



## ANALYTICAL REPORT

Lab Number:	L2159742
Client:	Merrimack Village District 2 Greens Pond Road Merrimack, NH 03054
ATTN:	Jill Lavoie
Phone:	(603) 424-9241
Project Name:	PFAS INVESTIGATION
Project Number:	Not Specified
Report Date:	11/18/21

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

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



**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

<b>Alpha Sample ID</b>	<b>Client ID</b>	<b>Matrix</b>	<b>Sample Location</b>	<b>Collection Date/Time</b>	<b>Receive Date</b>
L2159742-01	1531010-008 (MVD-2)	DW	WELLS AND TREATMENT PLANTS	10/28/21 12:10	10/29/21
L2159742-02	1531010-003 (MVD-3)	DW	WELLS AND TREATMENT PLANTS	10/28/21 10:30	10/29/21
L2159742-03	1531010-011 (MVD-4R)	DW	WELLS AND TREATMENT PLANTS	10/28/21 11:00	10/29/21
L2159742-04	1531010_005 (MVD-5)	DW	WELLS AND TREATMENT PLANTS	10/28/21 11:07	10/29/21
L2159742-05	1531010_007 (MVD-7)	DW	WELLS AND TREATMENT PLANTS	10/28/21 10:41	10/29/21
L2159742-06	1531010_009 (MVD-8)	DW	WELLS AND TREATMENT PLANTS	10/28/21 10:47	10/29/21
L2159742-07	1531010_509 (TP-4/5)	DW	WELLS AND TREATMENT PLANTS	10/28/21 11:50	10/29/21

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

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### 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.

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**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21


### Case Narrative (continued)

#### Perfluorinated Alkyl Acids by EPA 533

L2159742-07: The extracted internal standard recoveries were outside the acceptance criteria for perfluoro[13c4]butanoic acid (mpfba) (46%), perfluoro[1,2,3,4,6-13c5]hexanoic acid (m5pfhxa) (48%), and perfluoro[1,2,3,4-13c4]heptanoic acid (m4pfhpa) (47%); however, re-extraction achieved similar results: perfluoro[13c4]butanoic acid (mpfba) (32%), perfluoro[1,2,3,4,6-13c5]hexanoic acid (m5pfhxa) (28%), and perfluoro[1,2,3,4-13c4]heptanoic acid (m4pfhpa) (27%). The results of the original extraction are reported; however, all associated compounds are considered to have a potential bias.

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

Authorized Signature:

 Kelly Stenstrom

Title: Technical Director/Representative

Date: 11/18/21

# ORGANICS

# SEMIVOLATILES

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-01  
 Client ID: 1531010-008 (MVD-2)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 12:10  
 Date Received: 10/29/21  
 Field Prep: Not Specified

## Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:13  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	8.76		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	13.5		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.61		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	15.6		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	8.07		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	30.9		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	2.30		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	5.37		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
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**SAMPLE RESULTS**

Lab ID: L2159742-01  
 Client ID: 1531010-008 (MVD-2)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 12:10  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	114		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	100		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	149		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	107		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	105		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	116		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	113		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	103		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	117		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	89		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	103		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	109		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	94		50-200



**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-02  
 Client ID: 1531010-003 (MVD-3)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:30  
 Date Received: 10/29/21  
 Field Prep: Not Specified

## Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:21  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	3.26		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	2.33		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	10.0		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-02  
 Client ID: 1531010-003 (MVD-3)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:30  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	115		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	113		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	140		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	103		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	101		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	116		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	101		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	111		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	118		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	93		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	110		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	90		50-200

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-03  
 Client ID: 1531010-011 (MVD-4R)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:00  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:30  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	5.69		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	11.4		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	5.69		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	15.3		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	11.0		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2.34		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	67.4		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	3.21		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-03  
 Client ID: 1531010-011 (MVD-4R)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:00  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	92		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	96		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	109		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	110		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	78		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	65		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	107		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	71		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	98		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	69		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	113		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	77		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	91		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	81		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	88		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	71		50-200

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-04  
 Client ID: 1531010\_005 (MVD-5)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:07  
 Date Received: 10/29/21  
 Field Prep: Not Specified

## Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:39  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	4.68		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	8.42		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	5.00		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	12.7		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	8.39		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	2.05		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	43.8		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-04  
 Client ID: 1531010\_005 (MVD-5)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:07  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	95		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	106		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	111		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	111		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	94		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	111		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	94		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	102		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	88		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	107		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	92		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	96		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	95		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	98		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	87		50-200

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-05  
 Client ID: 1531010\_007 (MVD-7)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:41  
 Date Received: 10/29/21  
 Field Prep: Not Specified

## Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:48  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	2.87		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	2.79		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	2.47		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	3.16		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	3.77		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	27.7		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	4.03		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-05  
 Client ID: 1531010\_007 (MVD-7)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:41  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	97		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	95		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	92		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	150		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	81		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	83		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	102		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	88		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	110		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	83		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	102		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	83		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	89		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	83		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	87		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	70		50-200



**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-06  
 Client ID: 1531010\_009 (MVD-8)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:47  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 01:56  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	2.43		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	2.54		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	19.7		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**SAMPLE RESULTS**

Lab ID: L2159742-06  
 Client ID: 1531010\_009 (MVD-8)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 10:47  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						

Surrogate (Extracted Internal Standard)	% Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	104		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	109		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	106		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	141		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	105		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	96		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	103		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	108		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	91		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	109		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	94		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	88		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	96		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	100		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	85		50-200

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-07  
 Client ID: 1531010\_509 (TP-4/5)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:50  
 Date Received: 10/29/21  
 Field Prep: Not Specified

## Sample Depth:

Matrix: Dw  
 Analytical Method: 136,533  
 Analytical Date: 11/12/21 02:05  
 Analyst: SL

Extraction Method: EPA 533  
 Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
<b>Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab</b>						
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--	1
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--	1
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--	1
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--	1
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--	1
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND		ng/l	2.00	--	1
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--	1
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--	1
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--	1
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--	1
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--	1
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--	1
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--	1
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--	1
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--	1
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--	1
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--	1
9-Chlorohexadecafluoro-3-Oxanonone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--	1
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--	1
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--	1
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--	1
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--	1
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--	1

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**SAMPLE RESULTS**

Lab ID: L2159742-07  
 Client ID: 1531010\_509 (TP-4/5)  
 Sample Location: WELLS AND TREATMENT PLANTS

Date Collected: 10/28/21 11:50  
 Date Received: 10/29/21  
 Field Prep: Not Specified

Sample Depth:

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab						
Surrogate (Extracted Internal Standard)			% Recovery	Qualifier	Acceptance Criteria	
Perfluoro[13C4]Butanoic Acid (MPFBA)			46	Q	50-200	
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)			54		50-200	
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)			107		50-200	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)			100		50-200	
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)			48	Q	50-200	
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)			47	Q	50-200	
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)			111		50-200	
Perfluoro[13C8]Octanoic Acid (M8PFOA)			64		50-200	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)			108		50-200	
Perfluoro[13C9]Nonanoic Acid (M9PFNA)			55		50-200	
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)			117		50-200	
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)			65		50-200	
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)			96		50-200	
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)			72		50-200	
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)			84		50-200	
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)			52		50-200	

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**Method Blank Analysis**  
**Batch Quality Control**

Analytical Method: 136,533  
Analytical Date: 11/12/21 00:20  
Analyst: SL

Extraction Method: EPA 533  
Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab for sample(s): 01-07 Batch: WG1569887-1					
Perfluorobutanoic Acid (PFBA)	ND		ng/l	2.00	--
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND		ng/l	2.00	--
Perfluoropentanoic Acid (PFPeA)	ND		ng/l	2.00	--
Perfluorobutanesulfonic Acid (PFBS)	ND		ng/l	2.00	--
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND		ng/l	2.00	--
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	ND		ng/l	2.00	--
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND		ng/l	2.00	--
Perfluorohexanoic Acid (PFHxA)	ND		ng/l	2.00	--
Perfluoropentanesulfonic Acid (PFPeS)	ND		ng/l	2.00	--
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND		ng/l	2.00	--
Perfluoroheptanoic Acid (PFHpA)	ND		ng/l	2.00	--
Perfluorohexanesulfonic Acid (PFHxS)	ND		ng/l	2.00	--
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND		ng/l	2.00	--
Perfluorooctanoic Acid (PFOA)	ND		ng/l	2.00	--
Perfluoroheptanesulfonic Acid (PFHpS)	ND		ng/l	2.00	--
Perfluorononanoic Acid (PFNA)	ND		ng/l	2.00	--
Perfluorooctanesulfonic Acid (PFOS)	ND		ng/l	2.00	--
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND		ng/l	2.00	--
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND		ng/l	2.00	--
Perfluorodecanoic Acid (PFDA)	ND		ng/l	2.00	--
Perfluoroundecanoic Acid (PFUnA)	ND		ng/l	2.00	--
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND		ng/l	2.00	--
Perfluorododecanoic Acid (PFDoA)	ND		ng/l	2.00	--

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**Method Blank Analysis  
Batch Quality Control**

Analytical Method: 136,533  
Analytical Date: 11/12/21 00:20  
Analyst: SL

Extraction Method: EPA 533  
Extraction Date: 11/11/21 05:50

Parameter	Result	Qualifier	Units	RL	MDL
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab for sample(s): 01-07 Batch: WG1569887-1					

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	88		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	101		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	116		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	102		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	88		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	91		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	118		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	100		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	104		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	95		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	110		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	97		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	100		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	104		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	103		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	80		50-200

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: PFAS INVESTIGATION

Lab Number: L2159742

Project Number: Not Specified

Report Date: 11/18/21

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-07 Batch: WG1569887-2								
Perfluorobutanoic Acid (PFBA)	102		-		70-130	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	106		-		70-130	-		30
Perfluoropentanoic Acid (PFPeA)	98		-		70-130	-		30
Perfluorobutanesulfonic Acid (PFBS)	99		-		70-130	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	98		-		70-130	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEEESA)	95		-		70-130	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	93		-		70-130	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	100		-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	98		-		70-130	-		30
Perfluoropentanesulfonic Acid (PFPeS)	105		-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	106		-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	104		-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	96		-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	101		-		70-130	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	101		-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	106		-		70-130	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	102		-		70-130	-		30
Perfluorononanoic Acid (PFNA)	111		-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	109		-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	100		-		70-130	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	111		-		70-130	-		30

## Lab Control Sample Analysis

### Batch Quality Control

Project Name: PFAS INVESTIGATION

Lab Number: L2159742

Project Number: Not Specified

Report Date: 11/18/21

Parameter	LCS		LCSD		%Recovery Limits	RPD	RPD	
	%Recovery	Qual	%Recovery	Qual			Qual	Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-07 Batch: WG1569887-2								
Perfluorodecanoic Acid (PFDA)	102		-		70-130	-		30
Perfluoroundecanoic Acid (PFUnA)	100		-		70-130	-		30
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	106		-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	109		-		70-130	-		30

Surrogate (Extracted Internal Standard)	LCS		LCSD		Acceptance Criteria
	%Recovery	Qual	%Recovery	Qual	
Perfluoro[13C4]Butanoic Acid (MPFBA)	98				50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	103				50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	116				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	115				50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	93				50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	92				50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	115				50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	97				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	127				50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	96				50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	119				50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	105				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	115				50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	107				50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	104				50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	89				50-200



## Matrix Spike Analysis

### Batch Quality Control

**Project Name:** PFAS INVESTIGATION

**Lab Number:** L2159742

**Project Number:** Not Specified

**Report Date:** 11/18/21

<b>Parameter</b>	<b>Native Sample</b>	<b>MS Added</b>	<b>MS Found</b>	<b>MS %Recovery</b>	<b>Qual</b>	<b>MSD Found</b>	<b>MSD %Recovery</b>	<b>Qual</b>	<b>Recovery Limits</b>	<b>RPD</b>	<b>Qual</b>	<b>RPD Limits</b>
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab		Associated sample(s): 01-07			QC Batch ID: WG1569887-3		QC Sample: L2159406-01		Client ID: MS Sample			
Perfluorobutanoic Acid (PFBA)	ND	151	151	100		-	-		70-130	-		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND	151	160	106		-	-		70-130	-		30
Perfluoropentanoic Acid (PFPeA)	ND	151	145	96		-	-		70-130	-		30
Perfluorobutanesulfonic Acid (PFBS)	ND	134	131	98		-	-		70-130	-		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND	151	144	95		-	-		70-130	-		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND	135	128	95		-	-		70-130	-		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND	151	151	100		-	-		70-130	-		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	142	144	102		-	-		70-130	-		30
Perfluorohexanoic Acid (PFHxA)	ND	151	148	98		-	-		70-130	-		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	142	143	101		-	-		70-130	-		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	151	143	95		-	-		70-130	-		30
Perfluoroheptanoic Acid (PFHpA)	ND	151	140	93		-	-		70-130	-		30
Perfluorohexanesulfonic Acid (PFHxS)	18.9	138	159	102		-	-		70-130	-		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	143	127	89		-	-		70-130	-		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	144	153	106		-	-		70-130	-		30
Perfluorooctanoic Acid (PFOA)	ND	151	140	93		-	-		70-130	-		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	144	137	95		-	-		70-130	-		30
Perfluorononanoic Acid (PFNA)	ND	151	158	104		-	-		70-130	-		30
Perfluorooctanesulfonic Acid (PFOS)	16.3	140	147	93		-	-		70-130	-		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	141	137	97		-	-		70-130	-		30
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	145	158	109		-	-		70-130	-		30
Perfluorodecanoic Acid (PFDA)	ND	151	154	102		-	-		70-130	-		30

## Matrix Spike Analysis

*Batch Quality Control*

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

<i>Parameter</i>	<i>Native Sample</i>	<i>MS Added</i>	<i>MS Found</i>	<i>MS %Recovery</i>	<i>Qual</i>	<i>MSD Found</i>	<i>MSD %Recovery</i>	<i>Qual</i>	<i>Recovery Limits</i>	<i>RPD</i>	<i>Qual</i>	<i>RPD Limits</i>
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab			Associated sample(s): 01-07			QC Batch ID: WG1569887-3			QC Sample: L2159406-01		Client ID: MS Sample	
Perfluoroundecanoic Acid (PFUnA)	ND	151	157	104		-	-		70-130	-		30
11-Chloroeicosafluoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	143	138	97		-	-		70-130	-		30
Perfluorododecanoic Acid (PFDoA)	ND	151	160	106		-	-		70-130	-		30

<i>Surrogate (Extracted Internal Standard)</i>	<i>MS % Recovery</i>	<i>Qualifier</i>	<i>MSD % Recovery</i>	<i>Qualifier</i>	<i>Acceptance Criteria</i>
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	116				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	143				50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	124				50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	102				50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	109				50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	104				50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	109				50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	105				50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	114				50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	112				50-200
Perfluoro[13C4]Butanoic Acid (MPFBA)	107				50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	115				50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	121				50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	115				50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	98				50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	121				50-200

## Lab Duplicate Analysis

### Batch Quality Control

Project Name: PFAS INVESTIGATION

Project Number: Not Specified

Lab Number: L2159742

Report Date: 11/18/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1569887-4 QC Sample: L2159408-01 Client ID: DUP Sample						
Perfluorobutanoic Acid (PFBA)	3.88	3.67	ng/l	6		30
Perfluoro-3-Methoxypropanoic Acid (PFMPA)	ND	ND	ng/l	NC		30
Perfluoropentanoic Acid (PFPeA)	ND	2.05	ng/l	NC		30
Perfluorobutanesulfonic Acid (PFBS)	ND	ND	ng/l	NC		30
Perfluoro-4-Methoxybutanoic Acid (PFMBA)	ND	ND	ng/l	NC		30
Perfluoro(2-Ethoxyethane)Sulfonic Acid (PFEESA)	ND	ND	ng/l	NC		30
Nonafluoro-3,6-Dioxaheptanoic Acid (NFDHA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorohexanesulfonic Acid (4:2FTS)	ND	ND	ng/l	NC		30
Perfluorohexanoic Acid (PFHxA)	ND	ND	ng/l	NC		30
Perfluoropentanesulfonic Acid (PFPeS)	ND	ND	ng/l	NC		30
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-Propanoic Acid (HFPO-DA)	ND	ND	ng/l	NC		30
Perfluoroheptanoic Acid (PFHpA)	ND	ND	ng/l	NC		30
Perfluorohexanesulfonic Acid (PFHxS)	ND	ND	ng/l	NC		30
4,8-Dioxa-3h-Perfluorononanoic Acid (ADONA)	ND	ND	ng/l	NC		30
1H,1H,2H,2H-Perfluorooctanesulfonic Acid (6:2FTS)	ND	ND	ng/l	NC		30
Perfluorooctanoic Acid (PFOA)	7.80	7.78	ng/l	0		30
Perfluoroheptanesulfonic Acid (PFHpS)	ND	ND	ng/l	NC		30
Perfluorononanoic Acid (PFNA)	ND	ND	ng/l	NC		30
Perfluorooctanesulfonic Acid (PFOS)	ND	ND	ng/l	NC		30
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid (9Cl-PF3ONS)	ND	ND	ng/l	NC		30

## Lab Duplicate Analysis

Batch Quality Control

Project Name: PFAS INVESTIGATION

Project Number: Not Specified

Lab Number: L2159742

Report Date: 11/18/21

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Perfluorinated Alkyl Acids by EPA 533 - Mansfield Lab Associated sample(s): 01-07 QC Batch ID: WG1569887-4 QC Sample: L2159408-01 Client ID: DUP Sample						
1H,1H,2H,2H-Perfluorodecanesulfonic Acid (8:2FTS)	ND	ND	ng/l	NC		30
Perfluorodecanoic Acid (PFDA)	ND	ND	ng/l	NC		30
Perfluoroundecanoic Acid (PFUnA)	ND	ND	ng/l	NC		30
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid (11Cl-PF3OUdS)	ND	ND	ng/l	NC		30
Perfluorododecanoic Acid (PFDoA)	ND	ND	ng/l	NC		30

Surrogate (Extracted Internal Standard)	%Recovery	Qualifier	%Recovery	Qualifier	Acceptance Criteria
Perfluoro[13C4]Butanoic Acid (MPFBA)	111		111		50-200
Perfluoro[13C5]Pentanoic Acid (M5PFPEA)	103		105		50-200
Perfluoro[2,3,4-13C3]Butanesulfonic Acid (M3PFBS)	96		99		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Hexanesulfonic Acid (M2-4:2FTS)	144		150		50-200
Perfluoro[1,2,3,4,6-13C5]Hexanoic Acid (M5PFHxA)	98		97		50-200
Perfluoro[1,2,3,4-13C4]Heptanoic Acid (M4PFHpA)	100		101		50-200
Perfluoro[1,2,3-13C3]Hexanesulfonic Acid (M3PFHxS)	108		112		50-200
Perfluoro[13C8]Octanoic Acid (M8PFOA)	102		107		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Octanesulfonic Acid (M2-6:2FTS)	133		117		50-200
Perfluoro[13C9]Nonanoic Acid (M9PFNA)	101		100		50-200
Perfluoro[13C8]Octanesulfonic Acid (M8PFOS)	113		111		50-200
Perfluoro[1,2,3,4,5,6-13C6]Decanoic Acid (M6PFDA)	99		92		50-200
1H,1H,2H,2H-Perfluoro[1,2-13C2]Decanesulfonic Acid (M2-8:2FTS)	90		90		50-200
Perfluoro[1,2,3,4,5,6,7-13C7]Undecanoic Acid (M7-PFUDA)	94		94		50-200
Perfluoro[1,2-13C2]Dodecanoic Acid (MPFDOA)	92		98		50-200
2,3,3,3-Tetrafluoro-2-[1,1,2,2,3,3,3-Heptafluoropropoxy]-13C3-Propanoic Acid (M3HFPO-DA)	89		91		50-200

**Project Name:** PFAS INVESTIGATION**Lab Number:** L2159742**Project Number:** Not Specified**Report Date:** 11/18/21**Sample Receipt and Container Information**

Were project specific reporting limits specified?

YES

**Cooler Information**

<b>Cooler</b>	<b>Custody Seal</b>
A	Absent

**Container Information**

<b>Container ID</b>	<b>Container Type</b>	<b>Cooler</b>	<b>Initial pH</b>	<b>Final pH</b>	<b>Temp deg C</b>	<b>Pres</b>	<b>Seal</b>	<b>Frozen Date/Time</b>	<b>Analysis(*)</b>
L2159742-01A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-01B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-02A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-02B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-03A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-03B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-04A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-04B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-05A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-05B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-06A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-06B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-07A	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)
L2159742-07B	Plastic 250ml Ammonium Acetate preserved	A	NA		2.0	Y	Absent		A2-NH-533(28)

## PFAS PARAMETER SUMMARY

Parameter	Acronym	CAS Number
<b>PERFLUOROALKYL CARBOXYLIC ACIDS (PFCAs)</b>		
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
<b>PERFLUOROALKYL SULFONIC ACIDS (PFSAs)</b>		
Perfluorododecanesulfonic Acid	PFDoDS	79780-39-5
Perfluorodecanesulfonic Acid	PFDS	335-77-3
Perfluoronanesulfonic 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
<b>FLUOROTELOMERS</b>		
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
<b>PERFLUOROALKANE SULFONAMIDES (FASAs)</b>		
Perfluorooctanesulfonamide	FOSA	754-91-6
N-Ethyl Perfluorooctane Sulfonamide	NEtFOSA	4151-50-2
N-Methyl Perfluorooctane Sulfonamide	NMeFOSA	31506-32-8
<b>PERFLUOROALKANE SULFONYL SUBSTANCES</b>		
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
<b>PER- and POLYFLUOROALKYL ETHER CARBOXYLIC ACIDS</b>		
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
<b>CHLORO-PERFLUOROALKYL SULFONIC ACIDS</b>		
11-Chloroeicosafuoro-3-Oxaundecane-1-Sulfonic Acid	11Cl-PF3OUdS	763051-92-9
9-Chlorohexadecafluoro-3-Oxanone-1-Sulfonic Acid	9Cl-PF3ONS	756426-58-1
<b>PERFLUOROETHER SULFONIC ACIDS (PFESAs)</b>		
Perfluoro(2-Ethoxyethane)Sulfonic Acid	PFEEESA	113507-82-7
<b>PERFLUOROETHER/POLYETHER CARBOXYLIC ACIDS (PFPCAs)</b>		
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:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

## GLOSSARY

### Acronyms

DL	- Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the limit of quantitation (LOQ). The DL includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
EDL	- Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
EMPC	- Estimated Maximum Possible Concentration: The concentration that results from the signal present at the retention time of an analyte when the ions meet all of the identification criteria except the ion abundance ratio criteria. An EMPC is a worst-case estimate of the concentration.
EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LOD	- Limit of Detection: This value represents the level to which a target analyte can reliably be detected for a specific analyte in a specific matrix by a specific method. The LOD includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
LOQ	- Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)  Limit of Quantitation: The value at which an instrument can accurately measure an analyte at a specific concentration. The LOQ includes any adjustments from dilutions, concentrations or moisture content, where applicable. (DoD report formats only.)
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available. For Method 332.0, the spike recovery is calculated using the native concentration, including estimated values.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NDPA/DPA	- N-Nitrosodiphenylamine/Diphenylamine.
NI	- Not Ignitable.
NP	- Non-Plastic: Term is utilized for the analysis of Atterberg Limits in soil.
NR	- No Results: Term is utilized when 'No Target Compounds Requested' is reported for the analysis of Volatile or Semivolatile Organic TIC only requests.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.
STLP	- Semi-dynamic Tank Leaching Procedure per EPA Method 1315.
TEF	- Toxic Equivalency Factors: The values assigned to each dioxin and furan to evaluate their toxicity relative to 2,3,7,8-TCDD.
TEQ	- Toxic Equivalent: The measure of a sample's toxicity derived by multiplying each dioxin and furan by its corresponding TEF and then summing the resulting values.
TIC	- Tentatively Identified Compound: A compound that has been identified to be present and is not part of the target compound list (TCL) for the method and/or program. All TICs are qualitatively identified and reported as estimated concentrations.

Report Format: Data Usability Report



**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

#### 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 Water-preserved 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(ah)+(ac)anthracene, Benzo(g,h,i)perylene. If a 'Total' result is requested, the results of its individual components will also be reported.

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

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 concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- C** - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- D** - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- E** - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
- F** - The ratio of quantifier ion response to qualifier ion response falls outside of the laboratory criteria. Results are considered to be an estimated maximum concentration.
- G** - The concentration may be biased high due to matrix interferences (i.e. co-elution) with non-target compound(s). The result should be considered estimated.
- H** - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
- I** - The lower value for the two columns has been reported due to obvious interference.
- J** - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).
- M** - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
- ND** - Not detected at the reporting limit (RL) for the sample.
- NJ** - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where

Report Format: Data Usability Report





**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

**Data Qualifiers**

the identification is based on a mass spectral library search.

- P** - The RPD between the results for the two columns exceeds the method-specified criteria.
- Q** - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)
- R** - Analytical results are from sample re-analysis.
- RE** - Analytical results are from sample re-extraction.
- S** - Analytical results are from modified screening analysis.
- V** - The surrogate associated with this target analyte has a recovery outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)
- Z** - The batch matrix spike and/or duplicate associated with this target analyte has a recovery/RPD outside the QC acceptance limits. (Applicable to MassDEP DW Compliance samples only.)

**Project Name:** PFAS INVESTIGATION  
**Project Number:** Not Specified

**Lab Number:** L2159742  
**Report Date:** 11/18/21

## REFERENCES

- 136 Determination of Per- and Polyfluoroalkyl Substances in Drinking Water by Isotope Dilution Anion Exchange Solid Phase Extraction and Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS). EPA Method 533, EPA Document 815-B-19-020, November 2019.

## 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

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

### Westborough Facility

**EPA 624/624.1:** m/p-xylene, o-xylene, Naphthalene

**EPA 625/625.1:** alpha-Terpineol

**EPA 8260C/8260D:** NPW: 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene, Azobenzene; SCM: Iodomethane (methyl iodide), 1,2,4,5-Tetramethylbenzene; 4-Ethyltoluene.

**EPA 8270D/8270E:** NPW: Dimethylnaphthalene, 1,4-Diphenylhydrazine, alpha-Terpineol; SCM: Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**SM4500:** NPW: Amenable Cyanide; SCM: Total Phosphorus, TKN, NO<sub>2</sub>, NO<sub>3</sub>.

### Mansfield Facility

**SM 2540D:** TSS

**EPA 8082A:** NPW: PCB: 1, 5, 31, 87,101, 110, 141, 151, 153, 180, 183, 187.

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene,

3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

**Biological Tissue Matrix:** EPA 3050B

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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, **LCHAT 10-107-06-1-B:** Ammonia-N, **EPA 351.1, SM4500NO3-F, EPA 353.2:** Nitrate-N, **SM4500P-E, SM4500P-B, E, SM4500SO4-E,**

**SM5220D, EPA 410.4, SM5210B, SM5310C, SM4500CL-D, EPA 1664, EPA 420.1, SM4500-CN-CE, SM2540D, EPA 300:** Chloride, Sulfate, Nitrate.

**EPA 624.1:** Volatile Halocarbons & Aromatics,

**EPA 608.3:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II,

Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625.1:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** **SM9223B-Colilert-QT; Enterolert-QT, SM9221E, EPA 1600, EPA 1603, SM9222D.**

### Mansfield Facility:

#### Drinking Water

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

**EPA 522, EPA 537.1.**

#### Non-Potable Water

**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, TL, Ti, V, Zn.

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Fe, Pb, Mn, Ni, K, Se, Ag, Na, TL, Zn.

**EPA 245.1 Hg.**

**SM2340B**

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



# CHAIN OF CUSTODY

PAGE 1 OF 1

## Project Information

Project Name: PFAS Investigation

Project Location: Wells and treatment plants

Project #:

Project Manager: Jill Lavoie

ALPHA Quote #:

## Turn-Around Time

Standard  Rush (ONLY IF PRE-APPROVED)

Due Date: Time:

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

## Client Information

Client: Merrimack Village District

Address: 2 Greens Pond Road

Merrimack NH 03054

Phone: (603) 424-9241 x103

Fax: Email: jill.lavoie@mvdwater.org

These samples have been Previously analyzed by Alpha

Other Project Specific Requirements/Comments/Detection Limits:

Sampler: Ronald Miner, Jr.

EPA ID 1531010

Date Rec'd in Lab: 10/30/21

ALPHA Job #: C2159742

## Report Information Data Deliverables

FAX  EMAIL  
 ADEx  Add'l Deliverables

## Billing Information

Same as Client info PO #:

## Regulatory Requirements/Report Limits

State/Fed Program Criteria

## ANALYSIS

PFAS METHOD 533	ANALYSIS															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
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SAMPLE HANDLING  
 Filtration  
 Done  
 Not Needed  
 Lab to do  
 Preservation  
 Lab to do  
 (Please specify below)

TOTAL # BOTTLES

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection		Sample Matrix	Sampler's Initials
		Date	Time		
69742-01	1531010-008 (MVD-2)	10/28/21	12:10		RM
-02	1531010_003 (MVD-3)	10/28/21	10:30		RM
-03	1531010-011 (MVD-4R)	10/28/21	11:00		RM
-04	1531010_005 (MVD-5)	10/28/21	11:07		RM
-05	1531010_007 (MVD-7)	10/28/21	10:41		RM
-06	1531010_009 (MVD-8)	10/28/21	10:47		RM
-07	1531010_508 (TP-7/B) OFF	10/28/21			RM
-08	1531010_509 (TP-4/5)	10/28/21	11:50		RM

Container Type

Preservative

Relinquished By:	Date/Time	Received By:	Date/Time
Ronald Miner, Jr.	10/28 12:20	Jill Lavoie	10/28/21 1745
Jill Lavoie	10/28/21	Wendy Marini	10/29/21
Wendy Marini	10/30/21 4:48	Jill Lavoie	10/30/21 0655

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Payment Terms.