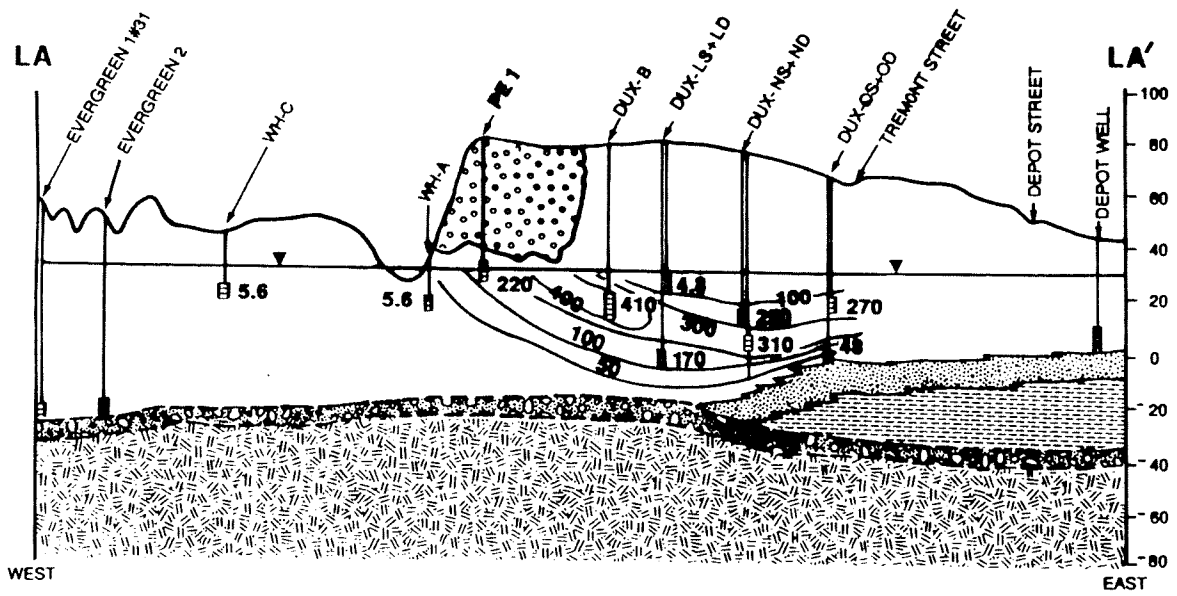
— *LINE OF EQUAL ALKALINITY*

SITE

SCALE IN FEET

0 1000 2000

IEP Inc.



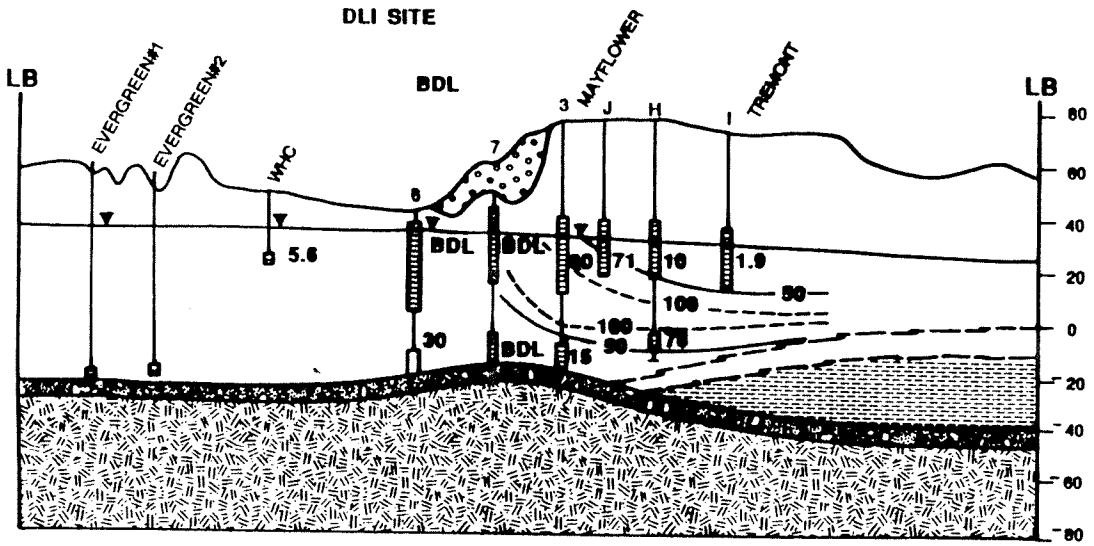


FIGURE 9: ALKALINITY CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL ALKALINITY (CaCO3)*

DASHED WHERE INFERRED

MONITOR WELL, SCREENED INTERVAL AND ALKALINITY

SCALE IN FEET

0 600 1200

IEP inc.

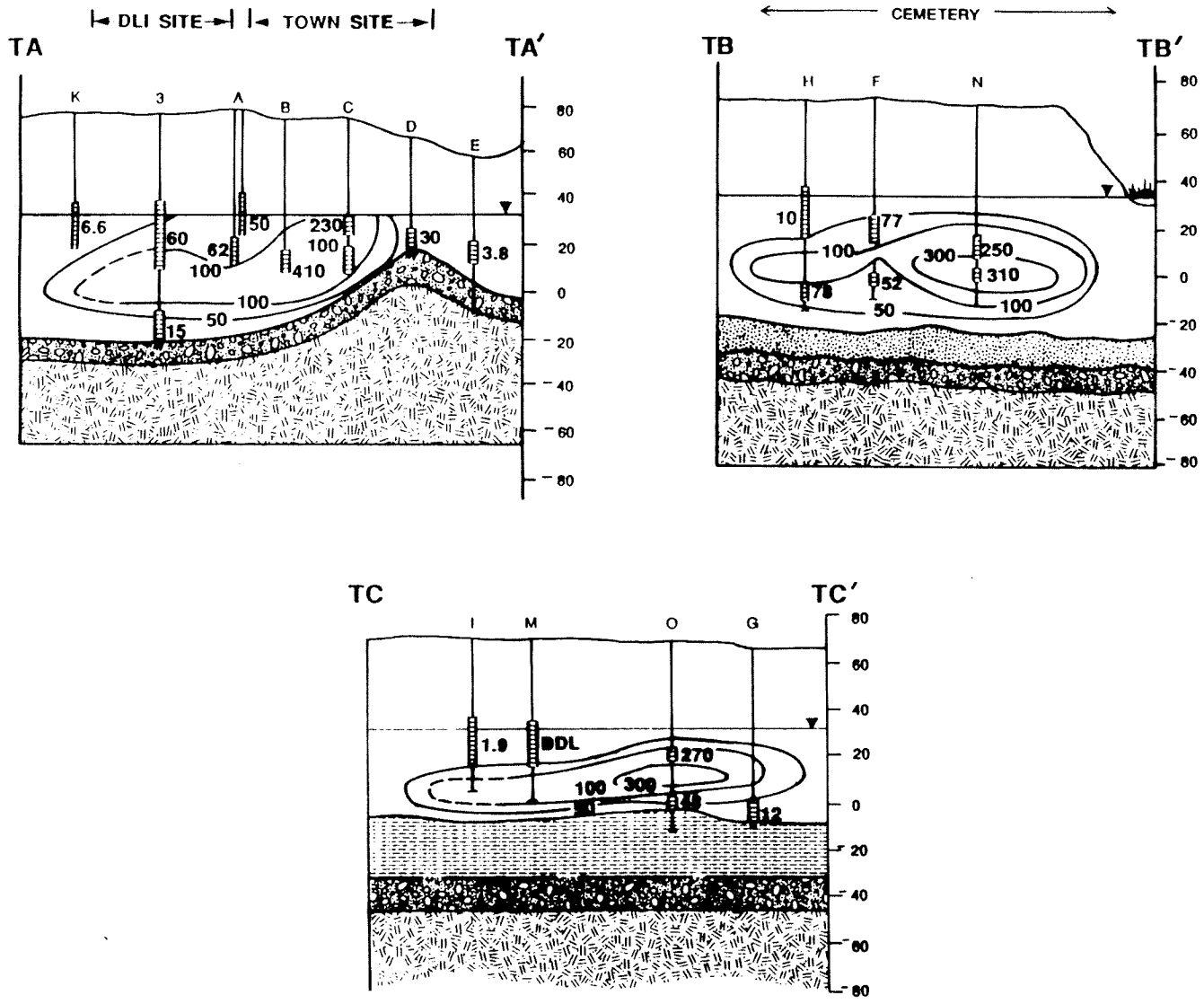


FIGURE 10: ALKALINITY CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL ALKALINITY CaCO3*

DASHED WHERE INFERRED

MONITOR WELL, SCREENED INTERVAL AND ALKALINITY

SCALE IN FEET

0 600 1200

IEP inc.

Sodium and Chloride

Sodium and chloride have been cited throughout the literature as conservative tracers in ground water contamination investigations (Kimmel and Braids, 1980; Hem, 1970). Typical ambient sodium and chloride concentrations in Duxbury are 10 and 20 ppm respectively. Sodium and chloride concentrations in ground water at the study area range from 110 to 190 ppm, respectively. The plume as defined by a moderately high chloride concentration of 50 ppm has a similar orientation and configuration to specific conductance and alkalinity (Figures 11, 12 and 13). There are however, higher sodium and chloride concentrations in the downgradient portion of the plume than shown in the upgradient landfill perimeter wells. This occurrence suggests a supplemental introduction of sodium and chloride into ground water other than the landfills.

The high infiltration rates of the stratified drift aquifer make it highly susceptible to contamination by road salt. Road salt generally increases the background concentrations of sodium chloride in the study area and masks the leachate plume. This phenomena is illustrated on the chloride scatter plot (Figure 7) where three different population sets of data are observable. The leachate plume is represented by moderate to low chloride concentrations and moderate to high specific conductance. Ground water contaminated by road salt has high chloride concentrations but only moderate specific conductance. The third population set is a combination which has elevated chloride concentrations with respect to the leachate plume and high specific conductance with respect to salt contamination. Road salt occurs at well Ls where the specific conductance is 610 umho/cm (Figure 12) and the alkalinity is only 4.8 (Figure 9). In this case, road salt is probably more responsible for the high specific conductance than the leachate plume. The basic parameter analysis of shallow well K also indicates road salt contamination (Figures 9 and 12).

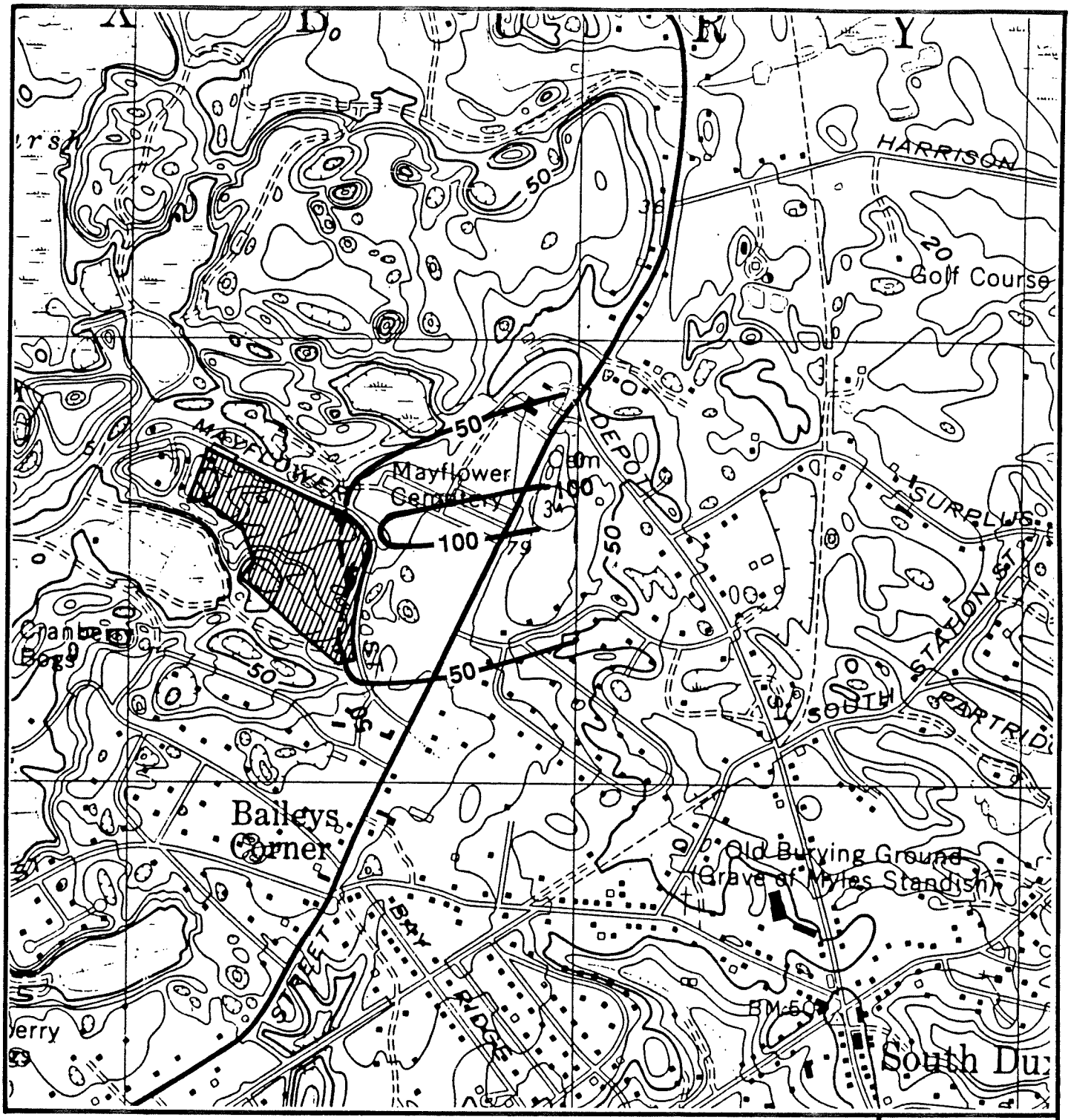


FIGURE 11 :MAP OF CHLORIDE

LEGEND

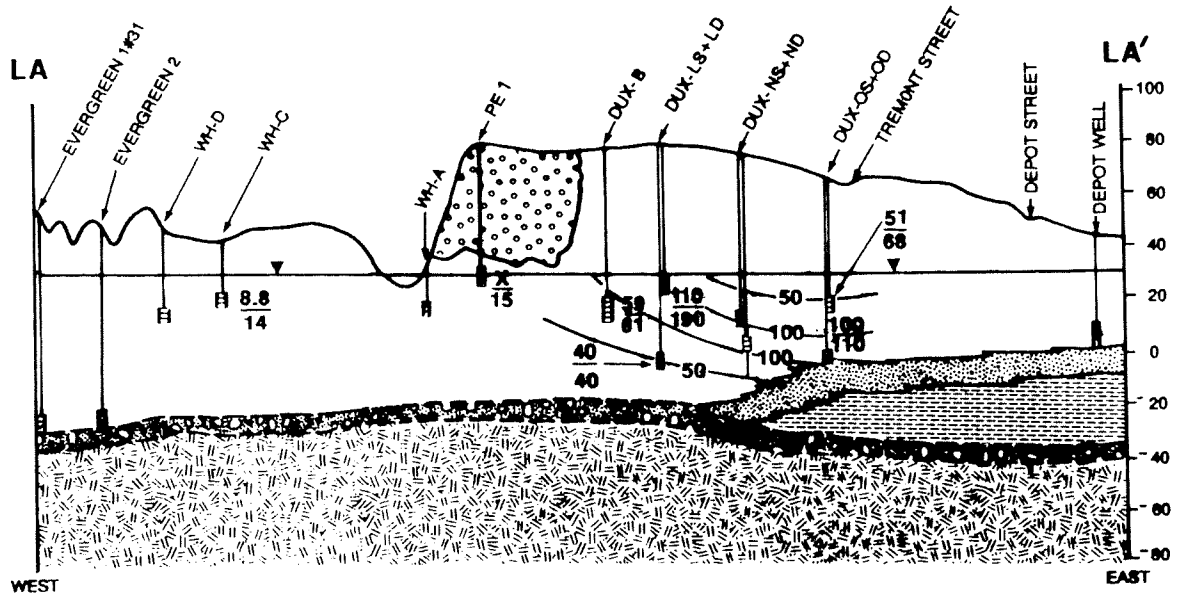
— *LINE OF EQUAL CHLORIDE*

SITE

SCALE IN FEET

0 1000 2000

IEP inc.



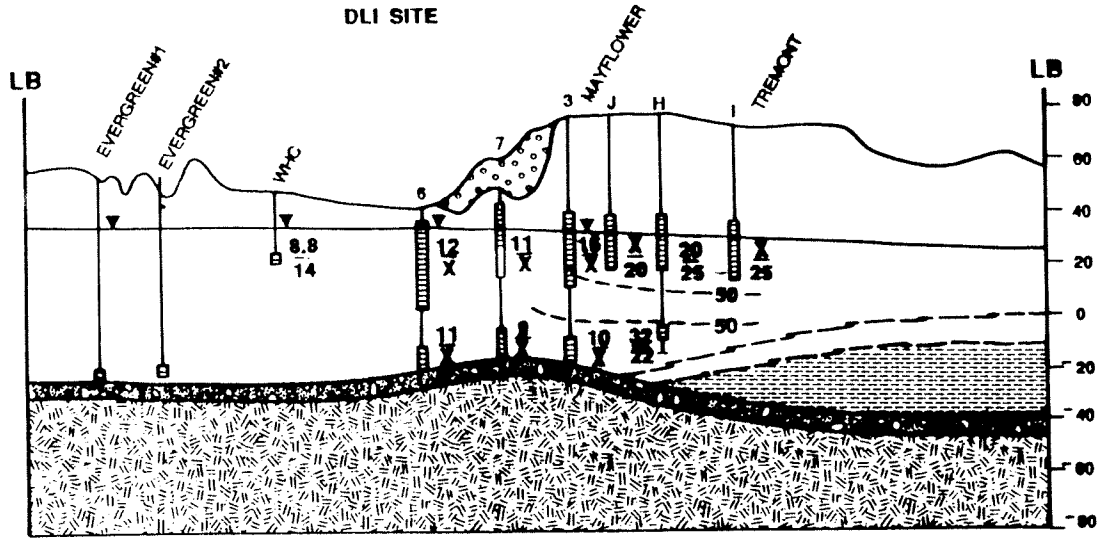


FIGURE 12: CHLORIDE CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL CHLORIDE CONCENTRATION*

MONITOR WELL, SCREENED INTERVAL AND ALKALINITY

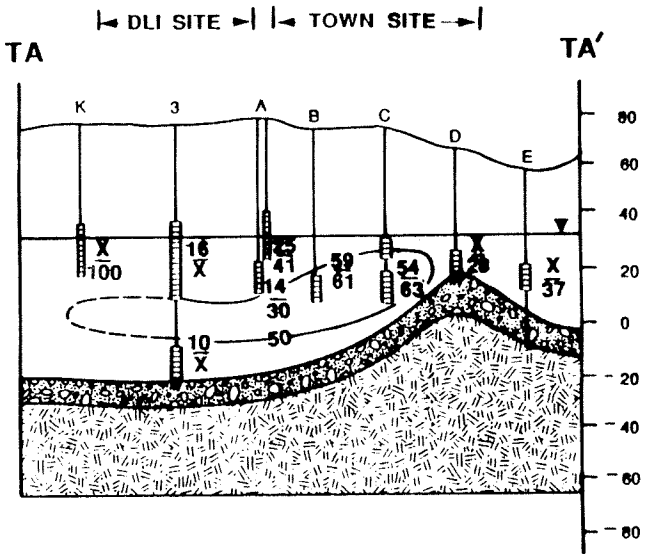
51 *SODIUM*
68 *CHLORIDE*

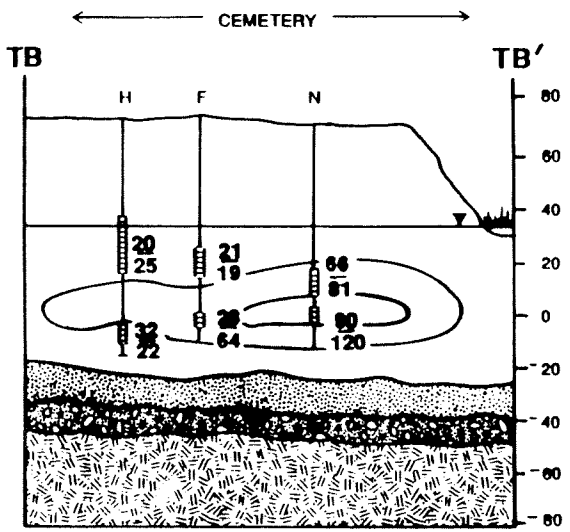
X *NO DATA*

SCALE IN FEET

0 600 1200

IEP inc.





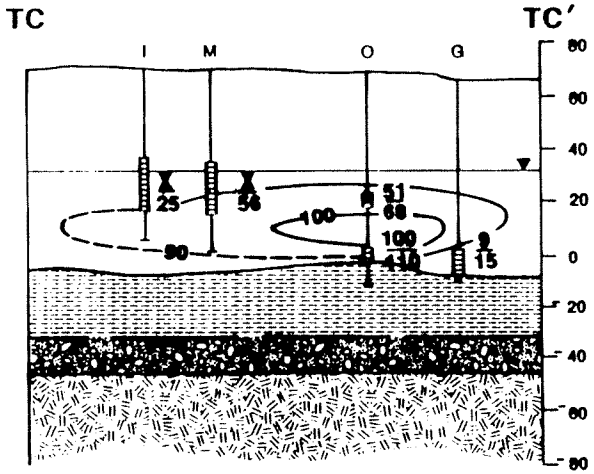


FIGURE 13: CHLORIDE CROSS-SECTIONS

LEGEND

— *LINE OF EQUAL CHLORIDE CONCENTRATION*

DASHED WHERE INFERRED

MONITERING WELL, SCREENED INTERVAL AND SODIUM /CHLORIDE CONCENTRATION

SCALE IN FEET

0 600 1200

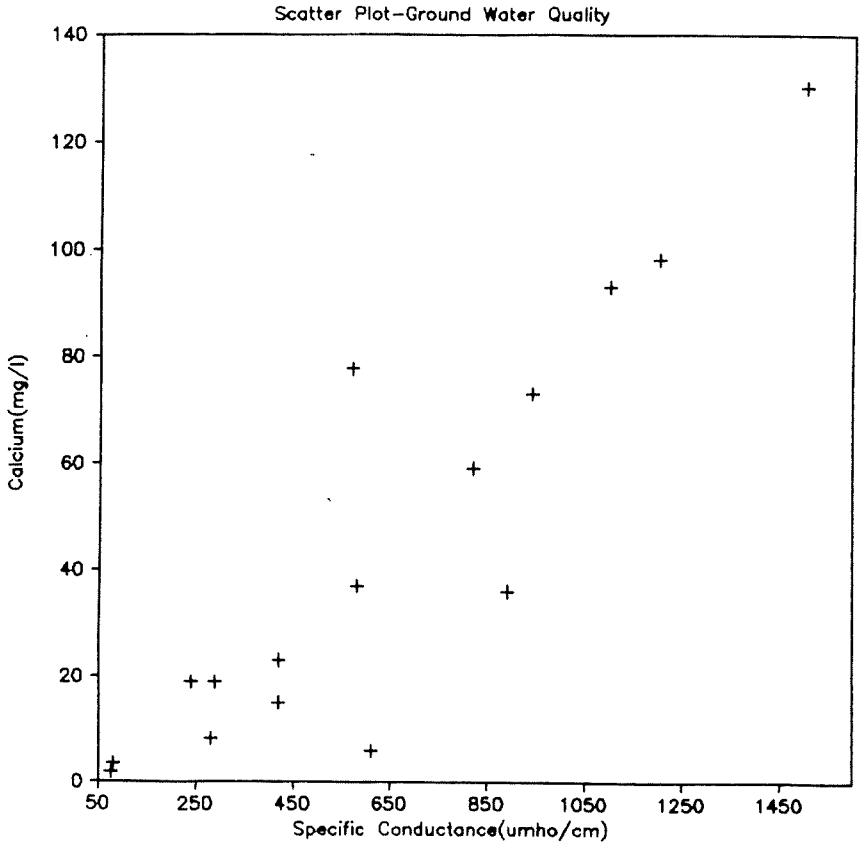
IEP inc.

Well sites L and K are located downgradient of natural topographic low spots adjacent to Mayflower Street. These areas receive high volumes of road run-off which probably concentrates the road salt. Well sites Bd and Hd, in contrast, have a high specific conductance due to an abundance of other leachate constituents than road salt.

The Depot Street well which is downgradient of the study area has had an historic problem with elevated concentrations of salt. The chloride and sodium concentration over the last ten years has averaged at 50 and 35 ppm respectively. This high salt concentration in the past has been attributed to road salting of Depot and Tremont Street. However, this data suggests the landfill sites and salting of Mayflower Street, as the point source of this problem.

Calcium and Hardness

Calcium is a naturally occurring trace metal which has an ambient concentration of 1.8 ppm at upgradient well WH-C. Calcium in the plume ranges from 27 ppm at well 3 to 130 ppm at well Bd. Its distribution in ground water is similar to specific conductance, alkalinity and chloride. Hardness is a general indicator of a particular water's ability to foam due to the presence or absence of ionic substances. Magnesium and calcium are generally considered the dominant elements comprising hardness. It is, therefore, not surprising to find a similar distribution of hardness in the plume to calcium. The scatterplots of calcium and hardness vs specific conductance display a good linear relationship and are almost identical to each other (Figure 14). The ambient concentration of hardness is 14 ppm and its concentration ranges from 170 ppm at well Od to 550 at well Bd. A high concentration of 340 ppm hardness at well Hd downgradient of the DLI site suggest that other leachate-related ions such as calcium, potassium and



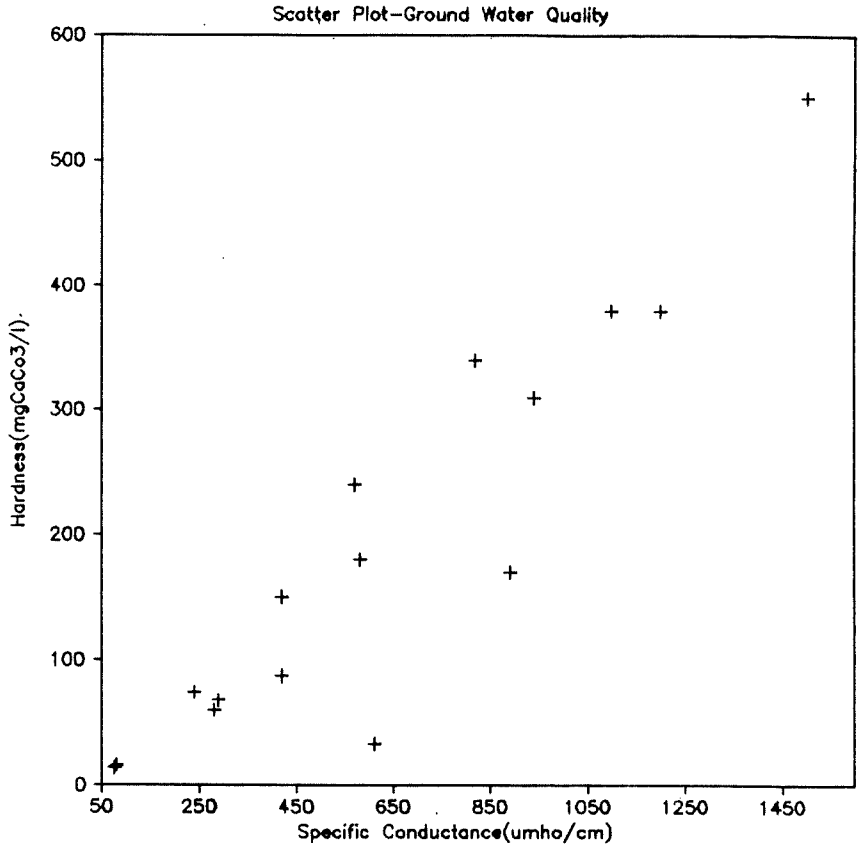


FIGURE 14: SCATTER PLOT OF CALCIUM AND HARDNESS VS. SPECIFIC CONDUCTANCE

magnesium are contributing to its high specific conductance (820 umho/cm) rather than sodium or chloride. Gypsum, a major component of drywall, is comprised of calcium and magnesium and could be the source of these elements.

Sulfate, Metals, and Tannic Acid

The ambient concentration of sulfate at well WH-C is 6.6. Sulfate concentration in the plume ranges from 100 ppm at well Os to 370 ppm at well Bd. Decomposing organic refuse generates sulfate. The distribution of sulfate in ground water is similar to the other dominant plume ions and, in fact, comprises a relatively large portion of the total anions as suggested by its concentrations (Figure 15). Sulfide, in contrast, was reported at the 7 ppm detection limit for nearly all analysis. This would suggest that the leachate plume is aerobic since sulfide occurs in reducing or anaerobic hydrochemical environments. This explains the fact that iron does not occur at the very high concentrations usually associated with other leachate plumes (Kimmel and Braids, 1979). Iron will typically precipitate out of solution in its ferric form in aerobic environments. Although iron and manganese occur at elevated levels in a majority of samples, a consistent concentration distribution is not evident within the plume area. Iron concentrations ranged from .03 to 33 ppm in ground water and occurred at elevated levels in excess of 0.3 ppm (the State Drinking Water Standard) in 8 of 15 samples. Manganese concentrations ranged from .03 to 8.3 ppm and occurred at elevated levels in excess of .05 ppm (the State Drinking Water Standard) in 14 of 15 samples. The slug-like introduction of leachate generation may provide enough time for the plume area to achieve an overall aerobic state, thereby causing the elements to precipitate out of solution. Lead and zinc concentration were not elevated for any of the samples.

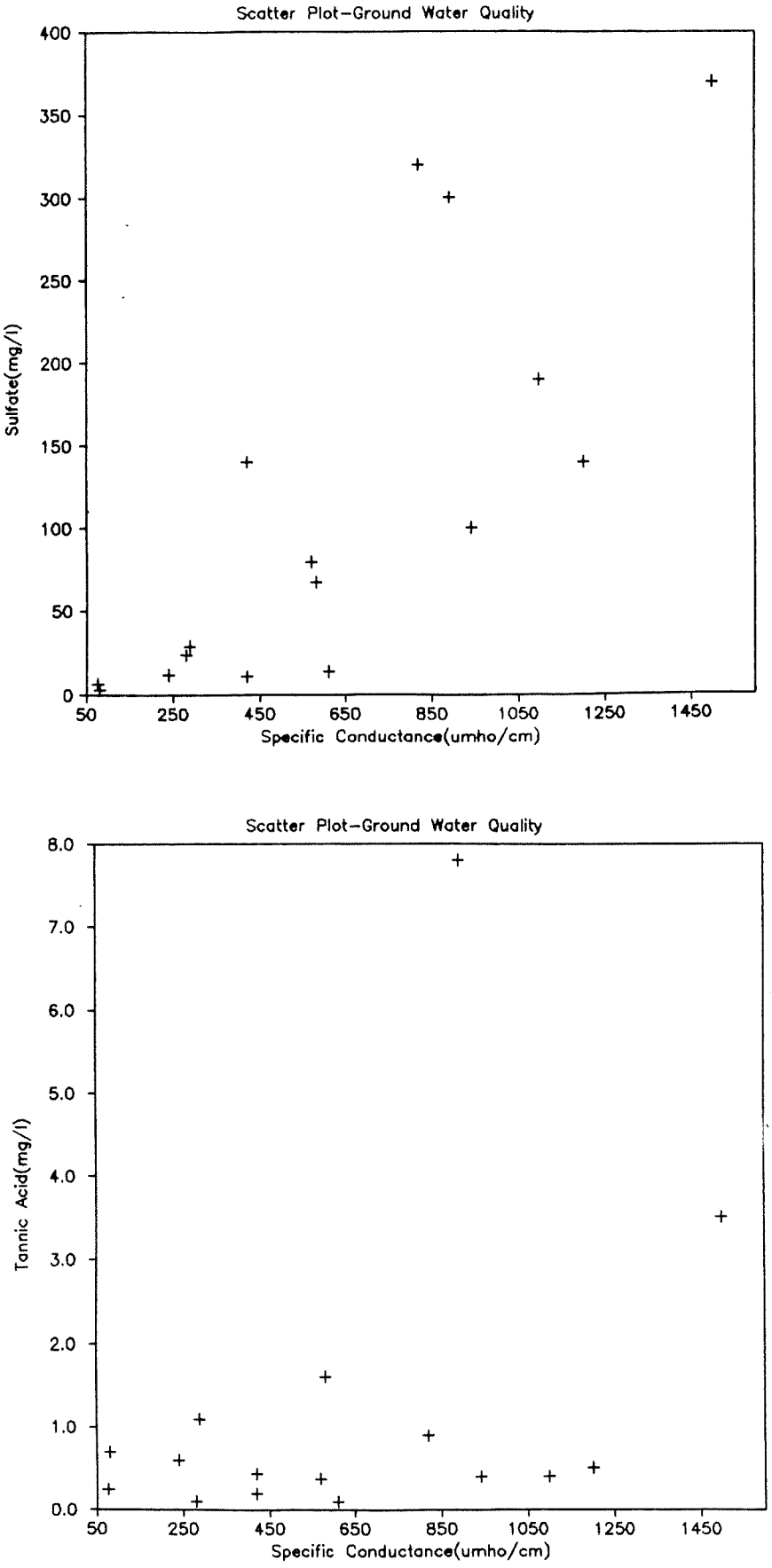


FIGURE 15: SCATTER PLOT OF SULFATE AND TANNIC ACID VS. SPECIFIC CONDUCTANCE

Tannic acid is a measurement of tannin and lignin-like substances which are associated with decomposing wood. Ambient tannin concentrations are 0.25 ppm at the upgradient well WH-C and concentrations are as high as 7.8 ppm at well Od (Figure 15). The presence of tannin, together with the other leachate constituents, indicates that demolition wood-waste has impacted ground water quality.

Volatile Organic Compounds

Groundwater was sampled at 17 wells for analysis by EPA Method 624 to detect the presence of volatile organic compounds. All samples were reported as below the detection limit for all compounds excepting wells Ls and Nd. Six micrograms per liter (approximately 6 parts per billion) of toluene was detected in ground water at well Ls. EPA's suggested no adverse response level (Snarl) for toluene in drinking water is 1 mg/l. This is several orders of magnitude higher than the concentration detected in this sample. A trace of tetrahydrafuran was detected in well Ls. This chemical is associated with solvents used in plastic cements. A trace level refers to a probable presence of the compound below the detection limit, and therefore cannot be quantified. The lack of volatile organic compounds in other ground water samples throughout the study area indicate that the leachate is "free" of hazardous volatile compounds associated with industrial wastes.

Environmental Considerations

Based upon the information presented herein, it is concluded that the leachate plume has been impacting the Depot Street well for a number of years. Given an average ground water velocity of three feet per day, it would only take a travel time of two years for the leachate to migrate the 2,200-foot distance to the well. The zone of contribution to the Depot Street well was realigned according to the sub-regional water-table mapping of this study using the same analytical methodology and well characteristics as presented in the previous IEP (1986) report (Figure 16). The Todd (1980)

formula was used to solve the downgradient and lateral capture points for a pumping well in a uniform flow field:

$$\text{Down Gradient Capture Point: } X = \frac{Q}{2 \pi T i}$$

$$\text{Lateral Capture Point: } Y = x \tilde{\pi}$$

Where: $Q = 400$ gpm or 77,005 ft^3/day

$T = 58{,}000$ gpd/foot or 7,767 ft^2/day

$i = .004$ hydraulic gradient

$$X = \frac{77{,}005}{2 \tilde{\pi} (7{,}767)\ .004} = 394 \text{ feet}$$

$Y = 1{,}240$ feet

These capture points were located on the water table map and the capture envelope was extended in an upgradient direction perpendicular to the water-table contours.

The realigned zone indicates that the landfill sites are within the zone of contribution to the Depot Street wellfield. A comparison of water quality data within the leachate plume and the well's production water indicate a correlation between several constituents. The production well water has elevated concentrations of specific conductance, sodium, chloride, potassium and calcium and slightly elevated levels of sulfate, hardness and alkalinity. Nitrate and ammonium were sampled at well sites G, Os, Od, Ns, Nd, Ld, Hs, Hd and the preliminary laboratory results indicate that the nitrogen content of the plume ranges between <.02 to 5.5 ppm ammonium and <.05 to 2.4 ppm nitrate. High nitrogen content leachate plumes are usually associated with an auxilliary disposal of waste water, septage and/or sludge which has reportedly not been disposed of at the sites. Ammonium and

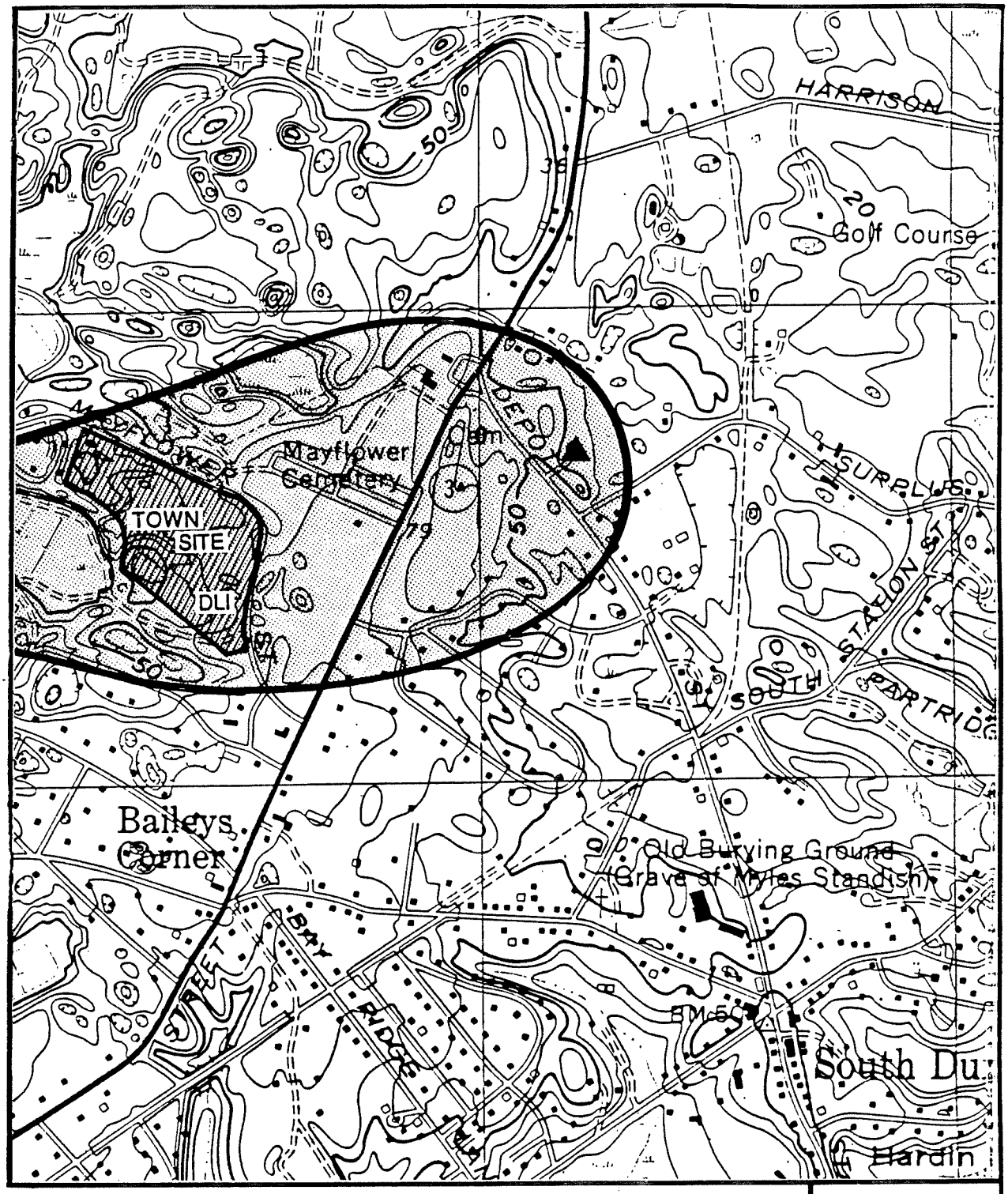


FIGURE 16: ZONE OF CONTRIBUTION TO DEPOT STREET WELL

LEGEND

- *ZONE OF CONTRIBUTION*
- *DEPOT STREET WELL*
- *SITES*

IEP Inc.

SCALE IN FEET

0 1000 2000

nitrate concentrations at the well are <.02 and 0.6 ppm respectively. It appears from the water quality data (Table 3) that the procedure of pumping the well to waste for several days before putting on-line offers a mitigating effect of the plume's impact. For instance, the well's alkalinity concentration is only slightly elevated as compared to 300 ppm alkalinity at well site O. However, because of the unpredictable effect of seasonal climatic changes upon leachate production, water quality of the Depot Street well remains threatened by the condition of the sites.

The Partridge Street well is located 4,500 feet from the landfill sites on an easterly south-east direction. Although there is a lack of water table elevation and chemical data in this area, the regional flow regime indicates the distinct probability that the Partridge Street well could be impacted by the landfill sites. Historical sodium and chloride data over the last ten years indicate concentrations of 16-22 and 20-30 ppm, respectively. Recent 1986 analysis of the well water indicates elevated concentrations of sodium, calcium, nitrate and specific conductance (Table 3). Based upon the average ground water flow velocity of three feet per day, there is a ground water travel time of 4.1 years between the landfills and the well.

Table 3.

WATER QUALITY COMPARISON

Inorganic Parameters	Well Bd	Depot St *	Partridge St **	Standards
Hydrogen Sulfide (mg/L)	< 1	-1	-	-
pH (units)	6.35	5.7	6.0	6.5-8.5
MBAS (mg/L)	< 0.4	-	-	0.5
Turbidity (NTU)	1,600	0.1	0	-
Color (units)	15	5	0	15
Total Dissolved Solids	930	-	-	-
Chloride (mg/L)	61	52	37	250
Sulfate (mg/L)	370	36	14	250
Specific Conductance (umhos/cm)	1,500	317	192	-
Alkalinity (mg/L)	410	12	10	-
Tannin-like Substances	3.5	-	-	.3
Hardness	550	59	33	-
Nitrate	-	0.6	2.6	10
Ammonia	-	< .02	.04	-
Metals				
Calcium	130	11	7.5	-
Copper	< 0.02	-	< .02	1.0
Iron	< 0.03	< 0.04	< .04	0.3
Manganese	8.3	.60	.03	0.05
Sodium	59	44	21	20
Lead	< 0.05	-	-	.05
Zinc	< 0.02	-	-	5.0
Potassium	-	2.8	1.7	-

* February 1988

** 1986

IEP inc.

CONCLUSIONS

1. There are two solid-waste disposal sites located on Mayflower Street. The Town transfer site was formerly a landfill that was first used as a dump in the early 1900's. The second is an inactive demolition/open dump that was first used in the 1940's. Both sites have been inactive since the mid 1970's when the former site was capped and the latter site entered into litigation.

2. The sites are located upon a thick stratified drift deposit of course to medium sand. The saturated thickness within this deposit ranges from 55 to 35 feet and is used as a public water supply by the Evergreen, Depot and Partridge Street wellfields. These wellfields are located within 4500 feet of the landfill.

3. The aquifer has an estimated average hydraulic conductivity of 325 ft/d and an average linear velocity of 3 ft/d. A detailed water table map indicates that ground water flow is to the east through the study area. The Evergreen Street wells are 1200 feet upgradient of the landfill sites. The landfills are directly upgradient of the Depot Street well and are in the well's zone of contribution. Although water table data to the south is lacking, consideration of regional flow patterns suggest that the Partridge Street well is also downgradient of the landfills.

4. A plume of leachate contaminated ground water is migrating from the landfills with the downgradient ground water flow. The plume is defined by higher than background levels of specific conductance, alkalinity, sodium, chloride, calcium, hardness, sulfate, iron, maganese, and tannic acid. Based on the analytical results of 17 ground water samples, the plume is "free" of industrial-related volatile organic compounds.

5. The present configuration of the plume indicates recent leachate production at the landfill sites. The uncapped condition of the DLI site results in leachate production from the unrestricted infiltration of rainfall through the refuse. Leachate generation at the Town site could be a result of some degree of infiltration through the cap and/or past refuse disposal below or at the water table.

6. The ground water flow velocity, plume configuration, and historical water quality data indicate that the landfill sites have impacted the Depot Street well. Production water from the well has elevated concentrations of specific conductance, sodium, chloride, calcium and potassium. None of these constituents excepting sodium are in excess of the State Drinking Water Standards.

7. Additional water-table elevation and chemical data is necessary to fully evaluate potential impacts of the landfill sites to the Partridge Street well.

RECOMMENDATIONS

1. Additional water-table elevation and chemical data should be provided in the area between the landfill sites and Partridge Street well.

2. Further site investigation is necessary to evaluate on-going processes of leachate generation.

3. The Town should keep abreast of imminent grant programs under the State 1987 Solid Waste Act which has allocated $100 million to assist communities in undertaking studies to evaluate the integrity of the existing landfill cap and for future hydrogeologic investigations as specified in Items 1 and 2 above.

4. Because of the transient effects of seasonal climatic variation upon the generation of leachate, the Town should consider the implementation of a ground water monitoring program of the defined leachate plume area.

5. The zones of contribution to the Depot and Partridge Street wells should be redefined and recommended for adoption at Town meeting to update the existing Water Resource Protection District.

6. The Town and DLI should consider a consistent closure plan for both respective sites.

7. The Town should require that future hydrochemical analysis of the DLI site include obtaining samples from discrete intervals of the aquifer that are consistent with the location of the leachate plume.

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APPENDIX A

B o r i n g L o g s

IEP BORING LOG

BORING NO. DUX-A5
SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT NO.: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 78.47 / TOP OF CASING
BORING CONTRACTOR: DESMOND	DATE: 10/27/87 — COMPLETION DEPTH: 55 FT
BORING EQUIPMENT: SOLID STEM AUGER	OBSERVED WATER LEVEL DATA: 46 FEET FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE FT	SAMPLE NO. LOC.	SAMPLE TYPE	REMARKS
78.47		0			TOP OF PROTECTIVE COVERING; TOP OF CASING
	0-60': STRATIGRAPHY IDENTICAL TO BORING A-D.	10			
		20			2" ID THREADED PVC CASING
		30			BENTOLYTE SEAL
		40			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	H_2O ▼				
		50			BOW
		60			B.O.H.

INSPECTOR: T. CAMPARERI

BORING NO. DUX-AD

IEP Inc. BORING LOG

SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 78.95 / TOP OF CASING
BORING CONTRACTOR: DESMOND	DATE: 8-31-87 / COMPLETION DEPTH: 65'
BORING EQUIPMENT: HOLLOW STEM AUGER W/SPLIT SPOON	OBSERVED WATER LEVEL DATA: 45.52' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
78.95					TOP OF CASING LOCKING PROTECTIVE COVERING
	0-10: DARK BROWN MED SAND, LITTLE COARSE SAND, TRACE SILT	0			FILL
		5			2" ID THREADED PVC CASING
		10		S1	HNU = 0 PPM 5-8-6 # OF BLOWS
		15			
	10-50: LITE TAN FINE TO MED (+) SAND; WELL SORTED. ISOLATED SILT LAYERS UP TO 0.05' THICK.	20		S2	GLACIOFLUVIAL HNU = 0 PPM 4-6-8 # OF BLOWS
		25			
		30		S3	HNU = 0 PPM 4-5-5 # OF BLOWS
		35			BENTONITE SEAL
	H_2O ▽	40		S4	HNU = 0 PPM 7-7-8 # OF BLOWS
		45			
	50-65: LITE BROWN MED TO COARSE (+) SAND, LITTLE GRAVEL, WELL SORTED.	50		S5	HNU = 0 PPM 25-12-11 # OF BLOWS GLACIOFLUVIAL
		55			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
		60		S6	INSPECTOR: T. CAMBARERI HNU = 0 PPM 2, 4, 6 # OF BLOWS
B.O.H.				B.O.H.	

BORING NO. DUX-B

SHEET 1 **OF** 1

IEP Inc. BORING LOG

PROJECT DUXBURY LANDFILL	**PROJECT** DUX-1
LOCATION DUXBURY	**ELEVATION AND DATUM** 81.11 TOP OF CASING
BORING CONTRACTOR T E DESMOND	**DATE** 9-1-87 / **COMPLETION DEPTH** 65'
BORING EQUIPMENT HOLLOW STEM AUGER W/ SPLIT SPOON	**OBSERVED WATER LEVEL DATA** 47.77' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
81.11					TOP OF CASING
					PROTECTIVE LOCKING COVERING
	0-1.5: LIGHT BRN MED TO FINE (+) SAND	0			TOPSOIL
	1.5-6: DARK TAN MED. SAND, LITTLE SILT, TRACE FINE GRAVEL	5			FILL
	6-14: DARK GRAY CRS SAND AND COARSE GRAVEL. REFUSE FRAGMENTS	10		B7	FILL & REFUSE HNU = 0 PPM
	14-17: DARK GRAY COARSE - MED. GRAVEL	15			FILL
	17-21: MOD BROWN MED. (+) TO FINE SAND. WELL SORTED	20			GLACIOFLUVIAL
	21-38: DARK TAN MED SAND, TRACE MED. GRAVEL	25			GLACIOFLUVIAL
		30			2" ID THREADED PVC CASING
		35			BENTONITE SEAL
	38-65: DARK TAN CRS (+) TO MED SAND, SOME MED GRAVEL	40			GLACIOFLUVIAL
	H_2O ▽	45		▽ H_2O	
		50		B50	HNU = 0 PPM 9-7-9 # OF BLOWS
		55			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
		60		B60	HNU = 0 PPM 61 # OF BLOWS
					INSPECTOR: D. PICKART

B.O.H. B.O.H.

BORING NO. DUX-CD

IEP Inc. BORING LOG

SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUX-1	ELEVATION AND DATUM: 73.12' TOP OF CASING
BORING CONTRACTOR: TE DESMOND	DATE: 8-31-87 / COMPLETION DEPTH: 65'
BORING EQUIPMENT: HOLLOW STEM AUGER W/ SPLIT SPOON	OBSERVED WATER LEVEL DATA: 39.61' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
73.12'					TOP OF CASING
					LOCKING PROTECTIVE COVERING
	0-1 BROWN SILT W/ COBBLES	0			TOP SOIL
	1-33: LIGHT BROWN FINE TO MED. SAND	5			GLACIOFLUVIAL
		10			
		15			2" ID THREADED PVC CASING
		20			
		25			
		30			BENTONITE SEAL
	33-40: DARK BROWN FINE TO MED. SAND H_2O ▽	35			GLACIOFLUVIAL ▽ H_2O
	40-48: BROWN FINE SAND, TRACE GRAVEL, LITTLE SILT	40		S1	NO RECOVERY GLACIOFLUVIAL
		45		S2	0 PPM, 6-5-10 # OF BLOWS
	48-55: BROWN VERY FINE TO FINE(+) SAND, TRACE MED. SAND	50		S3	GLACIOFLUVIAL 0 PPM, 6-11-10 # OF BLOWS
	55-65: LIGHT BROWN VERY FINE TO MED (+) SAND, TRACE SILT	55			GLACIOFLUVIAL
		60		S4	2" ID, .010 SLOT PVC SCREEN W/ CONICAL POINT 0 PPM 12-8-12 # OF BLOWS
					INSPECTOR: T. CABARERI

B.O.H.

B.O.H.

BORING NO. DUX-D

IEP Inc. BORING LOG

SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 64.52'/TOP OF CASING
BORING CONTRACTOR: T E DESMOND	DATE: 9-1-87 / COMPLETION DEPTH: 50'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 30.79 FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
64.52'					PROTECTIVE LOCKING COVERING; TOP OF CASING
	0-4: ORANGE BROWN MED. TO CRS. SAND, SOME GRAVEL	0			STONEY LOAM
	4-6: COARSE GRAVEL & CRS SAND	5			GLACIOFLUVIAL
	6-13: DARK TAN CRS(+) TO MED SAND, SOME FINE GRAVEL	10			GLACIOFLUVIAL
	13-20: LIGHT TAN MED(+) TO FINE SAND, TRACE FINE GRAVEL	15			GLACIOFLUVIAL; 2" ID THREADED PVC CASING
	20-35: LIGHT TAN FINE SAND, WELL SORTED	20			GLACIOFLUVIAL; BENTONITE SEAL
	H_2O ▽	25		▽	H_2O
		30			
	35-48 LIGHT TAN MED(+) TO FINE SAND, TRACE CRS. SAND. WELL SORTED	35			GLACIOFLUVIAL
		40			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	48-51 OLIVE GRAY FINE SAND AND SILT, TRACE CLAY, SCATTERED ANGULAR GRAVEL	45			TILL
	B.O.H.	50			B.O.H.

INSPECTOR: D. PICKART

BORING NO. DUX-E

SHEET 1 **OF** 1

IEP Inc. BORING LOG

PROJECT DUXBURY LANDFILL	**PROJECT** DUX-1
LOCATION DUXBURY	**ELEVATION AND DATUM** 55.07' TOP OF CASING
BORING CONTRACTOR T E DESMOND	**DATE** 9-1-87 / **COMPLETION DEPTH** 40'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 20.80' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
55.07'					PROTECTIVE LOCKING COVERING; TOP OF CASING
	0-4: DARK ORANGE FINE SAND, SOME GRAVEL	0			STONY LOAM
	4-9: BROWN MEDIUM TO FINE SAND, SCATTERED COBBLES	5			GLACIOFLUVIAL
	9-19: LIGHT ORANGE FINE TO MED(+) SAND	10			BENTONITE SEAL; GLACIOFLUVIAL
	H_2O ▽	15			2" ID THREADED PVC CASING; ▽ H_2O
	19-24: BROWN MED(+) TO COARSE SAND, SOME GRAVEL	20			GLACIOFLUVIAL
	24-34: LIGHT BROWN MED. SAND, SOME COARSE SAND, LITTLE GRAVEL	25			GLACIOFLUVIAL
		30			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	34-44: LIGHT BROWN MED(+) AND VERY FINE SAND, LITTLE SILT. B.O.W.	35			GLACIOFLUVIAL
		40			B.O.W.
	44-64: OLIVE GRAY COARSE TO FINE SAND AND SILT, TRACE CLAY, SOME ANGULAR GRAVEL	45			TILL
		50			
		55			
	B.O.H.	60			B.O.H.

INSPECTOR: T. CAMBARERI

BORING NO. DUX-FS

IEP Inc. BORING LOG

SHEET 1 **OF** 2

PROJECT DUXBURY LANDFILL	**PROJECT** DUX-1
LOCATION DUXBURY	**ELEVATION AND DATUM** 75.56' TOP OF CASING
BORING CONTRACTOR TE DESMOND	**DATE** 9-2-87 / **COMPLETION DEPTH** 60'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 42.69' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
75.56		0			LOCKING PROTECTIVE COVERING; TOP OF CASING
	0-9: ORANGE MED TO FINE SAND	5			LOAM
	9-14: LIGHT ORANGE VERY FINE SAND AND SILT	10			GLACIOFLUVIAL
	14-19: Light ORANGE FINE SAND, LITTLE CRS SAND, TRACE GRAVEL	15			GLACIOFLUVIAL; 2" ID THREADED PVC CASING
	19-29: BROWN MED SAND, SOME COARSE SAND, LITTLE FINE SAND.	20			GLACIOFLUVIAL
	29-69: LIGHT BROWN MED SAND, SOME COARSE SAND, TRACE FINE SAND	25			
	H_2O ▽	30			GLACIOFLUVIAL; BENTONITE SEAL
		35			▽ H_2O
		40			
		45			
		50			2" I.D. .010 SLOT PVC SCREEN W/ CONICAL POINT
		55			
	B.O.W.	60			B.O.W.

INSPECTOR: T. CAMBARERI

BORING NO. DUX-ES

IEP inc. BORING LOG

SHEET 2 OF 2

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 75.56 TOC
BORING CONTRACTOR: T E DESMOND	DATE: 7-3-87 / COMPLETION DEPTH: 75'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 42.69' 7-13-87

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
	69-75: BROWN MED TO COARSE(D) SAND, TRACE FINE SAND	70			GLACIOFLUVIAL
	B.O.H.	75			B.O.H.

INSPECTOR: T. CAMBARERI

BORING LOG

BORING NO. DUX-FD
SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT NO.: DUX-1
LOCATION: DUXBURY CEMETARY	ELEVATION AND DATUM: 75.10'/TOP OF CASING
BORING CONTRACTOR: DESMOND	DATE: 10/28/87 — COMPLETION DEPTH: 85'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 43' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE FT	SAMPLE NO. LOC.	SAMPLE TYPE	REMARKS
75.10		0			TOP OF STEEL COVERING; TOP OF CASING
	0-74': STRATIGRAPHY IDENTICAL TO BORING F5.	10			
		20			2" ID THREADED PVC SCREEN
		30			
		40			BENTONITE SEAL; H_2O
		50			
		60			
		70			
	74-85': BROWN COARSE TO VERY COARSE SAND, TRACE FINE GRAVEL				GLACIOFLUVIAL
		80			2" ID, .010 SLOT PVC SCREEN; BOW/BOM
		90			

INSPECTOR: D. PICKART

BORING NO. DUX-6

IEP Inc. BORING LOG

SHEET 1 OF 2

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 64.46' TOP OF CURB BOX
BORING CONTRACTOR: TE DESMOND	DATE: 9-2-87 / COMPLETION DEPTH: 75'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 31.55' FROM TOP OF CURB BOX

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
64.46'	0-4': DARK BROWN MED TO FINE(+) SAND AND SILT	0	TOP OF CURB BOX; TOP SOIL; TOP OF CASING		GLACIOFLUVIAL
	4-11': TAN MED TO CRS(+) SAND, SOME GRAVEL, COBBLE LAYER @ 8.0'	5			
	11-23': DARK TAN CRS TO MED(+) SAND, TRACE FINE GRAVEL	10			GLACIOFLUVIAL
		15	2" ID THREADED PVC CASING		
		20			
	23-28': CRS(+) TO VERY CRS SAND AND FINE TO CRS GRAVEL	25	BENTONITE SEAL		GLACIOFLUVIAL
	28-35': LIGHT TAN MED TO CRS SAND, TRACE FINE GRAVEL ▽ H_2O	30			GLACIOFLUVIAL ▽ H_2O
	35-51': LIGHT TAN MED SAND, WELL SORTED	35			GLACIOFLUVIAL
		40			
		45			
		50			
	51-72': LIGHT TAN MED TO FINE SAND, WELL SORTED	55			GLACIOFLUVIAL
		60			

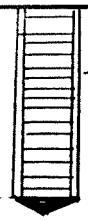
INSPECTOR: D. PEART

BORING NO. DUX-5

IEP Inc. BORING LOG

SHEET 2 OF 2

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY	ELEVATION AND DATUM: 64.46' TOP OF CURBBOX
BORING CONTRACTOR: TE DESMOND	DATE: 9-2-87 / COMPLETION DEPTH: 75'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 31.55' FROM TOP OF CURB BOX

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
		70			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	72-75: GRAY LAMINATED SILT AND CLAY				GLACIOLACUSTRINE, VARVED
	B.O.H.	75			B.O.H.

INSPECTOR: D. PICKART

BORING LOG

BORING NO. DUX-HS
SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT NO.: DUX-1
LOCATION: DUXBURY CEMETARY	ELEVATION AND DATUM: 74.14' / TOP OF CASING
BORING CONTRACTOR: DESMOND	DATE: 10/27/87 — COMPLETION DEPTH: 60'
BORING EQUIPMENT: SOLID STEM AUGER	OBSERVED WATER LEVEL DATA: 42' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE FT	SAMPLE NO. LOC.	SAMPLE TYPE	REMARKS
74.14'		0			TOP OF CURB BOX; TOP OF CASING
	0-1', ORANGE, MED. SAND & SILT, ORGANIC				TOPSOIL
	1-5' LIGHT BROWN MED. SAND, LITTLE COARSE				GLACIOFLUVIAL
	5-15' LIGHT BROWN MEDIUM SAND, WELL SORTED	10			GLACIOFLUVIAL
	15-50' LIGHT BROWN MEDIUM SAND, TRACE COBBLES	20			GLACIOFLUVIAL; 2" ID THREADED PVC CASING
		30			BENTONITE SEAL
32.14'		40			H_2O
					2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	50-53' BROWN COARSE TO MEDIUM SAND	50			GLACIOFLUVIAL
	53'-65' BROWN COARSE SAND, SOME MEDIUM SAND, TRACE PEBBLES				GLACIOFLUVIAL
	B.O.W.	60			B.O.W.

INSPECTOR: D. PILKART

B.O.H.

IEP inc. BORING LOG

BORING NO. DUX-HD

SHEET 1 OF 1

PROJECT: DUXBURY LANDFILL	PROJECT No.: DUX-1
LOCATION: CEMETARY	ELEVATION AND DATUM: 73.85'/TOP OF CASING
BORING CONTRACTOR: DESMOND	DATE: 1-22-88 / COMPLETION DEPTH: 85'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 42' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
73.85'		0			TOP OF CURB BOX; TOP OF RISER
	STRATIGRAPHY IDENTICAL TO BORING HS	10			
		20			2" ID THREADED PVC RISER
		30			BENTONITE SEAL
31.85'	▽	40			▽ H_2O
		50			
		60			
	65-80' BROWN, COARSE SAND, TRACE GRAVEL, WELL SORTED	70			GLACIOFLUVIAL
		80			2" ID. .010 SLOT PVC SCREEN W/ CONICAL PT.
	80-90' BROWN VERY CRS SAND, WELL SORTED	90			GLACIOFLUVIAL; B.O.H.
		100			

INSPECTOR: D. PICKART

IEP inc. BORING LOG

BORING NO. DUX-I

SHEET 1 **OF** 1

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION TREMONT STREET	**ELEVATION AND DATUM** 72.55' / TOP OF CASING
BORING CONTRACTOR DESMOND	**DATE** 10-27-87 / **COMPLETION DEPTH** 57'
BORING EQUIPMENT SOLID STEM AUGER	**OBSERVED WATER LEVEL DATA** 42' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
72.55'					TOP OF CURB BOX; TOP OF CASING
	0-1' ORANGE FINE SAND AND SILT, ORGANIC	0			TOPSOIL
	1-4' FINE TO MED. SAND, TRACE COBBLE				GLACIOFLUVIAL
	4-10' OLIVE SILT, FINE SAND, AND CLAY				GLACIOLACUSTRINE
	10-15' GRAY FINE TO MEDIUM SAND	10			GLACIOFLUVIAL
	15-45' GRAY MEDIUM SAND, TRACE COBBLES	20			GLACIOFLUVIAL; BENTONITE SEAL; 2" ID THREADED PVC RISER
30.55'		30			H_2O
	45-60' GRAY COARSE TO MEDIUM SAND	40			GLACIOFLUVIAL
	B.O.W.	50			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT; B.O.W.
	GRAY MEDIUM TO FINE SAND	60			GLACIOFLUVIAL
	B.O.H.				INSPECTOR: T. CAMBARERI; B.O.H.

BORING NO. DUX-J

SHEET 1 **OF** 1

IEP Inc. BORING LOG

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION DUXBURY CEMETARY	**ELEVATION AND DATUM** 77.58 / TOP OF CASING
BORING CONTRACTOR DESMOND	**DATE** 10-27-87 / **COMPLETION DEPTH** 60'
BORING EQUIPMENT SOLID STEM AUGER	**OBSERVED WATER LEVEL DATA** 45' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
77.58'					TOP OF CURB BOX; TOP OF CASING
	0-1' ORANGE FINE SAND, SOME SILT, ORGANIC	0			TOPSOIL
	1-10' LIGHT BROWN FINE TO MEDIUM SAND				GLACIOFLUVIAL; 2" ID FLUSH-THREADED PVC RISER
	10-15' LIGHT BROWN MEDIUM SAND, SOME COBBLES, TRACE COARSE SAND	10			GLACIOFLUVIAL
	15-20' BROWN MED SAND				GLACIOFLUVIAL
	20-25' ORANGE BROWN, FINE TO MEDIUM SAND.	20			GLACIOFLUVIAL
	25-50' BROWN MEDIUM SAND, WELL SORTED.				GLACIOFLUVIAL; BENTONITE SEAL
32.58'		30			
		40			H_2O
					2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	50-60' BROWN MED TO COARSE SAND	50			GLACIOFLUVIAL
		60			B.O.W. B.O.H.

INSPECTOR: T. CAMBARERI

IEP Inc. BORING LOG

BORING NO. DUX-K

SHEET 1 **OF** 1

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION DUXBURY CEMETARY	**ELEVATION AND DATUM** 74.04' / TOP OF CASING
BORING CONTRACTOR DESMOND	**DATE** 10-27-87 / **COMPLETION DEPTH** 57'
BORING EQUIPMENT SOLID STEM AUGER	**OBSERVED WATER LEVEL DATA** 41' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
74.04'					TOP OF CURB BOX; TOP OF CASING
	0-1' ORANGE BROWN FINE SAND, ORGANIC	0			TOP SOIL
	1-10' LIGHT BROWN FINE SAND				GLACIOFLUVIAL
	10-15' LIGHT BROWN MED. TO FINE SAND	10			GLACIOFLUVIAL
	15-45' LIGHT BROWN MED TO COARSE SAND, TRACE PEBBLES	20			GLACIOFLUVIAL; BENTONITE SEAL; 2" ID FLUSH-THREADED PVC RISER
33.04'	▼	30			▼ H_2O
		40			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
	45-60' BROWN MED. TO COARSE SAND	50			GLACIOFLUVIAL
		60			B.O.W.; B.O.H.

INSPECTOR: T. CAMBARERI

BORING NO. DUX-13

SHEET 1 **OF** 1

IEP Inc. BORING LOG

PROJECT DUXBURY LANDFILL	**PROJECT** DUX-1
LOCATION DUXBURY CEMETARY	**ELEVATION AND DATUM** 80.76 / TOP OF PVC CASING
BORING CONTRACTOR DESMOND	**DATE** 10/28/87 **COMPLETION DEPTH** 65'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 48.63' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
80.76'					PROTECTIVE STEEL COVERING
					TOP OF CASING
	0-4' ORANGE BROWN FINE SAND, SOME SILT, TRACE GRAVEL	0			ORGANIC TOPSOIL
	4-19' LIGHT TAN FINE TO MEDIUM SAND, WELL SORTED	10			GLACIOFLUVIAL
					2" ID THREADED PVC CASING
	19-27' LIGHT TAN FINE SAND, WELL SORTED	20			GLACIOFLUVIAL
	27-42' LIGHT TAN MEDIUM SAND, TRACE COARSE SAND, WELL SORTED	30			GLACIOFLUVIAL
		40			BENTONITE SEAL
	42-58' TAN COARSE SAND, TRACE FINE TO COARSE GRAVEL				GLACIOFLUVIAL
32.13'	H_2O	50			H_2O
					2" ID, .010 SLOT PVC SCREEN W/ CONICAL POINT
	58-65' DARK TAN COARSE TO VERY COARSE SAND, SOME GRAVEL	60			GLACIOFLUVIAL

INSPECTOR: D. PLKART

B.O.H., B.O.W.

BORING NO. DUX-LD

iEP inc. BORING LOG

SHEET 1 **OF** 2

PROJECT DUXBURY LANDFILL	**PROJECT** DUX-1
LOCATION DUXBURY CEMETARY	**ELEVATION AND DATUM** 80.33' / TOP OF PVC CASING
BORING CONTRACTOR DESMOND	**DATE** 1/21/88 — **COMPLETION DEPTH** 85'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 48.05' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
80.33'	STRATIGRAPHY IDENTICAL TO WELL DUX-LS TO 58'	0			TOP OF CURB BOX TOP OF CASING
		10			
		20			2" ID THREADED PVC CASING
		30			
		40			BENTONITE SEAL
32.28'	H_2O ▽	50			▽ H_2O
	58-90' DARK TAN COARSE TO VERY COARSE SAND, SOME GRAVEL	60			GLACIOFLUVIAL INSPECTOR: D. PICKART

BORING NO. DUX-LD

SHEET 2 OF 2

IEP Inc. BORING LOG

PROJECT: DUXBURY LANDFILL	PROJECT: DUX-1
LOCATION: DUXBURY CEMETARY	ELEVATION AND DATUM: 80.33 / TOP OF PVC CASING
BORING CONTRACTOR: DESMOND	DATE: 1/21/88 — COMPLETION DEPTH: 85'
BORING EQUIPMENT: HOLLOW STEM AUGER	OBSERVED WATER LEVEL DATA: 48.05' FROM TOP OF CASING

ELEV.	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
		70			
		80			2" ID .010 SLOT PVC SCREEN W/ CONICAL POINT
					B.O.W.
		90			B.O.H.

INSPECTOR: D. PICKART

IEP Inc. BORING LOG

BORING NO. DUX-M

SHEET 1 **OF** 1

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION CEMETARY	**ELEVATION AND DATUM** 71.16'/TOP OF CASING
BORING CONTRACTOR DESMOND	**DATE** 10-28-87 / **COMPLETION DEPTH** 55'
BORING EQUIPMENT SOLID STEM AUGER	**OBSERVED WATER LEVEL DATA** 40.5' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
71.16'					TOP OF CURB BOX; TOP OF CASING
	0-4' LT. BRN FINE SAND + SILT, ORGANIC	0			TOP SOIL
	4'-11' LIGHT TAN MED. SAND, TRACE SILT, SOME CRS. GRAVEL	10			GLACIOFLUVIAL
	11-20' DARK TAN CRS SAND, TRACE FINE GRAVEL	20			GLACIOFLUVIAL; BENTONITE SEAL
	20-70' DARK TAN VERY COARSE SAND + FINE GRAVEL	30			GLACIOFLUVIAL; 2" ID FLUSH-THREADED PVC RISER
30.66'	H_2O ▽	40			▽ H_2O
		50			2" ID .010 SLOT PVC SCREEN W/ CONICAL PT.
		60			
		70			B.O.H.
		80			

INSPECTOR: D. PICKART

IEP Inc. BORING LOG

BORING NO. DUX-N-S+D

SHEET 1 **OF** 1

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION CEMETARY	**ELEVATION AND DATUM** 75.64/DUX N-D
BORING CONTRACTOR DESMOND	**DATE** 1-21-88 / **COMPLETION DEPTH** 75'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 44' FROM TOP OF CASING

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
75.64'	0-5' BROWN FINE SAND & GRAVEL	0			TOP OF CURB BOX; TOP OF RISER
	5-10' BROWN FINE SAND & SILT				FILL
	10-16' ORANGE MED SAND & GRAVEL	10			GLACIOFLUVIAL
	16-24' DARK BRN. CRS. SAND, TRACE GRAVEL	20			GLACIOFLUVIAL
	24-38' LIGHT TAN MED SAND, WELL SORTED	30			GLACIOFLUVIAL; 2" ID FLUSH-THREADED PVC RISER
	38-85' LIGHT TAN FINE TO MED. SAND	40			BENTONITE SEAL; GLACIOFLUVIAL
31.64'	▽				H_2O
		50			
		60			
		70			2" ID .010 SLOT PVC SCREEN W/ CONICAL PT.
		80			B.O.H.
		90			

INSPECTOR: D. PICKART

IEP Inc. BORING LOG

BORING NO. DUX-O-S+D

SHEET 1 **OF** 1

PROJECT DUXBURY LANDFILL	**PROJECT No.** DUX-1
LOCATION CEMETARY	**ELEVATION AND DATUM** 68.79 / TOP OF CURB BOX
BORING CONTRACTOR DESMOND	**DATE** 1-22-88 / **COMPLETION DEPTH** 70'
BORING EQUIPMENT HOLLOW STEM AUGER	**OBSERVED WATER LEVEL DATA** 45' FROM BOX

ELEV. FT	DESCRIPTION	DEPTH SCALE	WELL DETAILS	SAMPLE NO.	REMARKS
68.79'	0-5' ORANGE FINE SAND, TRACE SILT	0	TOP OF CURB BOX; TOP OF CASING		TOPSOIL
	5-10' BROWN CRS SAND, SOME MED. SAND				GLACIOFLUVIAL
	10-30' LIGHT TAN MED. SAND, WELL SORTED	10, 20			GLACIOFLUVIAL
		30	2" ID THREADED PVC RISER		
	30-62' LIGHT TAN FINE SAND, VERY WELL SORTED	40	BENTONITE SEAL		
23.79'	▽		▽		H20
		50			
		60	2" ID. 010 SLOT PVC SCREEN W/ CONICAL POINT		
	62-70' LIGHT TAN MED. TO CRS. SAND				GLACIOFLUVIAL
	70-80 GRAY FINE SILT	70			GLACIOLACUSTRINE
		80			B.O.H.

INSPECTOR: D. PICKART

APPENDIX B

Water Table Measurements

DUXBURY LANDFILL WELLS: WATER TABLE MEASUREMENTS

9/16/87

WELL NUMBER	TAPE READING FT.	CORR. FACTOR FT.	WATER DEPTH FT.	WELL ELEVATION FT.	WATER ELEVATION FT.
DUX-A	45.12	0.40	45.52	78.95	33.43
DUX-B	47.37	0.40	47.77	81.11	33.34
DUX-CD	39.21	0.40	39.61	73.12	33.51
DUX-CS	40.77	0.40	41.17	74.54	33.37
DUX-D	30.39	0.40	30.79	64.52	33.73
DUX-E	20.40	0.40	20.80	55.07	34.27
DUX-F	42.29	0.40	42.69	75.56	32.87
DUX-G	36.15	0.40	36.55	64.46	27.91
PE-1	47.99	0.40	48.39	82.58	34.19
WH-A	5.31	0.40	5.71	40.04	34.33
WH-C	12.81	0.40	13.21	47.80	34.59
WH-D	17.40		DRY		
GHR-MW6	9.29	0.40	9.69	43.44	33.75

DUXBURY LANDFILL WELLS: WATER TABLE MEASUREMENTS

10/9/87

WELL NUMBER	TAPE READING FT.	CORR. FACTOR FT.	WATER DEPTH FT.	WELL ELEVATION FT.	WATER ELEVATION FT.
DUX-A	46.60	0.74	45.86	78.95	33.09
DUX-B	48.80	0.69	48.11	81.11	33.00
DUX-CD	40.50	0.55	39.95	73.12	33.17
DUX-CS	41.80	0.35	41.45	74.54	33.09
DUX-D	31.50	0.55	30.95	64.52	33.57
DUX-E	21.70	0.72	20.98	55.07	34.09
DUX-F	44.00	0.93	43.07	75.56	32.49
DUX-G	37.50	0.79	36.71	64.46	27.75
PE-1	49.00	0.52	48.48	82.58	34.10
WH-A	6.30	0.41	5.89	40.04	34.15
WH-C	13.70	0.57	13.13	47.80	34.67
WH-D	17.50		DRY		
GHR-MW1	31.00	0.40	30.60	67.37	36.77
GHR-MW2	34.50	1.00	33.50	64.78	31.28
GHR-MW3	46.00	0.96	45.04	78.19	33.15
GHR-MW3A	45.50	0.62	44.88	77.98	33.10
GHR-MW4	41.50	0.57	40.93	74.57	33.64
GHR-MW4A	42.50	1.71	40.79	74.45	33.66
GHR-MW5	29.80	0.47	29.33	63.28	33.95
GHR-MW5A	31.30	0.60	30.70	64.58	33.88
GHR-MW6	10.00	0.70	9.30	43.44	34.14
GHR-MW6A	13.00	1.49	11.51	45.59	34.08
GHR-MW7	25.00	0.66	24.34	58.26	33.92
GHR-MW7A	29.00	3.60	25.40	59.16	33.76

WATER TABLE MEASUREMENTS 3 NOVEMBER 1987

Well Number	Location	Elevation (feet)	Tape Reading (feet)	Chalk Reading (feet)	Depth to Water (feet)	Water Elevation (feet)
DUX-AS	Mayflower Street	78.47	49.00	3.12	45.88	32.59
DUX-AD	Mayflower Street	78.95	46.80	0.45	46.35	32.60
DUX-B	Mayflower Street	81.11	49.00	0.40	48.60	32.51
DUX-CS	Mayflower Street	74.54	42.50	0.58	41.92	32.62
DUX-CD	Mayflower Street	73.12	41.00	0.56	40.44	32.68
DUX-D	Mayflower Street	64.52	31.90	0.47	31.43	33.09
DUX-E	Mayflower Street	55.07	22.00	0.60	21.40	33.67
DUX-FS	Cemetary	75.57	44.00	0.46	43.54	32.03
DUX-FD	Cemetary	75.1	44.00	0.96	43.04	32.06
DUX-G	Tremont Street	64.47	38.00	1.04	36.96	27.51
DUX-H	Cemetary	74.14	42.80	0.58	42.22	31.92
DUX-I	Tremont Street	72.55	42.00	0.31	41.69	30.86
DUX-J	Mayflower Street	77.58	46.50	1.38	45.12	32.46
DUX-K	Mayflower Street	74.04	42.30	0.64	41.66	32.38
DUX-L	Cemetary	80.77	50.00	1.37	48.63	32.14
DUX-M	Cemetary	71.17	41.50	0.95	40.55	30.62
PE-1	Duxbury Landfill	82.58	49.75	0.80	48.95	33.63
MW-1	McNeil Stump Dump	67.37	32.50	1.42	31.08	36.29
MW-2	McNeil Stump Dump	64.78	35.60	1.62	33.98	30.80
MW-6	McNeil Stump Dump	43.44	11.00	1.23	9.77	33.67
WH-A	Duxbury Landfill	40.04	6.04	0.40	6.44	33.60
WH-C	Evergreen Street Well	47.80	14.00	0.68	13.32	34.48
WH-D	Evergreen Street Well	54.07		*DRY*		
EG-S	Evergreen Street Well	56.02	20.00	0.59	19.41	36.61

APPENDIX C

Slug Test Data

Well Bd

00:08 HRS 88/02/26 #02

STATION ID = 02

00:07:49	1	2.91
00:07:34	1	2.91
00:07:19	1	2.91
00:07:04	1	2.91
00:06:49	1	2.91
00:06:34	1	2.93
00:06:19	1	2.93
00:06:04	1	2.94
00:05:49	1	2.94
00:05:34	1	2.97
00:05:19	1	3.01
00:05:04	1	3.07
00:04:59	1	3.10
00:04:54	1	3.14
00:04:49	1	3.17
00:04:44	1	3.23
00:04:39	1	3.29
00:04:34	1	3.36
00:04:29	1	3.43
00:04:24	1	3.53
00:04:19	1	3.65
00:04:14	1	3.82
00:04:09	1	4.02
00:04:04	1	4.27
00:04:03	1	4.33
00:04:02	1	4.38
00:04:01	1	4.44
00:04:00	1	4.51
00:03:59	1	4.57
00:03:58	1	4.64
00:03:57	1	4.73
00:03:56	1	4.80
00:03:55	1	4.87
00:03:54	1	4.96
00:03:53	1	5.05
00:03:52	1	5.15
00:03:51	1	5.23
00:03:50	1	5.35
00:03:49	1	5.45
00:03:48	1	5.55
00:03:47	1	5.67
00:03:46	1	5.80
00:03:45	1	5.91
00:03:44	1	6.06
00:03:43	1	6.18
00:03:42	1	6.33
00:03:41	1	6.49
00:03:40	1	6.65
00:03:39	1	6.82
00:03:38	1	6.99
00:03:37	1	7.17
00:03:36	1	7.37
00:03:35	1	7.57
00:03:34	1	7.79
00:03:33	1	8.00
00:03:32	1	8.23
00:03:31	1	8.46
00:03:30	1	8.69
00:03:29	1	8.94
00:03:28	1	9.15
00:03:27	1	9.37
00:03:26	1	9.59
00:03:25	1	9.82
00:03:24	1	9.99
00:03:23	-1	10.11
00:03:22	1	10.11
00:03:21	1	9.99
00:03:20	1	9.37
00:03:19	1	8.91
00:03:18	1	8.23
00:03:17	1	7.44
00:03:16	1	7.41
00:03:15	1	6.78
00:03:14	1	6.23
00:03:13	1	5.59
00:03:12	1	4.97
00:03:11	1	4.18
00:03:10	1	3.42
00:03:09	1	2.91
00:03:08	1	2.90
00:03:07	1	2.90
00:03:06	1	2.90
00:03:05	1	2.88
00:03:04	1	2.88
00:02:04	1	2.88
00:11:08	1	1.41
00:11:03	1	1.43
00:10:58	1	1.44
00:10:53	1	1.47

Well Ad

00:56 HRS 88/02/26 #03

STATION ID = 03

00:55:32	1	1.33
00:55:02	1	1.33
00:54:32	1	1.33
00:54:02	1	1.33
00:53:32	1	1.33
00:53:02	1	1.33
00:52:32	1	1.33
00:52:02	1	1.33
00:51:47	1	1.33
00:51:32	1	1.33
00:51:17	1	1.33
00:51:02	1	1.33
00:50:47	1	1.33
00:50:32	1	1.31
00:50:17	1	1.33
00:50:02	1	1.33
00:49:47	1	1.31
00:49:32	1	1.33
00:49:17	1	1.31
00:49:02	1	1.31
00:48:57	1	1.31
00:48:52	1	1.31
00:48:47	1	1.31
00:48:42	1	1.31
00:48:37	1	1.31
00:48:32	1	1.31
00:48:27	1	1.31
00:48:22	1	1.31
00:48:17	1	1.31
00:48:12	1	1.31
00:48:07	1	1.31
00:48:02	1	1.31
00:48:01	1	1.31
00:48:00	1	1.31
00:47:59	1	1.31
00:47:58	1	1.31
00:47:57	1	1.31
00:47:56	1	1.31
00:47:55	1	1.31
00:47:54	1	1.31
00:47:53	1	1.31
00:47:52	1	1.31
00:47:51	1	1.31
00:47:50	1	1.31
00:47:49	1	1.33
00:47:48	1	1.33
00:47:47	1	1.33
00:47:46	1	1.33
00:47:45	1	1.33
00:47:44	1	1.34
00:47:43	1	1.34
00:47:42	1	1.36
00:47:41	1	1.37
00:47:40	1	1.38
00:47:39	1	1.40
00:47:38	1	1.41
00:47:37	1	1.43
00:47:36	1	1.46
00:47:35	1	1.48
00:47:34	1	1.53
00:47:33	1	1.59
00:47:32	1	1.64
00:47:31	1	1.73
00:47:30	1	1.85
00:47:29	1	1.99
00:47:28	1	2.15
00:47:27	1	2.35
00:47:26	1	2.51
00:47:25	1	2.71
00:47:24	1	3.04
00:47:23	1	3.29
00:47:22	1	3.53
00:47:21	1	3.83
00:47:20	1	4.17
00:47:19	1	4.15
00:47:18	1	4.87
00:47:17	1	4.07
00:47:16	1	4.17
00:47:15	1	3.09
00:47:14	1	2.90
00:47:13	1	2.84
00:47:12	1	2.61
00:47:11	1	2.08
00:47:10	1	1.79
00:47:09	1	1.28
00:47:08	1	1.30
00:47:07	1	1.28
00:47:06	1	1.28
00:47:05	1	1.28
00:47:04	1	1.28
00:47:03	1	1.28
00:47:02	1	1.27
00:46:02	1	1.27

Well H

01:48 HRS 88/02/26 #05

STATION ID = 05

01:47:47	1	4.05
01:47:17	1	4.05
01:46:47	1	4.05
01:46:17	1	4.05
01:45:47	1	4.05
01:45:17	1	4.05
01:44:47	1	4.05
01:44:17	1	4.05
01:44:02	1	4.05
01:43:47	1	4.05
01:43:32	1	4.05
01:43:17	1	4.05
01:43:02	1	4.05
01:42:47	1	4.05
01:42:32	1	4.05
01:42:17	1	4.05
01:42:02	1	4.05
01:41:47	1	4.05
01:41:32	1	4.05
01:41:17	1	4.05
01:41:12	1	4.05
01:41:07	1	4.05
01:41:02	1	4.05
01:40:57	1	4.05
01:40:52	1	4.05
01:40:47	1	4.05
01:40:42	1	4.07
01:40:37	1	4.07
01:40:32	1	4.07
01:40:27	1	4.07
01:40:22	1	4.07
01:40:17	1	4.08
01:40:16	1	4.08
01:40:15	1	4.08
01:40:14	1	4.08
01:40:13	1	4.08
01:40:12	1	4.09
01:40:11	1	4.09
01:40:10	1	4.09
01:40:09	1	4.09
01:40:08	1	4.11
01:40:07	1	4.11
01:40:06	1	4.12
01:40:05	1	4.12
01:40:04	1	4.14
01:40:03	1	4.15
01:40:02	1	4.17
01:40:01	1	4.18
01:40:00	1	4.20
01:39:59	1	4.21
01:39:58	1	4.22
01:39:57	1	4.24
01:39:56	1	4.27
01:39:55	1	4.28
01:39:54	1	4.31
01:39:53	1	4.33
01:39:52	1	4.37
01:39:51	1	4.41
01:39:50	1	4.48
01:39:49	1	4.56
01:39:48	1	4.64
01:39:47	1	4.74
01:39:46	1	4.86
01:39:45	1	4.97
01:39:44	1	5.12
01:39:43	1	5.28
01:39:42	1	5.44
01:39:41	1	5.75
01:39:40	1	5.81
01:39:39	1	6.10
01:39:38	1	6.34
01:39:37	1	5.87
01:39:36	1	6.39
01:39:35	1	6.11
01:39:34	1	7.05
01:39:33	1	5.90
01:39:32	1	6.23
01:39:31	1	5.78
01:39:30	1	5.90
01:39:29	1	5.28
01:39:28	1	5.03
01:39:27	1	4.76
01:39:26	1	4.67
01:39:25	1	4.44
01:39:24	1	4.31
01:39:23	1	4.04
01:39:22	1	4.05
01:39:21	1	4.05
01:39:20	1	4.04
01:39:19	1	4.05
01:39:18	1	4.04
01:39:17	1	4.04
01:38:17	1	4.04

- WFd

00:17 HRS 98/02/26 #01 Well E

STATION ID = 01

00:17:18	1	1.41
00:16:48	1	1.41
00:16:18	1	1.41
00:15:48	1	1.41
00:15:18	1	1.41
00:14:48	1	1.41
00:14:18	1	1.41
00:13:48	1	1.41
00:13:33	1	1.41
00:13:18	1	1.41
00:13:03	1	1.41
00:12:48	1	1.41
00:12:33	1	1.41
00:12:18	1	1.41
00:12:03 32	1	1.41
00:11:48 205	1	1.43
00:11:33 152	1	1.43
00:11:18 85	1	1.43
00:11:03 20	1	1.43
00:10:48 [illegible]	1	1.43
00:10:43 [illegible]	1	1.43
00:10:38 95	1	1.44
00:10:33 [illegible]	1	1.44
00:10:28 95	1	1.46
00:10:23 [illegible]	1	1.46
00:10:18 75	1	1.47
00:10:13 70	1	1.48
00:10:08 65	1	1.51
00:10:03 60	1	1.56
00:09:58 55	1	1.60
00:09:53 50	1	1.67
00:09:48 45	1	1.79
00:09:47 44	1	1.82
00:09:46 43	1	1.83
00:09:45 42	1	1.86
00:09:44 41	1	1.89
00:09:43 40	1	1.92
00:09:42 39	1	1.95
00:09:41 38	1	1.98
00:09:40 37	1	2.02
00:09:39 36	1	2.05
00:09:38 35	1	2.09
00:09:37 34	1	2.12
00:09:36 33	1	2.16
00:09:35 32	1	2.21
00:09:34 31	1	2.25
00:09:33 30	1	2.31
00:09:32 29	1	2.35
00:09:31 28	1	2.41
00:09:30 27	1	2.47
00:09:29 26	1	2.52
00:09:28 25	1	2.60
00:09:27 24	1	2.67
00:09:26 23	1	2.75
00:09:25 22	1	2.84
00:09:24 21	1	2.94
00:09:23 20	1	3.01
00:09:22 19	1	3.09
00:09:21 18	1	3.19
00:09:20 17	1	3.30
00:09:19 16	1	3.43
00:09:18 15	1	3.56
00:09:17 14	1	3.72
00:09:16 13	1	3.89
00:09:15 12	1	4.07
00:09:14 11	1	4.25
00:09:13 10	1	4.47
00:09:12 9	1	4.69
00:09:11 8	1	4.93
00:09:10 7	1	5.19
00:09:09 6	1	5.46
00:09:08 5	1	5.78
00:09:07 4	1	6.10
00:09:06 3	1	6.40
00:09:05 2	1	6.79
00:09:04 1	1	7.01
00:09:03 0	1	7.47 — 6,1
00:09:02	1	7.34
00:09:01	1	7.14
00:09:00	1	6.96
00:08:59	1	6.70
00:08:58	1	6.50
00:08:57	1	5.46
00:08:56	1	5.42
00:08:55	1	4.63
00:08:54	1	4.04
00:08:53	1	3.20
00:08:52	1	2.51
00:08:51	1	1.77
00:08:50	1	1.36
00:08:49	1	1.38
00:08:[illegible]		
00:07		

02:38 HRS 98/02/26 #07

STATION ID = 07 Well Nd

02:37:55	1	3.10
02:37:25	1	3.11
02:36:55	1	3.10
02:36:25	1	3.10
02:35:55	1	3.10
02:35:25	1	3.10
02:34:55	1	3.10
02:34:25	1	3.10
02:34:10	1	3.10
02:33:55	1	3.10
02:33:40	1	3.10
02:33:25	1	3.10
02:33:10	1	3.10
02:32:55	1	3.10
02:32:40	1	3.10
02:32:25	1	3.10
02:32:10	1	3.10
02:31:55	1	3.10
02:31:40	1	3.10
02:31:25	1	3.10
02:31:20	1	3.10
02:31:15	1	3.10
02:31:10 90	1	3.10
02:31:05 85	1	3.11
02:31:00 80	1	3.11
02:30:55 75	1	3.11
02:30:50 70	1	3.11
02:30:45 65	1	3.11
02:30:40 60	1	3.11
02:30:35 55	1	3.13
02:30:30 49	1	3.14
02:30:25 44	1	3.16
02:30:24 43	1	3.16
02:30:23 42	1	3.17
02:30:22 41	1	3.17
02:30:21 40	1	3.17
02:30:20 39	1	3.19 .18
02:30:19 38	1	3.19 .18
02:30:18 37	1	3.20 .19
02:30:17 36	1	3.21 .20
02:30:16 35	1	3.21 .20
02:30:15 34	1	3.23 .22
02:30:14 33	1	3.24 .23
02:30:13 32	1	3.26 .25
02:30:12 31	1	3.27 .26
02:30:11 30	1	3.29 .28
02:30:10 29	1	3.32 .31
02:30:09 28	1	3.33 .32
02:30:08 27	1	3.36 .35
02:30:07 26	1	3.39 .38
02:30:06 25	1	3.42 .41
02:30:05 24	1	3.46 .45
02:30:04 23	1	3.49 .49
02:30:03 22	1	3.53 .52
02:30:02 21	1	3.58 .57
02:30:01 20	1	3.63 .62
02:30:00 19	1	3.69 .68
02:29:59 18	1	3.75 .74
02:29:58 17	1	3.81 .80
02:29:57 16	1	3.85 .84
02:29:56 15	1	3.89 .88
02:29:55 14	1	3.94 .93
02:29:54 13	1	4.01 1.0
02:29:53 12	1	4.14 1.13
02:29:52 11	1	4.28 1.27
02:29:51 10	1	4.43 1.42
02:29:50 9	1	4.58 1.57
02:29:49 8	1	4.77 1.76
02:29:48 7	1	5.00 1.99
02:29:47 6	1	5.22 2.21
02:29:46 5	1	5.44 2.43
02:29:45 4	1	5.69 2.68
02:29:44 3	1	5.95 2.94
02:29:43 2	1	6.39 3.38
02:29:42 1	1	6.46 3.45
02:29:41 0	1	6.98 3.97
02:29:40	1	6.49
02:29:39	1	6.00
02:29:38	1	6.06
02:29:37	1	5.75
02:29:36	1	5.85
02:29:35	1	5.44
02:29:34	1	5.26
02:29:33	1	4.71
02:29:32	1	4.09
02:29:31	1	3.11
02:29:30	1	3.09
02:29:29	1	3.04
02:29:28	1	3.04
02:29:27	1	3.04
02:29:26	1	3.03
02:29:25	1	3.03
02:28:25	1	3.01

02:15 HRS 98/02/26 #07

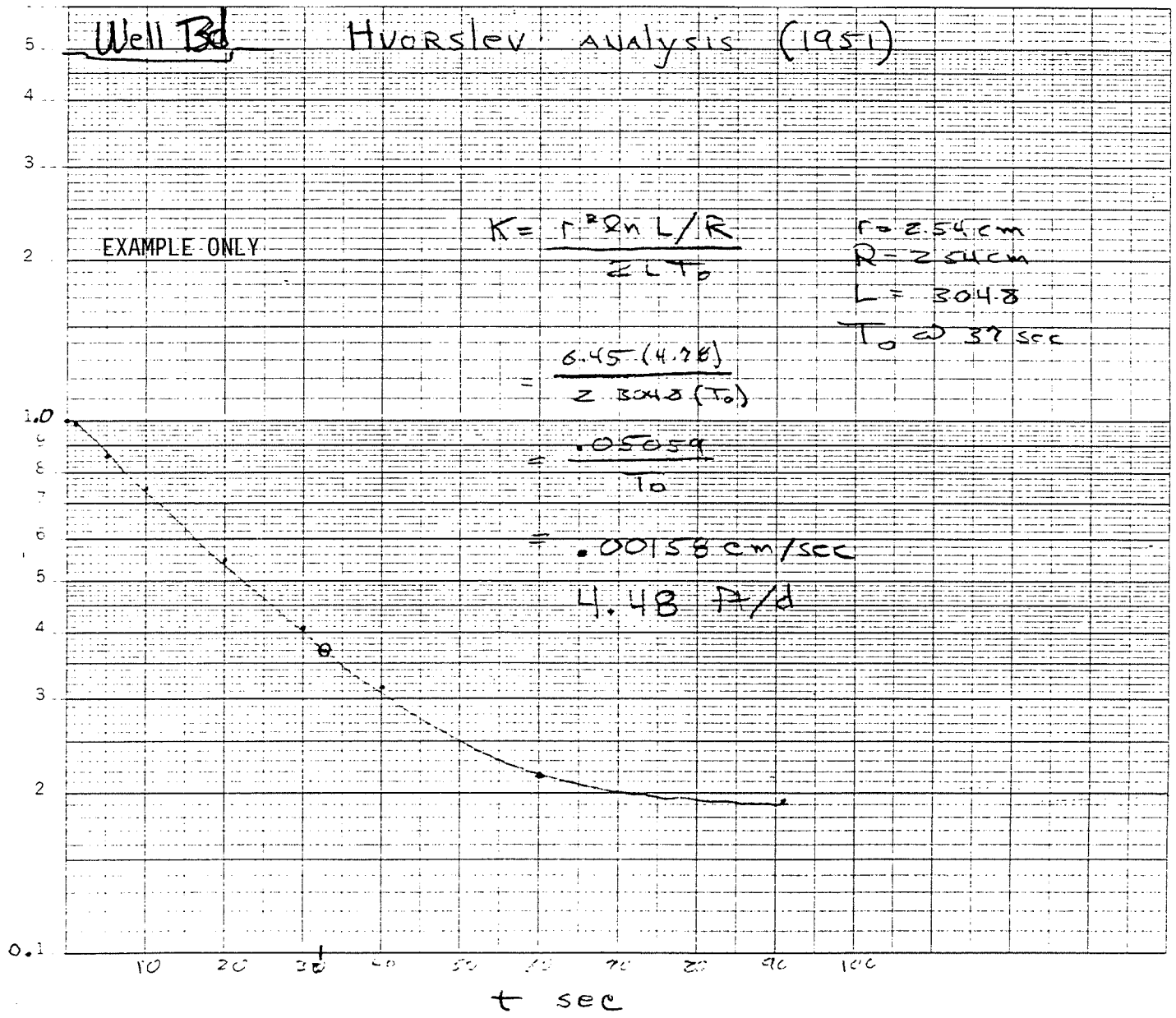
STATION ID = 06

02:15:

02:15 HRS 98/02/26 #06

STATION ID = 06

02:15:07	1	3.37
02:14:37	1	3.37
02:14:07	1	3.36
02:13:37	1	3.36
02:13:07	1	3.36
02:12:37	1	3.36
02:12:07	1	3.36
02:11:37	1	3.36
02:11:22	1	3.36
02:11:07	1	3.36
02:10:52	1	3.36
02:10:37	1	3.36
02:10:22	1	3.36
02:10:07	1	3.36
02:09:52	1	3.36
02:09:37	1	3.36
02:09:22	1	3.36
02:09:07	1	3.36
02:08:52	1	3.36
02:08:37	1	3.36
02:08:32	1	3.36
02:08:27	1	3.36
02:08:22	1	3.36
02:08:17	1	3.37
02:08:12	1	3.36
02:08:07	1	3.37
02:08:02	1	3.37
02:07:57	1	3.37
02:07:52	1	3.37
02:07:47	1	3.37
02:07:42	1	3.37
02:07:37	1	3.37
02:07:36	1	3.37
02:07:35	1	3.37
02:07:34	1	3.37
02:07:33	1	3.37
02:07:32	1	3.37
02:07:31	1	3.37
02:07:30	1	3.37
02:07:29	1	3.37
02:07:28	1	3.37
02:07:27	1	3.37
02:07:26	1	3.37
02:07:25	1	3.37
02:07:24	1	3.39
02:07:23	1	3.39
02:07:22	1	3.39
02:07:21	1	3.39
02:07:20	1	3.39
02:07:19	1	3.39
02:07:18	1	3.39
02:07:17	1	3.39
02:07:16	1	3.39
02:07:15	1	3.39
02:07:14	1	3.39
02:07:13	1	3.39
02:07:12	1	3.40
02:07:11	1	3.40
02:07:10	1	3.40
02:07:09	1	3.40
02:07:08	1	3.40
02:07:07	1	3.42
02:07:06	1	3.42
02:07:05	1	3.43
02:07:04	1	3.45
02:07:03	1	3.49
02:07:02	1	3.58
02:07:01	1	3.73
02:07:00	1	3.85
02:06:59	1	3.73
02:06:58	1	3.78
02:06:57	1	3.96
02:06:56	1	4.05
02:06:55	1	4.20
02:06:54	1	4.83
02:06:53	1	5.88
02:06:52	1	4.79
02:06:51	1	3.83
02:06:50	1	4.53
02:06:49	1	4.79
02:06:48	1	4.58
02:06:47	1	4.33
02:06:46	1	4.17
02:06:45	1	4.37
02:06:44	1	4.31
02:06:43	1	3.78
02:06:42	1	3.48
02:06:41	1	3.37
02:06:40	1	3.36
02:06:39	1	3.36
02:06:38	1	3.36
02:06:37	1	3.34
02:05:		
01:48		


Well B8
Hvorslev Analysis (1951)
EXAMPLE ONLY
$K = \frac{r^2 \ln L/R}{2LT_0}$
$= \frac{6.45\,(4.78)}{2\,\text{Ln}\,3\,(T_0)}$
$= \frac{.05059}{T_0}$
$= .00158$ cm/sec
4.48 ft/d
r = 2.54 cm
R = 2.54 cm
L = 304.8
T_0 @ 37 sec
5
4
3
2
1.0
8
7
6
5
4
3
2
0.1
10
20
30
50
90
100
t sec

APPENDIX D

Analytical Data

DEC 31 1987

RAI

Resource Analysts, Inc.
P.O. Box 778
1 Lafayette Road
Hampton, N.H. 03842
(603) 926-7777

TO:

Mr. Lyons Witten
IEP, Inc.
Sextant Hill, 90 Rt 6A
P.O. Box 1840
Sandwich, MA 02563

PO # DUX-1/2597

Date Received 12/04/87 (1735)

Lab Number: 11,770

Date Reported: 12/28/87

Attached please find test results for Volatile Organic Compounds, Hydrogen Sulfide, Calcium, Copper, Iron, Magnesium, Manganese, Sodium, Lead, Zinc, Hardness, pH, Alkalinity, Chloride, Color, Specific Conductance, Total Dissolved Solids, Sulfate, Turbidity, MBAS, and Tannic Acid.

Russell Osgood Jr

Date 12/28/87

1

Technical Director

CHAIN OF CUSTODY FORM

IEP, Inc.
Courthouse Square Office Building
Box 434
Barnstable, MA 02630
ATTN: LYONS WITTEN

Job Number: DUX-1
Sample Location: DUXBURY
Sampling Date: 12/2-3/87
IEP PO #: 2597

KAI# 1,770

QUANTITY	SAMPLE NO.	TYPE	PARAMETER	JAR
2	DUX-AS	WATER	COLD	VOA
			COLD	1 L PLASTIC
			filtered + pH<2 w/ HNO_3	250 ml Plastic
			ZN AC.	250 ml Plastic
2	DUX-AD		AS PER QUOTE #1171	
2	DUX-BD			
2	DUX-CD			
2	DUX-FS			
2	DUX-FD			
2	DUX-L			
2	WH-C			

Laboratory: RAI
Samples Collected By: WLW, J.C. + K.K for IEP, INC
Samples Delivered By: USPS ~~Express~~ MAIL
Samples Received By: Richard A. Pease
Samples Received When: 12-4-87 1755

CHAIN OF CUSTODY FORM

IEP, Inc.
Courthouse Square Office Building
Box 434
Barnstable, MA 02630
ATTN: LYONS WITTEN

Job Number: DUX-1
Sample Location: DUXBURY
Sampling Date: 12/2-3/87
IEP PO #: 2597

11,770

QUANTITY	SAMPLE NO.	TYPE	PARAMETER	JAR
1	DUX-I	WATER	Alkalinity, Chloride +	500 ml Plastic
1	DUX-E		Spec. Cond.	1 L
1	DUX-D			500 ml
1	DUX-H			500 ml
1	DUX-M			500 ml
1	DUX-J			500 ml
1	DUX-K			500 ml
1	DUX-G	↓	↓	500 ml
			as per quote #1171	

Laboratory: RAI
Samples Collected By: WLW, T.C. + KK for IEP, INC
Samples Delivered By: USPS, EXPRESS MAIL
Samples Received By: David N Rose
Samples Received When: 12-4-87 - 1733

Laboratory #: 11770-1
Field Identification: DUX-AS
Date analyzed: 12/10/87

Data file id:>D2201::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-2
Field Identification: DUX-AD
Date analyzed: 12/10/87

Data file id:>D2202::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-3
Field Identification: DUX-BD
Date analyzed: 12/10/87

Data file id:>D2203::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-4
Field Identification: DUX-CD
Date analyzed: 12/11/87

Data file id:>D2217::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-5
Field Identification: DUX-FS
Date analyzed: 12/11/87

Data file id:>D2218::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-6
Field Identification: DUX-FD
Date analyzed: 12/11/87

Data file id:>D2219::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	6	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-7
Field Identification: DUX-L
Date analyzed: 12/11/87

Data file id:>D2220::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 11770-8
Field Identification: WH-C
Date analyzed: 12/11/87

Data file id:>D2221::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Field Identification: DUX-AS

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-9	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-17	12/08/87	305/1	78
Copper, recoverable (mg/L)	11770-17	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-17	12/08/87	305/1	0.87
Manganese, recoverable (mg/L)	11778-17	12/08/87	305/1	0.44
Sodium, recoverable (mg/L)	11778-17	12/08/87	305/1	25
Lead, recoverable (mg/L)	11778-17	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-17	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-17	12/08/87	314A/1	240
pH (units)	11778-25	12/07/87	423/1	6.08
Alkalinity (mg/$CaCO_3$/L)	11778-25	1215/87	403/1	150
Chloride (mg/L)	11778-25	12/11/87	429/1	41
Color (units)	11778-25	12/08/87	204A/1	5
Specific Conductance (umhos/cm)	11778-25	12/18/87	205/1	570
Total Dissolved Solids (mg/L)	11778-25	12/09/87	209B/1	410
Sulfate (mg/L)	11778-25	12/11/87	429/1	79
Turbidity (NTU)	11778-25	12/09/87	214A/1	14000
MBAS (mg/L)	11778-25	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-25	12/21/87	513/1	0.38

Field Identification: DUX-AD

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-10	12/10/87	427D/1	<10
Calcium, recoverable (mg/L)	11770-18	12/08/87	305/1	19
Copper, recoverable (mg/L)	11770-18	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-18	12/08/87	305/1	2.0
Manganese, recoverable (mg/L)	11778-18	12/08/87	305/1	1.1
Sodium, recoverable (mg/L)	11778-18	12/08/87	305/1	14
Lead, recoverable (mg/L)	11778-18	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-18	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-18	12/08/87	314A/1	68
pH (units)	11778-26	12/07/87	423/1	5.91
Alkalinity (mg/$CaCO_3$/L)	11778-26	1215/87	403/1	62
Chloride (mg/L)	11778-26	12/11/87	429/1	30
Color (units)	11778-26	12/08/87	204A/1	40
Specific Conductance (umhos/cm)	11778-26	12/18/87	205/1	290
Total Dissolved Solids (mg/L)	11778-26	12/09/87	209B/1	230
Sulfate (mg/L)	11778-26	12/11/87	429/1	29
Turbidity (NTU)	11778-26	12/09/87	214A/1	5300
MBAS (mg/L)	11778-26	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-26	12/21/87	513/1	1.1

Field Identification: DUX-BD

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-11	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-19	12/08/87	305/1	130
Copper, recoverable (mg/L)	11770-19	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-19	12/08/87	305/1	<0.03
Manganese, recoverable (mg/L)	11778-19	12/08/87	305/1	8.3
Sodium, recoverable (mg/L)	11778-19	12/08/87	305/1	59
Lead, recoverable (mg/L)	11778-19	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-19	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-19	12/08/87	314A/1	550
pH (units)	11778-27	12/07/87	423/1	6.35
Alkalinity (mg/$CaCO_3$/L)	11778-27	1215/87	403/1	410
Chloride (mg/L)	11778-27	12/11/87	429/1	61
Color (units)	11778-27	12/08/87	204A/1	15
Specific Conductance (umhos/cm)	11778-27	12/18/87	205/1	1500
Total Dissolved Solids (mg/L)	11778-27	12/09/87	209B/1	930
Sulfate (mg/L)	11778-27	12/11/87	429/1	370
Turbidity (NTU)	11778-27	12/09/87	214A/1	1600
MBAS (mg/L)	11778-27	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-27	12/21/87	513/1	3.5

Field Identification: DUX-CD

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-12	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-20	12/08/87	305/1	15
Copper, recoverable (mg/L)	11770-20	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-20	12/08/87	305/1	0.24
Manganese, recoverable (mg/L)	11778-20	12/08/87	305/1	0.59
Sodium, recoverable (mg/L)	11778-20	12/08/87	305/1	54
Lead, recoverable (mg/L)	11778-20	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-20	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-20	12/08/87	314A/1	87
pH (units)	11778-28	12/07/87	423/1	5.73
Alkalinity (mg/$CaCO_3$/L)	11778-28	1215/87	403/1	100
Chloride (mg/L)	11778-28	12/11/87	429/1	63
Color (units)	11778-28	12/08/87	204A/1	<5
Specific Conductance (umhos/cm)	11778-28	12/18/87	205/1	420
Total Dissolved Solids (mg/L)	11778-28	12/09/87	209B/1	240
Sulfate (mg/L)	11778-28	12/11/87	429/1	11
Turbidity (NTU)	11778-28	12/09/87	214A/1	290
MBAS (mg/L)	11778-28	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-28	12/21/87	513/1	.44

Field Identification: DUX-FS

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-13	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-21	12/08/87	305/1	19
Copper, recoverable (mg/L)	11770-21	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-21	12/08/87	305/1	20
Manganese, recoverable (mg/L)	11778-21	12/08/87	305/1	0.13
Sodium, recoverable (mg/L)	11778-21	12/08/87	305/1	21
Lead, recoverable (mg/L)	11778-21	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-21	12/08/87	305/1	0.02
Hardness (mg/$CaCO_3$/L)	11778-21	12/08/87	314A/1	74
pH (units)	11778-29	12/07/87	423/1	6.30
Alkalinity (mg/$CaCO_3$/L)	11778-29	1215/87	403/1	77
Chloride (mg/L)	11778-29	12/11/87	429/1	19
Color (units)	11778-29	12/08/87	204A/1	25
Specific Conductance (umhos/cm)	11778-29	12/18/87	205/1	240
Total Dissolved Solids (mg/L)	11778-29	12/09/87	209B/1	150
Sulfate (mg/L)	11778-29	12/11/87	429/1	12
Turbidity (NTU)	11778-29	12/09/87	214A/1	580
MBAS (mg/L)	11778-29	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-29	12/21/87	513/1	.60

Field Identification: DUX-FD

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-14	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-22	12/08/87	305/1	8.2
Copper, recoverable (mg/L)	11770-22	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-22	12/08/87	305/1	0.059
Manganese, recoverable (mg/L)	11778-22	12/08/87	305/1	0.03
Sodium, recoverable (mg/L)	11778-22	12/08/87	305/1	28
Lead, recoverable (mg/L)	11778-22	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-22	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-22	12/08/87	314A/1	60
pH (units)	11778-30	12/07/87	423/1	5.32
Alkalinity (mg/$CaCO_3$/L)	11778-30	1215/87	403/1	52
Chloride (mg/L)	11778-30	12/11/87	429/1	64
Color (units)	11778-30	12/08/87	204A/1	<5
Specific Conductance (umhos/cm)	11778-30	12/18/87	205/1	280
Total Dissolved Solids (mg/L)	11778-30	12/09/87	209B/1	140
Sulfate (mg/L)	11778-30	12/11/87	429/1	24
Turbidity (NTU)	11778-30	12/09/87	214A/1	99
MBAS (mg/L)	11778-30	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-30	12/21/87	513/1	<0.1

Field Identification: DUX-L

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-15	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-23	12/08/87	305/1	5.9
Copper, recoverable (mg/L)	11770-23	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-23	12/08/87	305/1	<0.03
Manganese, recoverable (mg/L)	11778-23	12/08/87	305/1	0.069
Sodium, recoverable (mg/L)	11778-23	12/08/87	305/1	110
Lead, recoverable (mg/L)	11778-23	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-23	12/08/87	305/1	<0.02
Hardness (mg/$CaCO_3$/L)	11778-23	12/08/87	314A/1	33
pH (units)	11778-31	12/07/87	423/1	5.27
Alkalinity (mg/$CaCO_3$/L)	11778-31	1215/87	403/1	4.3
Chloride (mg/L)	11778-31	12/11/87	429/1	190
Color (units)	11778-31	12/08/87	204A/1	<5
Specific Conductance (umhos/cm)	11778-31	12/18/87	205/1	610
Total Dissolved Solids (mg/L)	11778-31	12/09/87	209B/1	310
Sulfate (mg/L)	11778-31	12/11/87	429/1	14
Turbidity (NTU)	11778-31	12/09/87	214A/1	840
MBAS (mg/L)	11778-31	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-31	12/21/87	513/1	<0.1

Field Identification: WH-C

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	11770-16	12/10/87	427D/1	<1
Calcium, recoverable (mg/L)	11770-24	12/08/87	305/1	1.8
Copper, recoverable (mg/L)	11770-24	12/08/87	305/1	<0.02
Iron, recoverable (mg/L)	11770-24	12/08/87	305/1	4.7
Manganese, recoverable (mg/L)	11778-24	12/08/87	305/1	0.093
Sodium, recoverable (mg/L)	11778-24	12/08/87	305/1	8.8
Lead, recoverable (mg/L)	11778-24	12/08/87	305/1	<0.05
Zinc, recoverable (mg/L)	11778-24	12/08/87	305/1	0.14
Hardness (mg/$CaCO_3$/L)	11778-24	12/08/87	314A/1	14
pH (units)	11778-32	12/07/87	423/1	6.13
Alkalinity (mg/$CaCO_3$/L)	11778-32	1215/87	403/1	5.6
Chloride (mg/L)	11778-32	12/11/87	429/1	14
Color (units)	11778-32	12/08/87	204A/1	<5
Specific Conductance (umhos/cm)	11778-32	12/18/87	205/1	77
Total Dissolved Solids (mg/L)	11778-32	12/09/87	209B/1	57
Sulfate (mg/L)	11778-32	12/11/87	429/1	6.6
Turbidity (NTU)	11778-32	12/09/87	214A/1	270
MBAS (mg/L)	11778-32	12/09/87	512B/1	<0.4
Tannin- and Liqnin-like Substances (mg/L as Tannic Acid)	11770-32	12/21/87	513/1	0.25

Field Identification: DUX-I

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity (mg/$CaCO_3$/L)	11778-33	1215/87	403/1	1.9
Chloride (mg/L)	11778-33	12/14/87	429/1	25
Specific Conductance (umhos/cm)	11778-33	12/18/87	205/1	560

Field Identification: DUX-E

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity ($mg/CaCO_3/L$)	11778-34	1215/87	403/1	3.8
Chloride (mg/L)	11778-34	12/14/87	429/1	5.4
Specific Conductance (umhos/cm)	11778-34	12/18/87	205/1	37

Field Identification: DUX-D

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity ($mg/CaCO_3/L$)	11778-35	1215/87	403/1	30
Chloride (mg/L)	11778-35	12/14/87	429/1	28
Specific Conductance (umhos/cm)	11778-35	12/18/87	205/1	140

Field Identification: DUX-H

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity ($mg/CaCO_3/L$)	11778-36	1215/87	403/1	10
Chloride (mg/L)	11778-36	12/14/87	429/1	25
Specific Conductance (umhos/cm)	11778-36	12/18/87	205/1	350

Field Identification: DUX-M

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity ($mg/CaCO_3/L$)	11778-37	1215/87	403/1	1.6
Chloride (mg/L)	11778-37	12/14/87	429/1	46
Specific Conductance (umhos/cm)	11778-37	12/18/87	205/1	240

Field Identification: DUX-J

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity (mg/$CaCO_3$/L)	11778-38	1215/87	403/1	71
Chloride (mg/L)	11778-38	12/14/87	429/1	20
Specific Conductance (umhos/cm)	11778-38	12/18/87	205/1	470

Field Identification: DUX-K

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity (mg/$CaCO_3$/L)	11778-39	1215/87	403/1	6.6
Chloride (mg/L)	11778-39	12/14/87	429/1	100
Specific Conductance (umhos/cm)	11778-39	12/18/87	205/1	370

Field Identification: DUX-G

Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Alkalinity (mg/$CaCO_3$/L)	11778-40	1215/87	403/1	9.3
Chloride (mg/L)	11778-40	12/14/87	429/1	14
Specific Conductance (umhos/cm)	11778-40	12/22/87	205/1	78

References: 1) Standard Methods, 16th Edition

RAI

MAR 4 1988

Resource Analysts, Inc.
P.O. Box 778
1 Lafayette Road
Hampton, N.H. 03842
(603) 926-7777

TO:

Mr. Lyons Witten
IEP, Inc.
P.O. Box 1840
Sandwich, MA 02563

PO # 3333/DUX-1

Date Received: 2/9/88 (918)

Lab Number: 12,373

Date Reported: 2/27/88

Attached please find test results for Volatile Organic Compounds, Hydrogen Sulfide, pH, MBAS, Turbidity, Color, Nitrate, Total Dissolved Solids, Ammonia, Chloride, Sulfate, Specific Conductnace, Alkalinity, Tannin like Substances, Calcium, Copper, Iron, Manganese, Sodium, Lead, and Zinc.

Russell F. Foster Jr. Date 2/29/88

1

Technical Director

CHAIN OF CUSTODY — PAGE 1 / 1

CLIENT IEP
CONTACT LYONS WITTEN
ADDRESS P.O BOX 1840
SANDWICH MA 02563
TEL. # (617) 888-3960

RAI
1 LAFAYETTE ROAD
P O BOX 778
HAMPTON, NH 03842
603-926-7777

YOUR JOB NAME/NUMBER DUX-1
LOCATION DUXBURY, MA.
COLLECTOR WLW + D.P.
DO YOU USE PO NUMBERS? YES X NO
PURCHASE ORDER NUMBER 3333
PERSON TO CONTACT FOR PO NUMBER

YOUR FIELD IDENTIFICATION	DATE	TIME	RAI Use Only LAB #	w-water liquid s-soil	CONTAINER VOL./TYPE	DID YOU FIELD PRESERVE?	DID YOU FIELD FILTER?	IS LAB FILTRATION REQUIRED?	ANALYSIS REQUESTED
DUX-HD	2/8/88	3:10	12,373	W	1L P	NO	NO		SEE RAI QUOTE # 1171
					250 P	ZN Ac H_2S	NO		
					2-VOA	NO	NO		
					500 P	HNO_3	YES		
DUX-HS		3:00			1L P	NO	NO		
					250 P	ZN Ac H_2S	NO		
					2-VOA	NO	NO		
					500 P	HNO_3	YES		
DUX-CS		11:45			500 P	NO	NO		
PE-A		11:30			500 P	NO	NO		

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE: TIME:
	5:00 pm	2/8/88	W.A Sinko	2/8 17:00
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE: TIME:
			Beth O'Brien	2/9/88 9:48
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE: TIME:

Resource Analysts, Incorporated

A CHAIN OF CUSTODY IS REQUESTED WITH EACH SET OF SAMPLES.

MAR 4 1988

Field Identification: DUX-HD Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12373-2	2/19/88	427D/1	<1
pH (units)	12373-3	2/09/88	423/1	6.33
MBAS (mg/L)	12373-3	2/11/88	512B/1	<0.1
Turbidity (NTU)	12373-3	2/10/88	214A/1	400
Color (units)	12373-3	2/10/88	204A/1	10
Nitrate (mg/L as N)	12373-3	2/10/88	429/1	<0.05
Total Dissolved Solids (mg/L)	12373-3	2/17/88	209B/1	550
Ammonia (mg/L as N)	12373-3	2/16/88	417A,B/1	1.6
Chloride (mg/L)	12373-3	2/19/88	429/1	22
Sulfate (mg/L)	12373-3	2/19/88	429/1	320
Specific Conductance (umhos/cm)	12373-3	2/18/88	205/1	820
Alkalinity (mg/L)	12373-3	2/18/88	403/1	78
Tannin like Substances (mg/L)	12373-3	2/22/88	513/1	0.9

Field Identification: DUX-HS Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12373-6	2/19/88	427D/1	<1
pH (units)	12373-7	2/09/88	423/1	4.93
MBAS (mg/L)	12373-7	2/11/88	512B/1	<0.1
Turbidity (NTU)	12373-7	2/10/88	214A/1	250
Color (units)	12373-7	2/10/88	204A/1	5
Nitrate (mg/L as N)	12373-7	2/10/88	429/1	3.5
Total Dissolved Solids (mg/L)	12373-7	2/17/88	209B/1	280
Ammonia (mg/L as N)	12373-7	2/16/88	417A,B/1	0.34
Chloride (mg/L)	12373-7	2/19/88	429/1	28
Sulfate (mg/L)	12373-7	2/19/88	429/1	140
Specific Conductance (umhos/cm)	12373-7	2/18/88	205/1	420
Alkalinity (mg/L)	12373-7	2/18/88	403/1	5.8
Tannin like Substances (mg/L)	12373-7	2/22/88	513/1	0.2

MAR 4 1988

Field Identification: DUX-CS Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Chloride (mg/L)	12373-9	2/19/88	429/1	70
Specific Conductance (umhos/cm)	12373-9	2/18/88	205/1	430
Alkalinity (mg/L)	12373-9	2/18/88	403/1	230

Field Identification: PE-1 Matrix: Water

Parameter	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Chloride (mg/L)	12373-10	2/19/88	429/1	15
Specific Conductance (umhos/cm)	12373-10	2/18/88	205/1	110
Alkalinity (mg/L)	12373-10	2/18/88	403/1	220

Reference: 1) Standard Methods, 16th Edition

MAR 4 1988

Field Identification: DUX-HD
Laboratory Number: 12,373-4 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	59
Copper	(mg/L)	02/17/88	6010 / 1	<0.02
Iron	(mg/L)	02/17/88	6010 / 1	0.26
Manganese	(mg/L)	02/17/88	6010 / 1	2.6
Sodium	(mg/L)	02/10/88	6010 / 1	32
Lead	(mg/L)	02/17/88	6010 / 1	<0.05
Zinc	(mg/L)	02/17/88	6010 / 1	0.13
Hardness	(mg CaCO3/L)	02/10/88	314 /2	340

Field Identification: DUX-HS
Laboratory Number: 12,373-8 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	23
Copper	(mg/L)	02/17/88	6010 / 1	0.07
Iron	(mg/L)	02/17/88	6010 / 1	<0.03
Manganese	(mg/L)	02/17/88	6010 / 1	0.58
Sodium	(mg/L)	02/10/88	6010 / 1	20
Lead	(mg/L)	02/17/88	6010 / 1	<0.05
Zinc	(mg/L)	02/17/88	6010 / 1	0.02
Hardness	(mg CaCO3/L)	02/10/88	314 /2	150

References: 1) EPA SW 846, 3rd Edition

Laboratory #: 12373-1
Field Identification: DUX-HD
Date analyzed: 2/17/88

Data file id:>D3065::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

MAR 4 1988

Laboratory #: 12373-5
Field Identification: DUX-HS
Date analyzed: 2/17/88

Data file id:>D3066::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

RAI

FEB 29 1988

Resource Analysts, Inc.
P.O. Box 778
1 Lafayette Road
Hampton, N.H. 03842
(603) 926-7777

TO:

Mr. Lyons Witten
IEP, Inc.
P.O. Box 1840
Sandwich, MA 02563

PO # 3333/DUX-1

Date Received: 2/5/88 (955)

Lab Number: 12,345

Date Reported: 2/25/88

Attached please find test results for Hydrogen Sulfide, pH, MBAS, Turbidity, Color, Nitrate, Total Dissolved Solids, Ammonia, Chloride, Sulfate, Specific Conductance, Alkalinity, Tannin like Substances, Calcium, Copper, Iron, Manganese, Sodium, Lead, Zinc, and Volatile Organic Compounds.

The samples in this series (laboratory number 12,345) were received in the laboratory on 2/5/88. On 2/9/88 Mr. Tom Cambereri phoned requesting that nitrate-nitrogen and ammonia-nitrogen be added to the list of analyses.

At this point the samples were past the holding time for nitrate-nitrogen and had been unpreserved for ammonia-nitrogen. The results of these analyses should therefore be used with appropriate consideration.

The samples designated "DUX-OS" and "DUX-OD" (laboratory numbers 12,345-7 and -11) turned turbid upon the addition of the reagents during analysis for tannin-like substances. As a consequence, these samples had to be diluted prior to analysis resulting in elevated detection limits.

An uncharacterized interference prevented the observation of a distinct endpoint during the sulfide analysis of the sample designated "DUX-OS" (lab number 12,345-5). This required dilution of the sample which resulted in an elevated detection limit.

It was not possible to determine alkalinity for the sample designated "DUX-M" (lab number 12,345-25). The initial pH of this sample was 4.0 which is less than the value of 4.5 used as the endpoint in total alkalinity determinations.

Russell Frankenberger Date 2/25/88

1

Technical Director

CHAIN OF CUSTODY

CLIENT IEP, inc.
CONTACT LYONS WITTEN
ADDRESS P.O. BOX 1840
SANDWICH, MA. 02563
TEL. # (617) 888-3900

RAI

1 LAFAYETTE ROAD
P O BOX 778
HAMPTON, NH 03842
603-926-7777

YOUR JOB NAME/NUMBER DUX-1
LOCATION DUXBURY MASS
COLLECTOR WLW, D.P.
DO YOU USE PO NUMBERS? YES X NO
PURCHASE ORDER NUMBER 3333
PERSON TO CONTACT FOR PO NUMBER

YOUR FIELD IDENTIFICATION	DATE	TIME	RAI Use Only LAB #	w-water liquid s-soil	CONTAINER VOL./TYPE	DID YOU FIELD PRESERVE?	DID YOU FIELD FILTER?	IS LAB FILTRATION REQUIRED?	ANALYSIS REQUESTED
DUX-G	2/3/88	3:00	12,345-1	W	250 P	$ZnAc$ H_2S	NO		SEE RAI QUOTE # 1171 FOR ALL ANALYSES
			2		500 P	HNO_3	Yes		
			3		1L P	NO	NO		
			4		2-VOA	NO	NO		
DUX-OS		1:45	5		250 P	$ZnAc$ H_2S	NO		
			6		500 P	HNO_3	YES		
			7		1L P	NO	NO		
			8		2-VOA	NO	NO		
DUX-OD		1:50	9		250 P	$ZnAc$ H_2S	NO		
			10		500 P	HNO_3	YES		

RELINQUISHED BY:	DATE: 2/4/88	TIME: 1:04 pm	RECEIVED BY:	DATE: 2/4/88 TIME: 1:04 PM
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE: TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY: Donna Stanek	DATE: 2-5-88 TIME: 9:55

Resource Analysts, Incorporated

A CHAIN OF CUSTODY IS REQUESTED WITH EACH SET OF SAMPLES.

CHAIN OF CUSTODY

PAGE 2 (3

CLIENT IEP

CONTACT

ADDRESS

TEL. #

RAI

1 LAFAYETTE ROAD
P O BOX 778
HAMPTON, NH 03842
603-926-7777

YOUR JOB NAME/NUMBER DUX-1

LOCATION

COLLECTOR

DO YOU USE PO NUMBERS? YES _____ NO _____

PURCHASE ORDER NUMBER

PERSON TO CONTACT FOR PO NUMBER

YOUR FIELD IDENTIFICATION	DATE	TIME	RAI Use Only LAB #	w-water liquid s-soil	CONTAINER VOL./TYPE	DID YOU FIELD PRESERVE?	DID YOU FIELD FILTER?	IS LAB FILTRATION REQUIRED?	ANALYSIS REQUESTED
DUX-OD	2/3/88	1:50	12,345-11	W	1L P	NO	NO		RAI QUOTE # 1171
↓			12		2-VOA	NO	NO		
DUX-NS		10:30	13		250 P	ZnAc H_2S	NO		
			14		500 P	HNO_3	YES		
			15		1L P	NO	NO		
			16		2-VOA	NO	NO		
DUX-ND		10:45	17		250 P	ZnAc H_2S	NO		
			18		500 P	HNO_3	YES		
			19		1L P	NO	NO		
↓	↓		20	↓	2-VOA	NO	NO		↓

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY: Donna Stanek	DATE: 2-5-88	TIME: 9:55

Resource Analysts, Incorporated

A CHAIN OF CUSTODY IS REQUESTED WITH EACH SET OF SAMPLES.

CHAIN OF CUSTODY

PAGE 3 (3

CLIENT IEP

CONTACT

ADDRESS

TEL. #

RAI

1 LAFAYETTE ROAD
P O BOX 778
HAMPTON, NH 03842
603-926-7777

YOUR JOB NAME/NUMBER DUX-1

LOCATION

COLLECTOR

DO YOU USE PO NUMBERS? YES ____ NO ____

PURCHASE ORDER NUMBER

PERSON TO CONTACT FOR PO NUMBER

YOUR FIELD IDENTIFICATION	DATE	TIME	RAI Use Only LAB #	w-water liquid s-soil	CONTAINER VOL./TYPE	DID YOU FIELD PRESERVE?	DID YOU FIELD FILTER?	IS LAB FILTRATION REQUIRED?	ANALYSIS REQUESTED
DUX - LD	2/3/88	9:10	12,345-21	W	250 P	~~Zinc Ac~~ H_2S	NO		RAI QUOTE #1171
			22		500 P	HNO_3	YES		
			23		1L P	NO	NO		
			24		2-VOA	NO	NO		
DUX - M		4:00	25		500P	NO	NO		
DUX - LS		9:15	26		500 P	NO	NO		AIR, Spec Cond CL

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	DATE:	TIME:
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY: Donna Stanek	DATE: 2-5-88	TIME: 9:55

Resource Analysts, Incorporated

A CHAIN OF CUSTODY IS REQUESTED WITH EACH SET OF SAMPLES.

Field Identification DUX-G

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-1	2/10/88	427D/1	<1
pH (units)	12345-3	2/05/88	423/1	6.23
MBAS (mg/L)	12345-3	2/08/88	512B/1	<0.1
Turbidity (NTU)	12345-3	2/05/88	214A/1	170
Color (units)	12345-3	2/05/88	204A/1	10
Nitrate (mg/L as N)	12345-3	2/18/88	429/1	<0.05
Total Dissolved Solids (mg/L)	12345-3	2/10/88	209B/1	64
Ammonia (mg/L as N)	12345-3	2/16/88	417A,B/1	<0.2
Chloride (mg/L)	12345-3	2/18/88	429/1	15
Sulfate (mg/L)	12345-3	2/18/88	429/1	3.0
Specific Conductance (umhos/cm)	12345-3	2/09/88	205/1	81
Alkalinity (mg/L)	12345-3	2/08/88	403/1	12
Tannin-like Substances (mg/L)	12345-3	2/11/88	513/1	0.7

Field Identification DUX-OS

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-5	2/10/88	427D/1	<10
pH (units)	12345-7	2/05/88	423/1	6.28
MBAS (mg/L)	12345-7	2/08/88	512B/1	<0.1
Turbidity (NTU)	12345-7	2/05/88	214A/1	1900
Color (units)	12345-7	2/05/88	204A/1	5
Nitrate (mg/L as N)	12345-7	2/18/88	429/1	2.4
Total Dissolved Solids (mg/L)	12345-7	2/10/88	209B/1	580
Ammonia (mg/L as N)	12345-7	2/16/88	417A,B/1	4.9
Chloride (mg/L)	12345-7	2/18/88	429/1	68
Sulfate (mg/L)	12345-7	2/18/88	429/1	100
Specific Conductance (umhos/cm)	12345-7	2/09/88	205/1	940
Alkalinity (mg/L)	12345-7	2/08/88	403/1	270
Tannin-like Substances (mg/L)	12345-7	2/11/88	513/1	<0.5

Field Identification DUX-OD

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-9	2/10/88	427D/1	<1
pH (units)	12345-11	2/05/88	423/1	5.62
MBAS (mg/L)	12345-11	2/08/88	512B/1	<0.1
Turbidity (NTU)	12345-11	2/05/88	214A/1	2700
Color (units)	12345-11	2/05/88	204A/1	15
Nitrate (mg/L as N)	12345-11	2/18/88	429/1	0.12
Total Dissolved Solids (mg/L)	12345-11	2/10/88	209B/1	560
Ammonia (mg/L as N)	12345-11	2/16/88	417A,B/1	0.54
Chloride (mg/L)	12345-11	2/18/88	429/1	110
Sulfate (mg/L)	12345-11	2/18/88	429/1	300
Specific Conductanc1 (umhos/cm)	12345-11	2/09/88	205/1	890
Alkalinity (mg/L)	12345-11	2/08/88	403/1	48
Tannin-like Substances (mg/L)	12345-11	2/11/88	513/1	7.8

Field Identification DUX-NS

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-13	2/10/88	427D/1	<1
pH (units)	12345-15	2/05/88	423/1	6.24
MBAS (mg/L)	12345-15	2/08/88	512B/1	0.1
Turbidity (NTU)	12345-15	2/05/88	214A/1	1100
Color (units)	12345-15	2/05/88	204A/1	<5
Nitrate (mg/L as N)	12345-15	2/18/88	429/1	0.53
Total Dissolved Solids (mg/L)	12345-15	2/10/88	209B/1	640
Ammonia (mg/L as N)	12345-15	2/16/88	417A,B/1	1.4
Chloride (mg/L)	12345-15	2/18/88	429/1	81
Sulfate (mg/L)	12345-15	2/18/88	429/1	190
Specific Conductanc1 (umhos/cm)	12345-15	2/09/88	205/1	1100
Alkalinity (mg/L)	12345-15	2/08/88	403/1	250
Tannin-like Substances (mg/L)	12345-15	2/11/88	513/1	<0.5

Field Identification DUX-ND

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-17	2/10/88	427D/1	<1
pH (units)	12345-19	2/05/88	423/1	6.48
MBAS (mg/L)	12345-19	2/08/88	512B/1	0.1
Turbidity (NTU)	12345-19	2/05/88	214A/1	750
Color (units)	12345-19	2/05/88	204A/1	5
Nitrate (mg/L as N)	12345-19	2/18/88	429/1	0.05
Total Dissolved Solids (mg/L)	12345-19	2/10/88	209B/1	700
Ammonia (mg/L as N)	12345-19	2/16/88	417A,B/1	0.76
Chloride (mg/L)	12345-19	2/18/88	429/1	120
Sulfate (mg/L)	12345-19	2/18/88	429/1	140
Specific Conductance (umhos/cm)	12345-19	2/09/88	205/1	1200
Alkalinity (mg/L)	12345-19	2/08/88	403/1	310
Tannin-like Substances (mg/L)	12345-19	2/11/88	513/1	0.5

Field Identification DUX-LD

Matrix: Water

Paramete	Lab.No.	Date Analyzed	Method/Ref.	Conc.
Hydrogen Sulfide (mg/L)	12345-21	2/10/88	427D/1	<1
pH (units)	12345-23	2/05/88	423/1	6.31
MBAS (mg/L)	12345-23	2/08/88	512B/1	0.1
Turbidity (NTU)	12345-23	2/05/88	214A/1	1300
Color (units)	12345-23	2/05/88	204A/1	10
Nitrate (mg/L as N)	12345-23	2/18/88	429/1	0.12
Total Dissolved Solids (mg/L)	12345-23	2/10/88	209B/1	360
Ammonia (mg/L as N)	12345-23	2/16/88	417A,B/1	5.5
Chloride (mg/L)	12345-23	2/18/88	429/1	40
Sulfate (mg/L)	12345-23	2/18/88	429/1	67
Specific Conductance (umhos/cm)	12345-23	2/09/88	205/1	580
Alkalinity (mg/L)	12345-23	2/08/88	403/1	170
Tannin-like Substances (mg/L)	12345-23	2/11/88	513/1	1.6

Field Identification: DUX-M
Laboratory Number: 12,345-25

Matrix: Water

Parameter	Date Analyzed	Method/Reference	Concentration
Chloride (mg/L)	2/18/88	429/1	56
Specific Conductance (umhos/cm)	2/09/88	205/1	270

Field Identification: DUX-LS
Laboratory Number: 12,345-26

Matrix: Water

Parameter	Date Analyzed	Method/Reference	Concentration
Chloride (mg/L)	2/18/88	429/1	190
Specific Conductance (umhos/cm)	2/09/88	205/1	610
Alkalinity (mg/L)	2/08/88	403/1	4.8

References: 1) Standard Methods, 16th Edition

Field Identification: DUX-G
Laboratory Number: 12,345-2 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	3.5
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	14
Manganese	(mg/L)	02/11/88	6010 / 1	0.13
Sodium	(mg/L)	02/10/88	6010 / 1	9
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	<0.02
Hardness	(mg CaCO3/L)	02/10/88	314 /2	16

Field Identification: DUX-OS
Laboratory Number: 12,345-6 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	73
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	0.14
Manganese	(mg/L)	02/11/88	6010 / 1	1.4
Sodium	(mg/L)	02/10/88	6010 / 1	51
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	<0.02
Hardness	(mg CaCO3/L)	02/10/88	314 /2	310

Field Identification: DUX-0D
Laboratory Number: 12,345-10 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	36
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	33
Manganese	(mg/L)	02/11/88	6010 / 1	1.5
Sodium	(mg/L)	02/10/88	6010 / 1	100
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	0.03
Hardness	(mg CaCO3/L)	02/10/88	314 /2	170

Field Identification: DUX-NS
Laboratory Number: 12,345-14 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	93
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	<0.03
Manganese	(mg/L)	02/11/88	6010 / 1	0.18
Sodium	(mg/L)	02/10/88	6010 / 1	66
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	0.022
Hardness	(mg CaCO3/L)	02/10/88	314 /2	380

Field Identification: DUX-ND
Laboratory Number: 12,345-18 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	98
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	<0.03
Manganese	(mg/L)	02/11/88	6010 / 1	0.22
Sodium	(mg/L)	02/10/88	6010 / 1	90
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	<0.02
Hardness	(mg CaCO3/L)	02/10/88	314 /2	380

Field Identification: DUX-LD
Laboratory Number: 12,345-22 Matrix: Water

Metal, Recoverable	Units	Date Analyzed	Method(s)/ Reference(s)	Concentration
Calcium	(mg/L)	02/10/88	6010 / 1	37
Copper	(mg/L)	02/11/88	6010 / 1	<0.02
Iron	(mg/L)	02/11/88	6010 / 1	7.0
Manganese	(mg/L)	02/11/88	6010 / 1	2.7
Sodium	(mg/L)	02/10/88	6010 / 1	40
Lead	(mg/L)	02/11/88	6010 / 1	<0.05
Zinc	(mg/L)	02/11/88	6010 / 1	<0.02
Hardness	(mg CaCO3/L)	02/10/88	314 /2	180

References: 1) EPA SW 846, 3rd Edition
2) Standard Methods, 16th Edition

Laboratory #: 12345-4
Field Identification: DUX-G
Date analyzed: 2/11/88

Data file id:>C5631::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 12345-8
Field Identification: DUX-OS
Date analyzed: 2/10/88

Data file id:>C5611::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 12345-12
Field Identification: DUX-OD
Date analyzed: 2/10/88

Data file id:>C5612::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 12345-16
Field Identification: DUX-NS
Date analyzed: 2/10/88

Data file id:>C5613::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

Laboratory #: 12345-20
Field Identification: DUX-ND
Date analyzed: 2/11/88

Data file id:>D3009::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	Trace	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

"Trace" denotes probable presence below listed detection limits.

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

MATRIX SPIKE DUPLICATE RECOVERY

Laboratory Number: 12,345-20
Sample Designation: DUX-ND
Date Analyzed: 2/11/88
Matrix: Water

COMPOUND	ug/L IN SAMPLE	ug/L SPIKE	REPLICATE 1 ug/L FOUND	REPLICATE 1 %REC-OVERY	REPLICATE 2 ug/L FOUND	REPLICATE 2 % REC-OVERY	RELATIVE RANGE %
1,1-DICHLOROETHENE	0	53	51	96	47	89	8
TRICHLOROETHYLENE	0	55	52	95	45	82	14
BENZENE	0	55	55	100	46	84	18
TOLUENE	0	54	42	78	46	85	9
CHLOROBENZENE	0	59	56	95	50	85	11

METHOD REFERENCE: 40 CFR PART 136, FRIDAY, OCTOBER 26, 1984
METHOD 624

Laboratory #: 12345-24
Field Identification: DUX-LD
Date analyzed: 2/11/88

Data file id:>D3011::

Matrix: Water

Volatile Compounds	Concentration (ug/L)	Detection limit (ug/L)
CHLOROMETHANE	BDL	10
BROMOMETHANE	BDL	10
VINYL CHLORIDE	BDL	10
CHLOROETHANE	BDL	5
METHYLENE CHLORIDE	BDL	10
ACETONE	BDL	25
CARBON DISULFIDE	BDL	5
1,1-DICHLOROETHENE	BDL	5
TETRAHYDROFURAN	BDL	25
1,1-DICHLOROETHANE	BDL	5
1,2-DICHLOROETHENE (total)	BDL	5
CHLOROFORM	BDL	5
METHYL ETHYL KETONE	BDL	25
1,2-DICHLOROETHANE	BDL	5
1,1,1-TRICHLOROETHANE	BDL	5
CARBON TETRACHLORIDE	BDL	5
VINYL ACETATE	BDL	10
BROMODICHLOROMETHANE	BDL	5
CIS-1,3-DICHLOROPROPENE	BDL	5
TRANS-1,3-DICHLOROPROPENE	BDL	5
TRICHLOROETHENE	BDL	5
BENZENE	BDL	5
DIBROMOCHLOROMETHANE	BDL	5
1,1,2-TRICHLOROETHANE	BDL	5
1,2-DICHLOROPROPANE	BDL	5
2-CHLOROETHYLVINYLETHER	BDL	5
BROMOFORM	BDL	5
METHYL ISOBUTYL KETONE	BDL	25
2-HEXANONE	BDL	25
1,1,2,2-TETRACHLOROETHANE	BDL	5
TETRACHLOROETHENE	BDL	5
TOLUENE	BDL	5
CHLOROBENZENE	BDL	5
ETHYLBENZENE	BDL	5
m-XYLENE	BDL	5
o,p-XYLENES	BDL	5
STYRENE	BDL	5

BDL= Below detection limit
Method Reference: 40 CFR Part 136, Friday, October 26, 1984
Method 624

GROUNDWATER ANALYTICAL, INC.

258 Main Street A3, Buzzards Bay, MA 02532
Telephone (617) 759-4441

IEP, Inc.
PO Box 1840
Sandwich, MA 02563

Date of Analysis: 03-02-88

Sample ID: **DUX-J**
02-26-88 PO 3387
Proj DUX-1

REPORT OF ANALYSES

EPA METHODS 601 & 602 - Purgeable Halocarbons and Aromatics

_____Dichlorodifluoromethane*	_____Vinyl chloride
_____Chloromethane*	_____Chloroethane*
_____Bromomethane*	_____Trichlorofluoromethane*
_____1,1-Dichloroethene	_____Methylene chloride
_____trans-1,2-Dichloroethene	_____1,1-Dichloroethane
_____Chloroform	_____1,1,1-Trichloroethane
_____Carbon tetrachloride	_____Benzene
_____1,2-Dichloroethane	_____Trichloroethene
_____1,2-Dichloropropane	_____Bromodichloromethane
_____2-Chloroethylvinyl ether	_____trans-1,3-Dichloropropene
_____Toluene	_____cis-1,3-Dichloropropene
_____1,1,2-Trichloroethane	_____Tetrachloroethene
_____Dibromochloromethane	_____Chlorobenzene
_____Ethylbenzene	_____Bromoform
_____1,1,2,2-Tetrachloroethane	_____1,3-Dichlorobenzene
_____1,4-Dichlorobenzene	_____1,2-Dichlorobenzene
_____Methyl tertiary Butyl Ether	_____cis-1,2-Dichloroethene
_____m+p Xylenes	_____o-Xylene

No 601 or 602 contaminants were detected.

All concentrations expressed in ug/L (PPB).
Detection limits are 2 PPB except where noted.
* Detection limit for this parameter is 10 PPB.
"Trace" indicates probable presence but below detection limit.

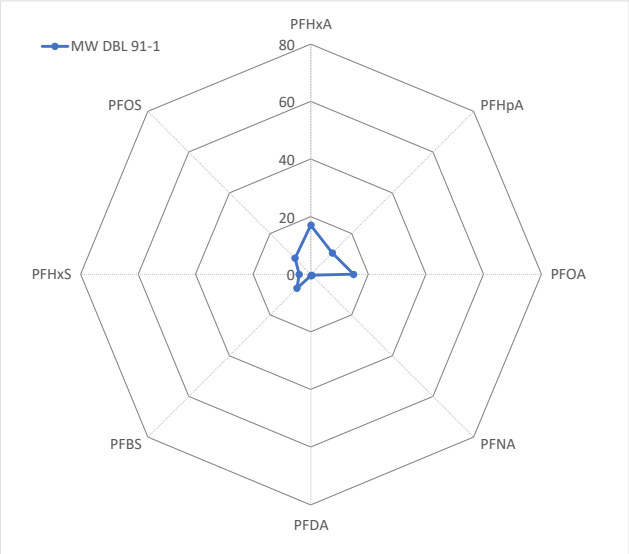
Analyst: David Sanford

ATTACHMENT 5
Radar charts

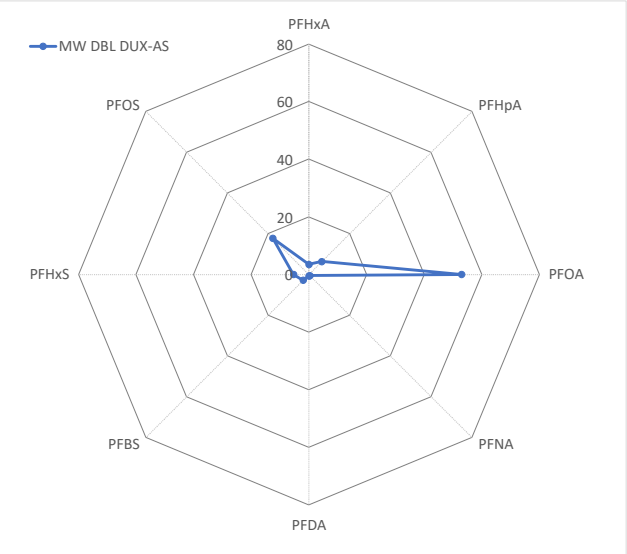
Duxbury Landfill Monitoring Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Groundwater

Screen Depth: Shallow

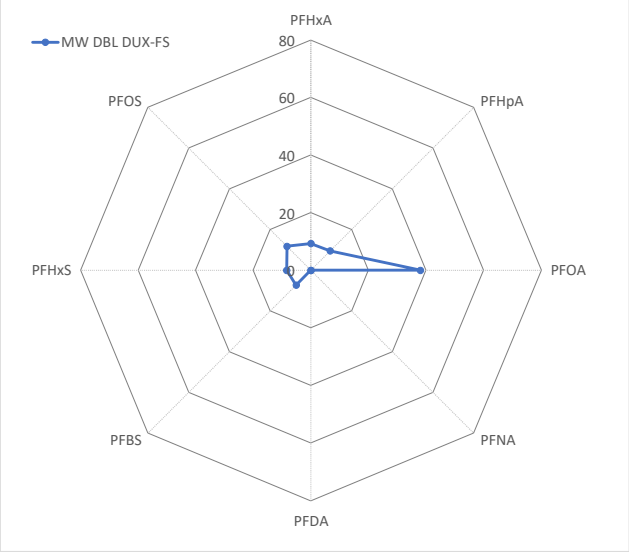
∑ PFAS (ng/L): 126.719 PFAS 6 (ng/L): 47.914
Location Relative to Waste: Adjacent, North



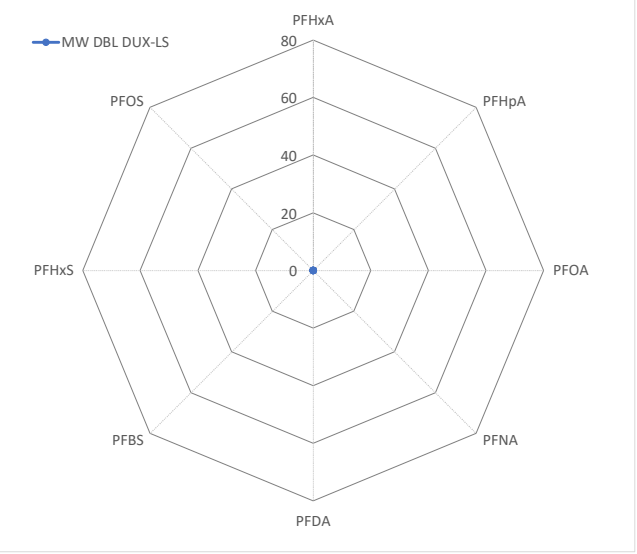
∑ PFAS (ng/L): 59.094 PFAS 6 (ng/L): 49.038
Location Relative to Waste: Adjacent, East



∑ PFAS (ng/L): 59.77 PFAS 6 (ng/L): 40.41
Location Relative to Waste: Downgradient, East



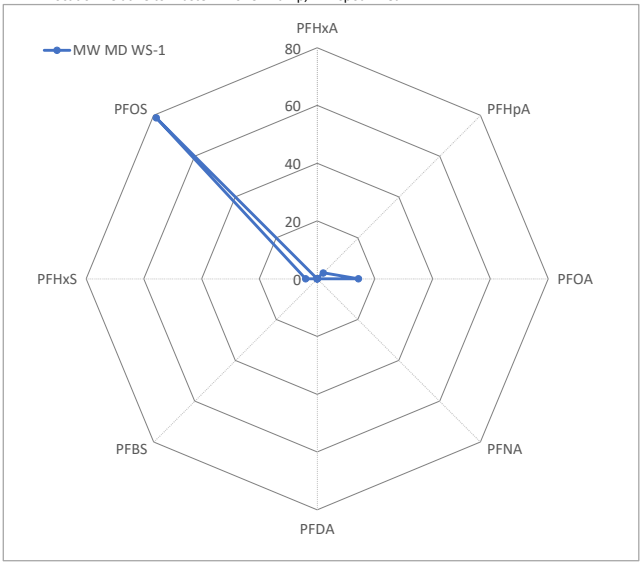
∑ PFAS (ng/L): 3.07 PFAS 6 (ng/L): 0
Location Relative to Waste: Downgradient, Northeast



∑ PFAS (ng/L): 57.32 PFAS 6 (ng/L): 29.87
Location Relative to Waste: Far Downgradient Northeast



∑ PFAS (ng/L): 68.79 PFAS 6 (ng/L): 68.79
Location Relative to Waste: McNeil Dump, In Dispoal Area



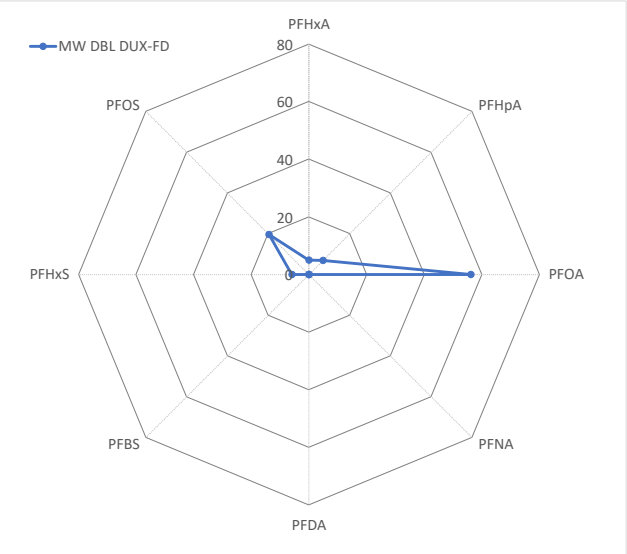
Duxbury Landfill Monitoring Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Groundwater

Screen Depth: Deep

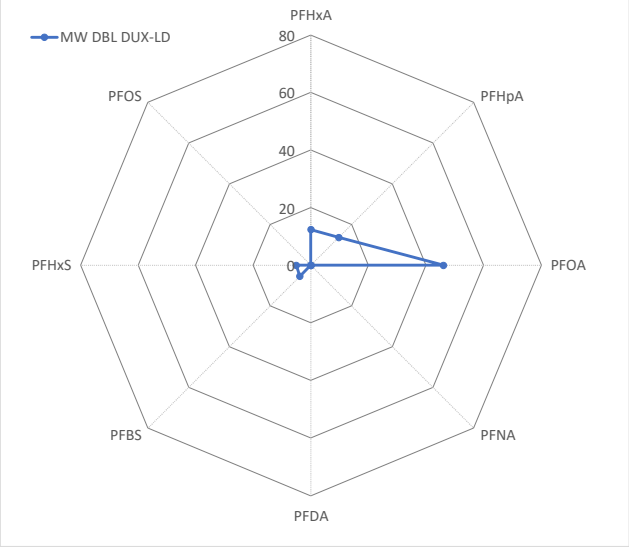
∑ PFAS (ng/L): 346.01 PFAS 6 (ng/L): 311.76
Location Relative to Waste: Adjacent, East



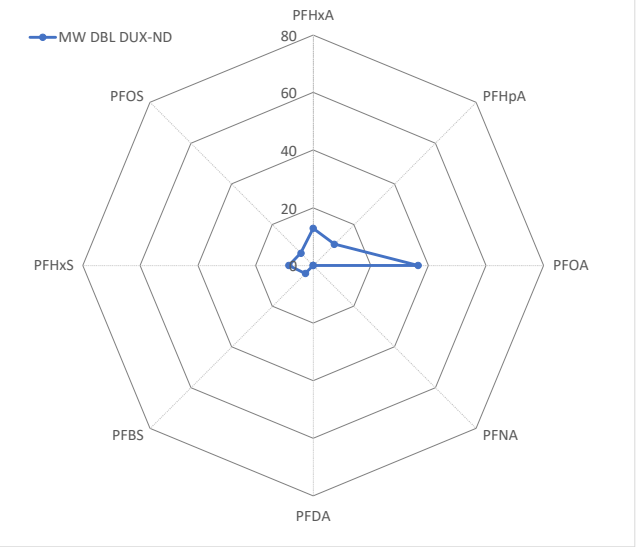
∑ PFAS (ng/L): 71.46 PFAS 6 (ng/L): 63.32
Location Relative to Waste: Downgradient, East



∑ PFAS (ng/L): 41.06 PFAS 6 (ng/L): 26.61
Location Relative to Waste: Downgradient, Northeast



∑ PFAS (ng/L): 54.85 PFAS 6 (ng/L): 33.66
Location Relative to Waste: Far Downgradient, Northeast



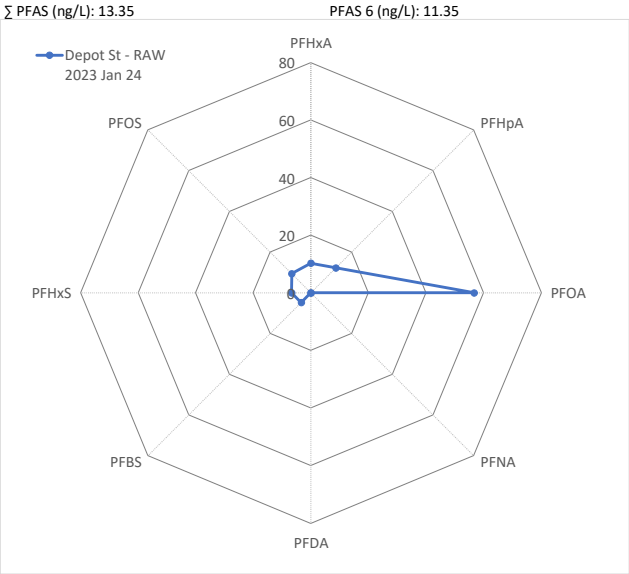
[Blank]

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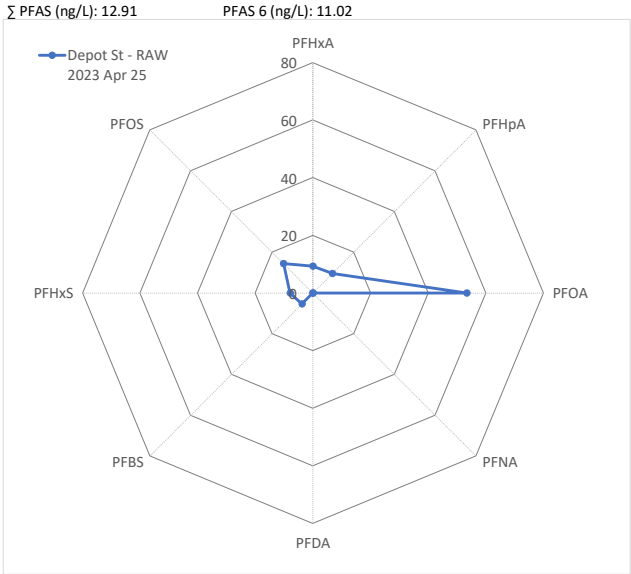
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Raw Water

Wellfield: Depot St

∑ PFAS (ng/L): 13.35 PFAS 6 (ng/L): 11.35



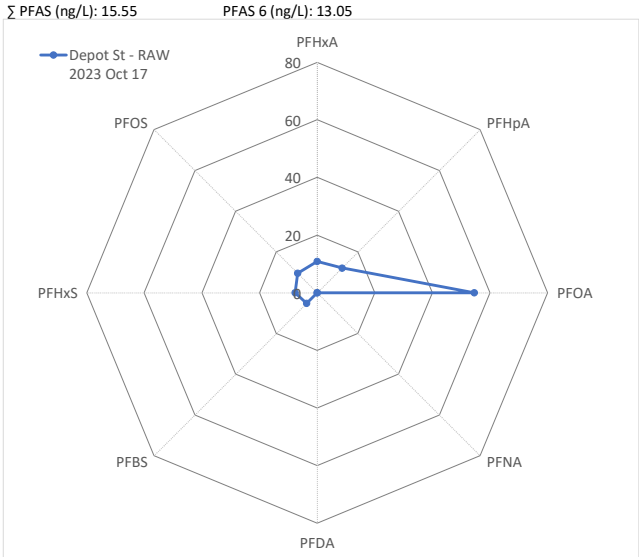
∑ PFAS (ng/L): 12.91 PFAS 6 (ng/L): 11.02



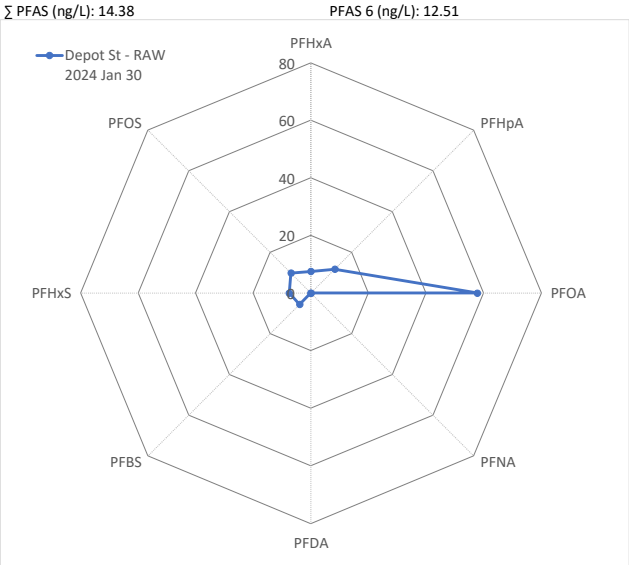
∑ PFAS (ng/L): 10.56 PFAS 6 (ng/L): 9.292



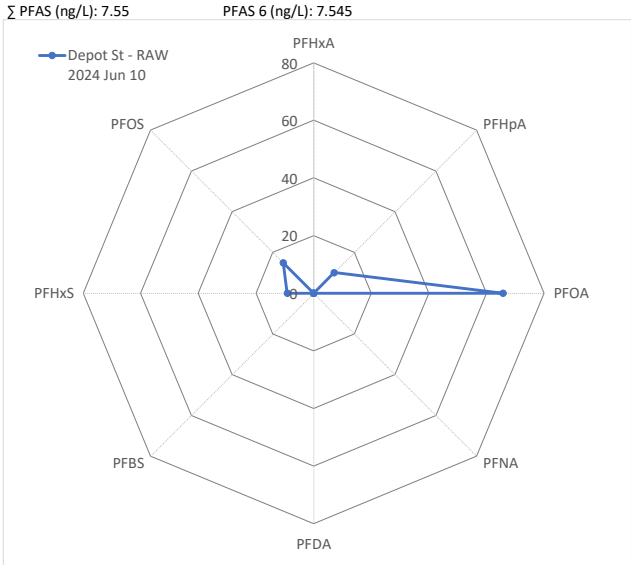
∑ PFAS (ng/L): 15.55 PFAS 6 (ng/L): 13.05



∑ PFAS (ng/L): 14.38 PFAS 6 (ng/L): 12.51



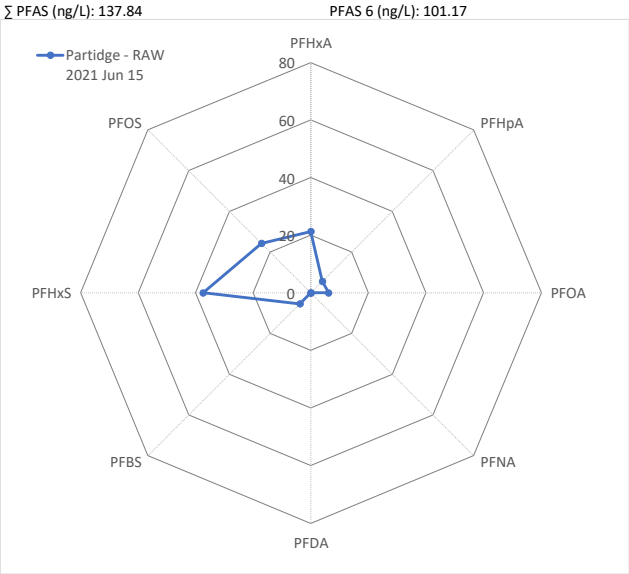
∑ PFAS (ng/L): 7.55 PFAS 6 (ng/L): 7.545



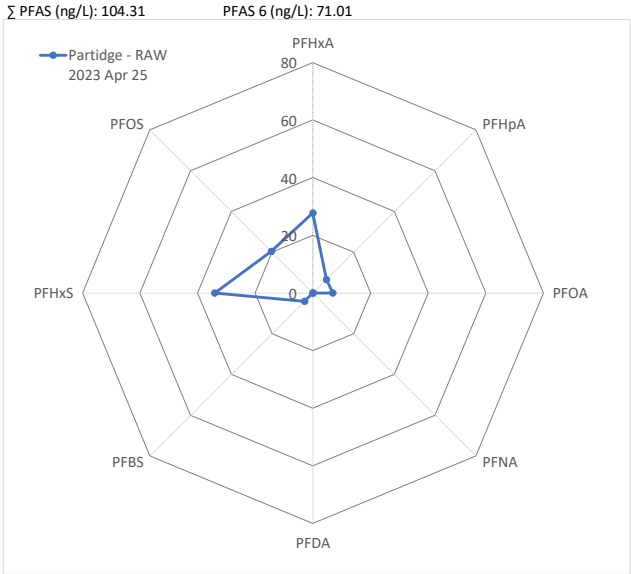
Duxbury Water Supply Wells - PFAS Radar Plots **Wellfield: Partidge**

Ratio [PFAS species] / Total (∑) PFAS - Raw Water

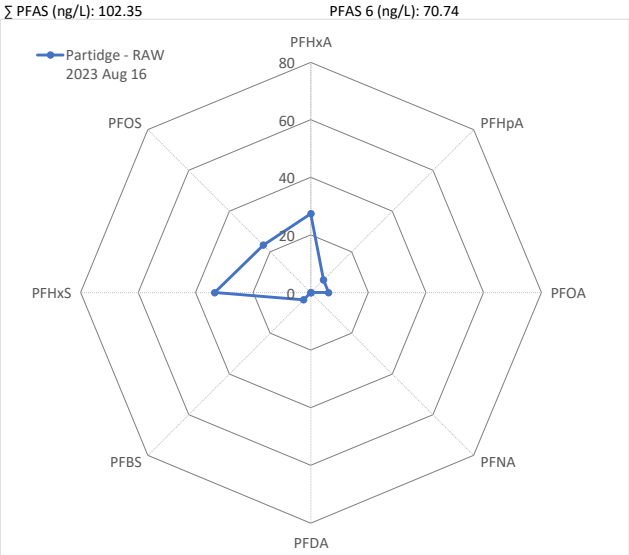
∑ PFAS (ng/L): 137.84 PFAS 6 (ng/L): 101.17



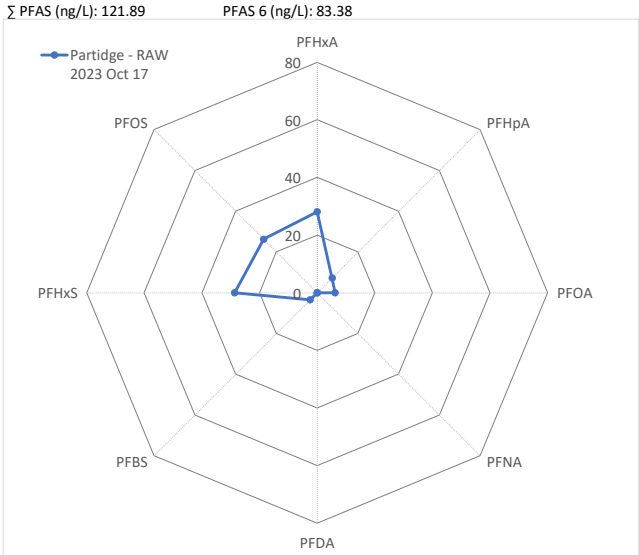
∑ PFAS (ng/L): 104.31 PFAS 6 (ng/L): 71.01



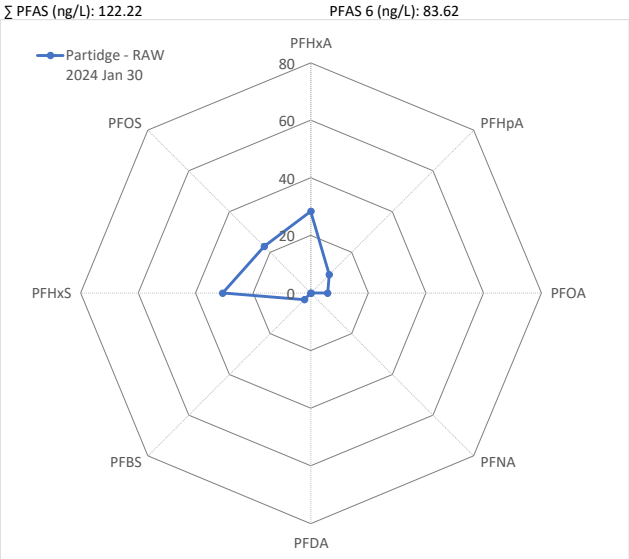
∑ PFAS (ng/L): 102.35 PFAS 6 (ng/L): 70.74



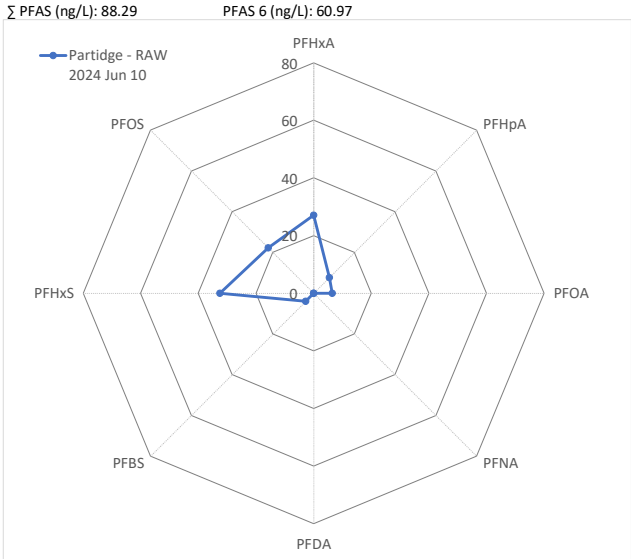
∑ PFAS (ng/L): 121.89 PFAS 6 (ng/L): 83.38



∑ PFAS (ng/L): 122.22 PFAS 6 (ng/L): 83.62



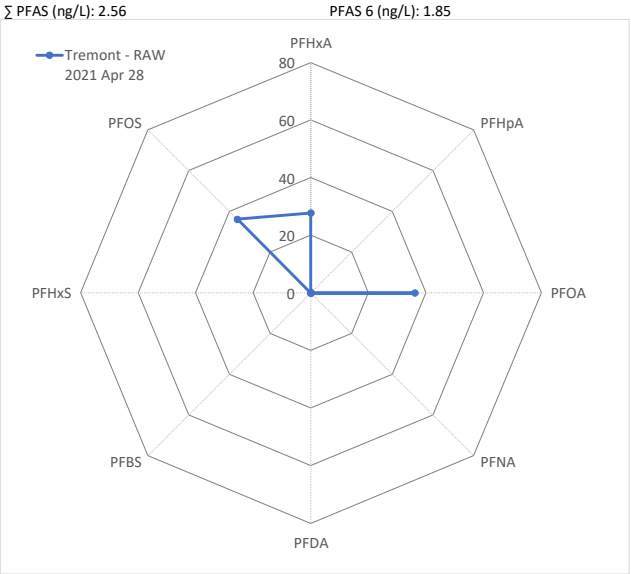
∑ PFAS (ng/L): 88.29 PFAS 6 (ng/L): 60.97



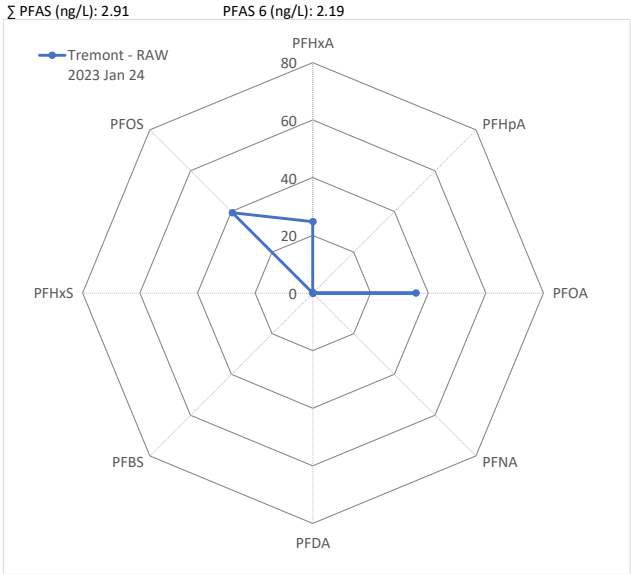
Duxbury Water Supply Wells - PFAS Radar Plots **Wellfield: Tremont**

Ratio [PFAS species] / Total (∑) PFAS - Raw Water

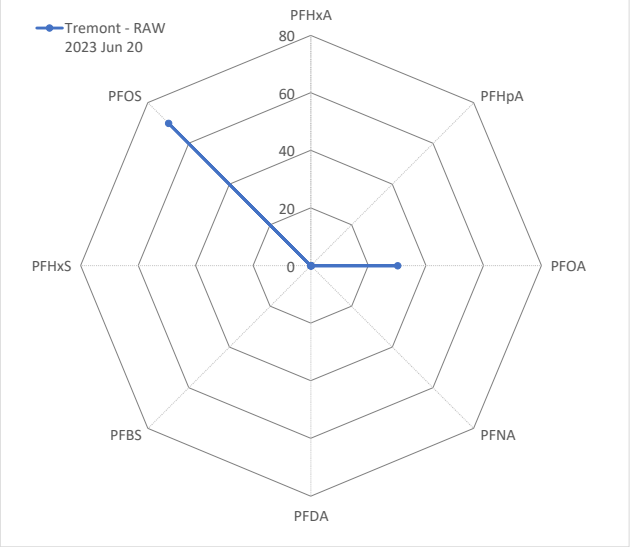
∑ PFAS (ng/L): 2.56 PFAS 6 (ng/L): 1.85



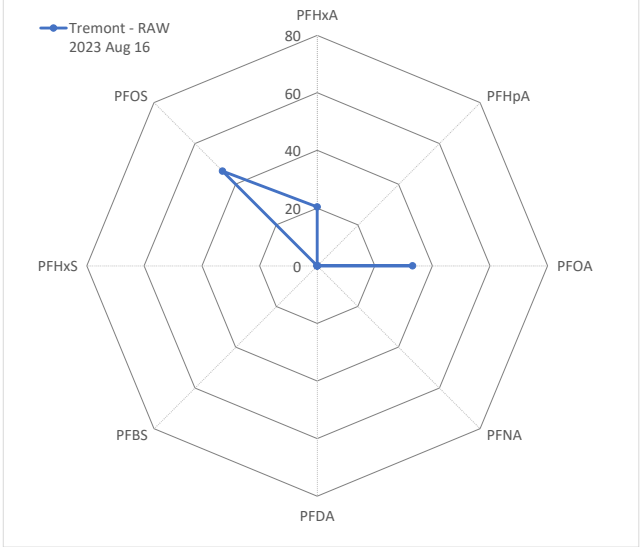
∑ PFAS (ng/L): 2.91 PFAS 6 (ng/L): 2.19



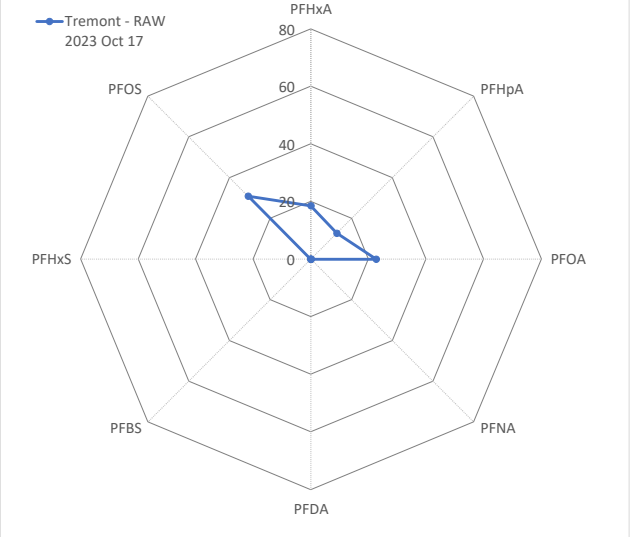
∑ PFAS (ng/L): 3.03 PFAS 6 (ng/L): 3.03



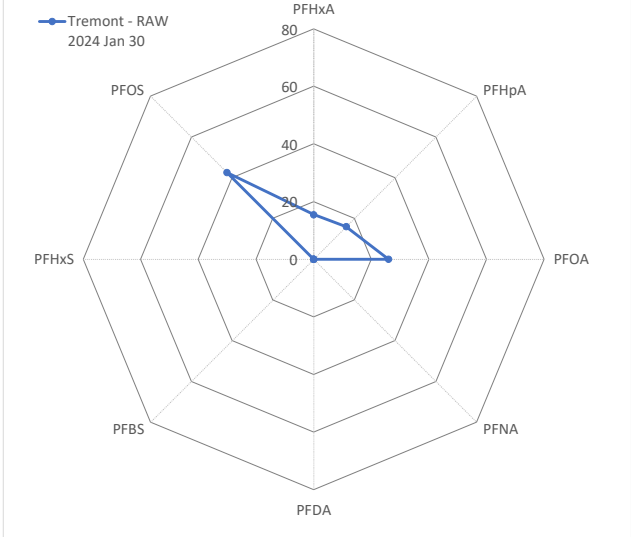
∑ PFAS (ng/L): 3.33 PFAS 6 (ng/L): 2.65



∑ PFAS (ng/L): 5.51 PFAS 6 (ng/L): 3.65



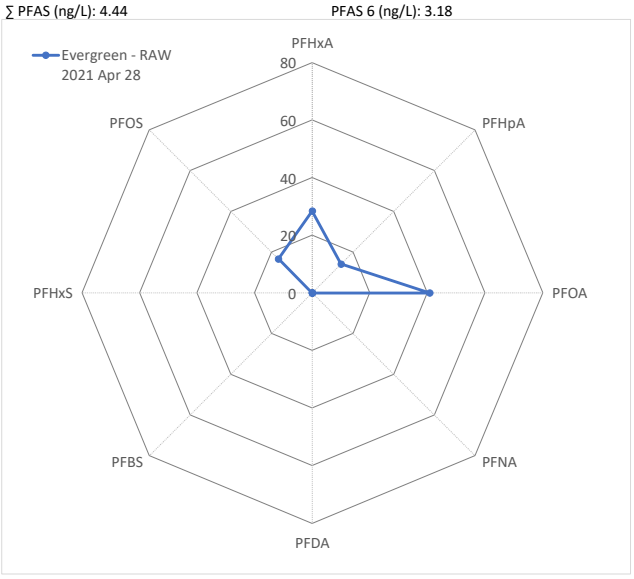
∑ PFAS (ng/L): 4.51 PFAS 6 (ng/L): 4.51



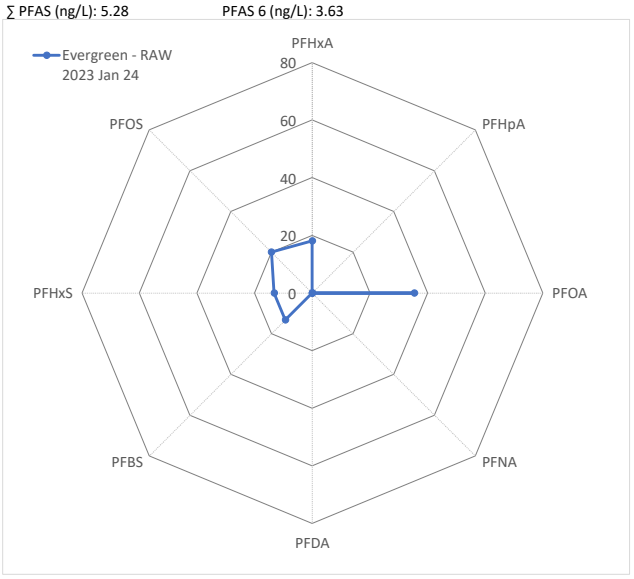
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Raw Water

Wellfield: Evergreen

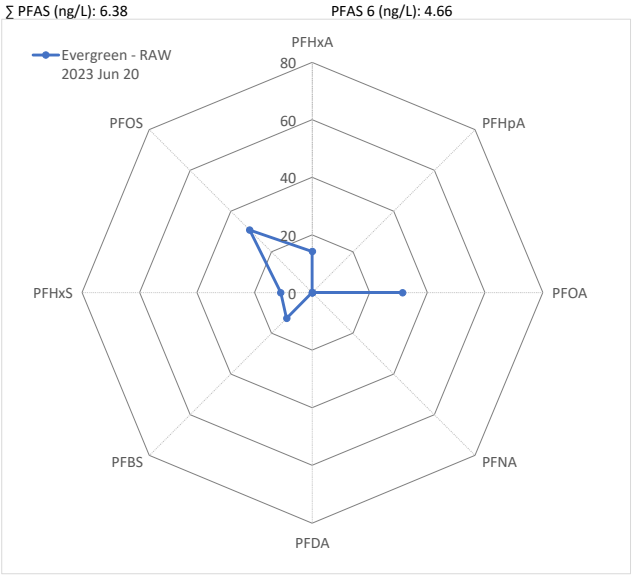
∑ PFAS (ng/L): 4.44 PFAS 6 (ng/L): 3.18



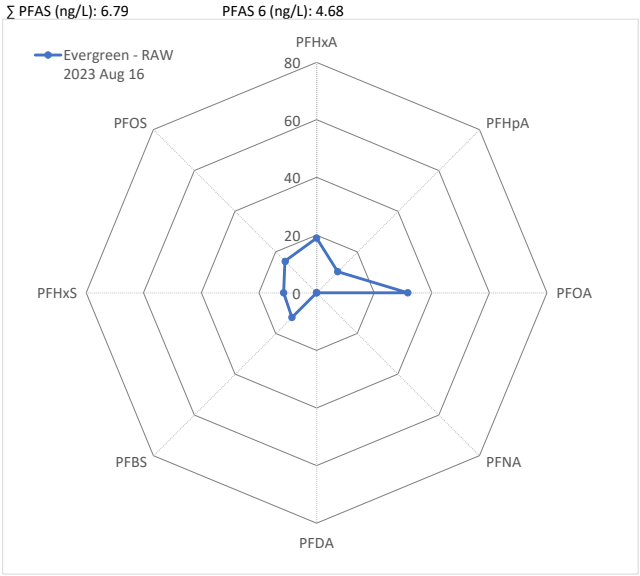
∑ PFAS (ng/L): 5.28 PFAS 6 (ng/L): 3.63



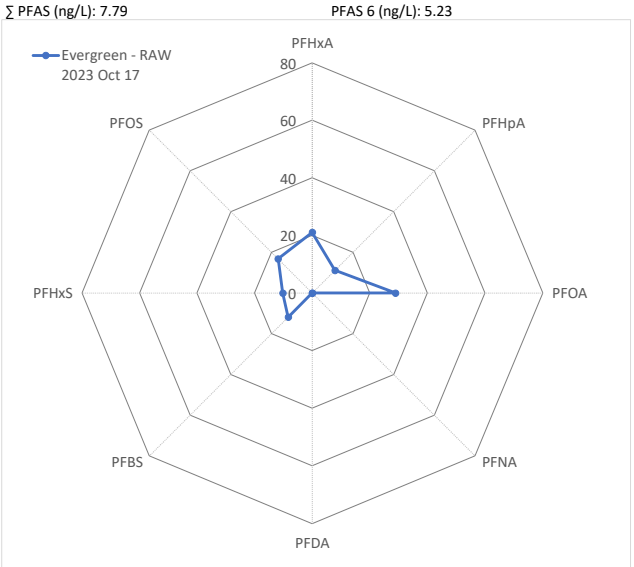
∑ PFAS (ng/L): 6.38 PFAS 6 (ng/L): 4.66



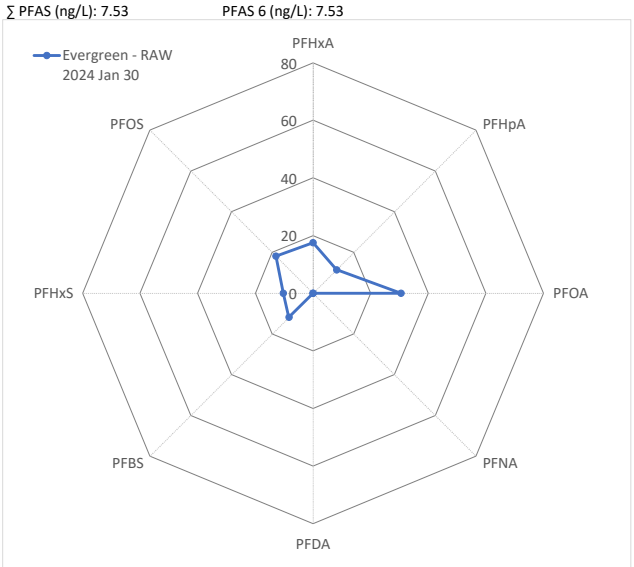
∑ PFAS (ng/L): 6.79 PFAS 6 (ng/L): 4.68



∑ PFAS (ng/L): 7.79 PFAS 6 (ng/L): 5.23



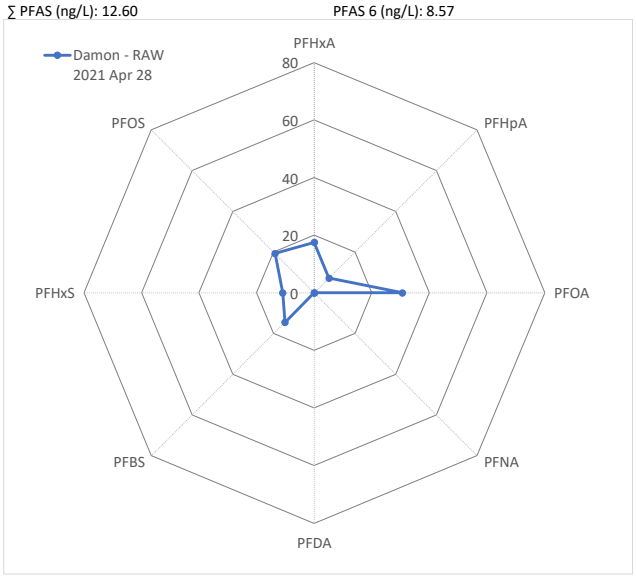
∑ PFAS (ng/L): 7.53 PFAS 6 (ng/L): 7.53



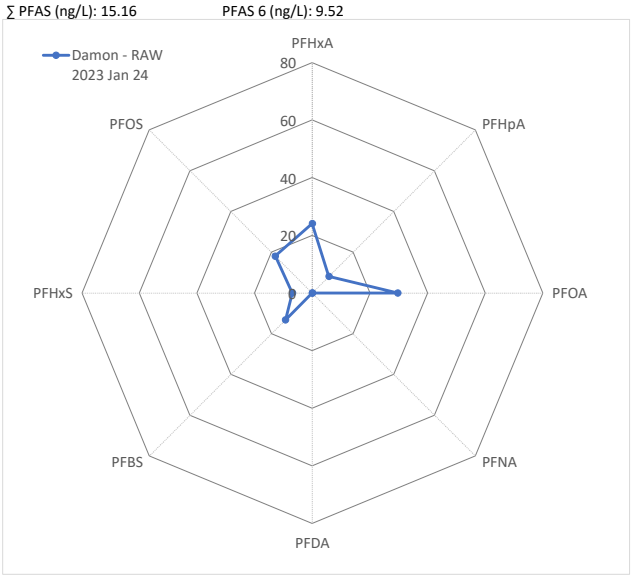
Duxbury Water Supply Wells - PFAS Radar Plots **Wellfield: Damon**

Ratio [PFAS species] / Total (∑) PFAS - Raw Water

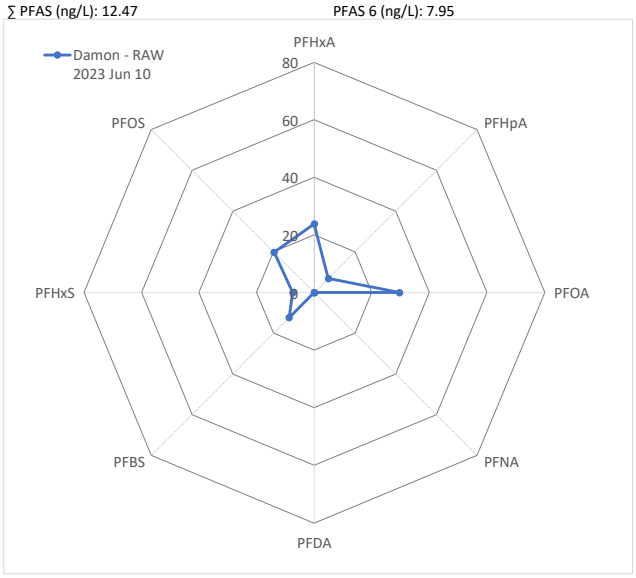
∑ PFAS (ng/L): 12.60 PFAS 6 (ng/L): 8.57



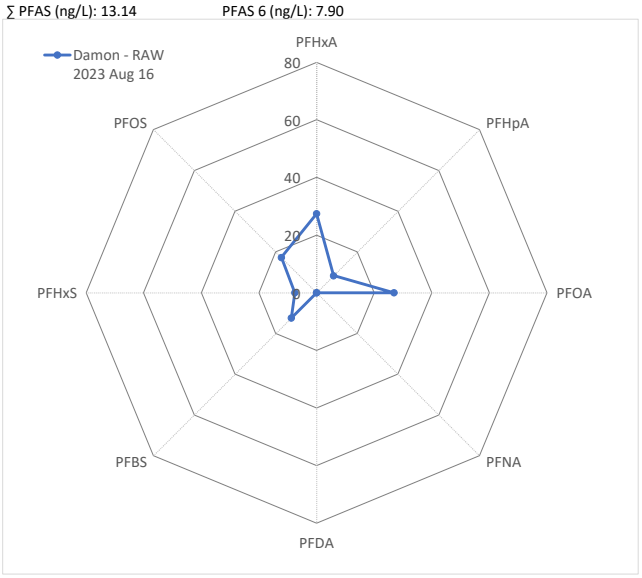
∑ PFAS (ng/L): 15.16 PFAS 6 (ng/L): 9.52



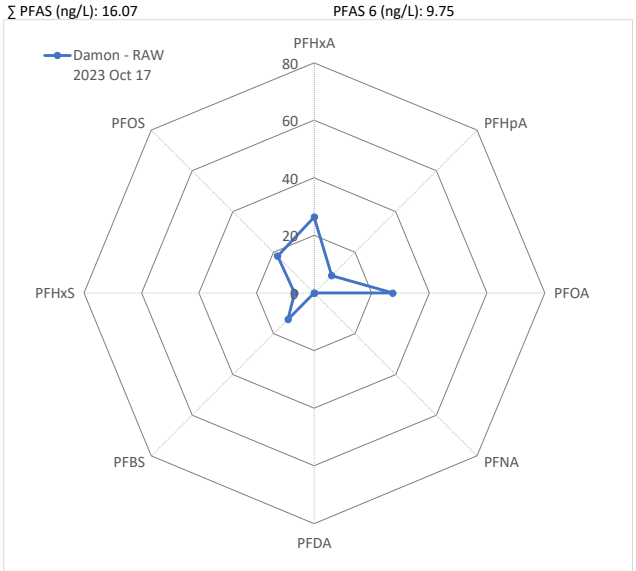
∑ PFAS (ng/L): 12.47 PFAS 6 (ng/L): 7.95



∑ PFAS (ng/L): 13.14 PFAS 6 (ng/L): 7.90



∑ PFAS (ng/L): 16.07 PFAS 6 (ng/L): 9.75

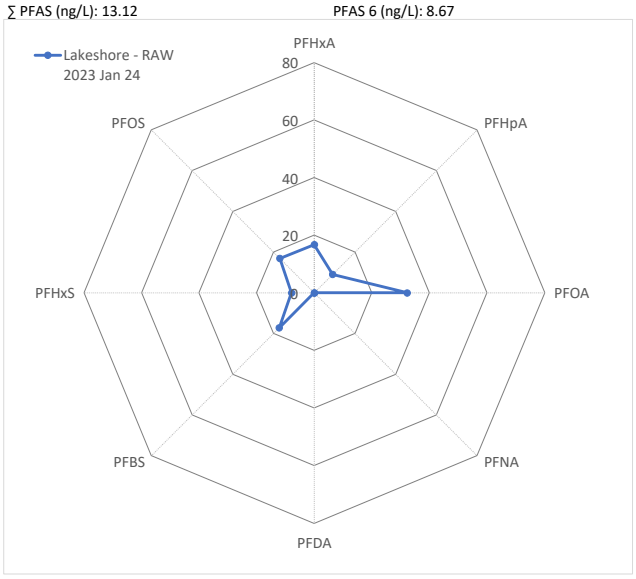


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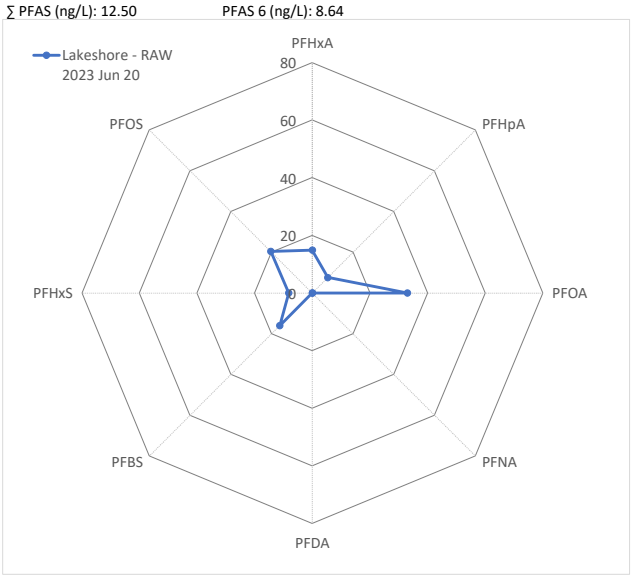
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Raw Water

Wellfield: Lakeshore

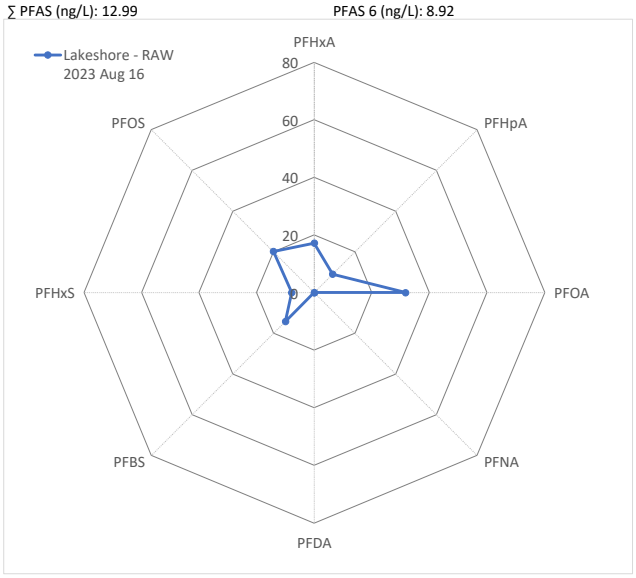
∑ PFAS (ng/L): 13.12 PFAS 6 (ng/L): 8.67



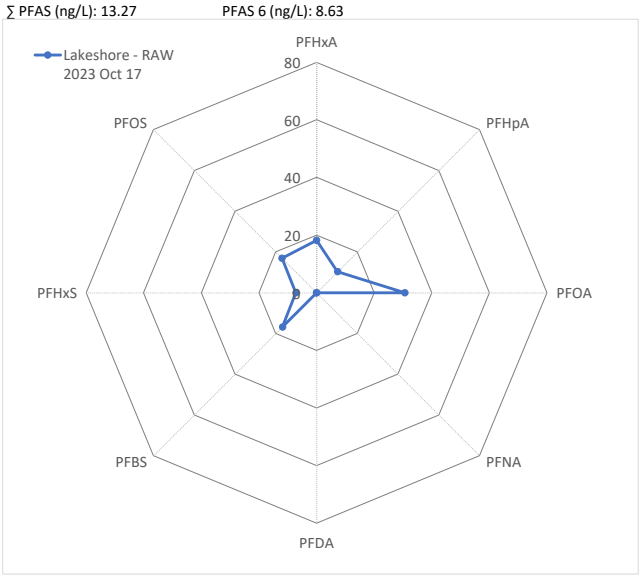
∑ PFAS (ng/L): 12.50 PFAS 6 (ng/L): 8.64



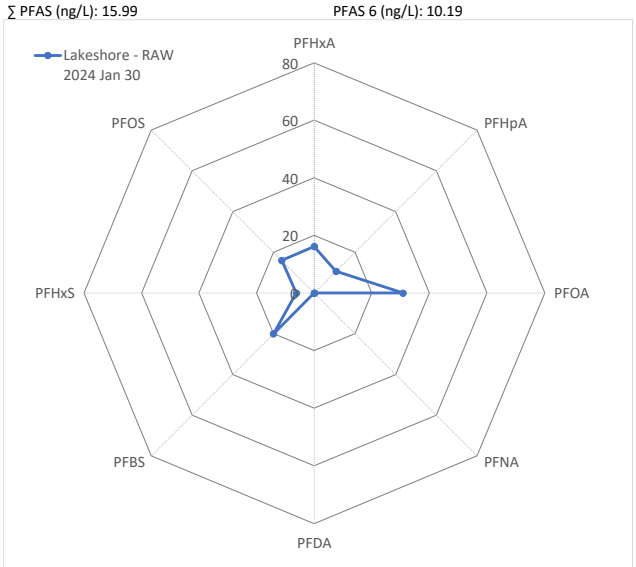
∑ PFAS (ng/L): 12.99 PFAS 6 (ng/L): 8.92



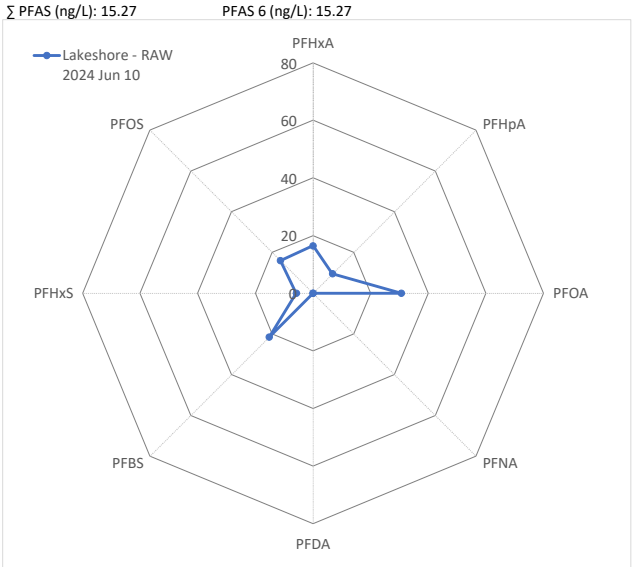
∑ PFAS (ng/L): 13.27 PFAS 6 (ng/L): 8.63



∑ PFAS (ng/L): 15.99 PFAS 6 (ng/L): 10.19



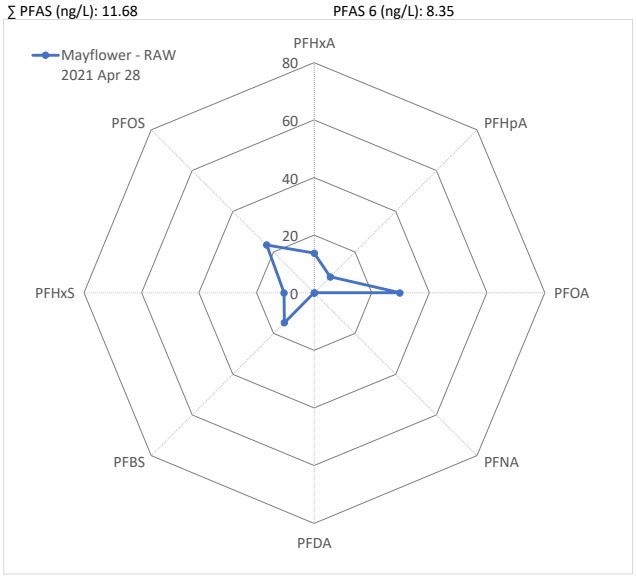
∑ PFAS (ng/L): 15.27 PFAS 6 (ng/L): 15.27



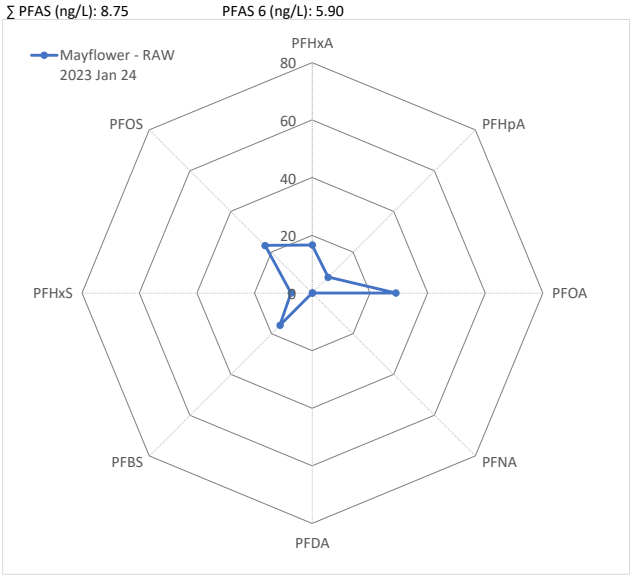
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Raw Water

Wellfield: Mayflower

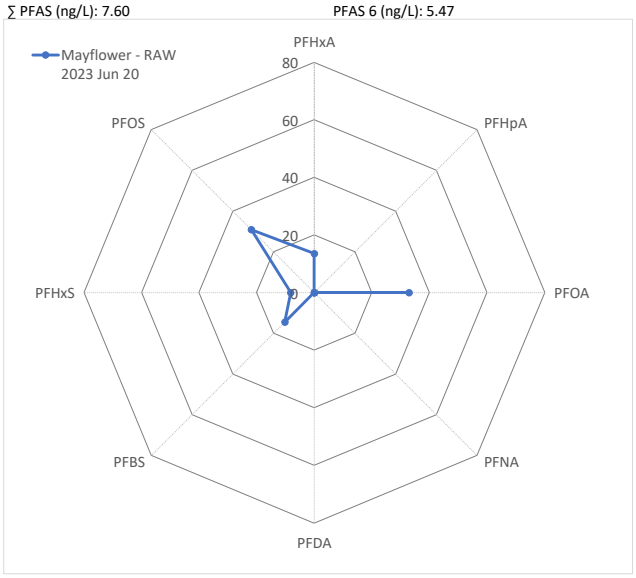
∑ PFAS (ng/L): 11.68 PFAS 6 (ng/L): 8.35



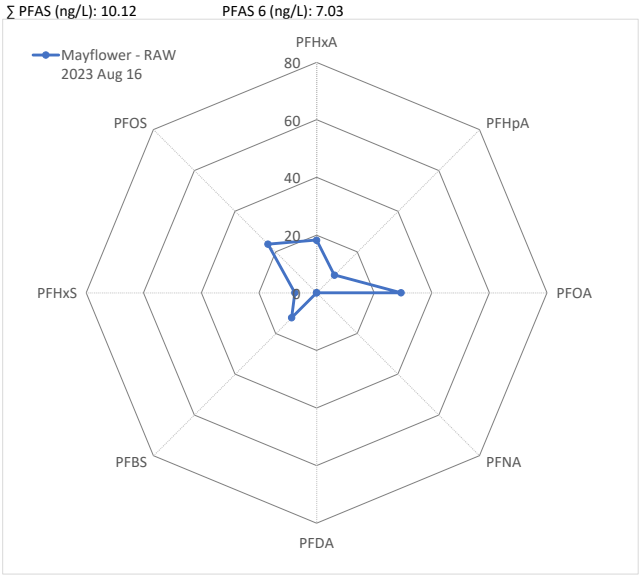
∑ PFAS (ng/L): 8.75 PFAS 6 (ng/L): 5.90



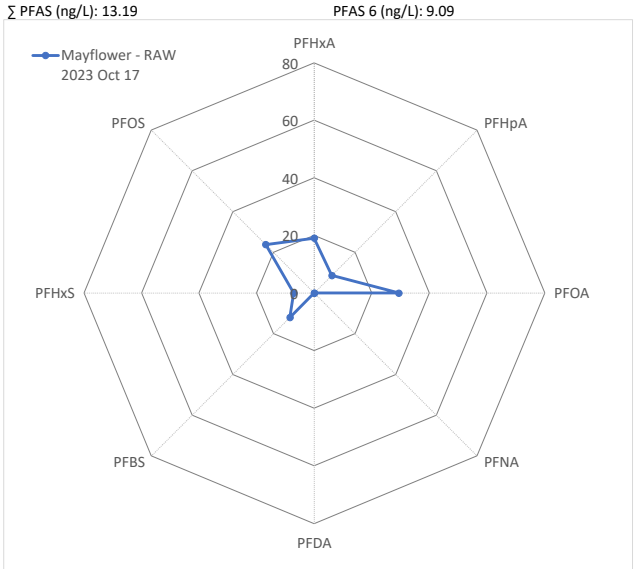
∑ PFAS (ng/L): 7.60 PFAS 6 (ng/L): 5.47



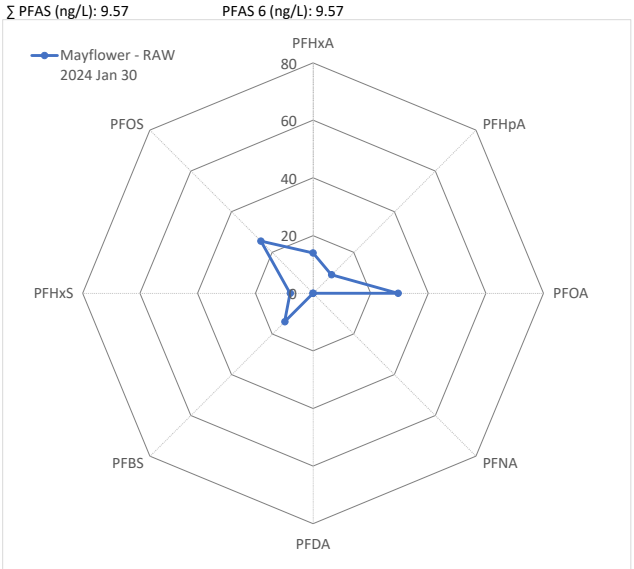
∑ PFAS (ng/L): 10.12 PFAS 6 (ng/L): 7.03



∑ PFAS (ng/L): 13.19 PFAS 6 (ng/L): 9.09



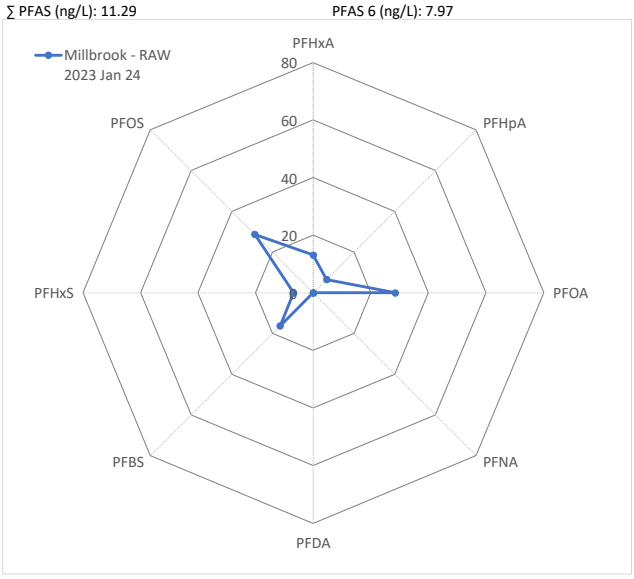
∑ PFAS (ng/L): 9.57 PFAS 6 (ng/L): 9.57



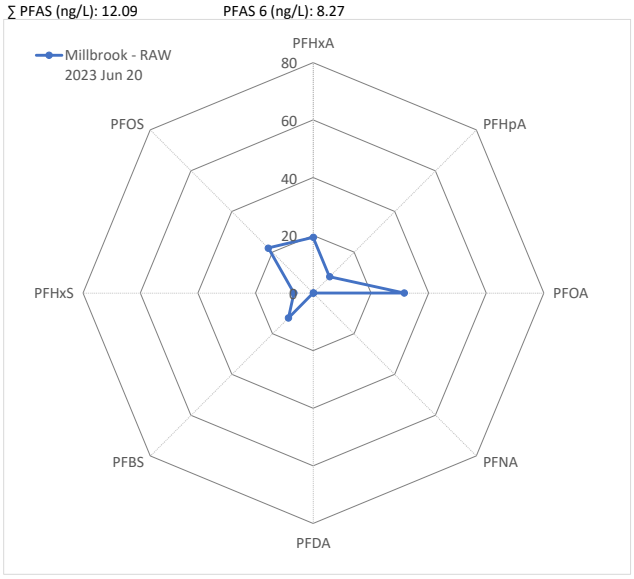
Duxbury Water Supply Wells - PFAS Radar Plots **Wellfield: Millbrook**

Ratio [PFAS species] / Total (∑) PFAS - Raw Water

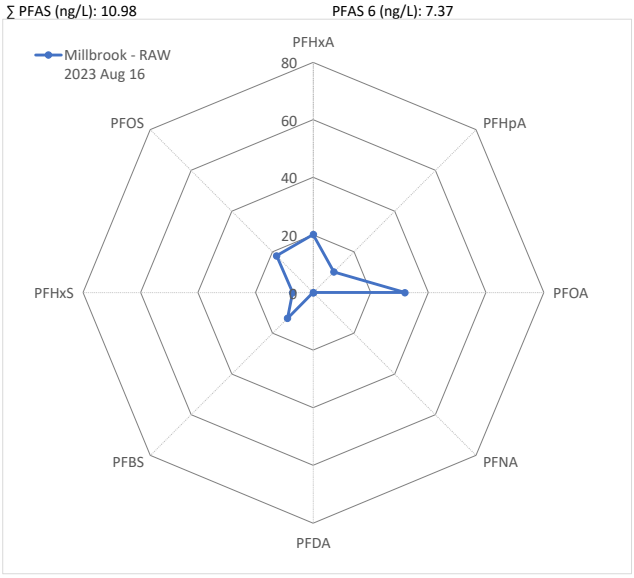
∑ PFAS (ng/L): 11.29 PFAS 6 (ng/L): 7.97



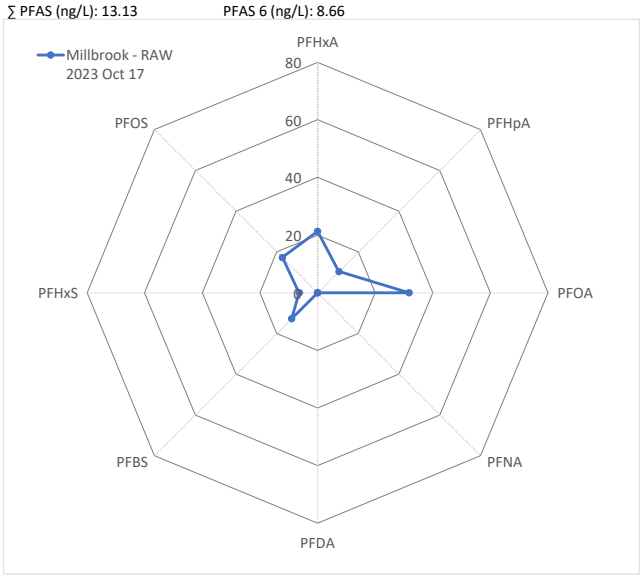
∑ PFAS (ng/L): 12.09 PFAS 6 (ng/L): 8.27



∑ PFAS (ng/L): 10.98 PFAS 6 (ng/L): 7.37



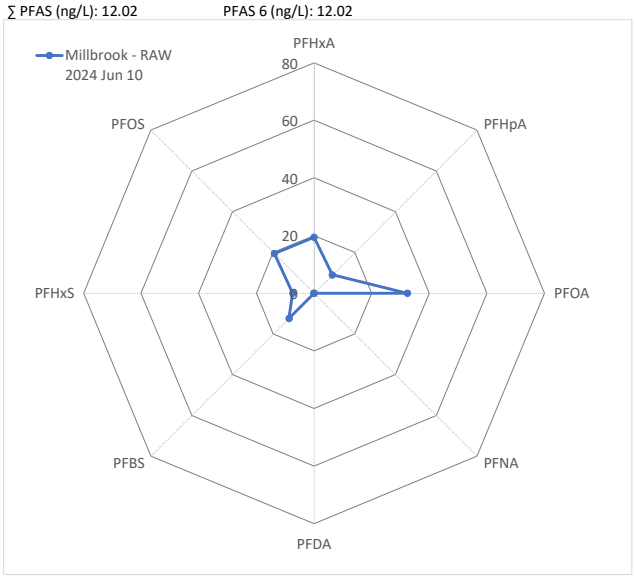
∑ PFAS (ng/L): 13.13 PFAS 6 (ng/L): 8.66



∑ PFAS (ng/L): 13.99 PFAS 6 (ng/L): 9.41



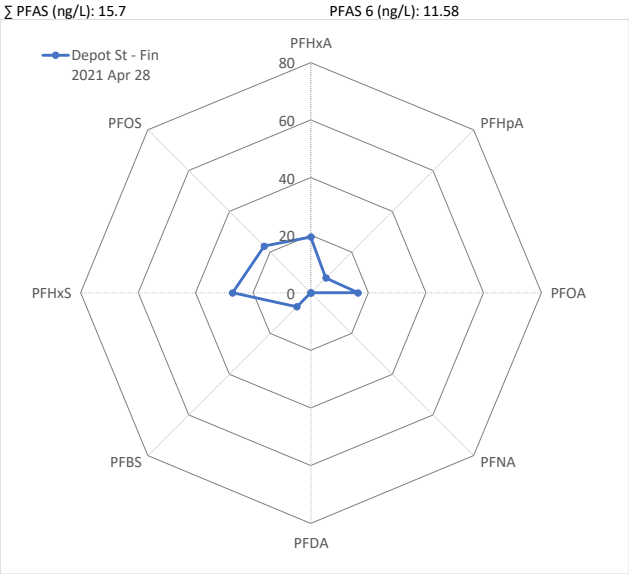
∑ PFAS (ng/L): 12.02 PFAS 6 (ng/L): 12.02



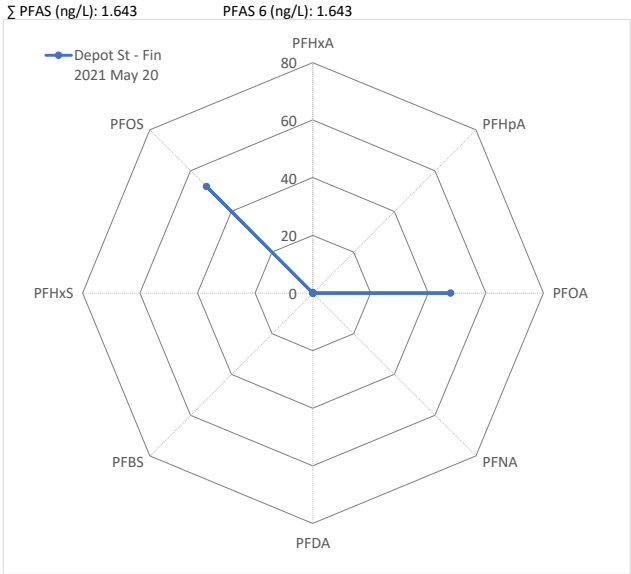
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Depot St

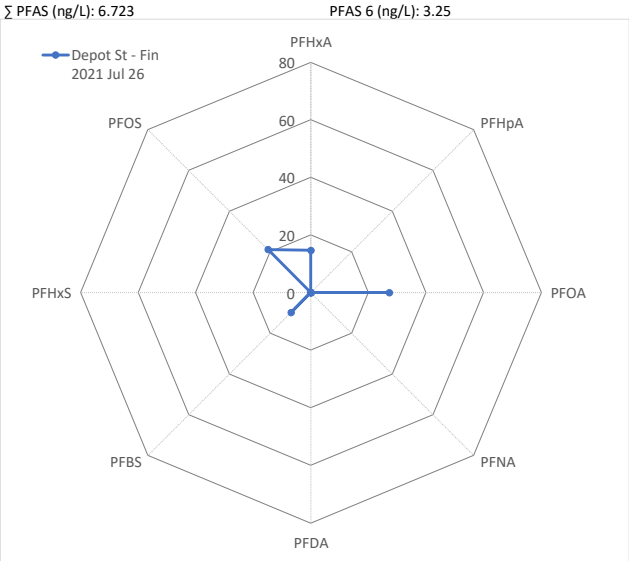
∑ PFAS (ng/L): 15.7 PFAS 6 (ng/L): 11.58



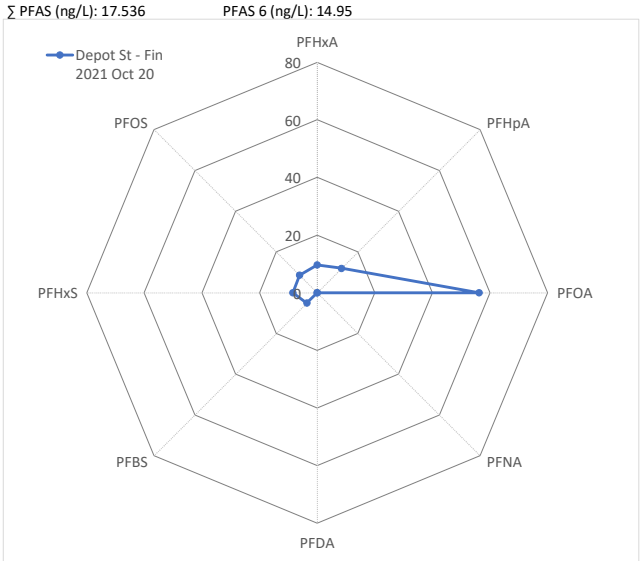
∑ PFAS (ng/L): 1.643 PFAS 6 (ng/L): 1.643



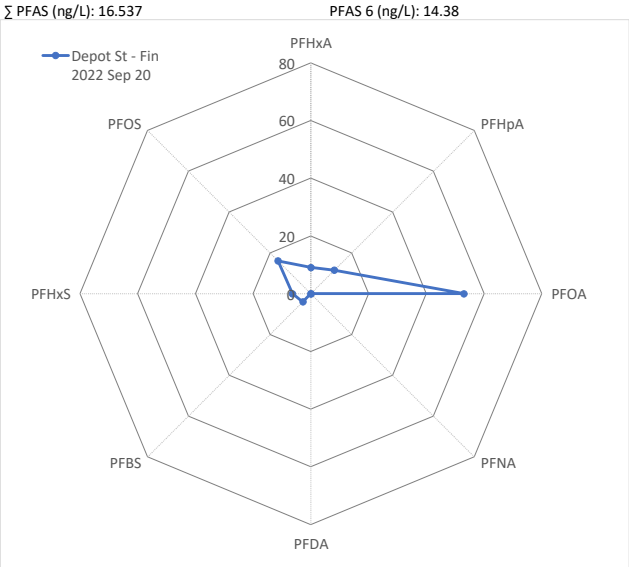
∑ PFAS (ng/L): 6.723 PFAS 6 (ng/L): 3.25



∑ PFAS (ng/L): 17.536 PFAS 6 (ng/L): 14.95



∑ PFAS (ng/L): 16.537 PFAS 6 (ng/L): 14.38

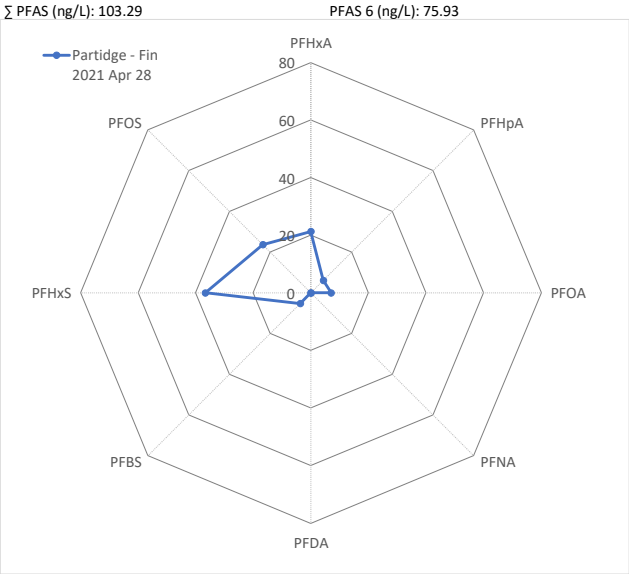


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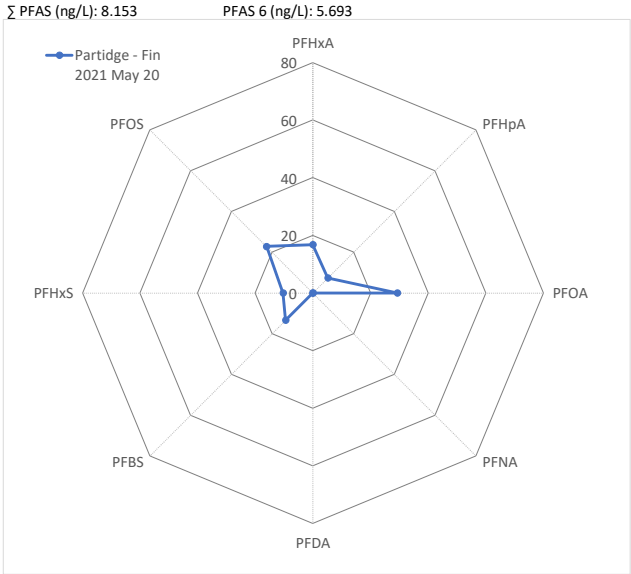
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Partidge

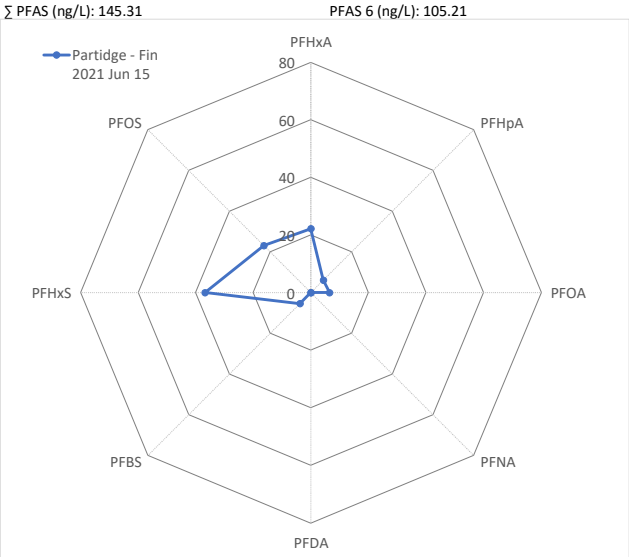
∑ PFAS (ng/L): 103.29 PFAS 6 (ng/L): 75.93



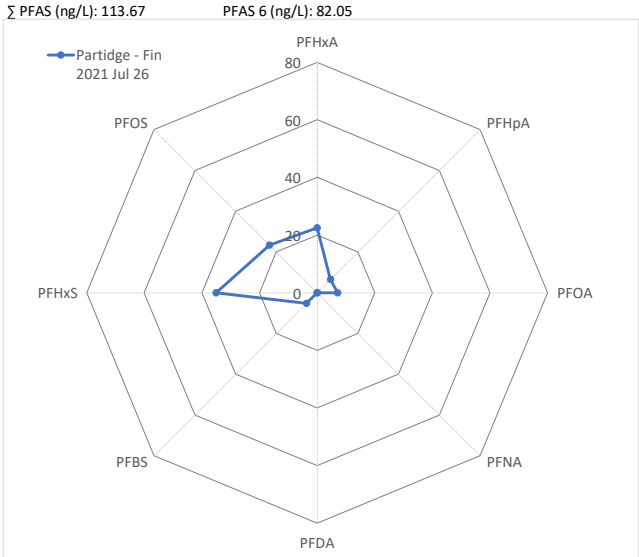
∑ PFAS (ng/L): 8.153 PFAS 6 (ng/L): 5.693



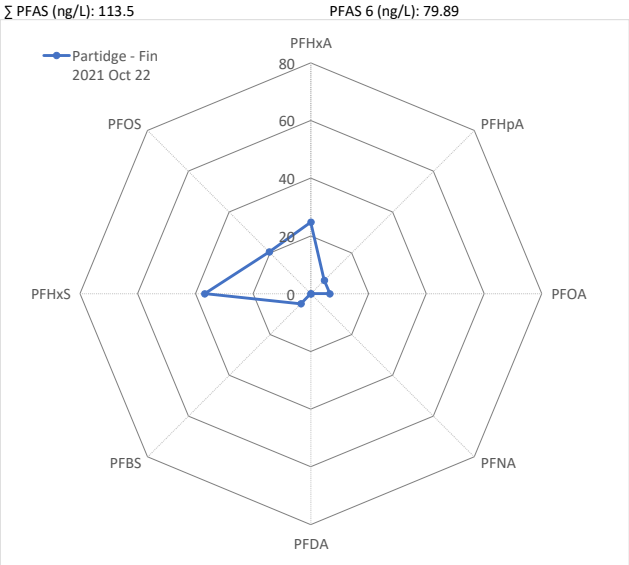
∑ PFAS (ng/L): 145.31 PFAS 6 (ng/L): 105.21



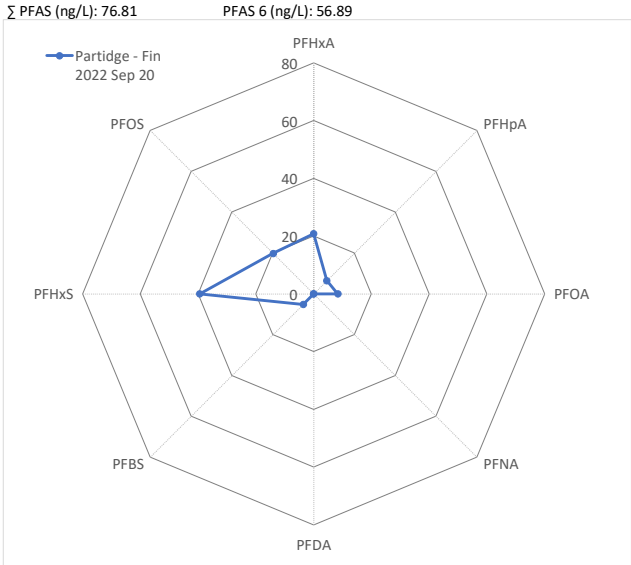
∑ PFAS (ng/L): 113.67 PFAS 6 (ng/L): 82.05



∑ PFAS (ng/L): 113.5 PFAS 6 (ng/L): 79.89



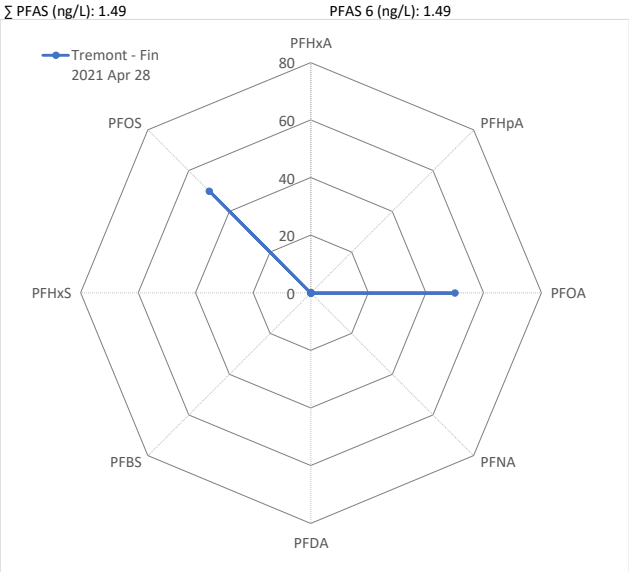
∑ PFAS (ng/L): 76.81 PFAS 6 (ng/L): 56.89



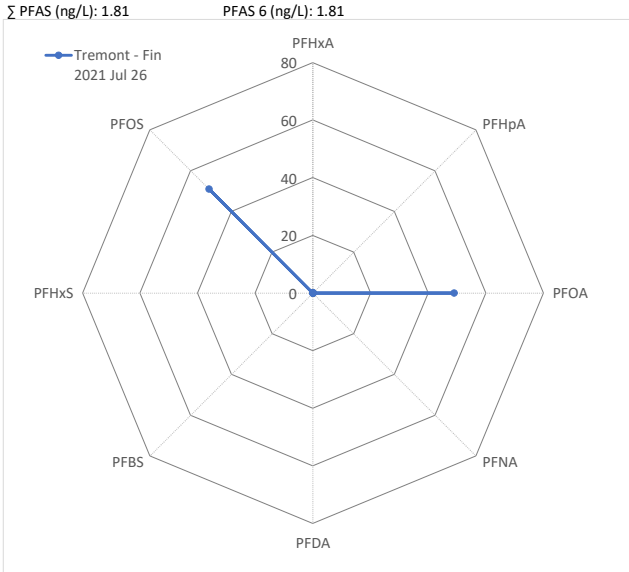
Duxbury Water Supply Wells - PFAS Radar Plots **Wellfield: Tremont**

Ratio [PFAS species] / Total (∑) PFAS - Finished Water

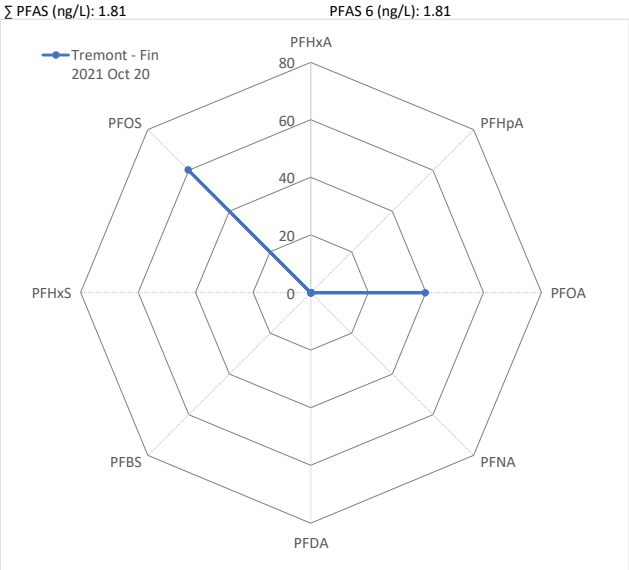
∑ PFAS (ng/L): 1.49 PFAS 6 (ng/L): 1.49



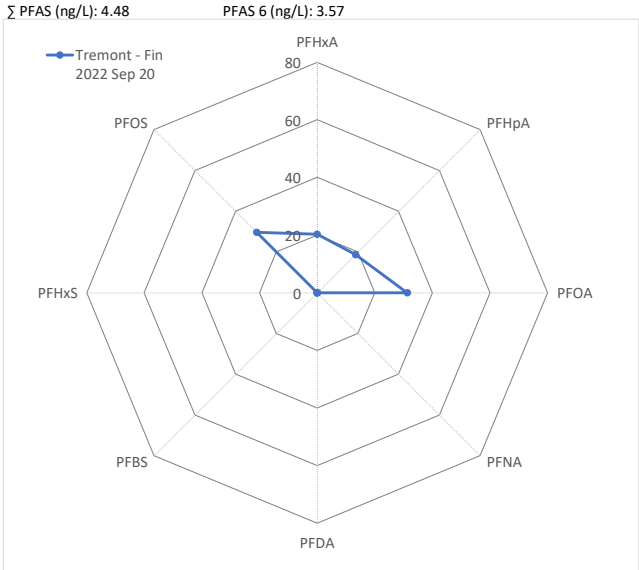
∑ PFAS (ng/L): 1.81 PFAS 6 (ng/L): 1.81



∑ PFAS (ng/L): 1.81 PFAS 6 (ng/L): 1.81



∑ PFAS (ng/L): 4.48 PFAS 6 (ng/L): 3.57



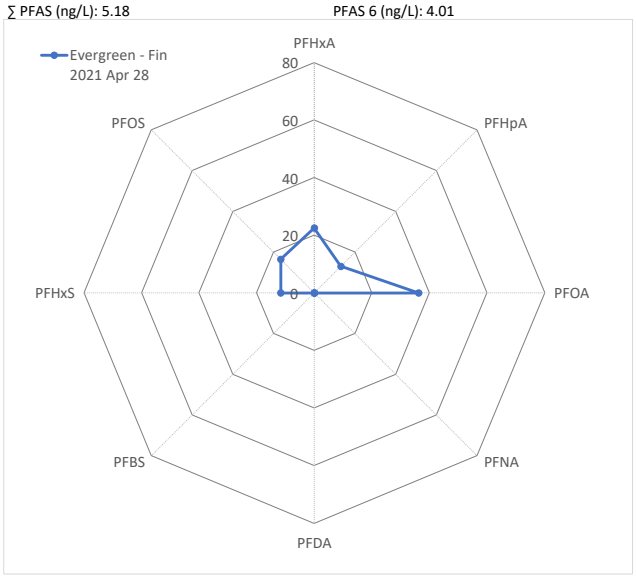
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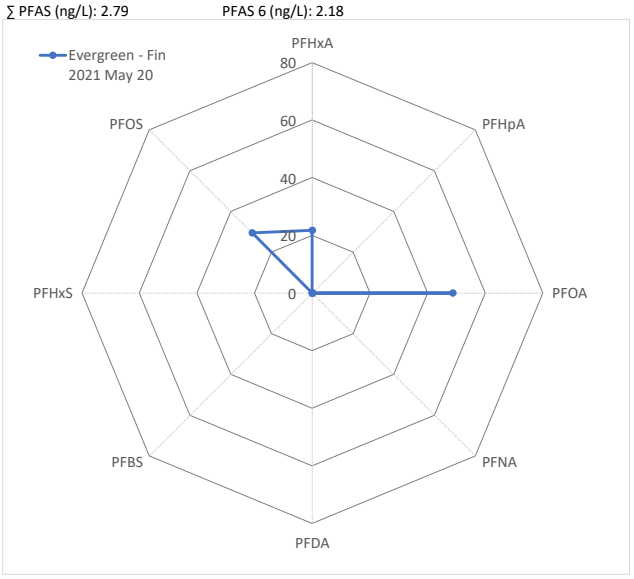
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Evergreen

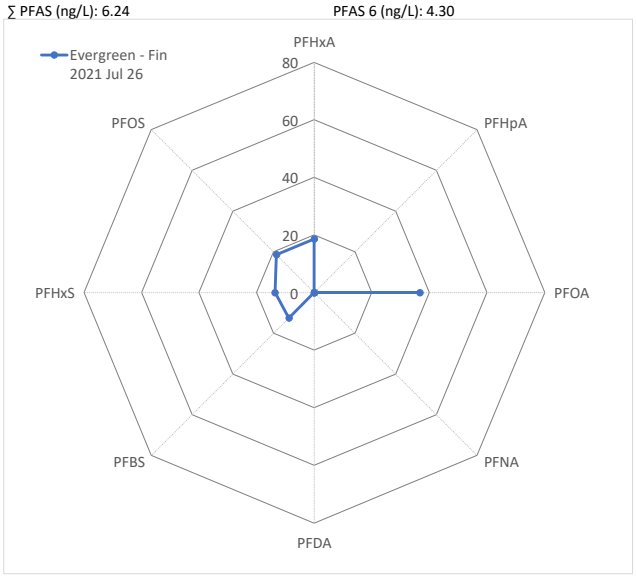
∑ PFAS (ng/L): 5.18 PFAS 6 (ng/L): 4.01



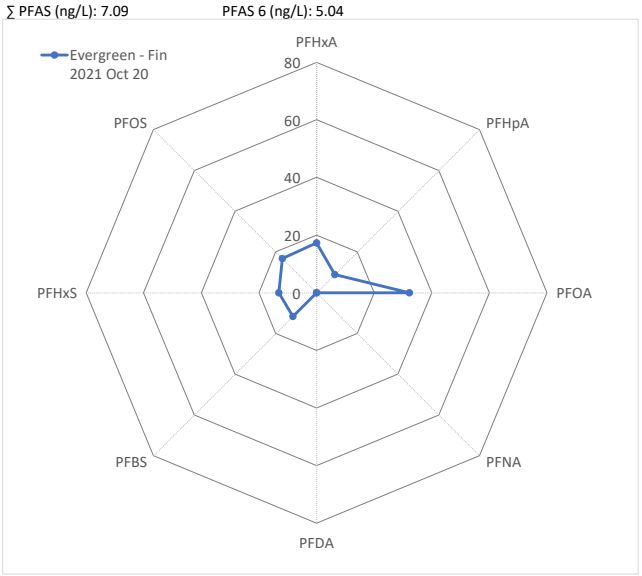
∑ PFAS (ng/L): 2.79 PFAS 6 (ng/L): 2.18



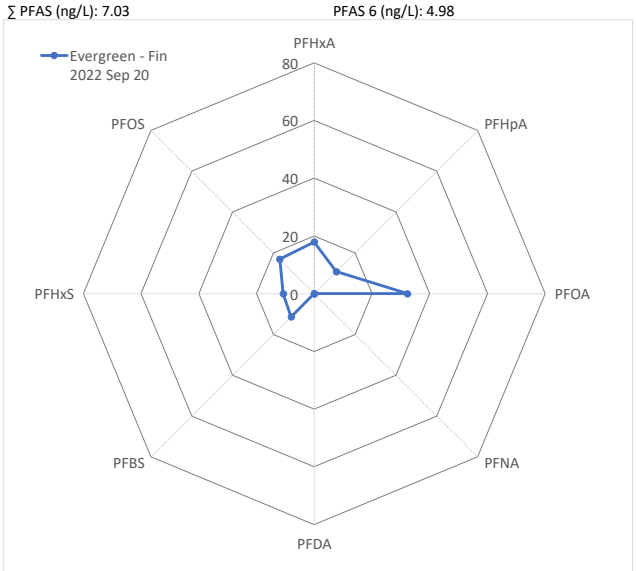
∑ PFAS (ng/L): 6.24 PFAS 6 (ng/L): 4.30



∑ PFAS (ng/L): 7.09 PFAS 6 (ng/L): 5.04



∑ PFAS (ng/L): 7.03 PFAS 6 (ng/L): 4.98

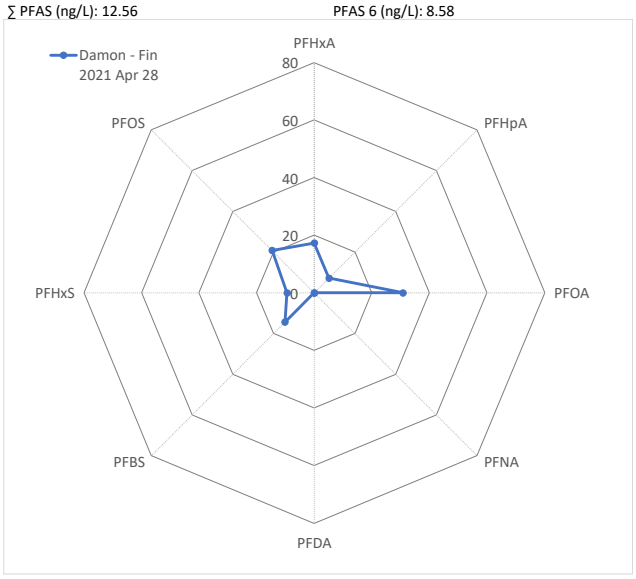


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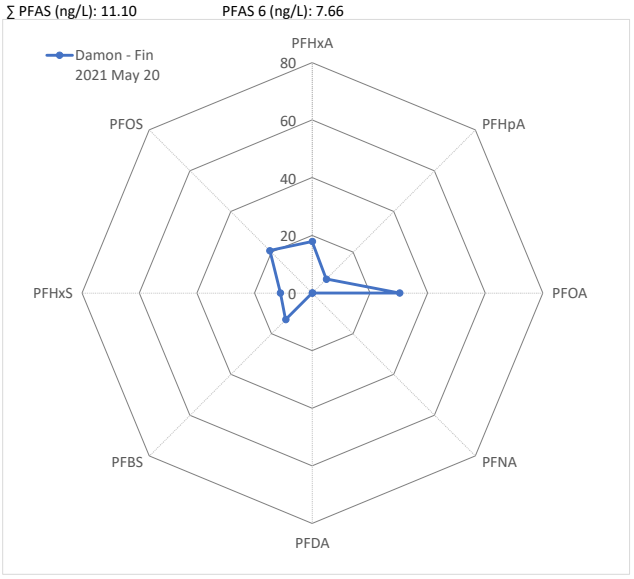
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Damon

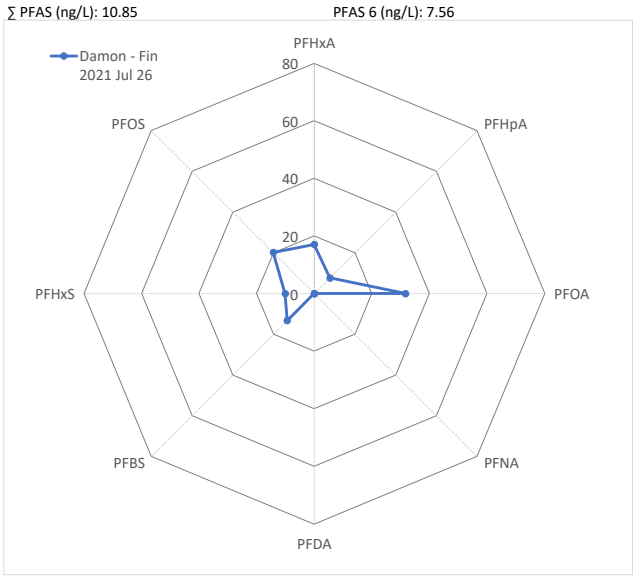
∑ PFAS (ng/L): 12.56 PFAS 6 (ng/L): 8.58



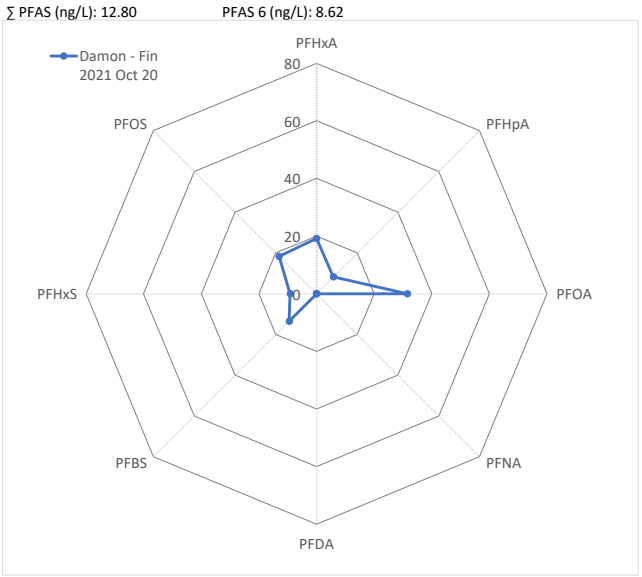
∑ PFAS (ng/L): 11.10 PFAS 6 (ng/L): 7.66



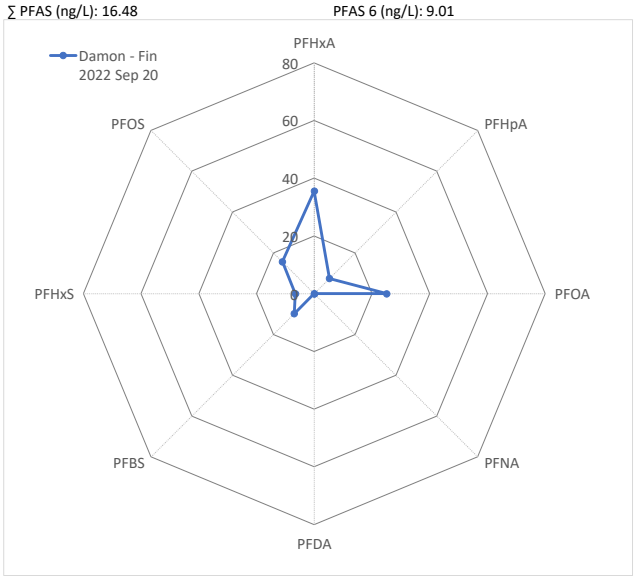
∑ PFAS (ng/L): 10.85 PFAS 6 (ng/L): 7.56



∑ PFAS (ng/L): 12.80 PFAS 6 (ng/L): 8.62



∑ PFAS (ng/L): 16.48 PFAS 6 (ng/L): 9.01

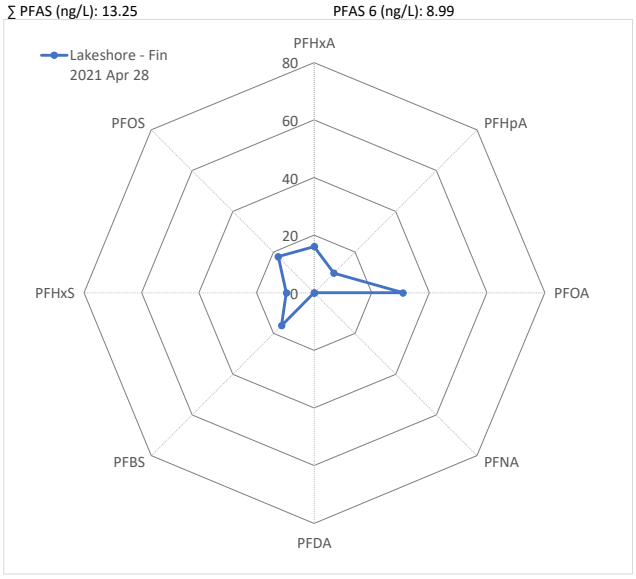


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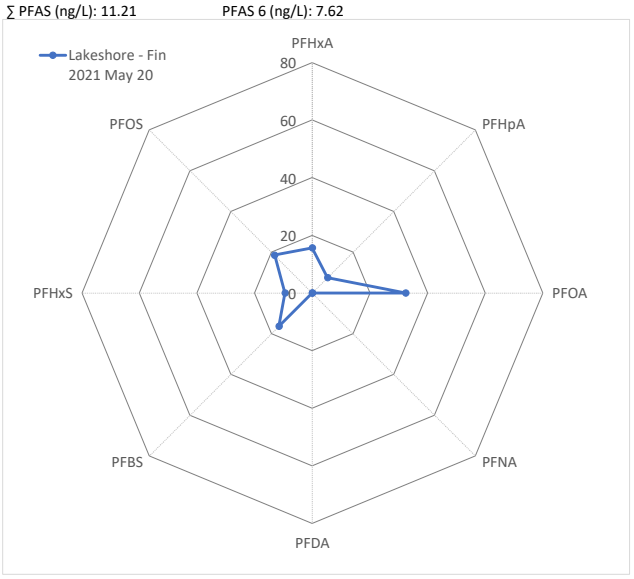
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Lakeshore

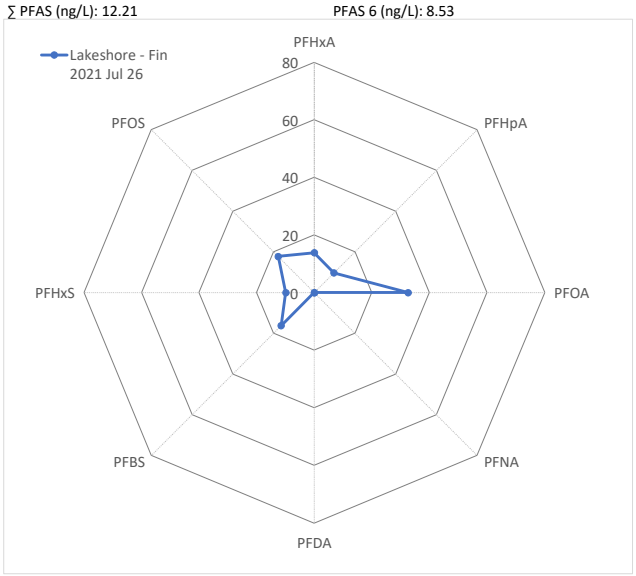
∑ PFAS (ng/L): 13.25 PFAS 6 (ng/L): 8.99



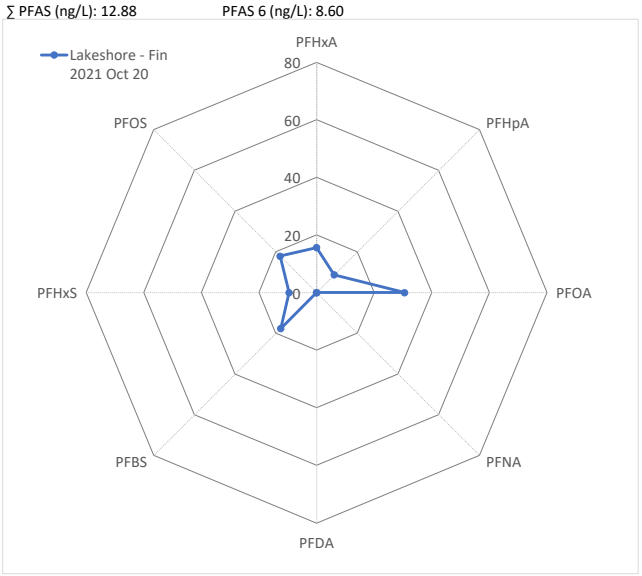
∑ PFAS (ng/L): 11.21 PFAS 6 (ng/L): 7.62



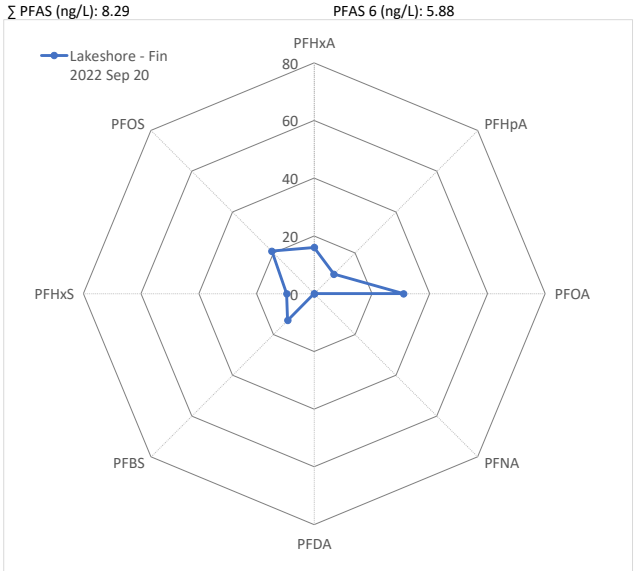
∑ PFAS (ng/L): 12.21 PFAS 6 (ng/L): 8.53



∑ PFAS (ng/L): 12.88 PFAS 6 (ng/L): 8.60



∑ PFAS (ng/L): 8.29 PFAS 6 (ng/L): 5.88

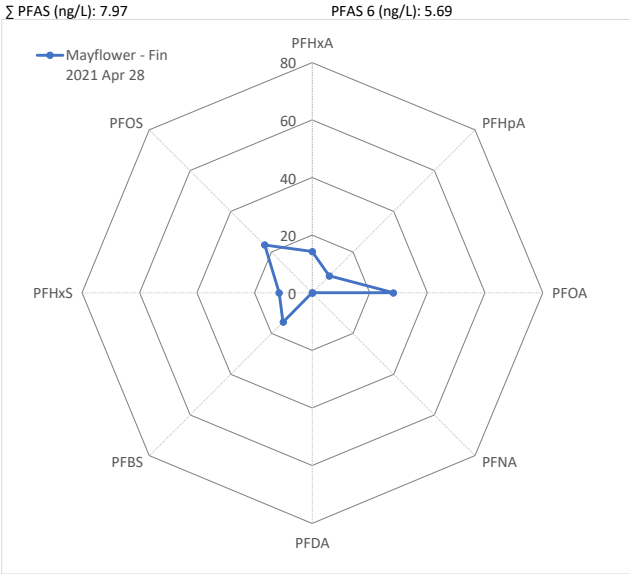


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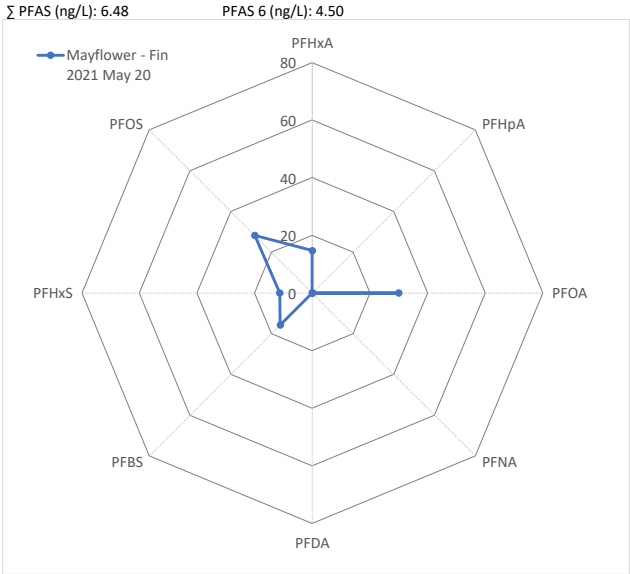
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Mayflower

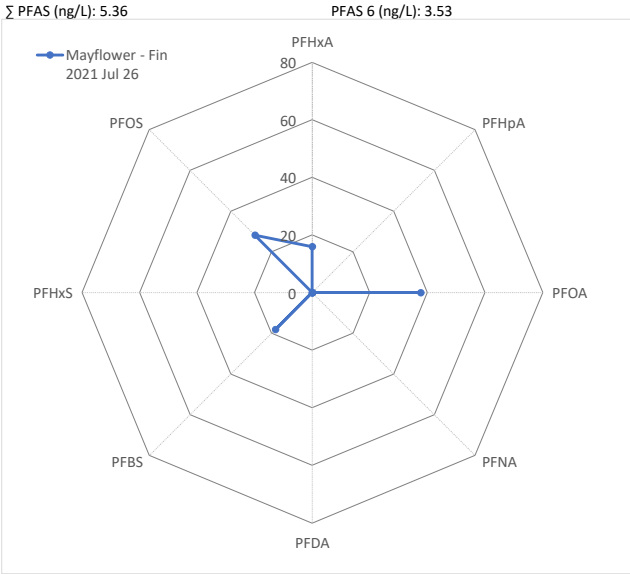
∑ PFAS (ng/L): 7.97 PFAS 6 (ng/L): 5.69



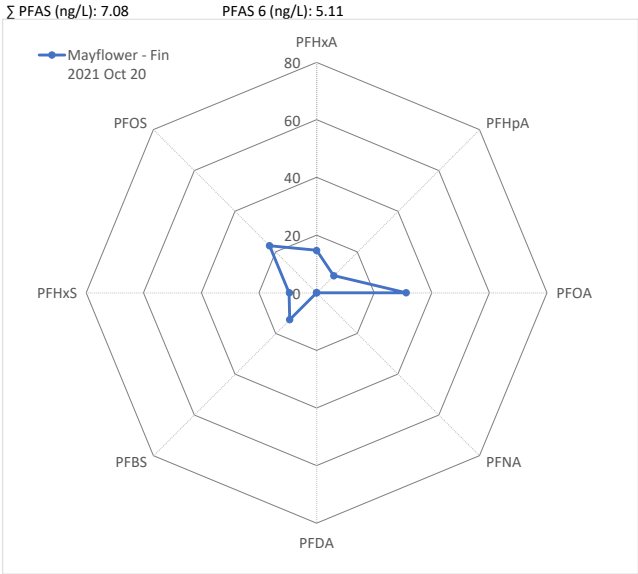
∑ PFAS (ng/L): 6.48 PFAS 6 (ng/L): 4.50



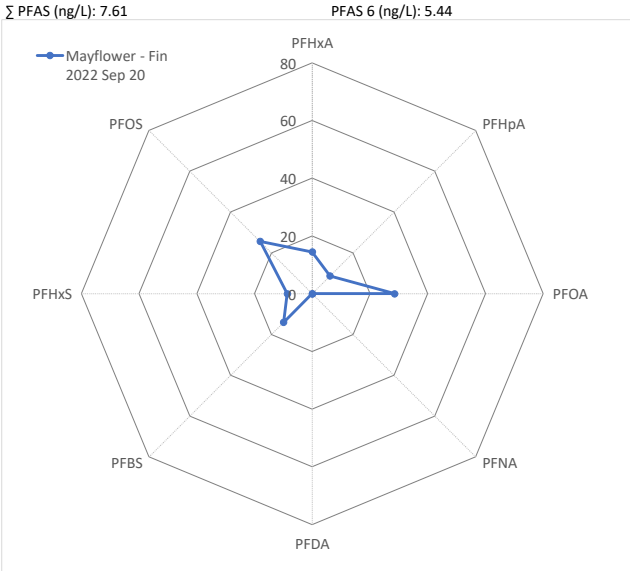
∑ PFAS (ng/L): 5.36 PFAS 6 (ng/L): 3.53



∑ PFAS (ng/L): 7.08 PFAS 6 (ng/L): 5.11



∑ PFAS (ng/L): 7.61 PFAS 6 (ng/L): 5.44

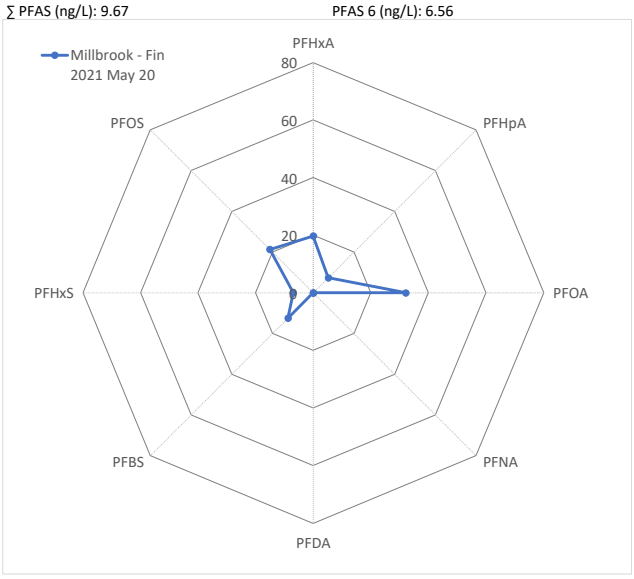


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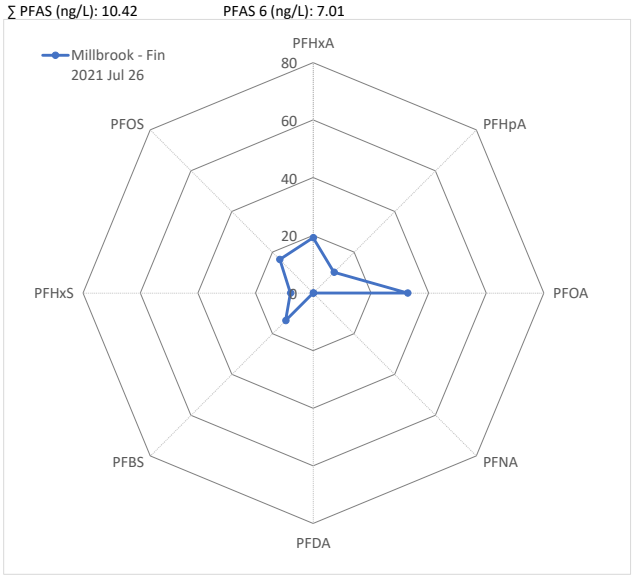
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS - Finished Water

Wellfield: Millbrook

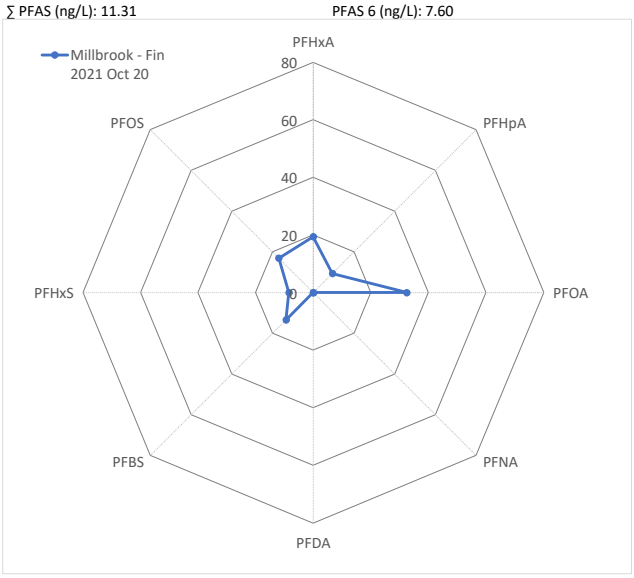
∑ PFAS (ng/L): 9.67 PFAS 6 (ng/L): 6.56



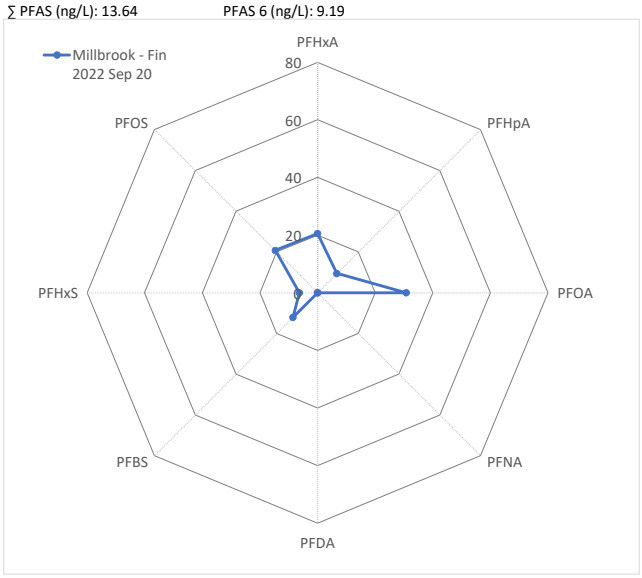
∑ PFAS (ng/L): 10.42 PFAS 6 (ng/L): 7.01



∑ PFAS (ng/L): 11.31 PFAS 6 (ng/L): 7.60



∑ PFAS (ng/L): 13.64 PFAS 6 (ng/L): 9.19



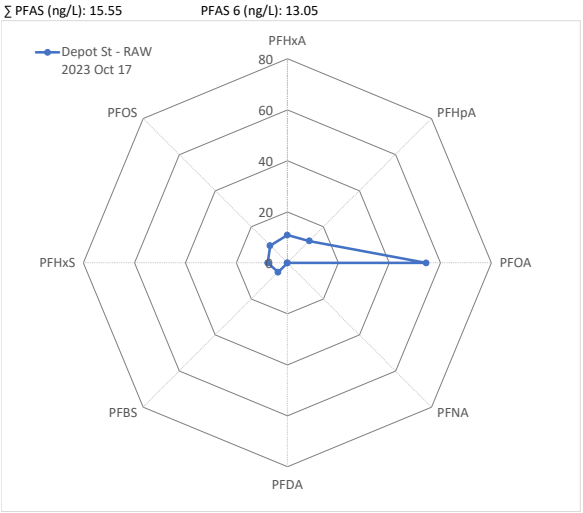
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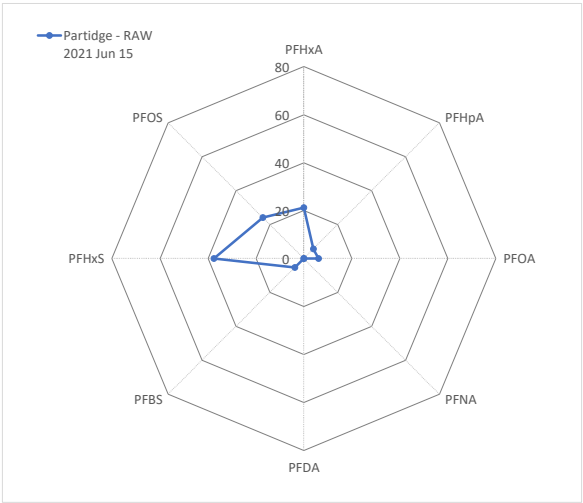
Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS

Raw (Untreated) Drinking Water Samples

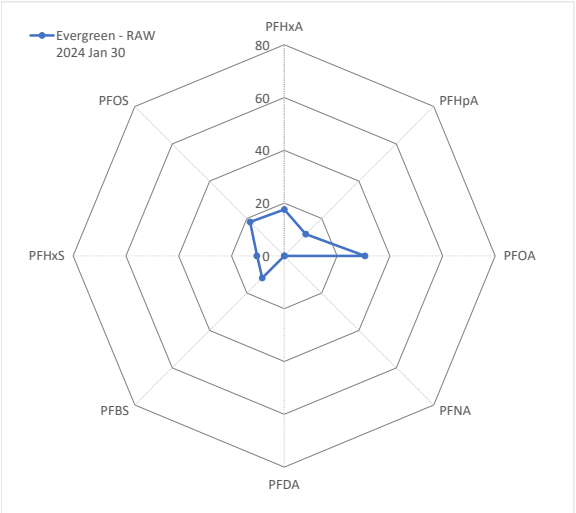
∑ PFAS (ng/L): 15.55 PFAS 6 (ng/L): 13.05



∑ PFAS (ng/L): 137.84 PFAS 6 (ng/L): 101.17

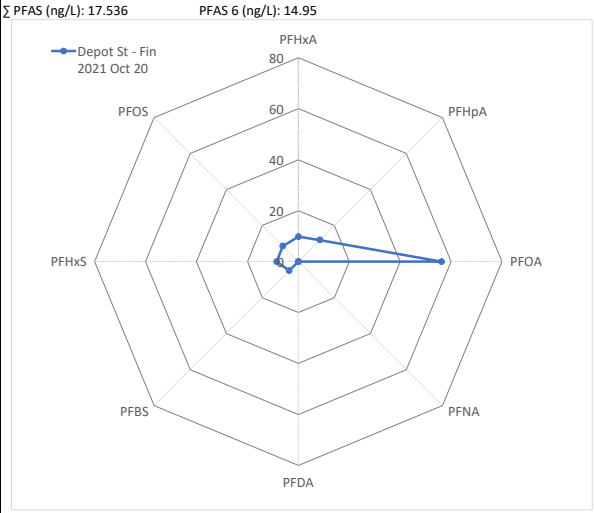


∑ PFAS (ng/L): 7.53 PFAS 6 (ng/L): 7.53

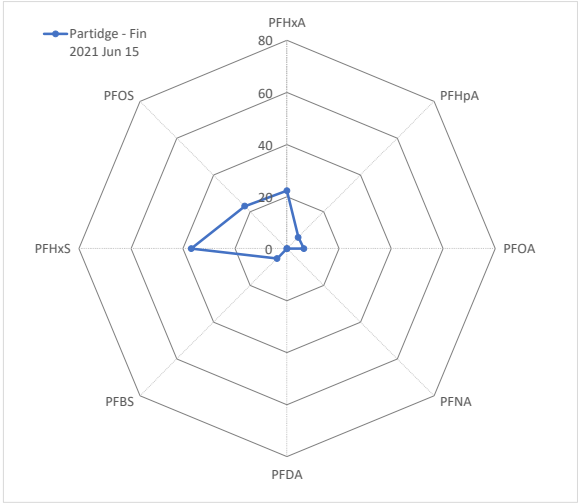


Finished (Treated and Delivered) Drinking Water Samples

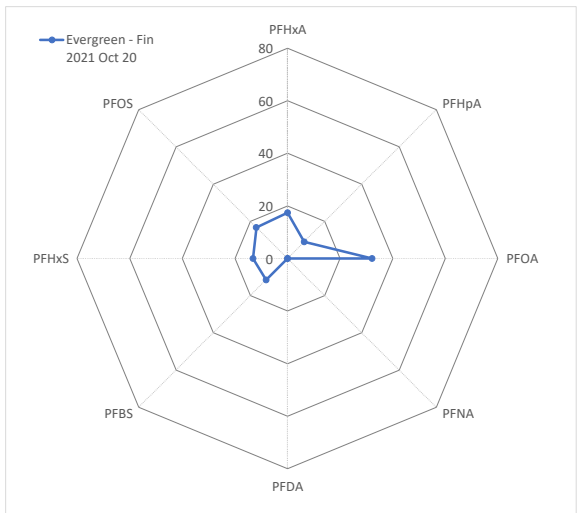
∑ PFAS (ng/L): 17.536 PFAS 6 (ng/L): 14.95



∑ PFAS (ng/L): 145.31 PFAS 6 (ng/L): 105.21



∑ PFAS (ng/L): 7.09 PFAS 6 (ng/L): 5.04



Duxbury Water Supply Wells - PFAS Radar Plots
Ratio [PFAS species] / Total (∑) PFAS
Representative Impacts

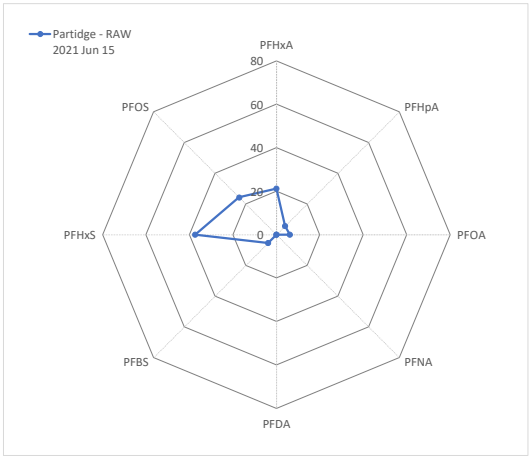
Downgradient (east-northeast) of the Duxbury Landfill / McNeil Dump

∑ PFAS (ng/L): 15.55 PFAS 6 (ng/L): 13.05



Downgradient (east) of the Duxbury Fire Station

∑ PFAS (ng/L): 137.84 PFAS 6 (ng/L): 101.17



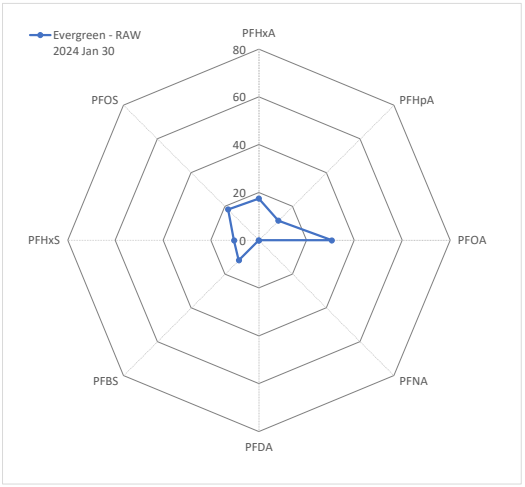
Cross-Gradient (north-northeast) of the Landfill / Dump
Moderate Septic System Density

∑ PFAS (ng/L): 4.51 PFAS 6 (ng/L): 4.51



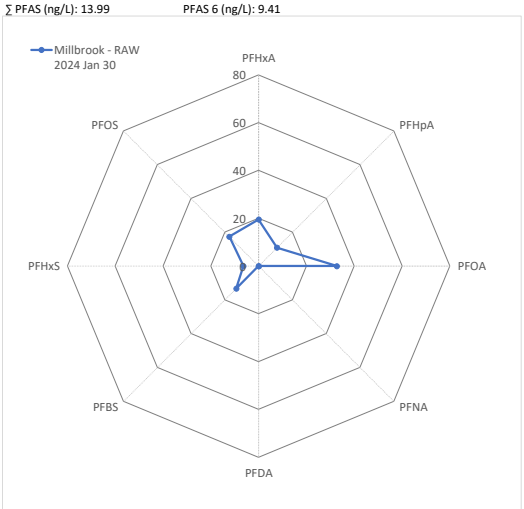
Up-Gradient (west) of the Landfill / Dump
Low Septic System Density

∑ PFAS (ng/L): 7.53 PFAS 6 (ng/L): 7.53



Cross-Gradient (north) of the Landfill / Dump
Moderate Septic System Density

∑ PFAS (ng/L): 13.99 PFAS 6 (ng/L): 9.41



Two Miles Upgradient (west) of the Landfill / Dump
Moderate Septic System Density

∑ PFAS (ng/L): 15.99 PFAS 6 (ng/L): 10.19

