

IMMEDIATE RESPONSE ACTION PLAN Status Report 11

Cape Cod Gateway Airport Hyannis, Massachusetts

RTN 4-26347

April 2022



IMMEDIATE RESPONSE ACTION PLAN STATUS REPORT 11 CAPE COD GATEWAY AIRPORT HYANNIS, MASSACHUSETTS RTN 4-26347

TABLE OF CONTENTS

1.0	INTRODUCTION	.1
2.0	SUMMARY OF IRA PLAN AND IRA MODIFICATION	.1
2.1	Background	.2
2.2	Actions Under the IRA Plan APPLICABLE MCP STANDARDS	.2
4.0		. Э л
4.0		.4
5.0	FIELD INVESTIGATIONS CONDUCTED DURING THE CURRENT REPORTING PERIOD	.8
6.0	BI-ANNUAL CAP INSPECTION AND CAP PERFORMANCE MONITORING	.9
7.0	GROUNDWATER MODELING AND CONTAMINANT TRANSPORT ANALYSIS	10
8.0	UPGRADES TO AFFF TESTING PROTOCOLS AT THE AIRPORT	10
9.0	PLANS FOR NEXT REPORTING PERIOD	11

FIGURES

- 1- USGS Locus
- 2- Soil Sample Locations
- 3- Sum of Six PFAS in Groundwater
- 4- 1,4-dioxane Results in Groundwater
- 5- Background PFAS Sample Locations
- 6- TOC Sample Locations
- 7- Surficial Soil Sampling Runway 6/24 Locations

TABLES

- 1- Soil Results for PFAS
- 2- Groundwater Results for PFAS
- 3-1,4-Dioxane Results in Groundwater
- 4- AFFF Concentrate Analytical Results
- 5- SPLP Results
- 6- Background PFAS Levels in Soil
- 7- Surface Water Results for PFAS
- 8 Ratio of Stable Isotopes
- 9 Fire Truck Spray Water Analytical Results
- 10 Total Organic Carbon Data
- 11- Runway 6/24 Surface Sample Results
- 12- Select Pre and Post Cap Groundwater Results for PFAS

- i -

APPENDICES

Appendix A: Laboratory Analysis Reports (Not Previously Submitted to MassDEP)

Cape Cod Gateway Airport IRA Status Report 11 RTN 4-26347 Horsley Witten Group, Inc. April 2022

1.0 INTRODUCTION

The Horsley Witten Group, Inc. (HW) has been retained by the Cape Cod Gateway Airport (the "Airport"), formerly known as the Barnstable Municipal Airport, to develop this eleventh Immediate Response Action (IRA) Plan Status Report for its property at 480 Barnstable Road, Hyannis, Massachusetts (Figure 1). HW has prepared this report in accordance with the Massachusetts Contingency Plan 310 CMR 40.0000 (MCP) on behalf of:

Ms. Katie Servis, Airport Manager Cape Cod Gateway Airport Hyannis, Massachusetts 02601 (508) 775-2020

The report describes IRA related activities conducted between October 2021 and April 2022.

2.0 SUMMARY OF IRA PLAN AND IRA MODIFICATION

An IRA was initiated in response to a Notice of Responsibility (NOR) for Release Tracking Number (RTN) 4-26347 dated November 10, 2016, issued to the Airport by the Massachusetts Department of Environmental Protection (MassDEP). The NOR requested that the Airport conduct additional field investigations to evaluate:

- The source(s) of Per- and Poly-Fluoroalkyl Substances (PFAS) including perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) previously detected in groundwater at the Airport and several adjacent properties;
- The source(s) of 1,4-dioxane, previously detected in a monitoring well downgradient of the Airport on the Maher wellfield property; and
- To identify potential impacts to public water supply wells operated by the Hyannis Water District at the Mary Dunn and Maher wellfields.

A proposed IRA plan was submitted for approval in response to the NOR. Subsequently, a meeting was held by MassDEP at the Airport that included other stakeholders including the Barnstable Department of Public Works, the Hyannis Water District, and Barnstable County representatives (representing the Fire Training Academy). At the meeting, IRA plans were coordinated between the Airport and Fire Training Academy including sampling locations, type of analysis, groundwater modeling, goals, and next steps. The IRA plan served as the guide for the soil and groundwater testing conducted since November 2016 to follow up on the results of the previous analyses.

In June 2019, the MassDEP issued a Request for Modified Immediate Response Action Plan/Interim Deadline dated June 18, 2019 (the "Modified IRA Request") to the Airport. The Modified IRA Request asked that the Airport propose response actions to *"reduce infiltration of precipitation through PFAS-impacted soil, such as temporarily capping the source areas; excavating and properly disposing of the PFAS-impacted soil; or some equivalent approach"*.

Cape Cod Gateway Airport	- 1 -	Horsley Witten Group, Inc.
IRA Status Report 11 RTN 4-26347		April 2022

The Airports response is documented in the report titled *Final Immediate Response Action Plan Modification*, prepared by HW and dated December 2019 (the "IRA Modification"). The IRA Modification included details for the installation of a cap in two select areas to reduce precipitation infiltration. The two areas are identified as the Deployment Area and the Airport Rescue and Fire Fighting/Snow Removal Equipment (ARFF/SRE) Building Area. The two capped areas total approximately 94,100-square feet and represent a majority of the known PFAS in soil source areas relating to the historic application of aqueous film forming foam (AFFF) by the Airport. Areas of PFAS in soil remaining above the applicable Method 1 soil standard located outside of the caped area are indicated on Figure 2. Evaluation of these areas will be included in future response actions and/or included as part of a future risk assessment.

2.1 Background

Prior to issuance of the NOR, the Airport had conducted investigations on both 1,4-dioxane and PFAS and provided the results to MassDEP. In July 2015, HW sampled groundwater from seven groundwater monitoring wells for 1,4-dioxane. This contaminant was detected in groundwater monitoring well OW-9DD located in the Maher wellfield at a concentration of 0.926 micrograms per liter (ug/L). This concentration is above the applicable Method 1 standard of 0.30 ug/L. This groundwater monitoring well is screened from 77 to 87 feet below the ground surface.

At that time, it was thought that potential sources of 1,4-dioxane at the Airport could be related to a historic release of 1,1,1-trichloroethane (1,1,1-TCA) from an oil/water separator associated with a floor drain in the former Provincetown Boston Airlines hangar (currently leased to Cape Air) and/or from the application of deicing fluid. Given the screen depth of monitoring well OW-9DD, the 1,4-dioxane may also be from an off-Airport source.

On August 4, 2016, MassDEP issued a Request for Information (RFI) to the Airport requiring investigation of PFAS. On July 1 and 5, 2016, HW collected samples from six groundwater monitoring wells and submitted the samples for laboratory analysis of PFOS and PFOA. These compounds were detected in each of the wells tested. At monitoring wells HW-3 and HW-5, the sum of PFOS and PFOA were 0.0931 and 0.151 ug/L respectively, above the EPA health advisory limit and applicable MassDEP standard. PFOS and PFOA were also detected above the EPA health advisory limit and applicable MassDEP standard in monitoring well HW-1, located at the upgradient, western boundary of the Airport. Additional details about 1,4-dioxane and PFAS are included in the Revised Phase II Comprehensive Site Assessment Report submitted to the MassDEP in January 2022 (the "Revised Phase II Report").

2.2 Actions Under the IRA Plan

A summary of the IRA activities conducted between October 2021 and April 2022 include:

- Soil sampling for PFAS; and
- Groundwater Sampling for PFAS.

Cape Cod Gateway Airport	- 2 -	Horsley Witten Group, Inc.
IRA Status Report 11 RTN 4-26347		April 2022

As indicated in the Revised Phase II, the Airport is not the source of 1,4-dioxane and as such, additional delineation of the non-airport related source(s) of 1,4-dioxane will not be completed.

3.0 APPLICABLE MCP STANDARDS

Pursuant to 310 CMR 40.0900, the characterization of risk of harm to health, safety, public welfare, and the environment must be evaluated at each disposal site. This characterization includes the determination of site-specific soil and groundwater categories based on site location and use, and the comparison of laboratory results to these standards (310 CMR 40.0930).

In accordance with 310 CMR 40.0933, the applicable soil category is selected based upon the frequency, intensity of use, and accessibility of the Airport by adults and children. Based on these criteria, soil at the Airport is category S-1/GW-1 and S-1/GW-3.

Groundwater located within a Current Drinking Water Source Area is considered category GW-1. The Airport is located within several zones of contribution (Zone II) for Barnstable Village, the Hyannis Water District, and the Town of Yarmouth. Zone IIs are considered current drinking water sources as defined in 310 CMR 40.0006; thus, category GW-1 is applicable.

Groundwater located within 30 feet of an occupied building that has an average annual depth of less than 15 feet is categorized as GW-2. This is primarily a concern because of the possibility of vapor impacts to indoor air. The average annual depth to groundwater at the Airport is greater than 15 feet; therefore GW-2 Standards do not apply. Also, all disposal sites shall be considered a potential source of discharge to surface water, and therefore categorized as GW-3. Based on these criteria, categories GW-1 and GW-3 are applicable to the Airport.

The soil and groundwater standards applicable to the Airport for PFAS and 1,4-dioxane as described in the document titled Final PFAS – Related Changes to the MCP – 2019-12-13 prepared by the MassDEP and promulgated December 27, 2019 are as follows:

PFAS Standards												
Analyta	Soil Standa	ard (ug/kg)	Groundwater Standard (ug/l)									
Analyte	S-1/GW-1	SW-1/GW-3	GW-1	GW-3								
Pefluorodecanoic Acid (PFDA)	0.3	300	N/A	40,000								
Perfluoroheptanoic Acid (PFHpA)	0.5	300	N/A	40,000								
Perfluorohexanesulfonic Acid (PFHxS)	0.3	300	N/A	500								
Perfluorononanoic Acid (PFNA)	0.32	300	N/A	40,000								
Perfluorooctanesulfonic Acid (PFOS)	2	300	N/A	500								
Perfluorooctanoic Acid (PFOA)	0.72	300	N/A	40,000								

- 3 -

PFAS Standards												
Angluta	Soil Standa	ard (ug/kg)	Groundwate	r Standard (ug/l)								
Analyte	S-1/GW-1	SW-1/GW-3	GW-1	GW-3								
PFAS Sum of Six*	N/A	N/A	0.02	N/A								

* PFAS Sum of Six is the sum of PFDA, PFHpA, PFHxS, PFNA, PFOS, and PFOA

1,4-dioxane												
Soil Stan	dard (ug/kg)	Groundwater Standard (ug/l)										
S-1/GW-1	SW-1/GW-3	GW-1	GW-3									
200 ug/kg	20,000 ug/kg	0.3	50,000									

4.0 HISTORIC FIELD INVESTIGATIONS

Historic field investigations conducted at the Airport since the November 2016 NOR and documented in prior IRA status reports are summarized below:

- An initial round of three soil samples were collected on December 9, 2016. One sample was taken from each location where it was determined that AFFF had been used at the Airport. The areas included the MCI Drill Area, the Deployment Area, and the 1991 Drill Location.
- The installation of groundwater monitoring wells at six locations in April 2017: in the vicinity of potential sources of PFAS at the ARFF/SRE Area, at the Deployment Area and at upgradient locations outside of the Airport to evaluate potential off-site sources of PFAS and 1,4-dioxane.
- Groundwater from the new wells was initially sampled for PFAS and 1,4-dioxane in April 2017. Additional groundwater samples and one surface water sample were collected for analysis of PFAS on June 20, 2017.
- A second round of soil samples were collected on June 20, 2017 adjacent to the ARFF/SRE Building and within the Deployment Area to begin to determine the extent of PFAS within the surface soils. Based on the results of these analyses, a third round of samples from these two locations were collected on September 26, 2017. The third round of sampling was designed to further delineate the extent of PFAS in soils both horizontally and vertically, with samples taken at the ground surface and at two and four feet below ground surface (BGS).
- One sample of AFFF concentrate was analyzed for PFAS compounds. The analysis was inconclusive (only 225.5 ug/l of total PFAS was detected) and it is assumed that the sample was not homogeneous (i.e., had separated in the foam bucket) and that the

- 4 -

addition of water to the concentrated may affect how precursor PFAS analytes transform into various other detectable PFAS compounds.

- Six soil samples were analyzed for PFAS leaching potential using a synthetic precipitation leaching procedure (SPLP) test between September and October 2017. The chosen samples included four samples from the Deployment Area and two samples from runway reconstruction soils stockpiled at the Airport.
- In October 2017, 20 surface samples were collected both on and off Airport property to determine the concentration of PFAS in the area.
- In October 2017, three composite soil samples were taken from piles of soil associated with the redevelopment of Runway 15/33. These piles were located on Airport property at the site of the former Mildred's Restaurant and were analyzed for PFAS compounds to evaluate if soil removed from the Airport as part of this redevelopment contained PFAS.
- On August 14, 2018, 24 PFAS surface soil samples were collected in proximity to the ARFF/SRE Building Area and the Deployment Area. PFAS compounds were previously detected in these areas and additional samples were collected to determine the vertical extent of PFAS impacts in soil and to refine the soil disposal site boundary at the Airport.
- In October 2018, three soil borings (DL11, DL14 and HW-F) were advanced in the Deployment Area. One soil boring (ARFF3) was advanced, and one surface soil sample (HW-3) was collected near the ARFF/SRE Building in order to further delineate the extent of PFAS in soils both horizontally and vertically.
- In October 2018, six monitoring wells were installed at the Airport. A cluster of three wells (HW-G(s), HW-G(m), and HW-G(d)) was installed at an upgradient location to evaluate potential off-site sources of PFAS. Three additional wells (HW-H, HW-I, and HW-J) were installed southeast of the Deployment Area adjacent to the East Ramp.
- In November 2018, six groundwater samples were collected to evaluate PFAS concentrations in the Deployment Area. Four groundwater samples and one surface water sample from Mary Dunn Pond were also collected for analysis of oxygen and hydrogen isotopes to determine the contribution of pond water from Mary Dunn Pond to the four downgradient monitoring wells. The analysis was inconclusive in tracing the contribution of pond water in the downgradient monitoring wells.
- In December 2018, two soil samples were collected from the 1991 Drill Location to determine if PFAS detected in the area are related to background conditions.
- In December 2018, 12 groundwater samples were collected for analysis of PFAS and 13 groundwater samples were collected for analysis of oxygen and hydrogen isotopes to determine the contribution of pond water from Mary Dunn Pond to the 13

downgradient wells. Groundwater samples were also collected from four monitoring wells in the Maher Wellfield for analysis of 1,4-dioxane.

- In February 2019, three additional surface soil samples were collected to further delineate the soil Disposal Site boundary around the ARFF/SRE building.
- In May and June 2019, HW installed nine groundwater monitoring wells to delineate the vertical and horizontal extent of PFAS and 1,4-dioxane at the Airport and on adjacent hydraulically upgradient properties.
- In June 2019, eight groundwater samples were collected from newly installed groundwater monitoring wells HW-L, HW-K, HW-I (m), HW-I (d), HW-M, HW-D(d), HW-D (dd), and HW-N for PFAS.
- In July 2019, one groundwater sample was collected from the newly installed groundwater monitoring wells HW-O for PFAS. One groundwater sample was collected from HW-L for 1,4-dioxane.
- In July 2019, two surface water samples were collected from Upper Gate and Lewis Ponds for PFAS analysis.
- In August 2019, four groundwater samples were collected from monitoring wells HW-N, HW-A(d), HW-O, and HW-1 to evaluate potential sources of 1,4-dioxane entering the Airport from unknown upgradient sources(s). One groundwater sample was also collected from groundwater monitoring well HW-E for PFAS.
- In August 2019, soil sample DL 11 (0-1) was collected from the Deployment Area.
- In August 2019, six spray water samples were collected from discharge locations on a fire truck at the Airport. The samples were collected to verify that the valve mechanism that controls the mixing of AFFF with water was working appropriately. PFAS should not be detected in the spray water. Although the spray water is not considered drinking water, PFAS was detected in each of the six samples collected above the GW-1 standard.
- On September 27, 2019, HW collected groundwater samples from six monitoring wells located on the Airport for 1,4-dioxane analysis.
- In November 2019, the Airport replaced the valve mechanism in the fire truck to ensure that AFFF was no longer mixing with the water despite the mechanism not being engaged. In December 2019, HW resampled the six discharge locations from the fire truck at the Airport. PFAS was detected at various concentrations at each location, but all were below the GW-1 standard.

- 6 -

• Between May 5th and May 21st, 2020 HW collected 16 groundwater samples PFAS analysis. Refer to Table 2 for groundwater results.

- Between May 5th and May 13th, 2020 HW collected groundwater samples from four monitoring wells for 1,4-dioxane analysis.
- Between September 14th and September 24th, 2020 HW and Desmond Well Drilling installed 13 monitoring wells.
- On September 17, 2020 HW collected groundwater samples from the three Maher Wells (ME-1 through ME-3) for PFAS analysis.
- Between September 14th and September 30th, 2020 HW collected 23 soil samples for PFAS analysis.
- Between October 1 and October 7 2020, HW collected groundwater samples from 16 monitoring wells for PFAS.
- On October 2 and 7, 2020 HW collected groundwater samples from four monitoring wells for 1,4-dioxane analysis.
- Between November 5 and 6, 2020 HW collected five groundwater samples for PFAS analysis.
- On November 17, 2020 HW collected two roof samples (rubber membrane and asphalt shingle) from the ARFF/SRE building for SPLP PFAS. The testing was completed to determine if roofing materials were a potential source of PFAS in groundwater through stormwater infiltration. PFAS was detected in each of the samples collected. Although the leachate is not considered drinking water, the concentration of the MassDEP Sum of 6 were below the Method 1 GW-1 and GW-3 standards.
- On February 18 and 19th, 2021 HW conducted hydraulic conductivity testing at three monitoring well locations. Refer to the Revised Phase II Report for additional details.
- Between March 17th and March 19, 2021, HW collected 21 groundwater samples from the following monitoring wells for PFAS analysis as part of the first round of post-cap semiannual monitoring:

HW-R(s)	HW-I(d)	HW-2	HW-S(m)	RB-1(m)	OW-19(d)
HW-J	HW-E	HW-3	HW-P(s)	HW-K	
HW-I(s)	HW-F	HW-300	HW-P(m)	OW-19(s)	
HW-I(m)	HW-302	HW-S(s)	RB-1(s)	OW-19(m)	

- Between April 5th and April 7th, 2021, HW and Desmond Well Drilling installed monitoring wells HW-U(s), HW-U(m), HW-W(m), HW-W(d), and HW-W (dd).
- Between April 6th and 19th, 2021, HW collected 17 soil samples for TOC analysis. The TOC samples were collected from various depths between ground surface and 65 feet below grade. The TOC data is being used to determine plume migration.

- On April 19, 2021, HW sampled the recently installed monitoring wells HW-U(s), HW-U(m) HW-W(m), HW-W(d), and HW-W (dd) for further analysis of PFAS compounds in groundwater.
- On September 7, 2021, HW and New England Geotech installed monitoring wells HW-X(s) and HW-X(m). The monitoring wells were installed adjacent to the former ARFF/SRE Building.
- On September 7, 2021, HW collected a soil sample from HW-X (m) and submitted it for PFAS analysis. None of the MassDEP six regulated PFAS compounds were detected above the laboratory method detection limit.
- On September 10, 2021, HW collected groundwater samples from HW-X (s) and HW-X(m) and submitted them for PFAS and 1,4-dioxane analysis.
- Between September 1 and September 11, 2021 HW collected 26 groundwater samples from the following monitoring wells for PFAS analysis as part of the second round of post cap semiannual monitoring:

HW-R(s)	Hw-I(d)	HW-2	HW-S(m)	RB-1(m)	OW-19(d)
HW-J	HW-E	HW-3	HW-P(s)	HW-K	HW-W(m)
HW-I(s)	HW-F	HW-300	HW-P(m)	OW-19(s)	
HW-I(m)	HW-302	HW-S(s)	RB-1(s)	OW-19 (m)	
HW-W(dd)	HW-U (s)	HW-U(m)	HW-U (d)	HW-W(d)	

• On September 10, 2021, HW collected two groundwater samples from monitoring wells HW-E and HW-J located in the Deployment Area for 1,4-dioxane. 1,4-dioxane was not detected above the laboratory reporting limit.

Soil, surface water and groundwater sampling locations are indicated on Figures 2 through 6. Tabulated analytical data are included on Tables 1 through 10. Laboratory data packages and soil boring logs associated with historic field investigations have previously been submitted to MassDEP and are available in other IRA Status Reports and phased reports (i.e., Phase II)

5.0 FIELD INVESTIGATIONS CONDUCTED DURING THE CURRENT REPORTING PERIOD

Details concerning field investigations conducted between October 2021 and April 2022 are summarized below.

• On March 2nd and 4th, 2022, HW collected 6 surficial composite soil samples from Runway 6-24 at the locations on Figure 7 and submitted them to Alpha Analytical for PFAS analysis. Runway 6-24 will be redeveloped in 2022-2023 and the soil testing was conducted to evaluate how soils removed from the areas around the runway would need to be managed if they were taken off site. None of the MassDEP six regulated PFAS compounds were detected above the applicable Method 1 Standard. Analytical results are included on Table 11 and laboratory reports are include in Appendix A. • Between March 15th and March 31st, 2022, HW collected 29 groundwater samples from the following monitoring wells for PFAS analysis as part of the third round of post cap semiannual monitoring:

HW-R(s)	Hw-I(d)	HW-2	HW-S(m)	RB-1(m)	OW-19(d)
HW-J	HW-E	HW-3	HW-P(s)	HW-K	HW-W(m)
HW-I(s)	HW-F	HW-300	HW-P(m)	OW-19(s)	HW-4(m)
HW-I(m)	HW-302	HW-S(s)	RB-1(s)	OW-19 (m)	HW-5
HW-W(dd)	HW-U (s)	HW-U(m)	HW-U (d)	HW-W(d)	

At the time of this report, analytical results have not been provided by the laboratory. Analytical data packages and tabulated data will be included in the next MassDEP submission.

6.0 BI-ANNUAL CAP INSPECTION AND CAP PERFORMANCE MONITORING

HW inspected the asphalt cap on April 6, 2022 in the vicinity of the ARFF/SRE Building. The asphalt cap was free of cracks and significant depressions as indicated in the photos below.



HW inspected the geomembrane cap on April 6, 2021, in the vicinity of the Deployment Area. The sand and loam protective layer over the geomembrane cap were intact with no signs of significant erosion as indicated in the photos below.



As indicated above, HW collected 29 groundwater samples as part of the semi-annual cap inspections to determine the effectiveness of the caps. The groundwater analytical data was not available at the time of this report. Groundwater analytical data will be included in the next status report to MassDEP.

The first two rounds of post-cap monitoring are extremely promising and show a substantial decrease in PFAS concentrations in the shallow groundwater in the immediate vicinity of the cap as indicated on Table 12.

HW will continue to inspect the two cap areas every six months and collect groundwater samples from select existing monitoring wells to document the effectiveness of the caps. The next cap inspection and groundwater sampling event will take place in September 2022.

7.0 GROUNDWATER MODELING AND CONTAMINANT TRANSPORT ANALYSIS

A full evaluation of the groundwater plumes associated with the releases at the deployment area and the ARFF building sites are included in the Revised Phase II Report submitted to MassDEP in January 2022. Additional groundwater testing and forensic techniques will be utilized to further refine the groundwater contaminant fate and transport characteristics.

8.0 UPGRADES TO AFFF TESTING PROTOCOLS AT THE AIRPORT

The Airport has purchased an Ecologic Foam Test System to allow the Airport to test the AFFF delivery systems on its current fire trucks without having to discharge the foam into the environment. The use of the new system meets the Federal Aviation Administration requirements for the regular testing of AFFF usage. Therefore, it is anticipated that no further foam will be deployed at the Airport except during an emergency situation when its use is required.

The Airport received a new fire fighting vehicle that deploys AFFF to replace an older fire fighting vehicle in the Airport's fleet. The FAA requires that AFFF be discharged from new

Cape Cod Gateway Airport	- 10 -	Horsley Witten Group, Inc.
IRA Status Report 11 RTN 4-26347		April 2022

equipment at the delivery location before the equipment enters service to verify that the vehicle systems operate normally and produce the appropriate AFFF mixture. The information from the AFFF discharge test will also be used to calibrate the AFFF consistency for future testing using the Ecologic cart so that future AFFF deployment will not be necessary. Appropriate precautions will be initiated to limit the possibility of a release of AFFF to the environment during the required testing. These precautions will include discharging AFFF into a closed vessel such as a fractank or other sealed container, the placement of polyethylene sheeting and visual monitoring by HW. The discharge container will be cleaned, and the contents disposed of by a licensed waste disposal company. Polyethylene sheeting will be placed in a 55-gallon drum for off-site disposal by a licensed waste disposal company. The testing event will be conducted inside an airport facility with floor drains connected to an oil water separator and sanitary sewer to ensure any AFFF that is not contained within the vessel or sheeting is not released into the environment. The testing event will be documented in a status report along with photographical documentation. The testing event is expected to be conducted within during the next reporting period.

9.0 PLANS FOR NEXT REPORTING PERIOD

HW will continue to conduct inspections of the two cap areas and monitor groundwater. Further testing of soil and/or groundwater is planned to refine the disposal site boundaries in the Deployment Area and ARFF Building Area. Future analytical results and boring logs will be included in future status reports.

- 1- USGS Locus
- 2- Soil Sample Locations
- 3- Sum of Six PFAS in Groundwater
- 4- 1,4-dioxane Results in Groundwater
- 5- Background PFAS Sample Locations
- 6- TOC Sample Locations
- 7- Surficial Soil Sampling Runway 6/24 Locations





* Cape Cod Commission (CCC) Groundwater Contours

Legend

H.H



Deployment Area Liner Cap

ARFF Asphalt Cap

- Soil Sample Location
 below Method 1 S-1/GW-1
 Standard for all Six PFAS
 Compounds
- Soil Sample Exceeding Method 1 S-1/GW-1 for at least one of the six regulated PFAS compounds

Method PFHpA = 0.5 ug/kg PFHxS = 0.3 ug/kg PFOA = 0.72 ug/kg PFOA = 0.32 ug/kg PFDA = 0.3 ug/kg

Soil Sample Location for TOC



Horsley Witten Group Sustainable Environmental Solutions B0 Route EA+ Unit 1 - Sandwich, MA 02553 505-033-0600 - horsleyritten.com

Soil Sample Locations Barnstable Municipal Airport Hyannis, MA

Date: 10/4/2021

Figure 2

Path: K:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\Soil Sample Locations.mxd



Path: H:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\210409_DioxaneMap.mxa

Legend

0

Groundwater	Contours

Approximate Location of TOC Sample

Deployment Area Liner Cap

ARFF Asphalt Cap

Horsley Witten Group Sustainable Environmental Solutions B0 Route EA · Unit 1 · Sandwich, MA 02563 509-833-8600 · horsleywitten.com

TOC Sample Locations Cape Cod Gateway Airport Hyannis, MA

Date: 8/9/2021

Path: K:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\TOC Sample Locations.mxd

Path: H:\Projects\HYA\17027 BMA PFOS 1-4 IRA\GIS\Maps\220302_Surficial Soil Sampling.mxd

1- Soil Results for PFAS

2- Groundwater Results for PFAS

3-1,4-Dioxane Results in Groundwater

4- AFFF Concentrate Analytical Results

5- SPLP Results

6- Background PFAS Levels in Soil

7- Surface Water Results for PFAS

8 – Ratio of Stable Isotopes

9 – Fire Truck Spray Water Analytical Results

10 – TOC Data

11- Runway 6/24 Surface Sample Results

12- Select Pre and Post Cap Groundwater Results for PFAS

Table 1. Soil Results for PFAS ug/kg

Sample Location						-					-										ARFF Buildin	ng																	
Sample ID	Method 1 Star	ndard uc	ARFF1 (0-:	(2') ARFF1	ARFF1 (4')	ARFF2 (0-1')	ARFF3 (0-1')	ARFF3 (10-12)	ARFF4 (0-1')	ARFFCB (0-1)	A1 (0-1')	A2 (0-1')	A3 (0-1')	A4 (0-1')	A5 (0-1')	A5 (2-4')	A6 (0-1')	A7 (0-1')	A8 (0-1')	A9 (0-1')	A10 (0-1')	A11 (0-1')	A12 (0-1')	A13 (0-1')	A13 (0-1')	A14 (0-1')	A14 (0-1')	A15 (0-1')	A15 (0-1')	A16 (0-1')	A17 (0-1')	A18 (0-1)	A19 (0-1)	A20 (0-1)	A20 (2-4)	A21 (0-1) A'	22 (0-1) HV	W-P(M) HW-P((M) DL1(0-1')
Sample Date	S-1/GW-1 S-1	/GW-3	E 6/20/201	7 9/26/2017	0/26/2017	6/20/2017	0/26/2017	10/0/2018	0/26/2017	0/26/2017	9/14/2019	9/14/2019	9/14/2019	9/14/2019	9/14/2019	0/24/2020	9/14/2019	9/14/2019	9/14/2019	9/14/2019	9/14/2019	9/14/2019	9/14/2019	2/27/2010	0/20/2020	2/27/2010	5/12/2020	2/27/2010	E/12/2020	9/17/2020	9/17/2020	9/29/2020	9/24/2020	9/24/2020	9/24/2020	9/24/2020 9/	29/2020 0/	8-10] [18-2	2020 6/20/2017
Perfluorobentanoic acid (PEHoA)	0.5	300 4.00	0/20/201	1 8	9/26/2017	0.1711	9/26/2017	0.32 1	9/26/2017	9/26/2017	0 19 11	0 19 11	0.381	0 19 11	1 1	9/24/2020	0 19 11	0.19.11	0.19.11	0 19 11	0.19.11	0 19 11	0 19 11	2/2//2019	0.396.1	2/2//2019	0.511	2/2//2019	0.2111	0.067.1	1.07	0.076.1	0.1011	0.09.11	0.09.11	0.04511	0.0961	04411 0.043	311 0 30 1
Perfluorohexanesulfonic acid (PEHxS)	0.3	300 4.00	0 0.23 U	0.23 U	0.23 U	0.23 U	0.64 1	0.24 U	0.23 U	0.23.0	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.12 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	<2.0	0.058 U	<1.9	0.24 U	<2.0	0.21 U	0.0851	0.058 U	0.054 U	0.059.U	0.121 U	0.121 U	0.06U C	1055 U C	059 U 0.058	80 0.230
Perfluorooctanoic acid (PFOA)	0.72	300 4.00	0 0.75 J	2.6	0.75 J	0.26 U	0.78 J	1.9	0.97 J	0.90 J	0.25 U	0.25 U	0.37 J	0.30 J	1.9	0.228 J	0.25 U	0.25 U	0.25 U	0.34 J	0.25 U	0.25 U	0.25 U	<2.0	0.67 J	<1.9	0.68 J	<2.0	0.14 U	0.088 J	0.989	0.111 J	0.129 J	0.196 J	0.147 J	0.042 U	J.069 J F	0.089 J 0.046	6J 0.26 U
Perfluorononanoic acid (PFNA)	0.32	300 4,00	2.5	5.7	1.4	0.20 J	0.91 J	3.1	2.9	0.17 U	0.22 U	0.22 U	0.51 J	0.22 U	0.87 J	0.148 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	<2.0	1.2	<1.9	0.54 J	<2.0	0.15 U	0.119 J	0.774 J	0.281 J	0.246 J	0.15 U	0.15 U	0.075 U	0.11 J 0	.073 U 0.072	U 0.17 U
Perfluorooctane sulfonate (PFOS)	2	300 4,00	0 4.5	2.7	1.1	0.29 J	4.4	1.1	1.0	1.1	0.26 U	0.26 U	0.29 J	0.26 U	0.26 U	0.257 U	0.26 U	0.38 J	0.26 U	0.85 J	0.26 U	0.26 U	0.26 U	<2.0	1.3	<1.9	0.32 J	<2.0	0.29 J	2.02	0.573 J	1.15	0.611 J	0.259 U	0.26 U	0.276 J C	J.559 J 0.	0127 U 0.012	.4 U 0.40 J
Perfluorodecanoic Acid (PFDA)	0.3	300 4,00	00 4.4	1.2	0.62 J	0.13 U	1.6	0.28 U	0.85 J	0.13 U	0.28 U	0.28 U	0.42 J	0.28 U	1.4	0.133 U	0.28 U	0.28 U	0.28 U	0.28 U	0.33 J	0.28 U	0.28 U	<2.0	0.34 J	<1.9	0.95 J	<2.0	0.15 U	0.074 J	0.147 J	0.146 J	0.066 U	0.134 U	0.134 U	0.067 U C	1.119 J 0	.065 U 0.064	JU 0.63 J
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA NA	A 0.93 J	0.74 J	1	0.23 U	0.61 J	4.2	0.65 J	2.2	0.26 U	0.26 U	0.26 U	0.26 U	18	0.355 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	<2.0	0.173 U	<1.9	0.25 U	<2.0	0.22 U	0.17 U	0.172 U	0.161 U	0.175 U	0.358 U	0.359 U	0.179 U 0	.164 U 0	0.221 J 0.172	. U 0.39 J
T-1-10546			120.00	41.75	40.00	1.10	22.72	11.02	11.0	05.42	0	0	6.2	1.14	161.07	0.612	1.6	Sum of Labor	atory Reported PFAS (T	otal PFAS) and Sum	of Six	0.42	0	0.0	6.2	0	12.15	0.0	0.45	2.121	11.267	2.072	1.400	0.310	0.147	0.571	1.412	0.411 0.00	0 11.14
TOLAT PEAS	NA	INA INA	4 120.06	41.75	40.65	1.10	23.72	11.05	11.9	95.43	0	U	0.2	1.14	101.07	0.015	1.5	1.35	0.48	1.92	1.1	0.45	0	0.0	5.2	0	13.15	0.0	0.45	3.131	11.207	2.052	1.409	0.310	0.147	0.5/1		0.411 0.05	/ 11.14
Sum of Six (PFHpA,PFHxS,PFOA, PFOS,	NA	NA NA	12.97	14	4.53	0.49	8.93	6.42	6.47	2.6	0	0	1.97	0.3	5.27	0.228	0	0.38	0	1.19	0.33	0	0	0	3.916	0	3	0	0.29	2.453	3.553	1.764	1.087	0.196	0.147	0.276	0.953	0.089 0.04	46 1.33
PFNA, and PFDA)																						-										-		1					
Sample Location											•										Deployment /	Area														7	_		
Sample ID	Method 1 Star	ndard	DL2 (0-1) DL2 2'	DL2 4'	DL3 (0-1')	DL3 2'	DL3 4'	DL4 (0-1')	DL4 2'	DL4 4'	DL5 (0-1')	DL5 2'	DL5 4'	DL6 (0-1')	DL7 (0-1')	DL8 (2')	DL8 (4')	DL9 (0-1')	DL10 (0-1')	DL 11 (0-1')	DL 11 (0-1')	DL11 (4-6')	DL11 (10-12')	DL11 (14-16')	DL12 (0-1')	DL13 (0-1')	DL14 (0-1')	DL14 (4-6')	DL14 (10-12')	DL14 (14-16')	DL15 (0-1)	DL16 (0-1)	DL17 (0-1)	DL18 (0-1)	DL19 (0-1) DI	.20 (0-1) DI'	21 (0-1) DL22 (2	,2-4) DL22 (6-8)
Sample Date	S-1/GW-1 S-1	/GW-3	6/20/201	7 9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	9/26/2017	9/26/2017	6/20/2017	6/20/2017	6/20/2017	9/26/2017	6/20/2017	6/20/2017	9/26/2017	8/20/2019	10/4/2018	10/4/2018	10/4/2018	9/26/2017	9/26/2017	9/26/2017	10/4/2018	10/4/2018	10/4/2018	9/30/2020	9/30/2020	9/25/2020	9/25/2020	9/25/2020 9/	25/2020 9/*	25/2020 9/25/2	020 9/25/2020
Perfluoroheptanoic acid (PFHpA)	0.5	300 4,00	00 1.9	1.2	0.48 J	0.84 J	0.17 U	0.17 U	0.31 J	0.17 U	0.17 U	2.5	0.40 J	0.50 J	5.0	2.5 J	2.9 J	4.7 J	0.66 J	1.3	2.1	1.8	1.3	0.31 J	0.23 J	1.2	1.6	4.9	0.36 J	0.19 U	1.4	0.175 U	0.138 J	0.167 U	0.319 J	0.145 U 0	.157 U 0	.158 U 0.109	JJ 0.481 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300 4,00	00 1.8	1.3	0.59 J	0.34 J	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.49 J	0.49 J	0.23 U	0.23 U	2.3 U	2.3 U	2.3 U	0.35 J	0.94 J	0.82 J	<0.9	0.24 U	0.24 U	0.24 U	0.23 U	0.23 U	0.71 J	0.24 U	0.24 U	0.74 J	0.235 U	0.057 U	0.224 U	0.159 J	0.194 U C	1.21 U 0	.212 U 0.057	U 0.07 J
Perfluorooctanoic acid (PFOA)	0.72	300 4,00	1.6	4.1	0.74 J	0.80 J	0.26 U	0.26 U	0.83 J	0.26 U	0.26 U	3.7	1.6	0.26 U	0.26 U	4.2 J	25	22	0.68 J	1.7	4.7	5.2	2.9	1.9	0.50 J	4.6	2.4	23	0.58 J	0.32 J	2.9	0.334 J	0.223 J	0.166 J	0.979 J	0.135 U 0	.146 U 0	0.159 J 0.447	J 1.32
Pertiliorononanoic acid (PENA)	0.32	300 4,00	0.81	2.5	0.170	0.55 J	0.17 0	0.17 0	2.7	0.17 0	3.7	0.19 J	0.170	0.170	0.19 J	9.61	46	1.70	0.22 J	0.170	16	2.4	2.5	0.22 0	0.22 0	7.3	1.5	10	0.22 0	0.22 0	10	0.292 0	0.285 J	0.277 U	0.296 J	0.2410 0	.2610 0.	263 U 5.46	2.66
Perfluorodocanois Asid (PEDA)	0.2	300 4,00	0 0 12	0.12.11	0.210	0.511	0.21 0	0.210	2.0	0.210	0.50 J	0.210	0.1210	0.1210	0.1210	1211	14	1.2.10	0.36 J	0.28 J	29	1.5	0.26 0	0.28 U	0.28 U	25	0.00 J	7.6	0.28 U	0.28 U	0.28.11	0.505 0	0.3/3 J	0.4810	0.167.1	0.4180 0.	452 0 0.	225 11 0 92/	41 0.2921
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA .	NA NA	0.13 U	0.23 U	0.571	3.1	1.5	1	0.24	0.13 0	1.7	0.130	0.23 U	0.23 U	2	290	1600	900	0.23 U	0.23 U	7.8	30	4.1	4.4	6.7	62	320	230	0.671	0.301	64	0.698 U	0.168 U	0.664 U	0.107 J	0.577 U C	1625 U C	62911 7.49	9 11.7
						1 0.2		1										Sum of Labor	atory Reported PFAS (T	otal PFAS) and Sum	of Six				1														
Total PFAS	NA	NA	24.41	12.17	2.38	84.86	9.56	13.81	9.6	0.88	5.9	11.03	2.49	0.5	18.59	404.4	1727.2	949.6	6.38	9.1	85.22	91.5	11.07	6.82	7.63	108.56	521.26	598.24	50.11	21.22	116.64	4.523	2.269	0.628	4.84	0	0	0.68 66.83	13 41.988
Sum of Six (PFHpA,PFHxS,PFOA, PFOS,	NA		18 11	10.6	1.81	4 44	0	0	7 14	0	4.2	6.88	2.49	0.5	5.19	20.2	87.9	26.7	2.29	4.2	54.42	19.6	6.7	2 21	0.73	36.76	13.56	55.81	0.94	0.32	17.34	0.334	1.402	0.166	2.97	0	0	0 159 27 1	15 13 764
PFNA, and PFDA)	104		. 10.11	10.0	1.01	4.44	v	0	7.14	0	4.2	0.00	2.45	0.5	5.15	20.2	07.5	20.7	2.2.5	4.2	54.42	15.0	0.7	2.22	0.75	50.70	15.50	55.01	0.34	0.52	17.54	0.554	1.402	0.100	2.57	ő		0.155 27.1	3 13.704
Sample Location						- r	1		1	r	1	Deployment /	Area	r	r							-																	
Sample ID	Method 1 Star	ndard uc	DL22 (18-2	0) DL23 (0-1)	D1 (0-1')	D2 (0-1')	D3 (0-1')	D4 (0-1')	D5 (0-1')	D6 (0-1')	D7 (0-1')	D8 (0-1')	D9 (0-1')	D10 (0-1')	D11 (0-1')	D12 (0-1')	HW-F (10-12')	HW-F (14-16')	HW-3 (0-1')	MCI Drill (0-1)	Annual Dealeument (0, 1)																		
Sample Date	S-1/GW-1 S-1	/GW-3	9/25/202	0 9/29/2020	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	8/14/2018	10/4/2018	10/4/2018	10/9/2018	12/9/2016	12/9/2016	-																	
Perfluoroheptanoic acid (PFHpA)	0.5	300 4.00	0.073 J	0.24 J	0.19 U	0.21 J	0.19 U	0,95 J	0.22 J	0.25 J	7.8	1.0	2.7	0.19 U	0.19 U	0.19 U	0.32 J	1.3	0.19 U	8.4	20																		
Perfluorohexanesulfonic acid (PFHxS)	0.3	300 4,00	0.059 U	0.134 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.31 J	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.5 J	4 U																		
Perfluorooctanoic acid (PFOA)	0.72	300 4,00	0.176 J	0.471 J	0.25 U	0.33 J	0.25 U	1.1	0.25 U	0.28 J	14	2.2	3	0.25 U	0.25 U	0.25 U	0.25 U	1.4	0.25 U	23	100																		
Perfluorononanoic acid (PFNA)	0.32	300 4,00	00 0.476 J	0.176 J	0.22 U	0.67 J	0.22 U	0.98 J	0.22 U	0.22 U	10	0.59 J	0.83 J	0.22 U	0.22 U	0.32 J	0.22 U	0.22 U	0.22 U	14	31																		
Perfluorooctane sulfonate (PFOS)	2	300 4,00	00 1.18	0.725 J	0.26 U	0.66 J	0.38 J	2.9	0.26 U	0.26 U	3.4	2.1	0.67 J	0.54 J	0.91 J	0.44 J	0.26 U	0.26 U	0.26 U	24	1.9 J																		
Perfluorodecanoic Acid (PFDA)	0.3	300 4,00	00 0.065 U	0.266 J	0.28 U	0.28 U	0.28 U	0.40 J	0.28 U	0.66 J	8.6	1.3	1.6	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	20	69																		
6:2 Fluorotelomer sulfonate (6:2 FIS)	NA	NA NA	A 2.67	0.181 0	0.26 0	0.26 0	0.26 0	0.26 U	U. /8 J	1.2 ad REAS (Total REAS	12 S) and Sum of Si	0.260	6.6	0.26 0	0.26 0	0.26 0	24	140	0.26 0	270	4300																		
Total PEAS	NA	NA NA	11.352	4.053	0.74	1.87	0.94	11.42	3.01	9.06	151 24	24.61	43.41	0.83	1.62	1.47	25.27	146.5	0	1 524	5 972 9																		
Sum of Six (PEHpA PEHxS PEOA PEOS									0.02	5.00	131.24	14.01		0.00					-	-,	0,000																		
PFNA, and PFDA)	NA	NA NA	1.905	2.012	0	1.87	0.38	6.33	0.22	1.19	43.8	7.5	8.8	0.54	0.91	0.76	0.32	2.7	0	89.9	221.9																		
fample Location					1001 D	vill Location			Old ARFF/SRE													-																	
Sample Location					1991 D	nii Location			Building																														
Sample ID	Method 1 Star	ndard	1991A (0-	() 1991B (0-1) 1991C (0-1')	1991D (0-1')	1991A-B (3-4')	1991C-D (2-3')	HW-X(m) [7-9]																														
Comple Data	C 1/CW 1 C 1	UC	1			0.0000	10/11/0010	10/11/0010	0/7/0004																														
Sample Date Porfluorobontanois acid (REHoA)	0.5	200 4.00	8/14/201	8 8/14/2018	0 10 11	8/14/2018	0.10.11	0.10.11	9/7/2021																														
Perfluorohevanesulfonic acid (PEHyS)	0.3	300 4,00	0.130	0.150	0.2411	0.2411	0.13 0	0.13 0	0.058 U																														
Perfluorooctanoic acid (PFOA)	0.72	300 4.00	0 0.25 U	0.26 J	0.25 U	0.25 U	0.25 U	0.24 U	0.04 U																														
Perfluorononanoic acid (PFNA)	0.32	300 4,00	00 0.22 U	0.22 U	0.22 U	0.30 J	0.22 U	0.22 U	0.072 U																														
Perfluorooctane sulfonate (PFOS)	2	300 4,00	0.49 J	1.1	0.55 J	0.36 J	0.30 J	0.42 J	0.124 U																														
Perfluorodecanoic Acid (PFDA)	0.3	300 4,00	00 0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.064 U																														
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA NA	A 0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.171 U	1																													
	1	Sum of L	Laboratory Repor	tea PFAS (Total P	/FASJ and Sum of S	NX 0.55		0.40	0.400	4																													
Total PEAS	NA	NA NA	a 0.49	3.18	0.55	0.66	0.3	0.42	0.139	1																													
DEMA and REDAL	NA	NA NA	0.49	2.02	0.55	0.66	0.3	0.42	0.124 U																														
rnw, and rrbwj	1 I		1	1	1	1	1	1	1	3																													

 Processing
 All of Processing

 Notes:

 < > Not detected by the laboratory above the reporting limit. Reporting limit shown.
 >

 > = Estimated concentration between the method detection limit and reporting limit.
 Results in ug/Regimerogeness per kilogram.

 Us Not detected by the laboratory above the method detection limit. Method detection limit shown.
 Bold results aboratory above the method 3-15/04-31 standard.

 Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).</td>
 Sum of six includes estimated values and does not include non-detects (U or <).</td>

 UCL = Upper Concentration Limit
 Users
 Sum of six includes restimated values and does not include non-detects (U or <).</td>

Table 2. Groundwater Results for PFAS ug/L

Sample Location								North Rar	mp						Lewis Pond Area							Airport	Road/Iyannough	h Road Area													ARFF Building A	rea				
Sample ID		HW-1	HW-1	HW-1	HW-4M	HW-5	HW-5	HW-5	HW-23	HW-23	HW-19D	HW-19D	HW-X(s)	HW-X(m)	HW-401S	HW-A(S)	HW-B(S)	HW-B(S)	HW-B(D)	HW-C	HW-M	HW-N	HW-0	HW-U(s)	HW-U(s)	HW-U(m)	HW-U(m)	HW-U(d)	HW-U(d)	HW-V(m)	HW-L (s)	HW-L (m)	HW-L (d)	HW-L (d)	HW-P (s)	HW-P (s)	HW-P (s)	HW-P (m)	HW-P (m)	HW-P (m)	HW-Q (s)	HW-Q (s) HW-Q (m)
Sample Date	UCL	7/1/2016	6/20/2017	11/1/2018	4/5/2017	7/1/2016	4/7/2017	11/1/2018	6/20/2017	11/1/2018	6/20/2017	11/7/2018	9/10/2021	9/10/2021	4/7/2017	4/7/2017	4/7/2017	10/26/2018	10/26/2018	8 4/7/2017	6/24/2019	6/24/2019	7/2/2019	4/19/2021	9/5/2021	4/19/2021	9/5/2021	10/2/2020	9/5/2021	10/2/2020	10/7/2020	10/7/2020	6/19/2019	10/7/2020	10/1/2020	3/18/202	1 9/8/2021	10/1/2020	3/18/2021	9/8/2021	10/1/2020	11/6/2020 10/1/2020
Depth to Groundwater		21.63	25.00	21.83	26.20	24.94	26.75	25.27	22.70	24.01	21.29	22.19	24.74	25.21	17.95	24.62	22.26	21.59	21.66	38.50	20.32	15.48	3.62	23.59	24.53	23.50	24.49	24.66	25.24	22.90	21.96	21.88	19.40	22.22	22.69	22.09	23.54	22.80	22.20	23.67	21.45	22.04 21.41
Total Well Depth	100.000	30.84	30.84	30.84	32.32	27.80	27.80	27.80	28.11	28.11	41.30	41.30	29.24	36.82	23.60	32.00	30.23	30.23	57.20	42.15	26.92	22.33	14.10	28.83	28.83	38.93	38.93	62.30	62.30	36.15	27.33	37.33	70.55	70.55	27.60	27.60	27.60	38.30	38.30	38.30	26.60	26.60 36.79
Perfluorohexanorulfonis acid (PEHxS)	100,000	0.01	0.0042 J	0.013 J	0.007 J	0.0041	0.0084 J	0.0074 0	0.0045J	0.0098 J	0.0052 J	0.0080 J	0.0061	0.0034	0.0043 J	0.0048 J	0.049	0.012 J	0.0074 0	0.0033 U	0.007	0.0034	<0.002	0.002 J	0.004	0.0018 J	0.0049	0.01	0.01	0.0033	0.00053 0	0.0064	0.0078	0.0065	0.026	0.00074	0.004	0.003	0.017	0.016	0.0018 J	0.0021 0.00053 0
Perfluorononanoic acid (PENA)	100.000	<0.002	0.0057 1	0.008711	0.02	<0.002	0.0181	0.0038.0	0.021	0.023	0.046	0.045	0.0047	0.0021	0.0011 J	0.00791	0.0044	0.047	0.0036 0	0.0034 0	<0.002	<0.002	0.0043	0.00131	0.0034	0.00043	0.0011	0.018	0.022	0.0032	0.0013	0.023	0.0033	0.0022	0.0018	0.00074	0.000363	0.00085	0.00151	0.0013 J	0.0013	0.0087 0.0019
Perfluorooctanoic acid (PFOA)	100,000	0.033	0.0037 3	0.031	0.011 J	0.031	0.020 J	0.011 J	0.0046 U	0.011 J	0.017 J	0.0087 0	0.000433	0.002	0.0046 U	0.0026 U	0.0094 J	0.020 J	0.012 J	0.0026 U	0.027	0.0088	0.0039	0.0075	0.0047	0.0055	0.0094	0.01	0.003	0.0063	0.00071 U	0.01	0.025	0.0022	0.0084	0.002	0.0013 J	0.0011	0.0096	0.0033	0.00003 0	0.00003 0 0.00075
Perfluorooctane sulfonate (PFOS)	5,000	0.017	0.24	0.028	0.043	0.12	0.052	0.12	0.0079 J	0.015 J	0.061	0.069	0.068	0.034	0.012 J	0.0026 U	0.026	0.019 J	0.010 J	0.0026 U	0.0074	0.004	0.017	0.06	0.029	0.0093	0.027	0.023	0.051	0.0059	0.0014	0.07	0.049	0.039	0.00097	0.00049	J 0.00054 U	0.0011	0.0035	0.003	0.0041	0.0075 0.0049
Perfluorodecanoic Acid (PFDA)	100,000	NA	0.0040 U	0.0061 U	0.0040 U	NA	0.0040 U	0.0061 U	0.0040 U	0.0061 U	0.0040 U	0.0061 U	0.00050 U	0.0042	0.0040 U	0.0040 U	0.0040 U	0.0061 U	0.0061 U	0.0040 U	< 0.002	< 0.002	0.0021	0.00064 J	0.0011 J	0.00038 U	0.001 U	0.00062 U	0.0025 U	0.00062 U	0.00062 U	0.00062 U	< 0.002	0.0019	0.00085	0.0004 J	0.00048 U	0.00062 U	0.00038 U	0.00048 U	0.00062 U	0.00062 U 0.00062 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	0.0032 U	0.0066 U	0.0038 J	NA	0.0037 J	0.0066 U	0.0032 U	0.0066 U	0.0032 U	0.0066 U	0.002 J	0.00035 U	0.004 J	0.0032 U	0.0032 U	0.0066 U	0.0066 U	0.0034 J	< 0.002	< 0.002	0.002 U	0.0011 U	0.00034 U	0.0011 U	0.00075	0.0012	0.04	0.00039 U	0.00039 U	0.022	0.0021	0.00078	0.011	0.0034	0.0014 J	0.00092	0.0011 U	0.00036 U	0.00039 U	0.00039 U 0.00039 U
																		Sum of Lab	boratory Re	eported PFA	S (Total PFA	AS) and Sum	of Six																			
Total PFAS	NA	0.078	0.4247	0.15	0.1162	0.1661	3.0021	0.1507	0.0745	0.0858	0.1758	0.16	0.18221	0.10025	0.0313	0.0779	0.4561	0.186	0.0465	0.0034	0.0927	0.0727	0.0585	0.09704	0.06596	0.03622	0.0839	0.0889	0.1775	0.0543	0.0027	0.18375	0.1823	0.12348	0.2478	0.06294	0.05055	0.02967	0.17311	0.15362	0.0307	0.0346 0.00944
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	0.078	0.3369	0.09	0.081	0.1661	0.0984	0.1398	0.0334	0.0588	0.1357	0.136	0.13459	0.0519	0.0273	0.0127	0.1284	0.098	0.022	<0.0046	0.0574	0.0492	0.0273	0.08144	0.0439	0.02173	0.0534	0.0588	0.0987	0.0204	0.0027	0.1119	0.1181	0.0826	0.04412	0.01453	0.00756	0.00785	0.0376	0.0402	0.0238	0.0245 0.0085
Sample Location												•					Deployment A	lrea															Yarmouth Roa	I								
Sample ID		HM L(c)	HW(1(c)	HIM L (c)	HIM L (c)	HW(1 (m)	HW(1 (m)	HW(1 (m)	HW/L (m)	HW(1(d)	HW L(d)	HW L(d)	HW(1(d)	HIM/ I	HIM/ I	HIM/ I	LIM E		HW E	HW E	LIW E ¹		HIM/ E	LIW C		HIM/ E		UW U		HIM R(c)		HIM D(c)	HIM S (c)	HIM S (c)	HW/S/c)	HIM S (m	HW 5 (m)	HW S (m)	HW/T/c)	HW/T(m)	RB-1 (s)	RR-1 (c) RR-1 (c)
Sample Date	-	11/7/2018	5/8/2020	3/17/2021	9/8/2021	6/24/2019	5/8/2020	3/17/2021	9/8/2021	6/24/2019	5/8/2020	3/17/2021	9/11/2021	11/7/2018	3/17/2021	9/10/2021	4/5/2017	11/7/2018	8/19/2019	5/5/2020	3/17/2021	9/8/2021	4/5/2017	11/7/2018	5/5/2020	3/17/2021	9/8/2021	11/7/2018	5/8/2020	10/1/2020	3/17/2021	9/8/2021	10/1/2020	3/18/2021	9/3/2021	10/1/202	0 3/18/2021	9/3/2021	10/1/2020	10/1/2020	11/5/2020	3/18/2021 9/5/2021
Depth to Groundwater	UCL	18.35	15.39	18.42	19.94	16.33	15.61	18.66	20.17	16.20	15.49	18.52	20.04	19.18	19.34	20.60	19.05	19.38	17.82	16.16	23.35	25.02	19.60	20.08	16.82	20.01	21.72	20.39	17.37	18.33	17.37	19.00	16.88	16.29	17.30	17.01	16.35	17.37	13.41	13.58	17.87	16.91 18.64
Total Well Depth		25.10	25.10	25.10	25.10	34.80	34.80	34.80	34.80	41.67	41.67	41.67	41.67	24.30	24.30	24.30	26.22	26.22	26.22	26.22	30.26	30.26	26.89	26.89	26.89	26.89	26.89	27.09	27.09	23.56	23.67	23.67	22.10	22.10	22.10	32.04	32.04	32.04	18.54	28.96	27.80	27.80 27.80
Perfluoroheptanoic acid (PFHpA)	100,000	0.2	0.54	0.032	0.097	0.0032	0.0012	0.00086 J	0.0014 J	0.0053	0.0046	0.0065	0.0083	0.025	0.044	0.02	0.15	0.0074 U	0.0053	0.044	0.014	0.0018 J	0.34	0.0074 U	0.23	0.39	0.0051	0.077	0.28	0.021	0.005	0.021	0.11	0.14	0.11	0.00096	0.0011 J	0.0012 J	0.0039	0.022	0.0042	0.0054 0.0077
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.18	0.22	0.021	0.036	0.019	0.0091	0.0052	0.0078	0.057	0.018	0.031	0.05	0.0056 U	0.088	0.01	0.042	0.0056 U	0.0021	0.011	0.0015 J	0.00088 J	0.019J	0.0056 U	0.005	0.012 U	0.00037 U	0.0056 U	0.0031	0.02	0.01	0.0046	0.055	0.083	0.064	0.0064	0.0073	0.0053	0.17	0.019	0.0084	0.03 0.0051
Perfluorononanoic acid (PFNA)	100,000	0.16	0.082	0.065	0.033	< 0.002	0.00078	0.00048 U	0.00046 J	< 0.002	0.00063 U	0.00075 J	0.00084 J	0.028	0.035 J	0.015	0.0087 J	0.0087 U	< 0.002	0.0052	0.00048 U	0.00037 U	0.0046 U	0.0087 U	0.00081	0.0097 U	0.00037 U	0.0087 U	0.00063 U	0.0031	0.001 J	0.00034 U	0.1	0.024	0.1	0.00063 0	J 0.00057 J	0.00055 J	0.00074	0.0032	0.0047	0.0025 0.0026
Perfluorooctanoic acid (PFOA)	100,000	0.26	0.29	0.05	0.063	0.0061	0.0018	0.0014 J	0.0016 J	0.0047	0.0028	0.0043	0.0053	0.026	0.061	0.0091	0.053	0.0033 U	0.0047	0.027	0.00095 J	0.00094 J	0.075	0.0033 U	0.02	0.052	0.00074 U	0.0050 J	0.002	0.014	0.004	0.004	0.062	0.078	0.13	0.0013	0.0018 J	0.0014 J	0.0067	0.011	0.007	0.0087 0.0093
Perfluorooctane sulfonate (PFOS)	5,000	0.066	0.04	0.028	0.02	0.014	0.014	0.013	0.016	0.012	0.02	0.038	0.039	0.13	0.25	0.08	0.047	0.0060 U	< 0.002	0.0037	0.00082 J	0.00064 U	0.0026 U	0.0060 U	0.00086	0.0076 U	0.00065 U	0.0060 U	0.00068 U	0.016	0.0023	0.0053	0.1	0.03	0.048	0.0058	0.006	0.0094	0.21	0.025	0.038	0.04 0.01
Perfluorodecanoic Acid (PFDA)	100,000	0.012 U	0.00062 L	0.0038 U	0.00047 U	< 0.002	0.00062 U	0.00038 U	0.00050 U	<0.002	0.00062 U	0.00038 U	0.00048 U	0.0061 U	0.0076 U	0.00050 U	0.0040 U	0.0061 U	< 0.002	0.00062 U	0.00038 U	0.00052 U	0.0040 U	0.0061 U	0.00062 U	0.0076 U	0.00053 U	0.0061 U	0.00062 U	0.00062 U	0.00038 U	0.00049 U	0.00062 U	0.0038 U	0.012 U	0.00062	J 0.00038 U	0.00047 U	0.00062 U	0.0014	0.00062 U	0.00038 U 0.00045 U
b:2 Fluorotelomer sultonate (6:2 FTS)	NA	11	13	1.7	2.1	0.002 U	0.00039 U	0.0011 U	0.00037 U	< 0.002	0.0016	0.0011 U	0.00054 J	0.68	0.44	0.13	2	0.0066 U	0.069	0.86	0.0035	0.00039 U	5.7	0.0066 U	1.5	4.8	0.0049	1.5	0.13	0.037	0.0048	0.003	3.7	3.1	5.2	0.0065	0.0067	0.0036	0.00039 U	0.00039 U	0.00039 U	U.0011 U 0.00034 U
			-	-														Sum of Lab	boratory Re	eported PFA	is (Total PFA	AS) and Sum	of Six		-											-						r
Total PFAS	NA	13.346	15.5383	2.082	2.73304	0.0718	0.03308	0.02516	0.03254	0.1367	0.08985	0.15585	0.16687	1.074	1.217	0.511	3.2257	0	0.14	1.04526	0.04812	0.01342	12.96	0.084	2.65637	8.422	0.159	4.452	1.26666	0.2171	0.04878	0.2549	4.8958	4.3105	6.1418	0.02471	0.03263	0.02873	0.44114	0.3254	0.08008	0.1175 0.06755
PFDA)	NA	0.866	1.172	0.196	0.249	0.0423	0.02688	0.02046	0.02726	0.079	0.0454	0.08055	0.10344	0.209	0.478	0.1341	0.3007	0.0087 U	0.0121	0.0909	0.01727	0.00362	0.434	0.0087 U	0.25667	0.442	0.0051	0.082	0.2851	0.0741	0.0223	0.0349	0.427	0.355	0.452	0.01446	0.02667	0.01785	0.39134	0.0816	0.0623	0.0866 0.0347
Sample Location			Yarmouth Ro	ad					Solar Field	I.													S	iteamship Park	king Lot														Maher Wells			
Sample ID		RB-1 (m)	RB-1 (m)	RB-1 (m)	HW-D (m)	HW-D (m)	HW-D (d)	HW-D (d)	HW-D (dd)	HW-D (dd)	HW-G(S)	HW-G(M)	HW-G(D)	HW-2	HW-2	HW-2	HW-3	HW-3	HW-3	HW-3	HW-3	HW-3	HW-300	HW-300	HW-300	HW-301	HW-302	HW-302	HW-302	HW-302	HW-K	HW-K	HW-K	HW-K	OW-9S	OW-9S	OW-9S	OW-9M	OW-9M	OW-9D	OW-9D	OW-9D OW-9DD
Sample Date	1101	11/5/2020	3/18/2021	9/5/2021	4/7/2017	5/13/2020	6/24/2019	5/13/2020	6/24/2019	5/13/2020	12/3/2018	12/3/2018	12/3/2018	7/1/2016	5/5/2020	9/1/2021	7/1/2016	4/5/2017	10/26/2018	8 5/5/2020	3/17/2021	9/1/2021	7/1/2016	3/17/2021	9/2/2021	7/1/2016	7/1/2016	12/3/2018	3/17/2021	9/1/2021	6/19/2019	5/21/2020	3/18/2021	9/2/2021	7/5/2016	12/3/201	8 5/8/2020	12/3/2018	5/8/2020	7/5/2016	12/3/2018	5/5/2020 4/11/2017
Depth to Groundwater	000	17.79	16.85	18.57	18.83	18.34	18.99	18.23	20.60	19.97	20.69	20.75	20.71	27.48	25.33	30.20	25.81	25.70	26.06	23.64	26.19	28.35	22.52	22.86	23.02	25.05	23.52	22.65	24.04	26.15	20.88	20.56	22.87	24.24	12.23	10.80	10.14	11.11	10.45	12.48	10.82	10.15 12.10
Total Well Depth		49.85	49.85	48.85	30.32	30.32	44.94	44.94	65.05	65.05	28.45	38.25	48.28	32.80	32.80	32.80	33.08	33.08	33.08	33.08	33.12	33.11	30.33	30.30	30.34	30.42	30.45	30.45	30.44	30.40	44.18	44.18	44.17	44.18	21.35	21.35	21.35	56.20	56.20	68.63	68.63	68.63 86.75
Perfluoroheptanoic acid (PFHpA)	100,000	0.011	0.013 J	0.0073	0.0033 U	0.00053 U	0.021	0.017	< 0.002	0.00053 U	0.0074 U	0.0074 U	0.0074 U	0.0071	0.035	0.046	0.016	0.1	0.10	0.1	0.084	0.035	0.0096	0.0028	0.0029	0.002	0.019	0.015 J	0.0066	0.0062	0.0051	0.0028	0.0044	0.0086	0.014	0.048	0.0064	0.11	0.0061	0.0028	0.033	0.044 0.034
Perfluorohexanesulfonic acid (PFHxS)	5,000	0.01	0.017 J	0.0099	0.0089 J	0.00077 U	0.062	0.039	0.0092	0.008	0.0056 U	0.012 J	0.0056 U	0.0035	0.0066	0.0056 J	0.0043	0.020 J	0.012 J	0.0087	0.0064 J	0.0057 J	0.012	0.0099	0.00066 J	0.038	0.0063	0.016 J	0.0022	0.004	< 0.002	0.001	0.00066 J	0.0015 J	< 0.003	0.023	0.011	0.0056 U	0.0033	0.012	0.12	0.18 0.12
Perfluorononanoic acid (PFNA)	100,000	0.0068	0.0072 J	0.0044	0.0046 U	0.00063 U	0.015	0.019	0.0041	0.0029	0.0087 U	0.011 J	0.0087 U	<0.002	0.016	0.004 J	0.0063	0.027	0.023	0.021	0.019 J	0.014 J	< 0.002	0.00099 J	0.0028	<0.002	0.054	0.0097 J	0.0066	0.005	<0.002	0.0012	0.0037	0.003	0.0077	0.0087 U	0.0033	0.044	0.0037	0.0036	0.1	0.15 0.059
Perfluorooctanoic acid (PFOA)	100,000	0.013	0.013 J	0.012	0.0046 U	0.00071 U	0.0088	0.0076	<0.002	0.00071 U	0.0033 U	0.0033 U	0.0033 U	0.0063	0.039	0.012	0.0091	0.065	0.057	0.054	0.064	0.016 J	0.0052	0.0044	0.0044	0.0037	0.033	0.03	0.005	0.0065	0.0041	0.0019	0.0036	0.0038	0.007	0.032	0.0043	0.052	0.0035	0.0052	0.057	0.088 0.055
Perfluorooctane sulfonate (PFOS)	5,000	0.049	0.075	0.055	0.022	0.0011	0.095	0.12	0.013	0.013	0.0060 0	0.036	0.0060 0	0.012	0.053	0.026	0.084	0.15	0.053	0.0	0.056	0.044	0.017	0.015	0.017	0.011	0.014	0.031	0.0041	0.015	<0.002	0.0016	0.0015 J	0.0019	0.0074	0.024	0.0058	0.0081 J	0.00	0.041	0.52	0.72 0.5
Pertiuorodecanoic Acid (PFDA)	100,000	0.00075	0.0038 0	0.0033	0.0040 0	0.00062.0	<0.002	0.00062 0	<0.002	0.00062 0	0.0061 0	0.0061 0	0.0061 0	NA	0.00062.0	0.0025 0	NA	0.0040 0	0.0061 0	0.0014	0.0038 0	0.0052 0	NA	0.00038 0	0.0006 J	NA	NA	0.0061 0	0.00086 J	0.001 J	<0.002	0.00062.0	0.00038 0	0.00046 0	NA	0.0061 0	0.00062.0	0.0061 0	0.00062 0	NA	0.0061 0	0.00062 0 0.0040 0
0.2 Hubiotelomer surronate (0.2 His)		0.038	0.055	0.013	0.0032.0	0.00033.0	0.0022	0.00033.0	0.002 0	0.00033.0	0.00000	0.0000 0	0.0000 0	11/3	0.15	0.071	194	Sum of Lak	horston/ Po	Dortod BEA	S (Total DEA	VS) and Sum	of Six	0.00110	0.00034 0	104	10/5	0.13	0.012	0.0002	0.002 0	0.00033.0	0.00110	0.00034 0	NA	0.0000 0	0.00033.0	0.04	0.0049	192	0.15	0.23 0.13
T-t-LOCAC		0.2015	0.2642	0.15(1	0.0200	0.0011	0.2760	0.24002	0.0262	0.03444	0	0.050	0	0.0200	0.42670	0.4126	0 1107	Juli Of Lat		eported FFA.	1 1204	AS) and Sum	01.31	0.05500	0.02012	0.05.47	0.1262	0.2427	0.00204	0.00703	0.0240	0.0275	0.04400	0.00217	0.0261	0.010	0.00070	1 71 41	0.001.0	0.0040	1.217	1.5045 1.00
Sum of Six (PEHp& PEHyS PEOA_PEOS_PENA_and	INA	0.2015	0.2042	0.1501	0.0509	0.0011	0.2768	0.24995	0.0265	0.02444	0	0.059	0	0.0289	0.42078	0.4130	0.1197	1.005	0.952	0.90981	1.1394	0.0607	0.0458	0.05509	0.03812	0.0547	0.1205	0.3427	0.08304	0.09793	0.0348	0.0275	0.04460	0.09217	0.0301	0.018	0.00078	1./141	0.0810	0.0640	1.217	1.3645 1.02
PFDA)	NA	0.0913	0.1252	0.0919	0.0309	0.0011	0.2018	0.2026	0.0263	0.0239	0.0087 U	0.059	0.0087 U	0.0289	0.1496	0.0936	0.1197	0.362	0.245	0.2851	0.2294	0.1147	0.0438	0.03309	0.02832	0.0547	0.1263	0.1017	0.02536	0.0377	0.0092	0.0085	0.0138	0.0188	0.0361	0.127	0.0308	0.2141	0.0266	0.0646	0.83	1.182 0.768
Sample Location	•								_		-						Mah	ner Wells				-																				
Sample ID		OW-9DD	OW-9DD	ME-1*	ME-2**	ME-3***	OW-185	OW-185	OW-185	OW-18M	OW-18M	OW-18M	OW-18D	OW-18D	OW-18D	OW-18D	OW-18D	OW-19(S)	OW-19(S)	OW-19(S)	OW-19(M)	OW-19(M)	OW-19(M)	OW-19D	OW-19D	OW-19D	OW-19D	HW-W(m)	HW-W(m)	HW-W(d)	HW-W(d)	HW-W(dd)	HW-W(dd)									
														Duplicate																												
Sample Date	UCL	12/3/2018	10/2/2020	9/17/2020	9/17/2020	9/17/2020	7/5/2016	12/7/2018	5/8/2020	7/5/2016	12/7/2018	5/8/2020	7/5/2016	7/5/2016	4/11/2017	12/7/2018	5/13/2020	11/6/2020	3/18/2021	9/2/2021	11/6/2020	3/19/2021	9/3/2021	4/11/2017	5/13/2020	3/19/2021	9/11/2021	4/19/2021	9/5/2021	4/19/2021	9/5/2021	4/19/2021	9/5/2021									
Total Wall Dopth	-	11.30	13.04	3.60	6.50	6.00	24.40	24.29	23.45	23.62	24.72	23.95	122.95	132.95	132.35	24.28	23.47	27.30	20.27	26.47	76.39	76.24	26.05	20.75	25.04	110.22	110.24	28.90	50.17	20.75	61 79	20.07	29.89									
Porfluorobentanois asid (REHnA)	100.000	86./5	86.75	81.20	54.20	50.30	0.0071	31.23	31.23	74.44	0.007411	74.44	0.0071	0.0062	0.0151	0.014	0.012	34.30	34.05	34.67	/6.28	76.24	0.014	0.00511	0.011	0.018	0.022	52.04	0.0024	0.0021	0.01	0.0001	0.0072									
Perfluorobevanesulfonic acid (PEHvS)	5 000	0.0133	0.0085	0.03	0.0035	0.0030	0.0068	0.0056 U	0.0035	0.0029	0.0074 0	0.0074	0.0071	0.0003	0.13	0.014 J	0.03	0.0042	0.0044	0.0030	0.027	0.044	0.015	0.00313	0.12	0.026	0.022	0.012	0.015	0.0021	0.0064	0.0091	0.0073									
Perfluorononanoic acid (PENA)	100.000	0.038	0.015	0.017	0.003	0.004	<0.000	0.0087 U	0.0032	0.0076	0.008711	0.0027	0.005	0.0058	0.004611	0.0087.11	0.0028	0.0034	0.00121	0.0025	0.0027	0.004811	0.0021	0.0061	0.0017	0.0020	0.00088 1	0.000771	0.0011	0.0013 I	0.0004	0.0014.1	0.0040									
Perfluorooctanoic acid (PFOA)	100,000	0.020 J	0.010	0.016	0.0077	0.012	0.018	0.012 J	0.01	0.0058	0.0060 J	0.0096	0.0059	0.0059	0.025	0.019 J	0.0095	0.011	0.007	0.0066	0.011	0.00941	0.0037	0.0046 U	0.023	0.0097	0.007	0.0041	0.0024	0.0029	0.0094	0.0046	0.0069									
Perfluorooctane sulfonate (PFOS)	5.000	0.14	0.049	0.11	0.095	0.072	0.0083	0.028	0.016	0.044	0.24	0.18	0.018	0.019	0.22	0.32	0.041	0.025	0.015	0.031	0.047	0.027	0.029	0.029	0.31	0.047	0.053	0.075	0.042	0.012	0.017	0.015	0.0081									
Perfluorodecanoic Acid (PFDA)	100,000	0.0061 U	0.00062 L	0.00062 U	0.00062 U	0.00062 U	NA	0.0061 U	0.00062 U	NA	0.0061 U	0.00062 U	NA	NA	0.0040 U	0.0061 U	0.00062 U	0.0027	0.001 J	0.00048 U	0.00062 U	0.0038 U	0.00046 U	0.0040 U	0.00062 U	0.00038 U	0.00048 U	0.00038 U	0.00046 U	0.00038 U	0.00046 U	0.00038 U	0.00049 U									
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	0.062	0.02	0.034	0.00039 U	0.0071	NA	0.0066 U	0.00039 U	NA	0.0066 U	0.00039 U	NA	NA	0.0032 U	0.0066 U	0.00039 U	0.00039 U	0.0011 U	0.00036 U	0.00095	0.011 U	0.00035 U	0.0032 U	0.00039 U	0.0011 U	0.00036 U	0.0011 U	0.0029	0.0011 U	0.00042 J	0.0011 U	0.00036 U									
												S	um of Labor	atory Repo	rted PFAS (1	Total PFAS)	and Sum o	of Six																								
Total PEAS	NA	0.39	0.169	0.2873	0.2009	0.14005	0.0402	0.0573	0.05953	0.0763	0.3891	0.4357	0.0475	NA	0.506	0.5504	0.1832	0.0707	0.0634	0.07307	0.37335	0.3974	0.16133	0.0936	0 5463	0.3127	0 31489	0 17849	0 17264	0.04339	0.08666	0.10469	0.0563									
Sum of Six (PFHpA, PFHxS, PFOA, PFOS, PFNA, and																	012002								0.0.00																	
PFDA)	NA	0.255	0.1045	0.184	0.1512	0.1096	0.0402	0.04	0.0416	0.0763	0.319	0.2697	0.0475	0.048	0.39	0.483	0.0953	0.0484	0.035	0.0484	0.117	0.0944	0.0638	0.0691	0.4657	0.1036	0.11088	0.09707	0.06380	0.0271	0.0453	0.0387	0.0291									
Note: ULL = Ligner (Concentration Limit) < Not detected by the laboratory above the reporting limit. Re $1 = Standard concentration between the method detection limit. Results in ugL, micrograms per liner. Li Not detected by the Laboratory shows the method detection limit. Results in ugL, micrograms per liner. Li Not detected by the Laboratory shows the method detection in the standard shows the laboratory shows the method shows on the standard shows the standard shows the shows perform Na = Not Applicable. ************************************$	porting limit shown. and reporting limit. limit. Method detect letects (U or <). cluding estimated valu de. se. sum of Six ranges from	ion limit shown. ues and does not in 1500 to 40,000 ug/	clude non-detec	s (U or <).																																						

Table 3 - 1,4 Dioxane Results in Groundwater ug/L

Sample Leastion											North	Dama								Airport Boo	d/luannou	ah Bood Ar	~~				ulding	
Sample Location											NOILI	глапр								Апротскоа	u/iyannoug	gii Kuau Ai	ea			ARFF DU	munig	
Sample ID	HW-1	HW-1	HW-5	HW-12	OW-6	OW-6	HW-4M	HW-4D	HW-204	HW-29	HW-207S	HW-207D	HW-207D	HW-19D	HW-19D	HW-X(s)	HW-X(m)	HW-A(D)	HW-A(D)	HW-B(D)	HW-N	HW-O	HW-U(d)	HW-V(m)	HW-L(s)	HW-L(m)	HW-L(d)	HW-L(d)
Sample Date	5/7/2015	8/5/2019	5/7/2015	5/7/2015	5/7/2015	9/27/2019	4/5/2017	4/5/2017	9/27/2019	9/27/2019	9/27/2019	4/5/2017	9/27/2019	4/5/2017	9/27/2019	9/10/2021	9/10/2021	4/5/2017	8/5/2019	4/5/2017	8/5/2019	8/5/2019	10/2/2020	10/2/2020	10/7/2020	10/7/2020	7/2/2019	5/13/2020
1,4-Dioxane	<0.152	<0.25	<0.150	<0.150	<0.150	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.19	<0.22	<0.25	<0.25	<0.25	<0.25	<0.25	0.73	0.8	<0.2	<0.2	0.727	0.75
Sample Location								Maher Well F	ield							Deploym	ient Area											
Sample ID	OW-9M	OW-9D	OW-9D	OW-9D	OW-9DD	OW-9DD	OW-9DD	OW-18M	OW-18D	OW-18D	OW-18D	OW-19M	OW-19D	OW-19D	OW-19D	HW-E	HW-J											
Sample Date	5/28/2015	5/28/2015	12/3/2018	5/5/2020	5/28/2015	4/11/2017	12/3/2018	4/11/2017	4/11/2017	12/7/2018	5/13/2020	4/11/2017	4/11/2017	12/7/2018	5/13/2020	9/10/2021	9/10/2021											
1,4-Dioxane	<0.141	<0.141	<0.25	<0.19	0.926	0.838	0.732	<0.25	0.552	<0.25	0.35	<0.25	0.800	<0.25	0.3	<0.20	<0.20											

Notes:

Results in ug/L, micrograms per liter.

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.
 Bold results above Method 1 GW-1 standard (0.3 ug/L).
 The Method 1 GW-2 standard for 1,4-dioxane is 6,000 ug/l.
 The Method 1 GW-3 standard for 1,4-dioxane is 50,000 ug/l.

Table 4. ARFF Concentrate Analytical Results ug/L

Sample ID	Foam Mix
Sample Date	12/9/2016
Perfluoroheptanoic acid (PFHpA)	3.4 J
Perfluorohexanesulfonic acid (PFHxS)	2.1 J
Perfluorononanoic acid (PFNA)	93
Perfluorooctanoic acid (PFOA)	19
Perfluorooctane sulfonate (PFOS)	5 U
Perfluorodecanoic Acid (PFDA)	2.8 J
6:2 FTS	33
Total PFAS	222.5
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	120.3

Notes:

1. U = Not detected by the laboratory above the Method Detection Limit. Method Detection Limit shown.

2. Results in ug/L, micrograms per liter.

3. Total PFAS is the sum of all laboratory detected PFAS analytes including estimated

values and does not include non-detects (U).

4. Sample is AFFF concentrate.

5. J = Estimated concentration between the Method Detection Limit and the Laboratory Reporting Limit.

Table 5. SPLP Results ug/L

		DI 5 2'	ח 8 (4')	(14(0-1')	Stockpile	Stockpile	ARFF Rubber	ARFF Asphalt
Sample ID			010(4)		West	East	Roof	Roof
Sample Date	9/26/2017	9/26/2017	9/26/2017	9/26/2017	10/10/2017	10/10/2017	11/17/2020	11/17/2020
Perfluoroheptanoic acid (PFHpA)	0.011 U	0.011 U	0.065 J	0.17	0.011 U	0.011 U	0.00279	0.0002 U
Perfluorohexanesulfonic acid (PFHxS)	0.0072 U	0.0072 U	0.036 U	0.01 J	0.0072 U	0.0072 U	0.00034 U	0.00036 U
Perfluorononanoic acid (PFNA)	0.16	0.0032 U	0.052 J	0.37	0.0032 U	0.0032 U	0.00068 J	0.00028 U
Perfluorooctanoic acid (PFOA)	0.012 J	0.042	0.6	0.87	0.0037 U	0.0037 U	0.0073	0.00021 U
Perfluorooctane sulfonate (PFOS)	0.013 J	0.0072 U	0.036 U	0.19	0.0072 U	0.0072 U	0.00045 U	0.00202
Perfluorodecanoic Acid (PFDA)	0.0052 U	0.0052 U	0.026 U	0.34	0.0052 U	0.0052 U	0.000364 J	0.000271 U
6:2 FTS	0.067	0.0072 U	25	7.13	0.034 J	0.024 J	0.0154 J	0.0017 J
Total PFAS	0.195	0.042	26.25	20.195	0.034	0.024	0.072723	0.07957
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	0.185	0.042	0.717	1.95	0.011 U	0.011 U	0.011133	0.00202

Notes:

1. U = Not detected by the laboratory above the Method Detection Limit. Method Detection Limit shown.

2. Results in ug/L, micrograms per liter.

3. Total PFAS is the sum of all laboratory detected PFAS analytes including estimated

values and does not include non-detects (U).

Table 6: Background PFAS Levels in Soil

										В	Background Sa	mple Location	S												
Cample ID	Mathad 1	Standard	Stockpile	Stockpile	Loom Dilo	DC 1 0 1		DC 201	DC 4.0.1			DC 701			DC 10.0.1	DC 11 0 1	DC 12.0.1	DC 12.0.1	DC 14 0 1	DC 15 0 1	DC 16 0 1	DC 17 0 1	DC 19 0 1	DC 10.0.1	DC 20.0.1
sample ib	wiethou I	Stanuaru	West	East	Loam Pile	BG-1 0-1	BG-2 0-1	BG-3 U-1	BG-4 0-1	BG-5 U-1	BG-0 0-1	BG-7 0-1	BG-8 U-1	BG-9 0-1	BG-10 0-1	BG-11 0-1	BG-12 U-1	BG-13 U-1	BG-14 0-1	BG-15 U-1	BG-10 U-1	BG-17 U-1	BG-18 U-1	BG-19 0-1	BG-20 0-1
Sample Date	S-1/GW-1	S-1/GW-3	10/10/2017	10/10/2017	10/10/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	10/26/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017	12/14/2017
Sample Location			On-Airport	On-Airport	On-Airport	Off-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	On-Airport	Off-Airport											
Perfluoroheptanoic acid (PFHpA)	0.5	300	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.18 J	0.17 U	0.18 J	0.17 U	0.17 U	0.23 J	0.17 U	0.17 U	0.19 U	0.19 U	0.19 U	0.19 U	0.44 J	0.19 U	0.19 U	0.35 J	0.19 U	0.46 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.24 U	0.39 J	0.24 U	0.24 U	0.57 J	0.47 J	0.24 U	0.49 J	0.24 U	0.24 U
Perfluorooctanoic acid (PFOA)	0.72	300	0.26 U	0.26 U	0.26 U	0.58 J	0.26 U	0.26 U	0.16 U	0.47 J	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.75 J	0.67 J	0.33 J	0.25 U	0.46 J	0.37 J	0.36 J	0.5 J	0.25 U	0.86 J
Perfluorononanoic acid (PFNA)	0.32	300	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.17 U	0.22 U	0.29 J	0.22 U	0.22 U	0.53 J	0.22	0.67 J	0.41 J	0.22 U	0.22 U
Perfluorooctane sulfonate (PFOS)	2	300	0.38 J	0.39 J	0.81 J	0.21 U	0.7 J	0.38 J	2.3	0.41 J	0.32 J	0.33 J	0.31 J	1.3	0.62 J	0.41 J	0.76 J	0.99	0.26 U	3.1	2	0.36 J	2.3	0.41 J	0.44 J
Perfluorodecanoic Acid (PFDA)	0.3	300	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.13 U	0.28 U	0.28 U	0.36 J	0.28 U	0.31 J	0.41 J	0.28 U	0.41 J	0.28 U	0.28 U
									Su	m of Laborato	ry Reported P	FAS (Total PFA	S) and Sum of	Six											
Total PFAS	NA	NA	1.78	0.91	0.81	1.47	0.7	0.56	3.21	1.31	0.32	0.3	0.84	1.3	0.62	1.16	2.73	1.68	0	6.79	3.77	5.09	5.45	0.41	2.43
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	0.38	0.39	0.81	0.58	0.7	0.56	2.3	1.06	0.32	0.33	0.54	1.3	0.62	1.16	2.11	1.68	0	5.41	3.47	1.39	4.46	0.41	1.76

Notes:

J = Estimated concentration between the method detection limit and reporting limit.

U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.
 Bold results above the proposed Method 1 S-1/GW-1 standard.

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <). Sum of six includes estimated values and does not include non-detects (U or <).

Table 7. Surface Water Results for PFAS ug/L

	Sui	rface Wate	er
Sample ID	Kmart	LP-1	UGP-1
Sample Date	6/20/2017	7/11/19	7/11/19
Perfluoroheptanoic acid (PFHpA)	0.0033 U	<0.01	<0.02
Perfluorohexanesulfonic acid (PFHxS)	0.0034 U	<0.01	<0.02
Perfluorononanoic acid (PFNA)	0.0043 J	<0.01	<0.02
Perfluorooctanoic acid (PFOA)	0.0026 U	<0.01	<0.02
Perfluorooctane sulfonate (PFOS)	0.0046 U	<0.01	<0.02
Perfluorodecanoic Acid (PFDA)	0.0040 U	<0.01	<0.02
Sum of Laboratory Reported PFAS	(Total PFAS)	and Sum o	f Six
Total PFAS	0.0174	0.018	0.047
Sum of Six (PFHpA,PFHxS,PFOA, PFOS,			
PFNA, and PFDA)	0.0043	< 0.01	<0.02

Notes:

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.

J = Estimated concentration between the method detection limit and reporting limit.

Results in ug/L, micrograms per liter.

U= Not detected by the laboratory above the method detection limit. Method detection limit shown.

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <). Currently MassDEP has not issued a surface water standard for PFAS.

The Method 1 GW-1 Standard for the Sum of Six is 0.02 ug/l.

The Method 1 GW-3 Standard for the individual analytes in the Sum of Six range from 500 to 40,000 ug/l.

Comula Data	Leh Comula ID		Stab	le Isotope Oxygen	-18	Stab	le Isotope Hydrogen-2	
Sample Date	Lab Sample ID	HW Sample ID	δ180 (V-SMOW)	Atm %	Expected Values	δ180 (V-SMOW)	Atm %	Expected Values
	1011200 2		-6.92	0.20	-	-40.41	0.01494	-
	1011299-2		-6.77	0.20	-	-40.17	0.01495	-
	1011200 /		-6.79	0.20	-	-38.56	0.01497	-
	1811299-4	TIV-E	-6.85	0.20	-	-38.87	0.01497	-
11/7/2018	1911200 F		-6.9	0.20	-	-38.28	0.01498	-
	1011299-5	п vv-г	-6.88	0.20	-	-38.15	0.01498	-
			-2.67	0.20	-	-18.65	0.01528	-
	1811299-7	SW-2	2.61	0.20		-20.42	0.01526	-
			-2.01	0.20	-	-23.04	0.01521	-
	1010100 1		-6.74	0.20	-	-38.19	0.01498	-
	1012190-1		-6.93	0.20	-	-37.87	0.01498	-
	1010100 0		-7.53	0.20	-	-44.34	0.01498	-
	1012190-2		-7.57	0.20	-	-44.39	0.01498	-
	1010100 0		-7.18	0.20	-	-44.15	0.01489	-
	1012190-5		-7.45	0.20	-	-44.56	0.01488	-
	1010100 /	20 14(0	-7.29	0.20	-	-41.86	0.01492	-
12/3/2018	1812198-4	077-95	-7.41	0.20	-	-42.94	0.0149	-
			-7.76	0.20	-	-47.91	0.01483	-
	1812198-5	OW-9D	-7 71	0.20	-	-46.82	0.01484	-
			-7.71	0.20	-	-47.20	0.01484	-
	1912109-6		-7.52	0.20	-	-45.58	0.01486	-
	1812198-0	000-900	-7.57	0.20	-	-45.48	0.01487	-
	1912109-7	0.01/-0.04	-7.13	0.20	-	-41.44	0.01493	-
	1012190-7	000-9101	-7.24	0.20	-	-43.40	0.0149	-
	1010020-1	0.1185	-7.58	0.20	-	-49.29	0.01481	-
	1012232-1	000-105	-7.54	0.20	-	-49.66	0.0148	-
12/7/2010	1917727_7	0.1/-1814	-6.95	0.20	-	-42.64	0.01491	-
12/7/2010	1012232-2	000-1000	-6.89	0.20	-	-42.57	0.01491	-
	1010000		-7.28	0.20	-	-44.76	0.01488	*
	1012252-5	000-100	-7.36	0.20	-	-41.61	0.01493	*
	IAEA OH-14	-	-5.64	0.20	-5.6	-37.45	0.01499	-37.70
04/00	IAEA OH-15	-	-9.59	0.20	-9.41	-77.89	0.01436	-78
QA/QC	IAEA OH-16	-	-15.72	0.20	-15.41	-	-	-113.8
	Antarc IC	-	-29.83	0.19	-30	-	-	-239.69

Table 8: Ratio of Stable Isotopes Oxygen-18 and Hydrogen-2 Laboratory Results

Table 9. Fire Truck Spray Water Analytical Results ug/L

					F	ire Truck Spra	y Water Spra	ay				
Sample ID	Ho	ose	Ro	oof	Bun	nper	Officer Sid	e Handline	Driver s	ide-Rear	Officer s	ide-Rear
Sample Date	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019	8/22/2019	11/12/2019
Perfluoroheptanoic acid (PFHpA)	0.073	<0.002	0.0045	<0.002	0.0039	<0.002	0.027	<0.002	0.0055	<0.002	0.081	0.0021
Perfluorohexanesulfonic acid (PFHxS)	0.0059	<0.002	0.0033	<0.002	0.0039	<0.002	0.004	<0.002	0.0048	<0.002	0.0043	<0.002
Perfluorononanoic acid (PFNA)	0.011	<0.002	0.0026	<0.002	0.0031	<0.002	0.013	<0.002	0.003	<0.002	0.016	<0.002
Perfluorooctanoic acid (PFOA)	0.088	0.0062	0.0087	<0.002	0.01	<0.002	0.039	<0.002	0.011	<0.002	0.076	0.0041
Perfluorooctane sulfonate (PFOS)	0.009	0.0021	0.0068	<0.002	0.006	<0.002	0.0087	<0.002	0.0093	<0.002	0.0086	<0.002
Perfluorodecanoic Acid (PFDA)	0.014	<0.002	0.004	<0.002	0.0045	<0.002	0.032	<0.002	0.0049	<0.002	0.032	<0.002
Total PFAS	5.7017	0.3391	0.9195	0.0205	0.7817	0.0167	4.1098	0.0481	0.8302	0.0087	5.4701	0.086
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	0.2009	0.0083	0.0299	<0.002	0.0314	<0.002	0.1237	<0.002	0.0385	<0.002	0.2179	0.0041

Notes:

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.

Results in ug/L, micrograms per liter.

Bold results above proposed MassDEP GW-1 standard (0.02 ug/L)

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).

Table 10: Total Organic Carbon Data (mg/kg)

						Tc	otal Organic Carb	on Concentratio	ı								
Sample ID	HW-W dd 3-5 ft	HW-W dd 8-10 ft	HW-W dd 18-20 ft	HW-W dd 23-25 ft	HW-W dd 28-30 ft	HW-W dd 33-35 ft	HW-W dd 38-40 ft	HW-W dd 43-45 ft	HW-W dd 48-50 ft	HW-W dd 58-60 ft	HW-W dd 63-65 ft	S1 0-2ft	S1 2-4ft	S1 4-6ft	S2 0-2ft	S2 2-4ft	S2 4-6ft
Sample Date	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	04/06/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021	4/19/2021
Sample Depth (ft below grade)	3-5	8-10	18-20	23-25	28-30	33-35	38-40	43-45	48-50	58-60	63-65	0-2	2-4	4-6	0-2	2-4	4-6
Sample Location	Water Department Property	Deployment Area	Deployment Area	Deployment Area	Deployment Area	Deployment Area	Deployment Area										
Total Organic Carbon	94.8 U	94.3 U	96.5 U	93.9 U	95.7 U	93.5 U	96.9 U	95.7 U	95.7 U	95.7 U	95.7 U	28,900	1,150	180	1,550	95.1 U	3,500

Notes:

Results in mg/kg, milligrams per kilogram.

U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.

Table 11. Runway 6/24 Surface Sample Results ug/kg

Sample Location						Surf	ace Soils		
Sample ID	Method 1	Standard		6-24 A (0-1)	6-24 A (1-2)	6-24 B (0-1)	6-24 B (1-2)	6-24 C (0-1)	6-24 C (1-2)
Sample Date	S-1/GW-1	S-1/GW-3	UCL	3/2/2022	3/2/2022	3/2/2022	3/2/2022	3/4/2022	3/4/2022
Perfluoroheptanoic acid (PFHpA)	0.5	300	4,000	< 0.051	<0.046	0.068 J	<0.049	<0.055	0.079 J
Perfluorohexanesulfonic acid (PFHxS)	0.3	300	4,000	<0.068	<0.062	<0.064	<0.066	<0.074	<0.069
Perfluorooctanoic acid (PFOA)	0.72	300	4,000	<0.047	0.115 J	0.136 J	0.106 J	0.058 J	0.156 J
Perfluorononanoic acid (PFNA)	0.32	300	4,000	<0.085	<0.077	0.115 J	<0.082	<0.091	<0.085
Perfluorooctane sulfonate (PFOS)	2	300	4,000	0.318	0.361	0.471	0.196 J	0.654	0.297
Perfluorodecanoic Acid (PFDA)	0.3	300	4,000	<0.076	<0.069	<0.071	<0.073	<0.082	<0.076
6:2 Fluorotelomer sulfonate (6:2 FTS)	NA	NA	NA	<0.203	<0.184	<0.19	<0.197	<0.219	<0.203
	Sur	n of Labora	tory Repo	rted PFAS (Tot	al PFAS) and Su	um of Six			
Total PFAS	NA	NA	NA	0.457	0.731	1.312	0.55	1.123	0.85
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA, and PFDA)	NA	NA	NA	0.318	0.476	0.79	0.302	0.712	0.532

Notes:

< = Not detected by the laboratory above the reporting limit. Reporting limit shown.

J = Estimated concentration between the method detection limit and reporting limit.

Results in ug/kg, micrograms per kilogram.

U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.

Bold results above the Method 1 S-1/GW-1 standard.

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).

Sum of six includes estimated values and does not include non-detects (U or <).

UCL = Upper Concentration Limit

Sample depth in feet below grade in parenthesis

Table 12. Select Pre and Post Cap Groundwater Results for PFAS Compounds (ug/L)

Sample Location	A	RFFF/SRE Are	ea			Deployment	t Area Area		
Sample ID		HW-P (s)			HW-I (s)			HW-E	
Sample Type	Pre-Cap	Post-Cap	Post-Cap	Pre-Cap	Post-Cap	Post-Cap	Pre-Cap	Post-Cap	Post-Cap
Sample Date	10/1/2020	3/18/2021	9/8/2021	5/8/2020	3/17/2021	9/8/2021	5/5/2020	3/17/2021	9/8/2021
Perfluoroheptanoic acid (PFHpA)	0.026	0.0067	0.004	0.54	0.032	0.097	0.044	0.014	0.0018 J
Perfluorohexanesulfonic acid (PFHxS)	0.0018 J	0.00074 J	0.00056 J	0.22	0.021	0.036	0.011	0.0015 J	0.00088 J
Perfluorononanoic acid (PFNA)	0.0061	0.002	0.0013 J	0.082	0.065	0.033	0.0052	0.00048 U	0.00037 U
Perfluorooctanoic acid (PFOA)	0.0084	0.0042	0.0017 J	0.29	0.05	0.063	0.027	0.00095 J	0.00094 J
Perfluorooctane sulfonate (PFOS)	0.00097	0.00049 J	0.00054 U	0.04	0.028	0.02	0.0037	0.00082 J	0.00064 U
Perfluorodecanoic Acid (PFDA)	0.00085	0.0004 J	0.00048 U	<0.002	0.0038 U	0.00047 U	< 0.002	0.00038 U	0.00052 U
6:2 Fluorotelomer sulfonate (6:2 FTS)	0.011	0.0034	0.0014 J	13	1.7	2.1	0.86	0.0035	0.00039 U
Sum o	of Laborate	ory Repor	ted PFAS (Total PFA	S) and Su	m of Six			
Total PFAS	0.2478	0.06294	0.05055	15.5383	2.082	2.73304	1.04526	0.04812	0.01342
Sum of Six (PFHpA,PFHxS,PFOA, PFOS, PFNA,	0.04412	0.01452	0.00756	1 170	0.106	0.240	0.0000	0.01727	0.00262
and PFDA)	0.04412	0.01455	0.00750	1.1/2	0.130	0.249	0.0909	0.01727	0.00302
			Statistics						
Percent Total PFAS Decrease		-79.60%			-82.41%			-98.72%	
Percent Sum of 6 Decrease		-82.86%			-78.75%			-96.02%	

Results in ug/L, micrograms per liter.

U= Not detected by the Laboratory above the method detection limit. Method detection limit shown.

Bold results above Method 1 GW-1 standard (0.02 ug/L).

Sum of six includes estimated values and does not include non-detects (U or <).

Total PFAS is the sum of all laboratory detected PFAS analytes including estimated values and does not include non-detects (U or <).

The Method 1 GW-3 Standard for the individual analytes in the Sum of Six ranges from 500 to 40,000 ug/l.

Percent increase or decrease is calculated as follows: [(Post Cap- Pre Cap)/(Pre Cap)]*100

APPENDIX A

Laboratory Analysis Report

ANALYTICAL REPORT

Lab Number:	L2211112
Client:	Horseley & Witten, Inc.
	Sextant Hill Office Park
	90 Route 6A
	Sandwich, MA 02563
ATTN:	Brian Massa
Phone:	(508) 833-6600
Project Name:	НҮА
Project Number:	Not Specified
Report Date:	03/14/22

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

Serial_No:03142214:56

Project Name:HYAProject Number:Not Specified

 Lab Number:
 L2211112

 Report Date:
 03/14/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2211112-01	6-24 A (0-1)	SOIL	HYANNIS, MA	03/02/22 09:55	03/03/22
L2211112-02	6-24 A (1-2)	SOIL	HYANNIS, MA	03/02/22 09:55	03/03/22
L2211112-03	6-24 B (0-1)	SOIL	HYANNIS, MA	03/02/22 12:15	03/03/22
L2211112-04	6-24 B (1-2)	SOIL	HYANNIS, MA	03/02/22 12:15	03/03/22



Project Name:HYAProject Number:Not Specified

 Lab Number:
 L2211112

 Report Date:
 03/14/22

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An af	firmative response to questions A through F is required for "Presumptive Certainty" status	
A	Were all samples received in a condition consistent with those described on the Chain-of- Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
В	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
С	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	N/A
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES
A res	ponse to questions G. H and I is required for "Presumptive Certainty" status	
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
н	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES

I Were results reported for the complete analyte list specified in the selected CAM protocol(s)? YES

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.



Project Name: HYA Project Number: Not Specified

 Lab Number:
 L2211112

 Report Date:
 03/14/22

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: HYA Project Number: Not Specified
 Lab Number:
 L2211112

 Report Date:
 03/14/22

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.

MCP Related Narratives

Report Submission

All MCP required questions were answered with affirmative responses; therefore, there are no relevant protocol-specific QC and/or performance standard non-conformances to report.

Non MCP Related Narratives

Perfluorinated Alkyl Acids by Isotope Dilution

L2211112-01R: The sample was re-analyzed due to QC failures in the original analysis. The results of the reanalysis are reported.

L2211112-02, -03, and -04: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1614223-1R, WG1614223-2R, and WG1614223-3R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

WG1614223-4: 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:

Custen Walker Cristin Walker

Title: Technical Director/Representative

Date: 03/14/22



QC OUTLIER SUMMARY REPORT

Project Name: HYA

Project Number: Not Specified

Lab Number: L2211112

Report Date: 03/14/22

					Recovery/RPD	QC Limits	Associated	Data Quality
Method	Client ID (Native ID)	Lab ID	Parameter	QC Type	(%)	(%)	Samples	Assessment
Perfluorinate	ed Alkyl Acids by Isotope Dilution -	Mansfield Lab						
LCMSMS-ID	6-24 A (1-2)	L2211112-02	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	19	31-134	-	not applicable
LCMSMS-ID	6-24 A (1-2)	L2211112-02	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	27	34-137	-	not applicable
LCMSMS-ID	6-24 B (0-1)	L2211112-03	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	24	31-134	-	not applicable
LCMSMS-ID	6-24 B (0-1)	L2211112-03	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	26	34-137	-	not applicable
LCMSMS-ID	6-24 B (1-2)	L2211112-04	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	7	31-134	-	not applicable
LCMSMS-ID	6-24 B (1-2)	L2211112-04	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	9	34-137	-	not applicable
LCMSMS-ID	Batch QC (L2211112-02)	WG1614223-4	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	18	31-134	-	not applicable
LCMSMS-ID	Batch QC (L2211112-02)	WG1614223-4	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	20	34-137	-	not applicable



ORGANICS



SEMIVOLATILES



				Serial_No:()3142214:56
Project Name:	HYA		L	_ab Number:	L2211112
Project Number:	Not Specified		R	Report Date:	03/14/22
			SAMPLE RESULTS		
Lab ID: Client ID: Sample Location:	L2211112-01 6-24 A (0-1) HYANNIS, MA	R	Da Da Fie	ate Collected: ate Received: eld Prep:	03/02/22 09:55 03/03/22 Not Specified
Sample Depth: Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/12/22 09:36 RS 86%		Ex Ex	traction Method: traction Date:	ALPHA 23528 03/10/22 17:00

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by Isotope Diluti	on - Mansfiel	d Lab				
Perfluorobutanoic Acid (PFBA)	0.084	J	ng/g	0.564	0.026	1
Perfluoropentanoic Acid (PFPeA)	0.055	J	ng/g	0.564	0.052	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.282	0.044	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/g	1.13	0.073	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.564	0.059	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	1.13	0.094	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.282	0.051	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.282	0.068	1
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.282	0.047	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.564	0.203	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.564	0.154	1
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.282	0.085	1
Perfluorooctanesulfonic Acid (PFOS)	0.318		ng/g	0.282	0.147	1
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.282	0.076	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/g	0.564	0.324	1
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	1.13	0.338	1
N-Methyl Perfluorooctanesulfonamidoacetic Acid	ND		ng/g	0.564	0.228	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.564	0.053	1
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.564	0.173	1
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.564	0.111	1
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.564	0.095	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.564	0.079	1
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.564	0.231	1
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.564	0.061	1



Parameter		l	Result	Qualifier	Units	RL	MDL	Dilution Factor
Sample Depth:								
Sample Location:	HYANNIS, MA					Field Pre	p:	Not Specified
Complete setient						Eald Dee		
Client ID:	6-24 A (0-1)					Date Rec	eived:	03/03/22
Lab ID:	L2211112-01	R				Date Coll	ected:	03/02/22 09:55
			SAMP	LE RESULTS)			
Project Number:	Not Specified					Report	Date:	03/14/22
							_	
Project Name:	HYA					Lab Nu	mber:	L2211112
						S	Serial_No	0:03142214:56

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Surrogate (Extracted Internal Standard)	% Recovery	Acceptance Qualifier Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	96	61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99	58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104	74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	58	14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	91	66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	93	71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108	78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	105	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	69	20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100	72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107	79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	102	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	86	19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	47	31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	110	61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	72	10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	60	34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104	54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	103	24-159



					S	erial_No	:03142214:56	
Project Name:	HYA				Lab Nur	nber:	L2211112	
Project Number:	Not Specified				Report I	Date:	03/14/22	
•		SAMPL	E RESULTS	5	•			
Lab ID: Client ID: Sample Location:	L2211112-02 6-24 A (1-2) HYANNIS, MA				Date Colle Date Rec Field Prep	ected: eived: o:	03/02/22 09:55 03/03/22 Not Specified	
Sample Depth: Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/11/22 01:38 HT 89%				Extractior Extractior	n Method n Date:	: ALPHA 23528 03/10/22 17:00	
Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor	
Perfluorinated Alkyl	Acids by Isotope Dilution	n - Mansfield	Lab					
Perfluorinated Alkyl	Acids by Isotope Dilution	n - Mansfield	ا Lab	na/a	0.514	0.023	1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F	I Acids by Isotope Dilutio FBA) PFPeA)	n - Mansfield 0.057 ND	l Lab J	ng/g	0.514	0.023	1	
Perfluorinated Alkyl Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic Acid	I Acids by Isotope Dilution FBA) PFPeA) cid (PFBS)	n - Mansfield 0.057 ND ND	J J	ng/g ng/g	0.514 0.514 0.257	0.023 0.047 0.040	1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic A 1H.1H.2H.2H-Perfluorobe:	I Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS)	n - Mansfield 0.057 ND ND ND	J J	ng/g ng/g ng/g	0.514 0.514 0.257 1.03	0.023 0.047 0.040 0.066	1 1 1 1	
Perfluorinated Alkyl Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic Acid 1H,1H,2H,2H-Perfluorohe: Perfluorohexanoic Acid (P	I Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA)	n - Mansfield 0.057 ND ND ND 0.068	J J	ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514	0.023 0.047 0.040 0.066 0.054	1 1 1 1 1 1	
Perfluorinated Alkyl Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic Acid (F Perfluorobutanesulfonic Acid (P Perfluorohexanoic Acid (P Perfluoropentanesulfonic Acid (P	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS)	n - Mansfield 0.057 ND ND ND 0.068 ND	J J	ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03	0.023 0.047 0.040 0.066 0.054 0.086	1 1 1 1 1 1 1	
Perfluorinated Alkyl Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic Ar 1H,1H,2H,2H-Perfluorohe: Perfluorohexanoic Acid (P Perfluoropentanesulfonic A Perfluoroheotanoic Acid (F	I Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA)	n - Mansfield 0.057 ND ND ND 0.068 ND ND	J J	ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046	1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (F Perfluorobutanesulfonic Acid (P Perfluorobutanesulfonic Acid (P Perfluoropentanesulfonic A Perfluoropentanesulfonic Acid (F Perfluorobeptanoic Acid (F Perfluorobeptanoic Acid (F	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) acid (PFHxS)	n - Mansfield 0.057 ND ND 0.068 ND ND ND ND	J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.062	1 1 1 1 1 1 1 1 1 1	
Perfluorinated Alkyl Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (Pf Perfluorobutanesulfonic Ar 1H,1H,2H,2H-Perfluorobe: Perfluorobexanoic Acid (P Perfluorobeptanoic Acid (F Perfluorobeptanoic Acid (F Perfluorobexanesulfonic A Perfluorobexanesulfonic A Perfluorobexanesulfonic A	I Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) acid (PFHxS) FOA)	n - Mansfield 0.057 ND ND 0.068 ND ND ND 0.115	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043	1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (Ff Perfluorobutanesulfonic Acid (Ff Perfluorobutanesulfonic Acid (Pf Perfluoropentanesulfonic Acid (Ff Perfluorohexanesulfonic Acid (Pf Perfluorohexanesulfonic Acid (Pf 1H,1H,2H,2H-Perfluorooct	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) Acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS)	n - Mansfield 0.057 ND ND 0.068 ND ND ND 0.115 ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.257 0.514	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043 0.184	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluorobutanesulfonic Acid 1H,1H,2H,2H-Perfluorobe: Perfluorobexanoic Acid (P Perfluorobeptanoic Acid (F Perfluorobeptanoic Acid (F Perfluorobeptanoic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluorobeptanesulfonic A	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS)	n - Mansfield 0.057 ND ND 0.068 ND ND ND 0.115 ND ND ND ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.257 0.514	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043 0.184 0.140	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (Pf Perfluorobutanesulfonic Acid (P Perfluorobutanesulfonic Acid (P Perfluorohexanoic Acid (P Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluoroctanoic Acid (Pf 1H,1H,2H,2H-Perfluoroct Perfluoroheptanesulfonic A Perfluoroheptanesulfonic A	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) Acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) PFNA)	n - Mansfield 0.057 ND ND 0.068 ND ND ND 0.115 ND ND ND ND ND ND ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.257 0.514 0.514 0.514	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.062 0.043 0.043 0.184 0.140	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluorobutanesulfonic Acid (F Perfluorobutanesulfonic Acid (F Perfluorobutanesulfonic Acid (P Perfluorohexanoic Acid (P Perfluoroheptanoic Acid (F Perfluoroheptanoic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluoroheptanesulfonic A Perfluoroheptanesulfonic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluoroheptanesulfonic Acid (P	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) PFNA) cid (PFOS)	n - Mansfield 0.057 ND ND 0.068 ND ND 0.115 ND 0.115 ND 0.115 ND 0.135	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.514 0.514 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043 0.184 0.140 0.077 0.134	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (Pf Perfluoropentanoic Acid (P Perfluorobutanesulfonic A Perfluorohexanoic Acid (P Perfluorohexanosulfonic A Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluoroheptanosulfonic A Perfluoroheptanosulfonic A Perfluoroheptanesulfonic A Perfluoroheptanesulfonic A Perfluoroheptanesulfonic A Perfluoroheptanesulfonic A	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) Acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) PFNA) cid (PFOS) FDA)	n - Mansfield 0.057 ND ND 0.068 ND ND 0.115 ND 0.115 ND 0.115 ND 0.361 ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.514 0.514 0.514 0.257 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.062 0.043 0.184 0.140 0.077 0.134 0.069	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluorobutanesulfonic Acid 1H,1H,2H,2H-Perfluorobe: Perfluorobexanoic Acid (P Perfluorobexanoic Acid (P Perfluorobeptanoic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A Perfluorobeptanesulfonic A	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) FNA) cid (PFOS) FDA) canesulfonic Acid (8:2FTS)	n - Mansfield 0.057 ND ND 0.068 ND ND 0.115 ND 0.115 ND 0.115 ND 0.361 ND ND 0.361 ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.514 0.514 0.257 0.257 0.257 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043 0.184 0.140 0.077 0.134 0.069 0.295	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluoropentanoic Acid (Pf Perfluoropentanoic Acid (Pf Perfluorobutanesulfonic A Perfluorohexanoic Acid (P Perfluorohexanoic Acid (P Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluorohexanesulfonic A Perfluoroheptanoic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluorononanoic Acid (P Perfluorononanoic Acid (P 1H,1H,2H,2H-Perfluoroder Perfluorononanoic Acid (P	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) Acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) FNA) cid (PFOS) FDA) canesulfonic Acid (8:2FTS) Acid (PFNS)	n - Mansfield 0.057 ND ND ND 0.068 ND 0.068 ND 0.115 ND 0.115 ND 0.115 ND 0.361 ND ND 0.361 ND ND ND ND ND ND ND ND ND ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.514 0.514 0.257 0.257 0.257 0.257 0.257 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.062 0.043 0.184 0.140 0.077 0.134 0.069 0.295 0.307	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluorobutanoic Acid (Pf Perfluorobutanesulfonic Acid 1H,1H,2H,2H-Perfluorobez Perfluorobexanoic Acid (P Perfluorobeptanoic Acid (P Perfluorobeptanoic Acid (Pf 1H,1H,2H,2H-Perfluorooct Perfluorobeptanesulfonic Acid (P Perfluorobeptanesulfonic Acid (P Perfluorobeptanesulfoni	Acids by Isotope Dilution FBA) PFPeA) cid (PFBS) xanesulfonic Acid (4:2FTS) FHxA) Acid (PFPeS) PFHpA) Acid (PFHxS) FOA) tanesulfonic Acid (6:2FTS) Acid (PFHpS) FNA) cid (PFOS) FDA) canesulfonic Acid (8:2FTS) Acid (PFNS) sulfonamidoacetic Acid	n - Mansfield 0.057 ND ND ND 0.068 ND 0.068 ND 0.115 ND 0.115 ND 0.115 ND 0.361 ND 0.361 ND ND ND ND ND ND ND ND ND ND	J J J	ng/g ng/g ng/g ng/g ng/g ng/g ng/g ng/g	0.514 0.514 0.257 1.03 0.514 1.03 0.257 0.257 0.257 0.257 0.514 0.257 0.257 0.257 0.257 0.257 0.257 0.257	0.023 0.047 0.040 0.066 0.054 0.086 0.046 0.046 0.062 0.043 0.184 0.140 0.077 0.134 0.069 0.295 0.307 0.207	1 1 1 1 1 1 1 1 1 1 1 1 1 1	

ND

ND

ND

ND

ND

0.130

ng/g

ng/g

ng/g

ng/g

ng/g

ng/g

J

0.514

0.514

0.514

0.514

0.514

0.514

0.157

0.101

0.087

0.072

0.210

0.056



1

1

1

1

1

1

Perfluorodecanesulfonic Acid (PFDS)

Perfluorooctanesulfonamide (FOSA)

Perfluorotridecanoic Acid (PFTrDA)

Perfluorotetradecanoic Acid (PFTA)

N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA) Perfluorododecanoic Acid (PFDoA)

Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor	
Sample Depth:								
Sample Location:	HYANNIS, MA				Field Pre	p:	Not Specified	
Client ID:	6-24 A (1-2)				Date Rec	ceived:	03/03/22	
Lab ID:	L2211112-02				Date Col	lected:	03/02/22 09:55	
		SAMP	LE RESULT	5				
Project Number:	Not Specified				Report	Date:	03/14/22	
Project Name:	HYA				Lab Nu	mber:	L2211112	
					ç	Serial_No	0:03142214:56	

Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab

Recovery	Qualifier	Criteria
86		61-135
93		58-150
96		74-139
63		14-167
97		66-128
87		71-129
105		78-139
93		75-130
69		20-154
125		72-140
101		79-136
96		75-130
75		19-175
19	Q	31-134
96		61-155
80		10-117
27	Q	34-137
91		54-150
89		24-159
	Recovery 86 93 96 63 97 87 105 93 69 125 101 96 75 19 96 80 27 91 89	Recovery Qualifier 86 93 93 96 63 97 63 97 87 0 105 93 69 125 101 96 75 0 96 0 97 Q 96 0 97 0 98 0



					Serial_No:03142214:56			
Project Name:	HYA				Lab Num	ber:	L2211112	
Project Number:	Not Specified				Report D	ate:	03/14/22	
-		SAMPLE	E RESULTS		-			
Lab ID: Client ID: Sample Location:	L2211112-03 6-24 B (0-1) HYANNIS, MA				Date Collec Date Recei Field Prep:	cted: ived:	03/02/22 12:15 03/03/22 Not Specified	
Sample Depth: Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/11/22 02:11 HT 88%				Extraction Extraction	Method: Date:	ALPHA 23528 03/10/22 17:00	
Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor	
Perfluorinated Alkyl	Acids by Isotope Dilution	- Mansfield	Lab					
Perfluorobutanoic Acid (Pf	FBA)	0.133	J	ng/g	0.530	0.024	1	
Perfluoropentanoic Acid (F	PFPeA)	0.108	J	ng/g	0.530	0.049	1	
Perfluorobutanesulfonic A	cid (PFBS)	ND		ng/g	0.265	0.041	1	
1H,1H,2H,2H-Perfluorohe	xanesulfonic Acid (4:2FTS)	ND		ng/g	1.06	0.068	1	
Perfluorohexanoic Acid (P	FHxA)	0.069	JF	ng/g	0.530	0.056	1	
Perfluoropentanesulfonic	Acid (PFPeS)	ND		ng/g	1.06	0.089	1	
Perfluoroheptanoic Acid (F	PFHpA)	0.068	J	ng/g	0.265	0.048	1	
Perfluorohexanesulfonic A	.cid (PFHxS)	ND		ng/g	0.265	0.064	1	
Perfluorooctanoic Acid (PF	FOA)	0.136	J	ng/g	0.265	0.044	1	
1H,1H,2H,2H-Perfluorooct	anesulfonic Acid (6:2FTS)	ND		ng/g	0.530	0.190	1	
Perfluoroheptanesulfonic	Acid (PFHpS)	ND		ng/g	0.530	0.145	1	
Perfluorononanoic Acid (P	FNA)	0.115	J	ng/g	0.265	0.079	1	
Perfluorooctanesulfonic A	cid (PFOS)	0.471	F	ng/g	0.265	0.138	1	
Perfluorodecanoic Acid (P	FDA)	ND		ng/g	0.265	0.071	1	
1H,1H,2H,2H-Perfluorode	canesulfonic Acid (8:2FTS)	ND		ng/g	0.530	0.304	1	
Perfluorononanesulfonic A	cid (PFNS)	ND		ng/g	1.06	0.317	1	
N-Methyl Perfluorooctanes	sulfonamidoacetic Acid	ND		ng/g	0.530	0.213	1	
(NMEFOSAA) Perfluoroundecanoic Acid	(PFUnA)	0.072	J	ng/g	0.530	0.050	1	
Perfluorodecanesulfonic A	cid (PFDS)	ND		ng/g	0.530	0.162	1	
Perfluorooctanesulfonamic	de (FOSA)	ND		ng/g	0.530	0.104	1	
N-Ethyl Perfluorooctanesu	Ifonamidoacetic Acid	ND		ng/g	0.530	0.090	1	
Perfluorododecanoic Acid	(PFDoA)	ND		ng/g	0.530	0.074	1	

ND

0.140



1

1

0.530

0.530

ng/g

ng/g

J

0.217

0.057

Perfluorotridecanoic Acid (PFTrDA)

Perfluorotetradecanoic Acid (PFTA)

					Seria	al_No	03142214:56	
Project Name:	HYA				Lab Numb	er:	L2211112	
Project Number:	Not Specified				Report Dat	e:	03/14/22	
		SAMP	LE RESULTS	5				
Lab ID:	L2211112-03				Date Collect	ed:	03/02/22 12:15	
Client ID:	6-24 B (0-1)				Date Receive	ed:	03/03/22	
Sample Location:	HYANNIS, 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)	88		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	64		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	99		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	85		71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	92		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	73		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	124		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	71		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	24	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	99		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	77		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	26	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	97		54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	88		24-159	



					S	erial_No	:03142214:56
Project Name:	HYA				Lab Nur	nber:	L2211112
Project Number:	Not Specified				Report I	Date:	03/14/22
-	•	SAMPL	E RESULTS		-		
Lab ID: Client ID: Sample Location:	L2211112-04 6-24 B (1-2) HYANNIS, MA				Date Colle Date Rec Field Prep	ected: eived: o:	03/02/22 12:15 03/03/22 Not Specified
Sample Depth: Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/11/22 02:28 HT 85%				Extractior Extractior	n Method n Date:	: ALPHA 23528 03/10/22 17:00
Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl	Acids by Isotope Dilution	- Mansfield	Lab				
Perfluorobutanoic Acid (Pf	FBA)	0.066	J	ng/g	0.548	0.025	1
Perfluoropentanoic Acid (F	PFPeA)	0.069	J	ng/g	0.548	0.050	1
Perfluorobutanesulfonic A	cid (PFBS)	ND		ng/g	0.274	0.043	1
1H,1H,2H,2H-Perfluorohez	xanesulfonic Acid (4:2FTS)	ND		ng/g	1.10	0.071	1
Perfluorohexanoic Acid (P	FHxA)	ND		ng/g	0.548	0.058	1
Perfluoropentanesulfonic	Acid (PFPeS)	ND		ng/g	1.10	0.092	1
Perfluoroheptanoic Acid (F	PFHpA)	ND		ng/g	0.274	0.049	1
Perfluorohexanesulfonic A	cid (PFHxS)	ND		ng/g	0.274	0.066	1
Perfluorooctanoic Acid (PF	FOA)	0.106	J	ng/g	0.274	0.046	1
1H,1H,2H,2H-Perfluorooct	anesulfonic Acid (6:2FTS)	ND		ng/g	0.548	0.197	1
Perfluoroheptanesulfonic	Acid (PFHpS)	ND		ng/g	0.548	0.150	1
Perfluorononanoic Acid (P	FNA)	ND		ng/g	0.274	0.082	1
Perfluorooctanesulfonic Ad	cid (PFOS)	0.196	J	ng/g	0.274	0.142	1
Perfluorodecanoic Acid (P	FDA)	ND		ng/g	0.274	0.073	1
1H,1H,2H,2H-Perfluorode	canesulfonic Acid (8:2FTS)	ND		ng/g	0.548	0.314	1
Perfluorononanesulfonic A	.cid (PFNS)	ND		ng/g	1.10	0.328	1
N-Methyl Perfluorooctanes	sulfonamidoacetic Acid	ND		ng/g	0.548	0.221	1
Perfluoroundecanoic Acid	(PFUnA)	ND		ng/g	0.548	0.051	1
Perfluorodecanesulfonic A	cid (PFDS)	ND		ng/g	0.548	0.168	1
Perfluorooctanesulfonamic	de (FOSA)	ND		ng/g	0.548	0.107	1
N-Ethyl Perfluorooctanesu	Ifonamidoacetic Acid	ND		ng/g	0.548	0.093	1
Perfluorododecanoic Acid	(PFDoA)	ND		ng/g	0.548	0.077	1

ND

0.113



1

1

0.548

0.548

ng/g

ng/g

ng/g

J

0.224

0.059

Perfluorotridecanoic Acid (PFTrDA)

Perfluorotetradecanoic Acid (PFTA)

					S	erial_No	0:03142214:56
Project Name:	HYA				Lab Nun	nber:	L2211112
Project Number:	Not Specified				Report I	Date:	03/14/22
		SAMP	LE RESULTS	5			
Lab ID:	L2211112-04				Date Colle	ected:	03/02/22 12:15
Client ID:	6-24 B (1-2)				Date Rece	eived:	03/03/22
Sample Location:	HYANNIS, 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)	74		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	80		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	89		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	53		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	85		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	76		71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	96		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	81		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	62		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	107		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	92		79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	85		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	63		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	7	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	86		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	81		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	9	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	83		54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	77		24-159	



Lab Number:

L2211112 **Report Date:** 03/14/22

Project Name: HYA **Project Number:**

Not Specified

Method Blank Analysis Batch Quality Control

Analytical Method: 134,LCMSMS-ID Analytical Date: 03/12/22 09:02 Analyst: RS

Extraction Method: ALPHA 23528 03/10/22 17:00 Extraction Date:

Parameter	Result	Qualifier I	Jnits	RL	MDL	
Perfluorinated Alkyl Acids by Isotope R	Dilution	- Mansfield La	b for	sample(s):	01-04 Batc	h: WG1614223-
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.500	0.023	
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.500	0.046	j
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.250	0.039	
1H,1H,2H,2H-Perfluorohexanesulfonic Acia (4:2FTS)	d ND		ng/g	1.00	0.065	;
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.500	0.053	,
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	1.00	0.084	
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.250	0.045	; ;
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.250	0.061	
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.250	0.042	2
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.500	0.180	
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.500	0.136	i
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.250	0.075	
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.250	0.130	
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.250	0.067	
1H,1H,2H,2H-Perfluorodecanesulfonic Acia (8:2FTS)	d ND		ng/g	0.500	0.287	
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	1.00	0.299	
N-Methyl Perfluorooctanesulfonamidoaceti Acid (NMeFOSAA)	c ND		ng/g	0.500	0.202	
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.500	0.047	,
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.500	0.153	;
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.500	0.098	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.500	0.085	
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.500	0.070	
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.500	0.204	
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.500	0.054	



Brainat Nama			Lab Number	10044440
Project Name.	нта		Lab Number.	LZZTTTTZ
Project Number:	Not Specified		Report Date:	03/14/22
		Method Blank Analysis Batch Quality Control		
Analytical Method:	134,LCMSMS-ID		Extraction Method:	ALPHA 23528

/ lindiy dour moundur			/ LEI 1 // LOOLO
Analytical Date:	03/12/22 09:02	Extraction Date:	03/10/22 17:00
Analyst:	RS		

Parameter	Result	Qualifier	Units	RL		MDL	
Perfluorinated Alkyl Acids by Isotope	e Dilution	- Mansfield L	ab for s	sample(s):	01-04	Batch:	WG1614223-1
R							

Surrogate (Extracted Internal Standard)	%Recovery	Acceptance Qualifier Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101	61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104	58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104	74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	54	14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94	66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96	71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	110	78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	107	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	64	20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103	72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105	79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66	19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77	31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	113	61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	82	10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	85	34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105	54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100	24-159



Lab Control Sample Analysis Batch Quality Control

Lab Number: L2211112

Project Number: Not Specified

HYA

Project Name:

Report Date: 03/14/22

	LCS		LCSD		%Recovery			RPD	
Parameter	%Recovery	Qual	%Recovery	Qual	Limits	RPD	Qual	Limits	
Perfluorinated Alkyl Acids by Isotope Dilution	- Mansfield Lab	Associated	sample(s): 01-04	Batch:	WG1614223-2				
Perfluorobutanoic Acid (PFBA)	86		-		71-135	-		30	
Perfluoropentanoic Acid (PFPeA)	87		-		69-132	-		30	
Perfluorobutanesulfonic Acid (PFBS)	86		-		72-128	-		30	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	91		-		62-145	-		30	
Perfluorohexanoic Acid (PFHxA)	86		-		70-132	-		30	
Perfluoropentanesulfonic Acid (PFPeS)	90		-		73-123	-		30	
Perfluoroheptanoic Acid (PFHpA)	87		-		71-131	-		30	
Perfluorohexanesulfonic Acid (PFHxS)	97		-		67-130	-		30	
Perfluorooctanoic Acid (PFOA)	82		-		69-133	-		30	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	99		-		64-140	-		30	
Perfluoroheptanesulfonic Acid (PFHpS)	95		-		70-132	-		30	
Perfluorononanoic Acid (PFNA)	88		-		72-129	-		30	
Perfluorooctanesulfonic Acid (PFOS)	96		-		68-136	-		30	
Perfluorodecanoic Acid (PFDA)	87		-		69-133	-		30	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	102		-		65-137	-		30	
Perfluorononanesulfonic Acid (PFNS)	100		-		69-125	-		30	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	91		-		63-144	-		30	
Perfluoroundecanoic Acid (PFUnA)	83		-		64-136	-		30	
Perfluorodecanesulfonic Acid (PFDS)	93		-		59-134	-		30	
Perfluorooctanesulfonamide (FOSA)	82		-		67-137	-		30	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	92		-		61-139	-		30	
Perfluorododecanoic Acid (PFDoA)	89		-		69-135	-		30	



Lab Control Sample Analysis Batch Quality Control

Lab Number: L2211112

Project Number: Not Specified

HYA

Project Name:

Report Date: 03/14/22

	LCS		LCSD		%Recovery			RPD	
Parameter	%Recovery	Qual	%Recovery	Qual	Limits	RPD	Qual	Limits	
Perfluorinated Alkyl Acids by Isotope Dilution	Mansfield Lab	Associated s	ample(s): 01-04	Batch:	WG1614223-2				
Perfluorotridecanoic Acid (PFTrDA)	102		-		66-139	-		30	
Perfluorotetradecanoic Acid (PFTA)	87		-		69-133	-		30	

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPEBA)	98				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99				58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102				74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	54				14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	95				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	66				20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96				79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66				19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	74				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	110				61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	89				10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80				34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	104				24-159



ALPHA

Matrix Spike Analysis Batch Quality Control

Batch Qua

Project Number: Not Specified

HYA

Project Name:

 Lab Number:
 L2211112

 Report Date:
 03/14/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery Qu	Recovery Ial Limits	RPD Qual	RPD Limits
Perfluorinated Alkyl Acids by Is A (0-1)	otope Dilution	- Mansfield	Lab Assoc	ciated sample(s):	01-04	QC Batch	ID: WG1614223-3	QC Sample:	L2211112-01	Client ID: 6-24
Perfluorobutanoic Acid (PFBA)	0.084J	5.67	4.97	86		-	-	71-135	-	30
Perfluoropentanoic Acid (PFPeA)	0.055J	5.67	4.89	85		-	-	69-132	-	30
Perfluorobutanesulfonic Acid (PFBS)	ND	5.04	4.40	87		-	-	72-128	-	30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	5.31	5.00	94		-	-	62-145	-	30
Perfluorohexanoic Acid (PFHxA)	ND	5.67	4.95	87		-	-	70-132	-	30
Perfluoropentanesulfonic Acid (PFPeS)	ND	5.33	4.82	90		-	-	73-123	-	30
Perfluoroheptanoic Acid (PFHpA)	ND	5.67	5.00	88		-	-	71-131	-	30
Perfluorohexanesulfonic Acid (PFHxS)	ND	5.18	5.11	99		-	-	67-130	-	30
Perfluorooctanoic Acid (PFOA)	ND	5.67	4.70	83		-	-	69-133	-	30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	5.4	5.14	95		-	-	64-140	-	30
Perfluoroheptanesulfonic Acid (PEHpS)	ND	5.41	5.03	93		-	-	70-132	-	30
Perfluorononanoic Acid (PFNA)	ND	5.67	5.25	93		-	-	72-129	-	30
Perfluorooctanesulfonic Acid (PFOS)	0.318	5.26	5.34	95		-	-	68-136	-	30
Perfluorodecanoic Acid (PFDA)	ND	5.67	4.88	86		-	-	69-133	-	30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	5.44	5.44	100		-	-	65-137	-	30
Perfluorononanesulfonic Acid (PFNS)	ND	5.46	5.69	104		-	-	69-125	-	30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeEOSAA)	ND	5.67	4.60	81		-	-	63-144	-	30
Perfluoroundecanoic Acid (PFUnA)	ND	5.67	5.00	88		-	-	64-136	-	30
Perfluorodecanesulfonic Acid (PFDS)	ND	5.48	5.60	102		-	-	59-134	-	30
Perfluorooctanesulfonamide (FOSA)	ND	5.67	4.65	82		-	-	67-137	-	30
N-Ethyl Perfluorooctanesulfonamidoacetic	ND	5.67	4.85	86		-	-	61-139	-	30
Acid (NEtFOSAA) Perfluorododecanoic Acid (PFDoA)	ND	5.67	5.15	91		-	-	69-135	-	30



Matrix Spike Analysis

Project Name:	НҮА	Batch Quality Control	Lab Number:	L2211112
Project Number:	Not Specified		Report Date:	03/14/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery	Qua	Recovery Limits	RPD G	Qual	RPD Limits	
Perfluorinated Alkyl Acids by A (0-1)	Isotope Dilutio	n - Mansfield	Lab Associ	ated sample(s):	01-04	QC Batch	ID: WG1614223	3-3	QC Sample:	L2211112	-01	Client ID: 6-2	4
Perfluorotridecanoic Acid (PFTrDA)	ND	5.67	5.50	97		-	-		66-139	-		30	
Perfluorotetradecanoic Acid (PFTA)	ND	5.67	4.74	84		-	-		69-133	-		30	

	MS		MS	SD	Acceptance	
Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	% Recovery	Qualifier	Criteria	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	78				19-175	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	57				14-167	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	71				20-154	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63				34-137	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	49				31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109				61-155	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103				75-130	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88				66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90				71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102				78-139	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105				54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108				24-159	
Perfluoro[13C4]Butanoic Acid (MPFBA)	95				61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97				58-150	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	78				10-117	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95				79-136	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99				75-130	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96				72-140	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				74-139	



Lab Duplicate Analysis Batch Quality Control

Project Number: Not Specified

HYA

Project Name:

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution ID: 6-24 A (1-2)	- Mansfield Lab Associated sa	ample(s): 01-04 QC Ba	tch ID: WG161	4223-4	QC Sample:	L2211112-02 Client
Perfluorobutanoic Acid (PFBA)	0.057J	0.061J	ng/g	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/g	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	0.068J	0.081J	ng/g	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	0.115J	0.138J	ng/g	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2ETS)	ND	ND	ng/g	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	0.361	0.425	ng/g	16		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2ETS)	ND	ND	ng/g	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/g	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	ND	ND	ng/g	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/g	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/g	NC		30



Lab Duplicate Analysis Batch Quality Control

Project Number: Not Specified

HYA

Project Name:

Parameter	Native Sample	Duplicate Sample	e Units	RPD	RPD Qual Limits	
Perfluorinated Alkyl Acids by Isotope Dilution - ID: 6-24 A (1-2)	Mansfield Lab Associated sa	mple(s): 01-04 QC	Batch ID: WG161	14223-4 Q	C Sample: L2211112-02 Clie	ent
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND	ND	ng/g	NC	30	
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/g	NC	30	
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/g	NC	30	
Perfluorotetradecanoic Acid (PFTA)	0.130J	0.153J	ng/g	NC	30	

Surrogate (Extracted Internal Standard)	%Pecoverv	Qualifier	%Pecoverv	Qualifier	Acceptance Criteria	
	/intecovery	Quaimer	/orcecovery	Quanner		
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		86		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		93		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		98		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	63		63		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		96		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		86		71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		105		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		94		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	69		74		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	125		124		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		103		79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		97		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75		73		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	19	Q	18	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		101		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	80		83		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	27	Q	20	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	91		100		54-150	



Project Name: Project Number:	HYA Not Specified		Lab Duplicate Al Batch Quality Co	Lab Number: Report Date:		L2211112 03/14/22		
Parameter		Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
Perfluorinated Alkyl Acid ID: 6-24 A (1-2)	ls by Isotope Dilution - Mar	sfield Lab Associated sa	ample(s): 01-04 QC Ba	atch ID: WG16	614223-4 (QC Sample: I	L2211112-(2 Client
Surrogata (E	Extracted Internal Standa	(d)			Qualifier	Acceptance		

- -

Surrogate (Extracted Internal Standard)	%Recovery Qualifier	%Recovery Qualifier	Criteria	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89	90	24-159	



INORGANICS & MISCELLANEOUS



Project Name:	HYA
Project Number:	Not Specified

Lab ID:	L2211112-0	1					Date (Collected:	03/02/22 09:55	5
Client ID:	6-24 A (0-1)	6-24 A (0-1)					Date I	Received:	03/03/22	
Sample Location:	HYANNIS, M	AN					Field	Prep: I	Not Specified	
Sample Depth:										
Matrix:	Soil									
Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mar	nsfield Lab									
Solids, Total	86.2		%	0.100	0.100	1	-	03/04/22 14:29	9 121,2540G	AL



Project Name:	HYA
Project Number:	Not Specified

Lab ID: Client ID: Sample Location:	L2211112-02 6-24 A (1-2) HYANNIS, MA					Date (Date I Field I	Collected: Received: Prep:	03/02/22 09:55 03/03/22 Not Specified	5	
Sample Depth: Matrix:	Soil					Dilution	Data	Dete	Analytical	
Parameter	Result	Qualifier	Units	RL	MDL	Factor	Prepared	Analyzed	Method	Analyst
General Chemistry - Mai	nsfield Lab									
Solids, Total	88.9		%	0.100	0.100	1	-	03/04/22 14:2	9 121,2540G	AL



Serial No:03142214:5	56
----------------------	----

Project Name:	HYA
Project Number:	Not Specified

Lab ID: Client ID: Sample Location:	L2211112-03 6-24 B (0-1) HYANNIS, MA					Date (Date I Field I	Collected: Received: Prep:	03/02/22 12:15 03/03/22 Not Specified	5	
Sample Depth: Matrix:	Soil						- /			
Parameter	Result	Qualifier	Units	RL	MDL	Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mar	nsfield Lab									
Solids, Total	87.6		%	0.100	0.100	1	-	03/04/22 14:29	9 121,2540G	AL



Serial No:03142214:56	6
-----------------------	---

Project Name:	HYA
Project Number:	Not Specified

Lab ID: Client ID: Sample Location:	L2211112-04 6-24 B (1-2) HYANNIS, MA					Date (Date I Field	Collected: (Received: (Prep: I	03/02/22 12:15 03/03/22 Not Specified	5	
Sample Depth: Matrix:	Soil					Dilution	Date	Date	Analvtical	
Parameter	Result	Qualifier	Units	RL	MDL	Factor	Prepared	Analyzed	Method	Analyst
General Chemistry - Mar	nsfield Lab									
Solids, Total	84.7		%	0.100	0.100	1	-	03/04/22 14:29) 121,2540G	AL



Project Name: HYA Project Number: Not Specified

Serial_No:03142214:56 Lab Number: L2211112 *Report Date:* 03/14/22

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container Info	rmation		Initial	Final	Temp			Frozen	
Container ID	Container Type	Cooler	pН	pН	deg C	Pres	Seal	Date/Time	Analysis(*)
L2211112-01A	Plastic 8oz unpreserved	А	NA		4.8	Y	Absent		A2-537-ISOTOPE(14)
L2211112-01B	Plastic 2oz unpreserved for TS	А	NA		4.8	Y	Absent		A2-TS(7)
L2211112-02A	Plastic 8oz unpreserved	А	NA		4.8	Y	Absent		A2-537-ISOTOPE(14)
L2211112-02B	Plastic 2oz unpreserved for TS	А	NA		4.8	Y	Absent		A2-TS(7)
L2211112-03A	Plastic 8oz unpreserved	А	NA		4.8	Y	Absent		A2-537-ISOTOPE(14)
L2211112-03B	Plastic 2oz unpreserved for TS	А	NA		4.8	Y	Absent		A2-TS(7)
L2211112-04A	Plastic 8oz unpreserved	А	NA		4.8	Y	Absent		A2-537-ISOTOPE(14)
L2211112-04B	Plastic 2oz unpreserved for TS	А	NA		4.8	Y	Absent		A2-TS(7)



Project Name: HYA

Project Number:

Serial_No:03142214:56 Lab Number: L2211112 Report Date: 03/14/22

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		
2,3,3,3-1 etranuoro-2-[1,1,2,2,3,3,3-Heptanuoropropoxy]-Propanoic Acid	HFPO-DA	13252-13-6
	ADONA	919005-14-4
CHLORO-PERFLUOROALKYL SULFONIC ACIDS		702054 00 0
Chlorobovodecofluero 2 Oveneno 1 Sulfenio Acid		763051-92-9
	901-2230113	/56426-58-1
PERFLUOROETHER SULFONIC ACIDS (PFESAs)	55550	
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: HYA

Project Number: Not Specified

Serial_No:03142214:56

Lab Number: L2211112

Report Date: 03/14/22

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 are reported when applicable (D) Departed formed and a set of the dilution of the dil		
EDL	 From dilutions, concentrations or moisture content, where applicable. (DoD report formats only.) 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:	НҮА	Lab Number:	L2211112
Project Number:	Not Specified	Report Date:	03/14/22

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.

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 Waterpreserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'. 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(a)+(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 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.

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.)

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 concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the 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 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-Air-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 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.

Report Format: DU Report with 'J' Qualifiers



Serial_No:03142214:56

Project Name:	HYA	Lab Number:	L2211112
Project Number:	Not Specified	Report Date:	03/14/22

Data Qualifiers

- 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: HYA Project Number: Not Specified

 Lab Number:
 L2211112

 Report Date:
 03/14/22

REFERENCES

- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 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: <u>NPW</u>: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; <u>SCM</u>: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: <u>NPW:</u> Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; <u>SCM</u>: Dimethylnaphthalene,1,4-Diphenylhydrazine. **SM4500**: <u>NPW</u>: Amenable Cyanide; <u>SCM</u>: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility

SM 2540D: TSS

EPA 8082A: <u>NPW</u>: 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, SM4500CI-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 Toxanbene Aldrin alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin DDD, DDE, DDT, Endosulfan I, Endosulfan II

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:03142214:56

AU2113	CHAIN O	F CU	STO	ОҮ на	GE	OF	Date	Rec'd in	n Lab:	313	122		A	LPH	A Job #: ++++ Capilila
WESTBORO, MA TEL: 508-898-9220 FAX: 508-898-9193	MANSFIELD, MA TEL: 508-822-8300 FAX: 508-822-3288	Project N	Informati ^{Jame:} HY	on A			Rep	FAX	ormati	on - Dat	a Delive	erables		Billing Same	as Client info PO #:
Client: Horsha Address: GO R Sand Wich Phone: 781 - Fax: Email: OmaSS These samples ha Other Project S	Witten Group Witten Group MA 02563 243-1527 GRANSKY WITTO COM We been previously analyzed by Alpha Specific Requirements/Com	Project I Project # Project M ALPHA Turn-/ Date Du Date Du	Around Tin ard are: etection Li	Yann Yan RUSH kontro mits:	S, mi Mass continued # pre-so Time:	A CA sportuned!	State	Ilatory IFed Pr MCP	Requi	rements	Crit	Limits	64	-1	SAMPLE HANDLING Filtration Done Not needed Lab to do Preservation T
ALPHA Lab ID (Lab Use Only)	Sample ID		Colle	ection Time	Sample Matrix	Sampler's Initials	Far	\$ /		11	//		11		Characteristic Comments S
11112 - 21	10-24A (0-1)		3/2/22	9:55	S	56	×			-					
-07	6-24A (1-2))	3/2/22	12.15	S	CA	×								
-04	6-24 B(1-2)	3/2/22	12:15	S	CA	×								
F°Páge 38 of 38	DCT-07)	Relinqu	iished By		Cont P Da 3/3 3/3/2 3-3	tainer Type reservative IIe/Time IIO:00 22 /30 22 15:00	A	CAL	Receive	d By:	A 44 3 23	1 1 3/3 2	Date/Til 100 135	me 50 1500	Please print clearly, legibly and com- pletely. 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.



ANALYTICAL REPORT

Lab Number:	L2211695
Client:	Horseley & Witten, Inc.
	Sextant Hill Office Park
	90 Route 6A
	Sandwich, MA 02563
ATTN:	Brian Massa
Phone:	(508) 833-6600
Project Name:	НҮА
Project Number:	Not Specified
Report Date:	03/14/22

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



Serial_No:03142214:55

Project Name:HYAProject Number:Not Specified

 Lab Number:
 L2211695

 Report Date:
 03/14/22

Alpha Sample ID	Client ID	Matrix	Sample Location	Collection Date/Time	Receive Date
L2211695-01	6-24 C (0-1)	SOIL	HYANNIS, MA	03/04/22 09:50	03/07/22
L2211695-02	6-24 C (1-2)	SOIL	HYANNIS, MA	03/04/22 09:50	03/07/22



Project Name:HYAProject Number:Not Specified

 Lab Number:
 L2211695

 Report Date:
 03/14/22

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An af	firmative response to questions A through F is required for "Presumptive Certainty" status	
A	Were all samples received in a condition consistent with those described on the Chain-of- Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
В	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
С	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	N/A
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES
A res	ponse to questions G, H and I is required for "Presumptive Certainty" status	
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	YES
н	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES

I Were results reported for the complete analyte list specified in the selected CAM protocol(s)? YES

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.



Project Name: HYA Project Number: Not Specified
 Lab Number:
 L2211695

 Report Date:
 03/14/22

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: HYA Project Number: Not Specified
 Lab Number:
 L2211695

 Report Date:
 03/14/22

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.

MCP Related Narratives

Report Submission

All MCP required questions were answered with affirmative responses; therefore, there are no relevant protocol-specific QC and/or performance standard non-conformances to report.

Non MCP Related Narratives

Perfluorinated Alkyl Acids by Isotope Dilution

L2211695-01 and -02: Extracted Internal Standard recoveries were outside the acceptance criteria for individual analytes. Please refer to the surrogate section of the report for details.

WG1614223-1R and WG1614223-2R: The sample was re-analyzed due to QC failures in the original analysis. The results of the re-analysis are reported.

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:

Custen Walker Cristin Walker

Title: Technical Director/Representative

Date: 03/14/22



QC OUTLIER SUMMARY REPORT

Project Name: HYA

Project Number: Not Specified

Lab Number: L2211695

Report Date:

03/14/22

					Recovery/RPD	QC Limits	Associated	Data Quality
Method	Client ID (Native ID)	Lab ID	Parameter	QC Type	(%)	(%)	Samples	Assessment
Perfluorinate	ed Alkyl Acids by Isotope Dilution - N	lansfield Lab						
LCMSMS-ID	6-24 C (0-1)	L2211695-01	Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	Surrogate	76	79-136	-	not applicable
LCMSMS-ID	6-24 C (0-1)	L2211695-01	Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	Surrogate	74	75-130	-	not applicable
LCMSMS-ID	6-24 C (0-1)	L2211695-01	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	21	31-134	-	not applicable
LCMSMS-ID	6-24 C (0-1)	L2211695-01	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	24	34-137	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	Surrogate	66	71-129	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	Perfluoro[13C8]Octanoic Acid (M8PFOA)	Surrogate	70	75-130	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	Surrogate	78	79-136	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	Surrogate	70	75-130	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	7	31-134	-	not applicable
LCMSMS-ID	6-24 C (1-2)	L2211695-02	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	7	34-137	-	not applicable
LCMSMS-ID	Batch QC (L2211112-02)	WG1614223-4	N-Deuteriomethylperfluoro-1- octanesulfonamidoacetic Acid (d3-NMeFOSAA)	Surrogate	18	31-134	-	not applicable
LCMSMS-ID	Batch QC (L2211112-02)	WG1614223-4	N-Deuterioethylperfluoro-1- octanesulfonamidoacetic Acid (d5-NEtFOSAA)	Surrogate	20	34-137	-	not applicable



ORGANICS



SEMIVOLATILES



				Serial_No:03142214:55				
Project Name:	HYA				Lab Nur	nber:	L2211695	
Project Number:	Not Specified				Report I	Date:	03/14/22	
	·	SAMPL	E RESULTS	5				
Lab ID: Client ID: Sample Location:	L2211695-01 6-24 C (0-1) HYANNIS, MA				Date Colle Date Rec Field Prep	ected: eived: o:	03/04/22 09:50 03/07/22 Not Specified	
Sample Depth: Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/11/22 02:44 HT 75%				Extraction Extraction	n Method: n Date:	ALPHA 23528 03/10/22 17:00	
Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor	
Perfluorinated Alkyl	Acids by Isotope Dilution	on - Mansfield	Lab					
Perfluorobutanoic Acid (PF	FBA)	0.091	J	ng/g	0.609	0.028	1	
Perfluoropentanoic Acid (F	PFPeA)	0.065	J	ng/g	0.609	0.056	1	
Perfluorobutanesulfonic A	cid (PFBS)	ND		ng/g	0.304	0.048	1	
1H,1H,2H,2H-Perfluorohe	xanesulfonic Acid (4:2FTS)	ND		ng/g	1.22	0.079	1	
Perfluorohexanoic Acid (P	FHxA)	ND		ng/g	0.609	0.064	1	
Perfluoropentanesulfonic A	Acid (PFPeS)	ND		ng/g	1.22	0.102	1	
Perfluoroheptanoic Acid (F	PFHpA)	ND		ng/g	0.304	0.055	1	
Perfluorohexanesulfonic A	cid (PFHxS)	ND		ng/g	0.304	0.074	1	
Perfluorooctanoic Acid (PF	FOA)	0.058	J	ng/g	0.304	0.051	1	
1H,1H,2H,2H-Perfluorooct	anesulfonic Acid (6:2FTS)	ND		ng/g	0.609	0.219	1	
Perfluoroheptanesulfonic A	Acid (PFHpS)	ND		ng/g	0.609	0.166	1	
Perfluorononanoic Acid (P	FNA)	ND		ng/g	0.304	0.091	1	
Perfluorooctanesulfonic Ac	cid (PFOS)	0.654		ng/g	0.304	0.158	1	
Perfluorodecanoic Acid (P	FDA)	ND		ng/g	0.304	0.082	1	
1H,1H,2H,2H-Perfluorodeo	canesulfonic Acid (8:2FTS)	ND		ng/g	0.609	0.350	1	
Perfluorononanesulfonic A	cid (PFNS)	ND		ng/g	1.22	0.364	1	
N-Methyl Perfluorooctanes	sulfonamidoacetic Acid	ND		ng/g	0.609	0.246	1	
Perfluoroundecanoic Acid	(PFUnA)	0.099	J	ng/g	0.609	0.057	1	
Perfluorodecanesulfonic A	cid (PFDS)	ND		ng/g	0.609	0.186	1	
Perfluorooctanesulfonamic	de (FOSA)	ND		ng/g	0.609	0.119	1	

ND

ND

ND

0.156



1

1

1

1

0.609

0.609

0.609

0.609

ng/g

ng/g

ng/g

ng/g

J

0.103

0.085

0.249

0.066

N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA) Perfluorododecanoic Acid (PFDoA)

Perfluorotridecanoic Acid (PFTrDA)

Perfluorotetradecanoic Acid (PFTA)

					S	erial_No	0:03142214:55	
Project Name:	HYA				Lab Nur	nber:	L2211695	
Project Number: Not Specified					Report	Date:	03/14/22	
		SAMP	LE RESULTS	5				
Lab ID:	L2211695-01				Date Colle	ected:	03/04/22 09:50	
Client ID:	6-24 C (0-1)				Date Rec	eived:	03/07/22	
Sample Location:	HYANNIS, MA				Field Prep	D :	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		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	79		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	81		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	53		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	84		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	72		71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	83		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	75		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	62		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	76	Q	79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	74	Q	75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	57		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	21	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	71		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	65		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	24	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	63		54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	29		24-159	



					Serial_No:03142214:55				
Project Name:	HYA				Lab Nun	nber:	L2211695		
Project Number:	Not Specified				Report D	Date:	03/14/22		
	·	SAMPI	LE RESULTS						
Lab ID: Client ID: Sample Location:	L2211695-02 6-24 C (1-2) HYANNIS, MA				Date Colle Date Rece Field Prep	ected: eived: :	03/04/22 09:50 03/07/22 Not Specified		
Sample Depth:									
Matrix: Analytical Method: Analytical Date: Analyst: Percent Solids:	Soil 134,LCMSMS-ID 03/11/22 03:01 HT 83%				Extraction Extraction	Method: Date:	ALPHA 23528 03/10/22 17:00		
Parameter		Result	Qualifier	Units	RL	MDL	Dilution Factor		
Perfluorinated Alkyl	Acids by Isotope Dilution	on - Mansfield	d Lab						
Perfluorobutanoic Acid (Pf	FBA)	0.055	J	ng/g	0.566	0.026	1		
Perfluoropentanoic Acid (F	PFPeA)	0.064	J	ng/g	0.566	0.052	1		
Perfluorobutanesulfonic A	cid (PFBS)	ND		ng/g	0.283	0.044	1		
1H,1H,2H,2H-Perfluorohez	xanesulfonic Acid (4:2FTS)	ND		ng/g	1.13	0.073	1		
Perfluorohexanoic Acid (P	FHxA)	0.073	JF	ng/g	0.566	0.059	1		
Perfluoropentanesulfonic	Acid (PFPeS)	ND		ng/g	1.13	0.095	1		
Perfluoroheptanoic Acid (F	PFHpA)	0.079	J	ng/g	0.283	0.051	1		
Perfluorohexanesulfonic A	cid (PFHxS)	ND		ng/g	0.283	0.069	1		
Perfluorooctanoic Acid (PF	FOA)	0.156	J	ng/g	0.283	0.047	1		
1H,1H,2H,2H-Perfluorooct	anesulfonic Acid (6:2FTS)	ND		ng/g	0.566	0.203	1		
Perfluoroheptanesulfonic	Acid (PFHpS)	ND		ng/g	0.566	0.154	1		
Perfluorononanoic Acid (P	FNA)	ND		ng/g	0.283	0.085	1		
Perfluorooctanesulfonic A	cid (PFOS)	0.297		ng/g	0.283	0.147	1		
Perfluorodecanoic Acid (P	FDA)	ND		ng/g	0.283	0.076	1		
1H,1H,2H,2H-Perfluorode	canesulfonic Acid (8:2FTS)	ND		ng/g	0.566	0.325	1		
Perfluorononanesulfonic A	cid (PFNS)	ND		ng/g	1.13	0.339	1		
N-Methyl Perfluorooctanes (NMeFOSAA)	sulfonamidoacetic Acid	ND		ng/g	0.566	0.228	1		
Perflueredecenceulfacia				ng/g	0.500	0.053	1		
				ng/g	0.500	0.173	1		
	ut (FUSA)			ng/g	0.500	0.111	1		
(NEtFOSAA)				ng/g	000.0	0.096	I		
Pertluorododecanoic Acid		ND		ng/g	0.566	0.079	1		
Perfluorotridecanoic Acid ((PFTrDA)	ND		ng/g	0.566	0.232	1		

0.126

JF

ng/g

0.566

0.061



1

Perfluorotetradecanoic Acid (PFTA)

					Serial_No:		0:03142214:55	
Project Name:	HYA				Lab Nu	mber:	L2211695	
roject Number: Not Specified					Report	Date:	03/14/22	
		SAMP	LE RESULTS	6				
Lab ID:	L2211695-02				Date Coll	ected:	03/04/22 09:50	
Client ID:	6-24 C (1-2)		Date Receive		eived:	03/07/22		
Sample Location:	HYANNIS, MA				Field Pre	p:	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)	68		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	72		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	81		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	50		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	76		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	66	Q	71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	85		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	70	Q	75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	58		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	92		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	78	Q	79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	70	Q	75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	53		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	7	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	68		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	79		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	7	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	62		54-150	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	27		24-159	



Lab Number: L2211695 **Report Date:** 03/14/22

Project Name: HYA Project Number:

Not Specified

Method Blank Analysis Batch Quality Control

Analytical Method: Analytical Date: Analyst: RS

134,LCMSMS-ID 03/12/22 09:02

Extraction Method: ALPHA 23528 03/10/22 17:00 Extraction Date:

arameter	Result	Qualifier	Units	RL	MDL	
Perfluorinated Alkyl Acids by Isotope	Dilution -	Mansfield	Lab for	sample(s):	01-02 Batch	WG1614223-
Perfluorobutanoic Acid (PFBA)	ND		ng/g	0.500	0.023	
Perfluoropentanoic Acid (PFPeA)	ND		ng/g	0.500	0.046	
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/g	0.250	0.039	
1H,1H,2H,2H-Perfluorohexanesulfonic Acia (4:2FTS)	d ND		ng/g	1.00	0.065	
Perfluorohexanoic Acid (PFHxA)	ND		ng/g	0.500	0.053	
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/g	1.00	0.084	
Perfluoroheptanoic Acid (PFHpA)	ND		ng/g	0.250	0.045	
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/g	0.250	0.061	
Perfluorooctanoic Acid (PFOA)	ND		ng/g	0.250	0.042	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/g	0.500	0.180	
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/g	0.500	0.136	
Perfluorononanoic Acid (PFNA)	ND		ng/g	0.250	0.075	
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/g	0.250	0.130	
Perfluorodecanoic Acid (PFDA)	ND		ng/g	0.250	0.067	
1H,1H,2H,2H-Perfluorodecanesulfonic Acia (8:2FTS)	d ND		ng/g	0.500	0.287	
Perfluorononanesulfonic Acid (PFNS)	ND		ng/g	1.00	0.299	
N-Methyl Perfluorooctanesulfonamidoaceti Acid (NMeFOSAA)	c ND		ng/g	0.500	0.202	
Perfluoroundecanoic Acid (PFUnA)	ND		ng/g	0.500	0.047	
Perfluorodecanesulfonic Acid (PFDS)	ND		ng/g	0.500	0.153	
Perfluorooctanesulfonamide (FOSA)	ND		ng/g	0.500	0.098	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	ND		ng/g	0.500	0.085	
Perfluorododecanoic Acid (PFDoA)	ND		ng/g	0.500	0.070	
Perfluorotridecanoic Acid (PFTrDA)	ND		ng/g	0.500	0.204	
Perfluorotetradecanoic Acid (PFTA)	ND		ng/g	0.500	0.054	



Project Name:	HYA		Lab Number:	L2211695
Project Number:	Not Specified		Report Date:	03/14/22
		Method Blank Analysis Batch Quality Control		
Analytical Method:	134,LCMSMS-ID		Extraction Method:	ALPHA 2

Analytical Method:	134,LCMSMS-II
Analytical Date:	03/12/22 09:02
Analyst:	RS

Extraction Method: ALPHA 23528 Extraction Date: 03/10/22 17:00

Parameter	Result	Qualifier	Units	RL		MDL	
Perfluorinated Alkyl Acids by Isotop	e Dilution	- Mansfield I	_ab for sa	ample(s):	01-02	Batch:	WG1614223-1

Surrogate (Extracted Internal Standard)	%Recovery	Acceptance Qualifier Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	101	61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	104	58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	104	74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	54	14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94	66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96	71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	110	78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	107	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	64	20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103	72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	105	79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104	75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66	19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	77	31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	113	61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	82	10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	85	34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105	54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	100	24-159



Lab Control Sample Analysis Batch Quality Control

Lab Number: L2211695

Project Number: Not Specified

HYA

Project Name:

Report Date: 03/14/22

	LCS		LCSD		%Recovery			RPD	
Parameter	%Recovery	Qual	%Recovery	Qual	Limits	RPD	Qual	Limits	
Perfluorinated Alkyl Acids by Isotope Dilution	- Mansfield Lab	Associated	sample(s): 01-02	Batch:	WG1614223-2				
Perfluorobutanoic Acid (PFBA)	86		-		71-135	-		30	
Perfluoropentanoic Acid (PFPeA)	87		-		69-132	-		30	
Perfluorobutanesulfonic Acid (PFBS)	86		-		72-128	-		30	
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	91		-		62-145	-		30	
Perfluorohexanoic Acid (PFHxA)	86		-		70-132	-		30	
Perfluoropentanesulfonic Acid (PFPeS)	90		-		73-123	-		30	
Perfluoroheptanoic Acid (PFHpA)	87		-		71-131	-		30	
Perfluorohexanesulfonic Acid (PFHxS)	97		-		67-130	-		30	
Perfluorooctanoic Acid (PFOA)	82		-		69-133	-		30	
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	99		-		64-140	-		30	
Perfluoroheptanesulfonic Acid (PFHpS)	95		-		70-132	-		30	
Perfluorononanoic Acid (PFNA)	88		-		72-129	-		30	
Perfluorooctanesulfonic Acid (PFOS)	96		-		68-136	-		30	
Perfluorodecanoic Acid (PFDA)	87		-		69-133	-		30	
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	102		-		65-137	-		30	
Perfluorononanesulfonic Acid (PFNS)	100		-		69-125	-		30	
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeFOSAA)	91		-		63-144	-		30	
Perfluoroundecanoic Acid (PFUnA)	83		-		64-136	-		30	
Perfluorodecanesulfonic Acid (PFDS)	93		-		59-134	-		30	
Perfluorooctanesulfonamide (FOSA)	82		-		67-137	-		30	
N-Ethyl Perfluorooctanesulfonamidoacetic Acid (NEtFOSAA)	92		-		61-139	-		30	
Perfluorododecanoic Acid (PFDoA)	89		-		69-135	-		30	



Lab Control Sample Analysis

Batch Quality Control

Project Number: Not Specified

HYA

Project Name:

LCS LCSD %Recovery RPD %Recovery %Recovery Parameter Qual Qual Limits RPD Qual Limits Perfluorinated Alkyl Acids by Isotope Dilution - Mansfield Lab Associated sample(s): 01-02 Batch: WG1614223-2 102 30 Perfluorotridecanoic Acid (PFTrDA) 66-139 --Perfluorotetradecanoic Acid (PFTA) 87 69-133 30 --

Surrogate (Extracted Internal Standard)	LCS %Recovery	Qual	LCSD %Recovery	Qual	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	98				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	99				58-150
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	102				74-139
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	54				14-167
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	95				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	104				78-139
Perfluoro[13C8]Octanoic Acid (M8PFOA)	104				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	66				20-154
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	100				72-140
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	96				79-136
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	100				75-130
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	66				19-175
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	74				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	110				61-155
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	89				10-117
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	80				34-137
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	104				24-159



Matrix Spike Analysis Batch Quality Control

Project Name: HYA Project Number: Not Specified

Lab Number: L2211695 Report Date: 03/14/22

Parameter	Native Sample	MS Added	MS Found	MS %Recovery	Qual	MSD Found	MSD %Recovery C	Qual	Recovery Limits	RPD (Qual	RPD Limits
Perfluorinated Alkyl Acids by Is Sample	otope Dilution	- Mansfield	Lab Assoc	ciated sample(s):	01-02	QC Batch	ID: WG1614223-	-3 C	C Sample:	L2211112	2-01	Client ID: MS
Perfluorobutanoic Acid (PFBA)	0.084J	5.67	4.97	86		-	-		71-135	-		30
Perfluoropentanoic Acid (PFPeA)	0.055J	5.67	4.89	85		-	-		69-132	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	5.04	4.40	87		-	-		72-128	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	5.31	5.00	94		-	-		62-145	-		30
Perfluorohexanoic Acid (PFHxA)	ND	5.67	4.95	87		-	-		70-132	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	5.33	4.82	90		-	-		73-123	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	5.67	5.00	88		-	-		71-131	-		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	5.18	5.11	99		-	-		67-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	5.67	4.70	83		-	-		69-133	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	5.4	5.14	95		-	-		64-140	-		30
Perfluoroheptanesulfonic Acid	ND	5.41	5.03	93		-	-		70-132	-		30
Perfluorononanoic Acid (PFNA)	ND	5.67	5.25	93		-	-		72-129	-		30
Perfluorooctanesulfonic Acid (PFOS)	0.318	5.26	5.34	95		-	-		68-136	-		30
Perfluorodecanoic Acid (PFDA)	ND	5.67	4.88	86		-	-		69-133	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	5.44	5.44	100		-	-		65-137	-		30
Perfluorononanesulfonic Acid (PFNS)	ND	5.46	5.69	104		-	-		69-125	-		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid (NMeEOSAA)	ND	5.67	4.60	81		-	-		63-144	-		30
Perfluoroundecanoic Acid (PFUnA)	ND	5.67	5.00	88		-	-		64-136	-		30
Perfluorodecanesulfonic Acid (PFDS)	ND	5.48	5.60	102		-	-		59-134	-		30
Perfluorooctanesulfonamide (FOSA)	ND	5.67	4.65	82		-	-		67-137	-		30
N-Ethyl Perfluorooctanesulfonamidoacetic	ND	5.67	4.85	86		-	-		61-139	-		30
Acid (NETFOSAA) Perfluorododecanoic Acid (PFDoA)	ND	5.67	5.15	91		-	-		69-135	-		30



Matrix Spike Analysis

Project Name:	НҮА	Batch Quality Control	Lab Number:	L2211695
Project Number:	Not Specified		Report Date:	03/14/22

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 I Sample	sotope Dilution	n - Mansfield	Lab Associ	ated sample(s)	: 01-02	QC Batch	ID: WG1614223	8-3	QC Sample:	L221111	2-01	Client ID: N	٨S
Perfluorotridecanoic Acid (PFTrDA)	ND	5.67	5.50	97		-	-		66-139	-		30	
Perfluorotetradecanoic Acid (PFTA)	ND	5.67	4.74	84		-	-		69-133	-		30	

	MS		MS	SD	Acceptance
Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	% Recovery	Qualifier	Criteria
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	78				19-175
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	57				14-167
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	71				20-154
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	63				34-137
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	49				31-134
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109				61-155
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	103				75-130
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88				66-128
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	90				71-129
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102				78-139
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	105				54-150
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	108				24-159
Perfluoro[13C4]Butanoic Acid (MPFBA)	95				61-135
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	97				58-150
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	78				10-117
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	95				79-136
Perfluoro[13C8]Octanoic Acid (M8PFOA)	99				75-130
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96				72-140
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	98				74-139



Lab Duplicate Analysis Batch Quality Control

Lab Number: Report Date:

Project Number: Not Specified

HYA

Project Name:

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by Isotope Dilution ID: DUP Sample	- Mansfield Lab Associated sa	mple(s): 01-02 QC Ba	tch ID: WG167	4223-4	QC Sample:	L2211112-02 Client
Perfluorobutanoic Acid (PFBA)	0.057J	0.061J	ng/g	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	ND	ng/g	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid	ND	ND	ng/g	NC		30
Perfluorohexanoic Acid (PFHxA)	0.068J	0.081J	ng/g	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/g	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/g	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/g	NC		30
Perfluorooctanoic Acid (PFOA)	0.115J	0.138J	ng/g	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid	ND	ND	ng/g	NC		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/g	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonic Acid (PFOS)	0.361	0.425	ng/g	16		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/g	NC		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/g	NC		30
Perfluorononanesulfonic Acid (PFNS)	ND	ND	ng/g	NC		30
N-Methyl Perfluorooctanesulfonamidoacetic Acid	ND	ND	ng/g	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/g	NC		30
Perfluorodecanesulfonic Acid (PFDS)	ND	ND	ng/g	NC		30
Perfluorooctanesulfonamide (FOSA)	ND	ND	ng/g	NC		30



Lab Duplicate Analysis Batch Quality Control

Lab Number: L2211695 03/14/22 Report Date:

Project Number: Not Specified

HYA

Project Name:

Parameter	Native Sample	Duplicate Sam	ple Units	RPD	RPD Qual Limits	
Perfluorinated Alkyl Acids by Isotope Dilution - Ma ID: DUP Sample	ansfield Lab Associated sa	mple(s): 01-02 G	QC Batch ID: WG161	4223-4 (QC Sample: L2211112-02 Clier	nt
N-Ethyl Perfluorooctanesulfonamidoacetic Acid	ND	ND	ng/g	NC	30	
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/g	NC	30	
Perfluorotridecanoic Acid (PFTrDA)	ND	ND	ng/g	NC	30	
Perfluorotetradecanoic Acid (PFTA)	0.130J	0.153J	ng/g	NC	30	

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria	
Perfluoro[13C4]Butanoic Acid (MPFBA)	86		86		61-135	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	93		93		58-150	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		98		74-139	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	63		63		14-167	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	97		96		66-128	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	87		86		71-129	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	105		105		78-139	
Perfluoro[13C8]Octanoic Acid (M8PFOA)	93		94		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	69		74		20-154	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	125		124		72-140	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	101		103		79-136	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	96		97		75-130	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	75		73		19-175	
N-Deuteriomethylperfluoro-1-octanesulfonamidoacetic Acid (d3-NMeFOSAA)	19	Q	18	Q	31-134	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		101		61-155	
Perfluoro[13C8]Octanesulfonamide (M8FOSA)	80		83		10-117	
N-Deuterioethylperfluoro-1-octanesulfonamidoacetic Acid (d5-NEtFOSAA)	27	Q	20	Q	34-137	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	91		100		54-150	



Project Name: Project Number:	HYA Not Specified		Lab Duplicate Ana Batch Quality Cont	alysis ^{Irol}		Lab Numb Report Da	er: te:	L2211695 03/14/22
Parameter		Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits	
Perfluorinated Alkyl Acid ID: DUP Sample	s by Isotope Dilution - I	Aansfield Lab Associated sar	mple(s): 01-02 QC Bato	ch ID: WG161422	3-4 (QC Sample:	L2211112-	02 Client
						Acceptance	;	

- -

Surrogate (Extracted Internal Standard)	%Recovery Qual	ifier %Recovery Qua	Acceptance lifier Criteria	
Perfluoro[1,2-13C2]Tetradecanoic Acid (M2PFTEDA)	89	90	24-159	



INORGANICS & MISCELLANEOUS



 Lab Number:
 L2211695

 Report Date:
 03/14/22

Project Name:HYAProject Number:Not Specified

SAMPLE RESULTS

Lab ID: Client ID: Sample Location:	L2211695-01 6-24 C (0-1) HYANNIS, MA						Date Collected: Date Received: Field Prep:		03/04/22 09:50 03/07/22 Not Specified)
Sample Depth: Matrix:	Soil									
Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor	Date Prepared	Date Analyzed	Analytical Method	Analyst
General Chemistry - Mai	nsfield Lab									
Solids, Total	75.3		%	0.100	0.100	1	-	03/09/22 11:03	3 121,2540G	AV



 Lab Number:
 L2211695

 Report Date:
 03/14/22

Project Name:	HYA
Project Number:	Not Specified

SAMPLE RESULTS

Lab ID: Client ID: Sample Location:	L2211695-02 6-24 C (1-2) HYANNIS, MA						Date Collected: Date Received: Field Prep:		03/04/22 09:50 03/07/22 Not Specified)
Sample Depth: Matrix:	Soil					Dilution	Date	Date	Analytical	
Parameter	Result	Qualifier	Units	RL	MDL	Factor	Prepared	Analyzed	Method	Analyst
General Chemistry - Mar	nsfield Lab									
Solids, Total	83.3		%	0.100	0.100	1	-	03/09/22 11:03	3 121,2540G	AV



Project Name: HYA Project Number: Not Specified

Serial_No:03142214:55 Lab Number: L2211695 *Report Date:* 03/14/22

Sample Receipt and Container Information

Were project specific reporting limits specified?

YES

Cooler Information

Cooler	Custody Seal
A	Absent

Container Information

Container Information		Initial	Final	Temp		Frozen			
Container ID	Container Type	Cooler	pН	pН	deg C	Pres	Seal	Date/Time	Analysis(*)
L2211695-01A	Plastic 8oz unpreserved	А	NA		3.5	Y	Absent		A2-537-ISOTOPE(14)
L2211695-01B	Plastic 2oz unpreserved for TS	А	NA		3.5	Y	Absent		A2-TS(7)
L2211695-02A	Plastic 8oz unpreserved	А	NA		3.5	Y	Absent		A2-537-ISOTOPE(14)
L2211695-02B	Plastic 2oz unpreserved for TS	А	NA		3.5	Y	Absent		A2-TS(7)



Project Name: HYA

Project Number:

Serial_No:03142214:55 Lab Number: L2211695 Report Date: 03/14/22

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	PFIA	376-06-7
Perfluorotridecanoic Acid	PFIrDA	72629-94-8
Perfluorododecanoic Acid	PEDOA	307-55-1
Perfluoroundecanoic Acid	PFUNA	2058-94-8
Perfluorodecanoic Acid	PEDA	335-76-2
Periluorononanoic Acid	PENA	375-95-1
Perhuorooccanoic Acid		335-67-1
Periluoroheptanoic Acid		375-05-9
Periluoronexanoic Acid		307-24-4
	DERA	2700-90-3
	FLDA	575-22-4
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	11CI-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9CI-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: HYA

Project Number: Not Specified

Serial_No:03142214:55

Lab Number: L2211695

Report Date: 03/14/22

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:	HYA	Lab Number:	L2211695
Project Number:	Not Specified	Report Date:	03/14/22

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.

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 Waterpreserved vials were initially frozen. Note: If frozen date/time is beyond 48 hours from sample collection, value will be reflected in 'bold'. 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(a)+(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 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.

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.)

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 concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the concentrations of the analyte at less than ten times (10x) the 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 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-Air-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 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.

Report Format: DU Report with 'J' Qualifiers



Serial_No:03142214:55

Project Name:	НҮА	Lab Number:	L2211695
Project Number:	Not Specified	Report Date:	03/14/22

Data Qualifiers

- 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: HYA Project Number: Not Specified

 Lab Number:
 L2211695

 Report Date:
 03/14/22

REFERENCES

- 121 Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WEF. Standard Methods Online.
- 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: <u>NPW</u>: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; <u>SCM</u>: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

EPA 8270D/8270E: <u>NPW:</u> Dimethylnaphthalene,1,4-Diphenylhydrazine, alpha-Terpineol; <u>SCM</u>: Dimethylnaphthalene,1,4-Diphenylhydrazine. **SM4500**: <u>NPW</u>: Amenable Cyanide; <u>SCM</u>: Total Phosphorus, TKN, NO2, NO3.

Mansfield Facility

SM 2540D: TSS EPA 8082A: <u>NPW</u>: 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, SM4500CI-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, DDF, DDT, Endosulfan I, Endosulfan II,

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:03142214:55

	CHAIN O	FCUST	ODY	PAGE \	OF	Date I	Rec'd in Li	ab: 313	7/22	ALP	HA JOB #: LJJ11695	
WESTBORO, MA TEL: 508-898-8220	MANSFIELD, MA TEL: 508-822-9300	Project Infor	mation	110		Repo	ort Inform	nation - Da	ta Deliverables	Billi	ng Information	
FAX: 508-898-9193	FAX: 508-822-3268	Project Name:	HYA			D FA	х	MAIL		🗆 Sar	me as Client info PO #	
Client Informat	ion	Project Location	Hugh	nis k	hA		Ex	Add'l E	eliverables			
Client: Horsi	ey with Group	Project #:	nope :		141	Regul	atory Red	quirements	Report Limits			
ddress: 90 1	2011× 6A	Project Manager	Bun	inco	sr.	State //	ed Progra	am	Criteria			
Sandu	ich mA	ALPHA Quote #	wyar	i mas	1201	m	Ar	ncp		_		
hone: USDP	1833-66000	Turn-Around	Time	100								
ax:			Time	101.	-							
mail: WWWSS These samples h Other Project \$	SCIENUS KUJULI THEN ave been previously analyzed by Oplian Specific Requirements/Comm	Standard Date Due:	RUSH (or	sty could med #pre-sp Time:	(proved)	LYSIS	app	111	111	11	SAMPLE HANDLING	
ALPHA Lab ID			ollection	Sampla	9 1 1	HJ ANIA	5	11	111		Done Done Not needed Lab to do Preservation Lab to do	
Lab Use Only)	Sample ID	Date	Time	Matrix	Sampler's	E	//	11	////	//	(Please specify below)	
095-01	6-24 C (0-1)	3/4/2	29:50		SB	x		T		11	dumple opecific continients	
-02	10-240 (1-2)	3/4/	229:50		SA	A						
		7.17	1.2.		00							
				-				11				
				-			-					
			1									
		1.1										
			-									
			-									
					-							
				Contair Pres	ner Type servative						Please print clearly, legibly and com- pletely. Samples can not be logged	
1		Relinquished By:		Date/Time			Receive	ed By:	Dat	e/Time	in and turnaround time clock will not start until any ambiguities are procha-	
ND 01-01 (rev. 14-00 Page 32 of 32	17-07) APTA	Jall	a)	3/2/20	19:41	MEN	A-n Mug	you a	Az 3/1/20	940	All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.	