Mr. Todd Caffoe
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Subject:
Emerging Contaminant Assessment Report
1,4-Dioxane and PFAS in Site Groundwater
Crosman Site
East Bloomfield, New York

Date:
September 11, 2020

Contact:
William B. Popham

Phone:
585.662.4022

Email:
bill.popham@arcadis.com

Our ref:
30005202

Dear Mr. Caffoe:

On behalf of Crosman Corporation and New Coleman Holdings, Inc. (collectively, Crosman), Arcadis of New York, Inc. (Arcadis) submits this report on the results of the emerging contaminant assessment of 1,4-dioxane and per- and polyfluoroalkyl substances (PFAS) in groundwater (Emerging Contaminant Assessment Report) at the Crosman site located at East Bloomfield, New York (site). Sampling was performed as requested by the New York State Department of Environmental Conservation (NYSDEC) in its November 22, 2019 letter.

DESCRIPTION OF ACTIVITIES

In March and April 2020, Arcadis removed dedicated bailers from groundwater monitoring wells (MW-1A, MW-4, and MW-13, see **Figure 1**) that were proposed for groundwater sampling as part of the emerging contaminant assessment. The bailers were removed to limit the potential for plastics components (i.e., bailers and plastic cord used to suspend the bailers in the monitoring wells) that could contain PFAS constituents.

Sampling for 1,4-dioxane and PFAS was performed on June 18, 2020 consistent with NYSDEC sampling guidelines and protocols, with the limitations outlined in the NYSDEC's August 9, 2018 PFAS Groundwater Samples from Monitoring Wells Sample Protocol Revision 1.2. Furthermore, sampling followed the NYSDEC's March 2019 Sampling for 1,4-Dioxane and PFAS under the NYSDEC's Part 375 Remedial Programs and Arcadis' October 12, 2018 TGI – Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells.

Groundwater samples were submitted to ALS Environmental Laboratory in Rochester, New York under full chain of custody. The samples were analyzed for PFAS by United States Environmental Protection Agency (USEPA) Modified Method 537 and 1,4-dioxane by USEPA Method 8270 SIM.

Upon receipt of the data, a data validator, independently reviewed the laboratory data in accordance with the following procedures and based on the following guidance documents:

- USEPA. CLP National Functional Guidance for Low Concentration Data Review. USEPA-540-R-00-006. June 2001.
- USEPA Region 2. Organic Data Review for Low Concentration Water. Standard Operating Procedure (SOP) HW-13 Rev. 3. July 2001.
- USEPA Region 2. CLP Organics Data Review and Preliminary Review. SOP HW-6 Rev. 12. March 2001.

The Data Usability Summary Report (**Attachment 1**) contains the laboratory data with practical quantitation limits, dilution factors, and data review. The Data Usability Summary Report found the data package to be complete with acceptable performance.

RESULTS

Table 1 summarizes 1,4-dioxane and PFAS concentrations in groundwater from the June 18, 2020 sampling event. The full, validated electronic data deliverable will be submitted electronically contemporaneous with this Emerging Contaminant Assessment Report in accordance with NYSDEC guidelines.

There are currently no federal or New York State standards for 1,4-dioxane or PFAS in groundwater. Maximum contaminant levels (MCLs) for drinking water in New York State have recently been adopted at 1 microgram per liter for 1,4-dioxane, 10 nanograms per liter (ng/L) for perfluorooctanoic acid, and 10 ng/L for perfluorooctanesulfonate. The USEPA has established health advisories for perfluorooctanoic acid and perfluorooctanesulfonate, which includes a recommended maximum combined concentration of 70 ng/L.

No emerging contaminants were detected at concentrations exceeding these drinking water MCLs. Neither 1,4-dioxane nor perfluorooctanoic acid were detected. Perfluorooctanesulfonate was detected at an estimated concentration of 1.5 ng/L in upgradient well MW-1A. Perfluorooctanesulfonate was not detected in either of the on-site wells downgradient of the manufacturing facility.

RECOMMENDATIONS

The current groundwater remedy for the Crosman site is operation of pumping well PW-1, which continues to operate and provide hydraulic containment for the site. Although emerging contaminants are not specifically targeted as part of the groundwater remedy, this remedy will effectively capture any emerging contaminants detected on the site. Therefore, no further action is recommended at this time.

If you have any questions, please contact me at 585.662.4022.

Sincerely,

Arcadis of New York, Inc.

William B. Popham
Senior Vice President

Copies:
David Pratt, NYSDEC
Anthony C. Perretta, New York State Department of Health
Timothy S. Martin, Esq., New Coleman Holdings, Inc.
Benedict Moshier, New Coleman Holdings, Inc.
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Gina Thomas, Crosman Corporation
Aaron D. Richardson, Arcadis of New York, Inc.

REFERENCE

Arcadis. 2018. TGI – Low-Flow Groundwater Purging and Sampling Procedures for Monitoring Wells, AVX Corporation, Olean, New York. October 12.

NYSDEC. 2018. PFAS Groundwater Samples from Monitoring Wells Sample Protocol, Revision 1.2. August 9.

NYSDEC. 2019. Sampling for 1,4-Dioxane and Per- and Polyfluoroalkyl Substances (PFAS) under NYSDEC's Part 375 Remedial Programs. March.

Enclosures:

Table

1 Emerging Contaminant Concentrations

Figure

1 Emerging Contaminant Sampling Locations

Attachment

1 Data Usability Summary Report

Table

Table 1
Emerging Contaminant Concentrations
1,4-Dioxane and PFAS Sampling Results
Crosman Corporation
East Bloomfield, New York

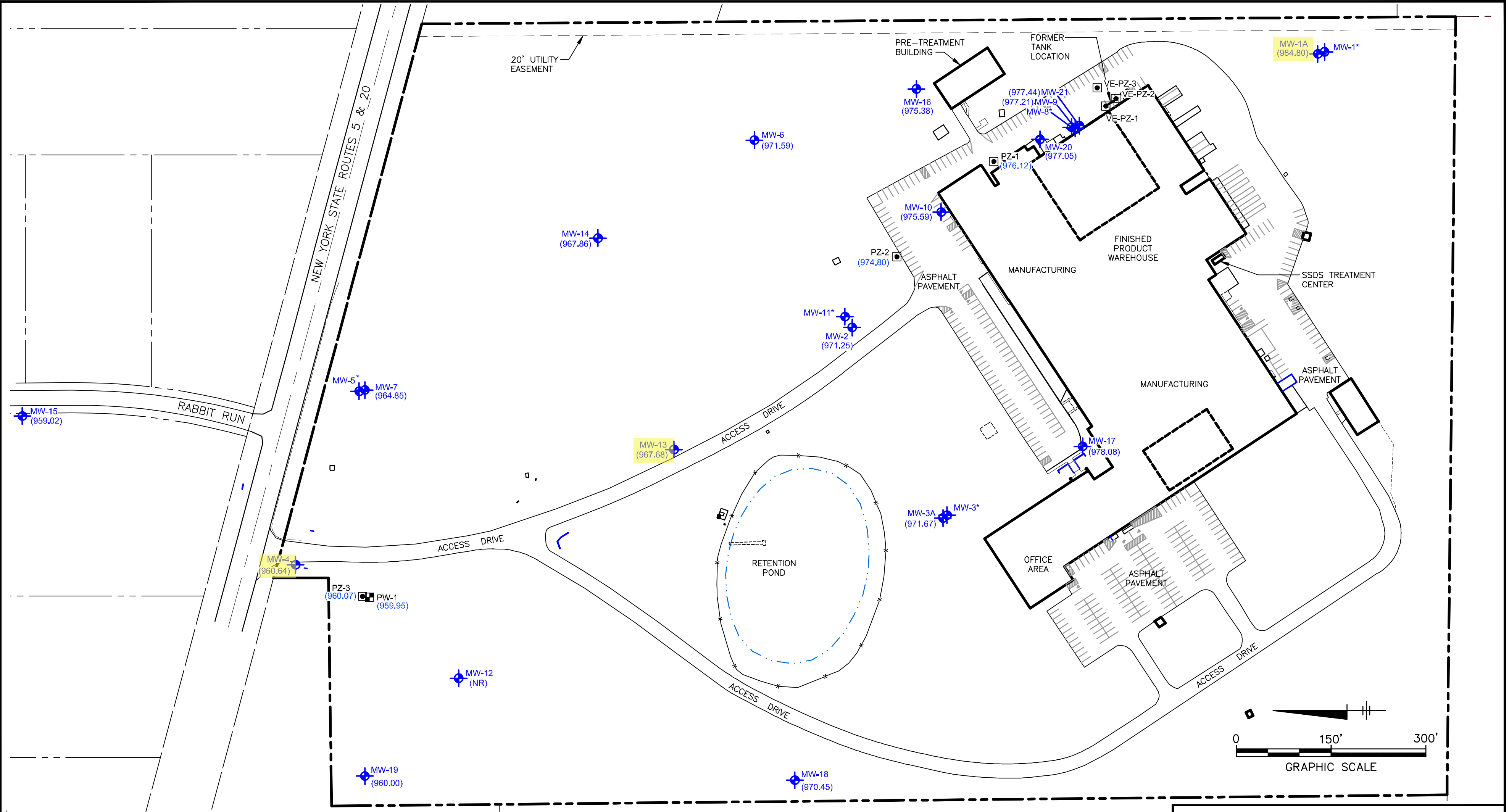
Location ID: Date Collected:	Units	MW-1A 04/21/20	MW-4 04/21/20	MW-13 04/21/20
Parameters				
1,4-Dioxane	µg/L	0.040 U	0.040 U	0.040 U
Perfluorobutanesulfonic Acid	ng/L	4.1 U	**0.39 J**	4.1 U
Perfluorohexanesulfonic Acid	ng/L	4.1 UB	4.1 UB	4.1 UB
Perfluoroheptane sulfonate	ng/L	4.1 U	4.1 U	4.1 U
Perfluorooctanesulfonic Acid	ng/L	**1.5 J**	1.6 U	1.6 U
Perfluorodecane Sulfonate	ng/L	4.1 U	4.1 U	4.1 U
Perfluorobutanoic Acid	ng/L	4.1 U	4.1 U	**16 J**
Perfluoropentanoic Acid	ng/L	4.1 U	4.1 U	**13**
Perfluorohexanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluoroheptanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluorooctanoic Acid	ng/L	1.7 U	1.6 U	1.6 U
Perfluorononanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluorodecanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluoroundecanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluorododecanoic Acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluoro-n-tridecanoic acid	ng/L	4.1 U	4.1 U	4.1 U
Perfluorotetradecanoic acid (PFTeDA)	ng/L	4.1 U	4.1 U	4.1 U
6:2 Fluorotelomer sulfonate	ng/L	4.1 U	4.1 U	4.1 U
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	ng/L	4.1 U	4.1 U	4.1 U
Perfluorooctanesulfonamide	ng/L	4.1 U	4.1 U	4.1 U
N-methylperfluoro-1-octanesulfonamidoacetic acid	ng/L	4.1 U	4.1 U	4.1 U
N-ethylperfluoro-1-octanesulfonamidoacetic acid	ng/L	4.1 U	4.1 U	4.1 U

Notes:
Bold indicates a detected concentration.
[Bracketed values] represent field duplicate sample results.

B = Constituent detected in laboratory method blank.
J = The compound was identified; however, the associated numerical value is an estimated concentration.
ng/L = nanogram per liter
U = Compound not detected above reported sample quantitation limit.
µg/L = microgram per liter

Figures

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD: (Opt) PIC/PM: W. POPHAM APM/TM: A. RICHARDSON LYR:(Opt)ON=*;OFF=*REF*
C:\Users\EKrahmer\BIM 360\Arcadis\AUS - NEW COLEMAN HOLDINGS INC\Project Files\CROSMAN SITE- E. BLOOMFIELD NY\2019\B0041501.0001\01-DWG\SMP-FIG 1-GW ELEV MAP OCT 2019.dwg LAYOUT: 1 SAVED: 11/21/2019 12:01 PM ACADVER: 23.0S (LMS TECH) PAGESETUP: —
PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 11/21/2019 12:02 PM BY: KRAHMER, ERIC
XREFS: SMP-X-TITLE SHEET SMP-X-BASE IMAGES: PROJECTNAME: —



LEGEND:

⌖	GROUNDWATER MONITORING WELL
▚	PRODUCTION WELL
⊡	PIEZOMETER
🟨	EMERGING CONTAMINANT SAMPLE LOCATION
▬ ▬ ▬	APPROXIMATE PROPERTY BOUNDARY
(960.00)	GROUNDWATER ELEVATION (FEET AMSL)
	GROUNDWATER ELEVATION CONTOUR (FEET AMSL) (DASHED WHERE INFERRED)

NOTES:

1. BASE MAP REFERENCE:
   1.1. SURVEY BY FISHER ASSOCIATES, ROCHESTER, NY. COMPLETED NOVEMBER 27, 2018
2. PROJECT BENCHMARK AT TOP OF CASING ON MW–7, ASSUMED LABELLA DATUM ELEV.= 979.71' ABOVE MEAN SEA LEVEL.
3. MONITORING WELL ELEVATIONS SURVEYED BY FISHER ASSOCIATES IN OCTOBER 2018.
4. * MONITORING WELLS MW–1, MW–3, MW–5, MW–8, AND MW–11 WERE NOT USED IN CONTOURING.
5. AMSL = ABOVE MEAN SEA LEVEL.

CROSMAN CORPORATION SITE
EAST BLOOMFIELD, NEW YORK

EMERGING CONTAMINANT
SAMPLING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

Attachment 1

Data Usability Summary

Crosman Corporation

DATA USABILITY SUMMARY REPORT (DUSR)

East Bloomfield, New York

Semivolatiles and Per- and Polyfluoroalkyl Substances (PFAS) Analysis

SDG #R2005252

Analyses Performed By:
ALS Environmental
Rochester, New York

Report #37984
Review Level: Tier III
Project: 30005202.00017

SUMMARY

This data quality assessment summarizes the review of Sample Delivery Group (SDG) # R2005252 for samples collected in association with the Crosman SSDS Site. The review was conducted as 10 percent of the samples as Tier 4 evaluation and included review of data package completeness. Only analytical data associated with constituents of concern were reviewed for this validation. Field documentation was not included in this review. Included with this assessment are the validation annotated sample result sheets, and chain of custody. Analyses were performed on the following samples:

Sample ID	Lab ID	Matrix	Sample Collection Date	Parent Sample	Analysis				
					VOC	SVOC	PFAS	MET	MISC
MW-1A_20200618	R2005252-001	Water	2020/06/18			X	X		
MW-4_20200618	R2005252-002	Water	2020/06/18			X	X		
MW-13_20200618	R2005252-003	Water	2020/06/18			X	X		
FD-061820	R2005252-004	Water	2020/06/18	MW-4_20200618		X	X		
EB-061820	R2005252-005	Water	2020/06/18			X	X		

NOTE:

1. Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample location MW-13_20200618.

ANALYTICAL DATA PACKAGE DOCUMENTATION

The table below is the evaluation of the data package completeness.

Items Reviewed	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
1. Sample receipt condition		X		X	
2. Requested analyses and sample results		X		X	
3. Master tracking list		X		X	
4. Methods of analysis		X		X	
5. Reporting limits		X		X	
6. Sample collection date		X		X	
7. Laboratory sample received date		X		X	
8. Sample preservation verification (as applicable)		X		X	
9. Sample preparation/extraction/analysis dates		X		X	
10. Fully executed Chain-of-Custody (COC) form		X		X	
11. Narrative summary of QA or sample problems provided		X		X	
12. Data Package Completeness and Compliance		X		X	

Note:
QA - Quality Assurance

ORGANIC ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 Method 8270D by Selected Ion Monitoring (SIM). Data were reviewed in accordance with USEPA National Functional Guidelines for Organic Superfund Methods Data Review, EPA 540-R-2017-002, January 2017 (with reference to the historical USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review, OSWER 9240.1-05A-P, October 1999, as appropriate).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers

U	The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
B	The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.

- Quantitation (Q) Qualifiers

E	The compound was quantitated above the calibration range.
D	Concentration is based on a diluted sample analysis.

- Validation Qualifiers

J	The compound was positively identified; however, the associated numerical value is an estimated concentration only.
UJ	The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
JN	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
UB	Compound considered non-detect at the listed value due to associated blank contamination.
N	The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
R	The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

SEMI-VOLATILE ORGANIC COMPOUND (SVOC) ANALYSIS

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
SW-846 8270D SIM	Water	7 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C
	Soil	14 days from collection to extraction and 40 days from extraction to analysis	Cool to <6°C

All samples were analyzed within the specified holding time criteria.

Please note the cooler temperature upon receipt was 10.6^{0} Celsius; however, the samples were received on the same day as they were collected. The samples were received on ice and the cooling process had begun. Therefore, no qualification of the sample results was necessary.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

Compounds were not detected above the DL in the associated blanks; therefore, detected sample results were not associated with blank contamination.

3. Mass Spectrometer Tuning

Mass spectrometer performance was acceptable and all analyses were performed within a 12-hour tune clock.

System performance and column resolution were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The method specifies percent relative standard deviation (%RSD) and relative response factor (RRF) limits for select compounds only. A technical review of the data applies limits to all compounds with no exceptions.

All target compounds associated with the initial calibration standards must exhibit a %RSD less than the control limit (20%) or a correlation coefficient greater than 0.99 and an RRF value greater than control limit (0.05).

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit (20%) and RRF value greater than control limit (0.05).

All compounds associated with the calibrations were within the specified control limits.

5. Surrogates/System Monitoring Compounds

All samples to be analyzed for organic compounds are spiked with surrogate compounds prior to sample preparation to evaluate overall laboratory performance and efficiency of the analytical technique. SVOC analysis requires that two of the three SVOC surrogate compounds within each fraction exhibit recoveries within the laboratory-established acceptance limits.

All surrogate recoveries were within control limits.

6. Internal Standard Performance

Internal standard performance criteria ensure that the GC/MS sensitivity and response are stable during every sample analysis. The criteria requires the internal standard compounds associated with the SVOC exhibit area counts that are not greater than two times (+100%) or less than one-half (-50%) of the area counts of the associated continuing calibration standard.

All internal standard responses were within control limits.

7. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must exhibit an RPD within the laboratory-established acceptance limits.

Note: The MS/MSD recovery control limits do not apply for MS/MSD performed on sample locations where the compound concentration detected in the parent sample exceeds the MS/MSD concentration by a factor of four or greater.

The MS/MSD analysis performed on sample location MW-13_20200618 exhibited acceptable recoveries and RPD between the MS/MSD recoveries.

8. Laboratory Control Sample/Laboratory Control Sample Duplicate (LCS/LCSD) Analysis

The LCS/LCSD analysis is used to assess the precision and accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS/LCSD analysis must exhibit a percent recovery within the laboratory-established acceptance limits.

All compounds associated with the LCS/LCSD analysis exhibited recoveries within the control limits.

9. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the MRL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-4_20200618/FD-061820	1,4-Dioxane	0.040 U	0.040 U	AC

Notes:

AC Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

10. Compound Identification

Compounds are identified on the GC/MS by using the analytes relative retention time and ion spectra.

All identified compounds met the specified criteria.

11. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR SVOCs

SVOCs: SW-846 8270D SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Equipment blanks		X		X	
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate (LCSD) %R		X		X	
LCS/LCSD Precision (RPD)		X		X	
Matrix Spike (MS) %R		X		X	
Matrix Spike Duplicate (MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field/Lab Duplicate (RPD)		X		X	
Surrogate Spike Recoveries		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
System performance and column resolution		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration RRFs		X		X	
Continuing calibration %Ds		X		X	
Instrument tune and performance check		X		X	
Ion abundance criteria for each instrument used		X		X	
Internal standard		X		X	
Compound identification and quantitation					
A. Reconstructed ion chromatograms		X		X	
B. Quantitation Reports		X		X	
C. RT of sample compounds within the established RT windows		X		X	

SVOCs: SW-846 8270D SIM	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
GAS CHROMATOGRAPHY/MASS SPECTROMETRY (GC/MS)					
D. Quantitation transcriptions/calculations		X		X	
E. Reporting limits adjusted to reflect sample dilutions		X		X	

Notes:

%RSD	Relative standard deviation
%R	Percent recovery
RPD	Relative percent difference
%D	Percent difference

PFAS ANALYSIS INTRODUCTION

Analyses were performed according to United States Environmental Protection Agency (USEPA) SW-846 USEPA Method 537 (Modified). Data were reviewed in accordance ALS SOP “Per and Polyfluoralkyl Substances (PFAS) by HPLC/MS/MS,” Guidelines for Sampling and Analysis of PFAs Under NYSDEC’s Part 375 Remedial Programs, January 2020; Department of Defense (DoD) Quality Systems Manual (QSM) 5.3, DoD General Data Validation Guidelines, November 2019, DoD Final Data Validation Guidelines Module 3: PFAS, May 2020, and Final Programmatic Uniform Federal Policy-Quality Assurance Project Plan USAEC PFAS PA/SI Active Army Installations, October 2019 (Arcadis).

The data review process is an evaluation of data on a technical basis rather than a determination of contract compliance. As such, the standards against which the data are being weighed may differ from those specified in the analytical method. It is assumed that the data package represents the best efforts of the laboratory and had already been subjected to adequate and sufficient quality review prior to submission.

During the review process, laboratory qualified and unqualified data are verified against the supporting documentation. Based on this evaluation, qualifier codes may be added, deleted, or modified by the data reviewer. Results are qualified with the following codes in accordance with USEPA National Functional Guidelines:

- Concentration (C) Qualifiers
    - U The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
    - B The compound has been found in the sample as well as its associated blank, its presence in the sample may be suspect.
- Quantitation (Q) Qualifiers
    - E The compound was quantitated above the calibration range.
    - D Concentration is based on a diluted sample analysis.
- Validation Qualifiers
    - J The compound was positively identified; however, the associated numerical value is an estimated concentration only.
    - UJ The compound was not detected above the reported sample quantitation limit. However, the reported limit is approximate and may or may not represent the actual limit of quantitation.
    - JN The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification. The associated numerical value is an estimated concentration only.
    - UB Compound considered non-detect at the listed value due to associated blank contamination.
    - N The analysis indicates the presence of a compound for which there is presumptive evidence to make a tentative identification.
    - R The sample results are rejected.

Two facts should be noted by all data users. First, the "R" flag means that the associated value is unusable. In other words, due to significant quality control (QC) problems, the analysis is invalid and provides no information as to whether the compound is present or not. "R" values should not appear on data tables because they cannot be relied upon, even as a last resort. The second fact to keep in mind is that no compound concentration, even if it has passed all QC tests, is guaranteed to be accurate. Strict QC serves to increase confidence in data but any value potentially contains error.

PERFLUOROALKYL SUBSTANCES (PFAS) ANALYSES

1. Holding Times

The specified holding times for the following methods are presented in the following table.

Method	Matrix	Holding Time	Preservation
USEPA Method 537 (Modified)	Water	28 days to extraction; 28 days from extraction to analysis	Cool to <6 °C

All samples were analyzed within the specified holding time criteria.

The holding time has been changed from the original holding time documented in EPA 537 of 14 days to extraction hold time that has now been changed to 28 days. This was documented in EPA Technical Brief EPA/600/F-17/022h Updated January 2020. Utilizing the new guidance of 28 days all samples were analyzed within the specified holding time criteria.

Please note the cooler temperature upon receipt was 10.6^0 Celsius; however, the samples were received on the same day as samples were collected. The samples were received on ice and the cooling process had begun. Therefore, no qualification of the sample results was necessary.

2. Blank Contamination

Quality assurance (QA) blanks (i.e., method and rinse blanks) are prepared to identify any contamination which may have been introduced into the samples during sample preparation or field activity. Method blanks measure laboratory contamination. Rinse blanks measure contamination of samples during field operations.

A blank action level (BAL) of five times the concentration of a detected compound in an associated blank (common laboratory contaminant compounds are calculated at ten times) is calculated for QA blanks containing concentrations greater than the method detection limit (MDL). The BAL is compared to the associated sample results to determine the appropriate qualification of the sample results, if needed.

All compounds associated with the QA blanks exhibited a concentration less than the DL, with the exception of the compounds listed in the following table. Sample results associated with QA blank contamination that were greater than the BAL resulted in the removal of the laboratory qualifier (B) of data. Sample results less than the BAL associated with the following sample locations were qualified as listed in the following table.

Sample Locations	Analytes	Sample Result	Qualification
MW-1A_20200618 MW-4_20200618 MW-13_20200618	Perfluorohexanesulfonic Acid (PFHxS)	Detected sample results <LOQ and <BAL	“UB” at the LOQ

3. Mass Calibration

Mass calibration and system performance were acceptable.

4. Calibration

Satisfactory instrument calibration is established to ensure that the instrument is capable of producing acceptable quantitative data. An initial calibration demonstrates that the instrument is capable of acceptable performance at the beginning of an experimental sequence. The continuing calibration verifies that the instrument daily performance is satisfactory.

4.1 Initial Calibration

The percent relative standard deviation (%RSD) of the response factors (RF) must be less than 20%, or for linear calibration, $r^2 \geq 0.99$. Analytes must be within 70-130% of their true value for each calibration standard.

4.2 Continuing Calibration

All target compounds associated with the continuing calibration standard must exhibit a percent difference (%D) less than the control limit of 30%.

All compounds associated with the initial and continuing calibrations were within the specified control limits.

4.3 Instrument Sensitivity Check (ISC)

The ISC concentration must be at the LOQ. All target compounds associated with the ISC must exhibit a percent recovery (%R) of 70 to 130%.

All compounds associated with ISC recoveries were within control limits.

5. Isotopically Labelled Standards

5.1. Extracted Internal Standard (EIS)/Surrogate Compounds

Labeled standards must be added to all field samples and QC samples prior to extraction. Surrogate recoveries must be within DoD QSM 5.3 specified limits of 50% to150%.

All EIS recoveries were within control limits.

6. Matrix Spike/Matrix Spike Duplicate (MS/MSD) Analysis

MS/MSD data are used to assess the precision and accuracy of the analytical method. The compounds used to perform the MS/MSD analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits. The relative percent difference (RPD) between the MS/MSD recoveries must be ≤ 30%.

Sample locations associated with the MS/MSD exhibiting recoveries outside of the control limits are presented in the following table.

Sample Locations	Compound	MS Recovery	MSD Recovery
MW-13_20200618	Perfluorobutanoic Acid (PFBA)	>UL	AC
	Perfluorodecanoic Acid (PFDA)	>UL	AC
	Perfluorododecanoic Acid (PFDoA)	>UL	AC
	Perfluorononanoic Acid (PFNA)	>UL	AC

Note:

AC	Acceptable
UL	Upper control limit

The criteria used to evaluate the MS/MSD recoveries are presented in the following table. In the case of an MS/MSD deviation, the sample results are qualified as documented in the table below.

Control Limit	Sample Result	Qualification
> the upper control limit (UL)	Non-detect	No Action
	Detect	J
< the lower control limit (LL) but > 10%	Non-detect	UJ
	Detect	J
< 10%	Non-detect	R
	Detect	J
SR>4X: Parent sample concentration > four times the MS/MSD spiking solution concentration.	Detect	No Action
	Non-detect	

7. Laboratory Control Sample (LCS) Analysis

The LCS analysis is used to assess the accuracy of the analytical method independent of matrix interferences. The compounds associated with the LCS analysis must exhibit a percent recovery within the DoD QSM 5.3 acceptance limits.

All compounds associated with the LCS analysis exhibited recoveries within the control limits.

8. Field Duplicate Analysis

Field duplicate analysis is used to assess the overall precision of the field sampling procedures and analytical method. A control limit of 30% for water matrices is applied to the RPD between the parent sample and the field duplicate. In the instance when the parent and/or duplicate sample concentrations are less than or equal to 5 times the RL, a control limit of two times the MRL is applied for water matrices.

Results for duplicate samples are summarized in the following table.

Sample ID/Duplicate ID	Compound	Sample Result	Duplicate Result	RPD
MW-4_20200618/FD-061820	Perfluorobutane sulfonic acid (PFBS)	0.39 J	4.2 U	AC

Notes:

AC	Acceptable

The calculated RPDs between the parent sample and field duplicate were acceptable.

9. Compound Identification

PFC analytes are identified by using the compound's ion abundance ratios, signal-to-noise values, and relative retention times.

All identified compounds met method criteria.

10. System Performance and Overall Assessment

Overall system performance was acceptable. Other than for those deviations specifically mentioned in this review, the overall data quality is within the guidelines specified in the method.

DATA VALIDATION CHECKLIST FOR PFAS

PFAS: USEPA Modified 537	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/TANDEM MASS SPECTROMETRY (LC/MS/MS)					
Tier II Validation					
Holding times		X		X	
Reporting limits (units)		X		X	
Blanks					
A. Method blanks		X		X	
B. Field blanks		X	X		
Laboratory Control Sample (LCS) %R		X		X	
Laboratory Control Sample Duplicate(LCSD) %R					X
LCS/LCSD Precision (RPD)					X
Matrix Spike (MS) %R		X	X		
Matrix Spike Duplicate(MSD) %R		X		X	
MS/MSD Precision (RPD)		X		X	
Field Duplicate (RPD)		X		X	
Extracted Internal Standards (EIS) %R		X		X	
Dilution Factor		X		X	
Moisture Content					X
Tier III Validation					
Instrument tune and performance check		X		X	
Initial calibration %RSDs		X		X	
Continuing calibration %Ds		X		X	
Instrument sensitivity check		X		X	
Ion transitions used		X		X	
Compound identification and quantitation					
F. Reconstructed ion chromatograms		X		X	
G. Quantitation Reports		X		X	
H. RT of sample compounds within the established RT windows		X		X	
I. Transcription/calculations acceptable		X		X	
J. Reporting limits adjusted to reflect sample dilutions		X		X	

PFAS: USEPA Modified 537	Reported		Performance Acceptable		Not Required
	No	Yes	No	Yes	
LIQUID CHROMATOGRAPHY/TANDEM MASS SPECTROMETRY (LC/MS/MS)					

Notes:

%RSD	Relative standard deviation
%R	Percent recovery
RPD	Relative percent difference
%D	Percent difference

SAMPLE COMPLIANCE REPORT

SAMPLE COMPLIANCE REPORT

Sample Delivery Group (SDG)	Sampling Date	Protocol	Sample ID	Matrix	Compliancy[1]					Noncompliance
					VOC	SVOC	PFAS	MET	MISC	
R2005252	6/18/2020	SW846	MW-1A_20200618	Water	--	Yes	Yes	--	--	PFAS: Associated QAQC blanks
	6/18/2020	SW846	MW-4_20200618	Water	--	Yes	Yes	--	--	PFAS: Associated QAQC blanks
	6/18/2020	SW846	MW-13_20200618	Water	--	Yes	No	--	--	PFAS: Associated QAQC blanks; MS/MSD %R
	6/18/2020	SW846	FD-061820	Water	--	Yes	Yes	--	--	PFAS: Associated QAQC blanks
	6/18/2020	SW846	EB-061820	Water	--	Yes	Yes	--	--	

Note:

1 Samples which are compliant with no added validation qualifiers are listed as "yes". Samples which are non-compliant or which have added qualifiers are listed as "no". A "no" designation does not necessarily indicate that the data have been rejected or are otherwise unusable.

VALIDATION PERFORMED BY: Jeffrey L. Davin

SIGNATURE:

DATE: August 20, 2020

PEER REVIEW: Dennis Capria

DATE: August 31, 2020

CHAIN OF CUSTODY

CORRECTED SAMPLE ANALYSIS DATA SHEETS

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

001380

1565 Jefferson Road, Building 300, Suite 360 • Rochester, NY 14623 | +1 585 288 5380 +1 585 288 8475 (fax) PAGE 1 OF 1

Project Name: Crosman - East Bloomfield
Project Number: 30005202
Project Manager: Aaron Richardson
Report CC:
Company/Address: 100 Chestnut St. Suite 1020 Rochester, NY 14604
Phone #: 585-202-4393
Email: aaron.richardson@arcadis.com
Sampler's Signature: Si Tw
Sampler's Printed Name: Sierra Tweedie

ANALYSIS REQUESTED (Include Method Number and Container Preservative)

CLIENT SAMPLE ID	FOR OFFICE USE ONLY LAB ID	SAMPLING DATE	SAMPLING TIME	MATRIX	NUMBER OF CONTAINERS	GC/MS VOAs ○ 8260 ○ 624 ○ CLP	GC/MS SVOAs ○ 8270 ○ 625	GC VOAs ○ 8021 ○ 601/602	PESTICIDES ○ 8081 ○ 608	PCBs ○ 8082 ○ 608	METALS, TOTAL (List in comments below)	METALS, DISSOLVED (List in comments below)	PFAS	1,4-Dioxane						REMARKS/ ALTERNATE DESCRIPTION
PRESERVATIVE													0	0						
MW-1A		6/18/20	1045	GW	4								X	X						
MW-4		6/18/20	1515	GW	4								X	X						
MW-13		6/18/20	1320	GW	12								X	X						MS/MSD collected here
FD-061820		6/18/20	—	GW	4								X	X						
EB-061820		6/18/20	0830	GW	4								X	X						

Preservative Key
0. NONE
1. HCL
2. HNO_3
3. H_2SO_4
4. NaOH
5. Zn. Acetate
6. MeOH
7. $NaHSO_4$
8. Other ______

SPECIAL INSTRUCTIONS/COMMENTS
Metals

See QAPP ☐

STATE WHERE SAMPLES WERE COLLECTED

TURNAROUND REQUIREMENTS
____ RUSH (SURCHARGES APPLY)
____ 1 day ____ 2 day ____ 3 day
____ 4 day ____ 5 day
✓ Standard (10 business days-No Surcharge)

REQUESTED REPORT DATE
______

REPORT REQUIREMENTS
____ I. Results Only
____ II. Results + QC Summaries (LCS, DUP, MS/MSD as required)
____ III. Results + QC and Calibration Summaries
X IV. Data Validation Report with Raw Data

Edata ✓ Yes ____ No

INVOICE INFORMATION
PO #
BILL TO:

	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY	RELINQUISHED BY	RECEIVED BY
Signature	Si Tw					
Printed Name	Sierra Tweedie	Daniel Ward				
Firm	Arcadis	ALS				
Date/Time	6/18/20 1440	6/18/2020/ 1445				

Distribution: White - Lab Copy; Yellow - Return to Originator

R2005252 5
ARCADIS of New York, Inc.
Crosman - East Bloomfield

REPORT QUALIFIERS AND DEFINITIONS

U	Analyte was analyzed for but not detected. The sample quantitation limit has been corrected for dilution and for percent moisture, unless otherwise noted in the case narrative.
J	Estimated value due to either being a Tentatively Identified Compound (TIC) or that the concentration is between the MRL and the MDL. Concentrations are not verified within the linear range of the calibration. For DoD: concentration >40% difference between two GC columns (pesticides/Arclors).
B	Analyte was also detected in the associated method blank at a concentration that may have contributed to the sample result.
E	Inorganics- Concentration is estimated due to the serial dilution was outside control limits.
E	Organics- Concentration has exceeded the calibration range for that specific analysis.
D	Concentration is a result of a dilution, typically a secondary analysis of the sample due to exceeding the calibration range or that a surrogate has been diluted out of the sample and cannot be assessed.
*	Indicates that a quality control parameter has exceeded laboratory limits. Under the ñNotesò column of the Form I, this qualifier denotes analysis was performed out of Holding Time.
H	Analysis was performed out of hold time for tests that have an ñimmediateò hold time criteria.
#	Spike was diluted out.
+	Correlation coefficient for MSA is <0.995.
N	Inorganics- Matrix spike recovery was outside laboratory limits.
N	Organics- Presumptive evidence of a compound (reported as a TIC) based on the MS library search.
S	Concentration has been determined using Method of Standard Additions (MSA).
W	Post-Digestion Spike recovery is outside control limits and the sample absorbance is <50% of the spike absorbance.
P	Concentration >40% difference between the two GC columns.
C	Confirmed by GC/MS
Q	DoD reports: indicates a pesticide/Aroclor is not confirmed (Ó100% Difference between two GC columns).
X	See Case Narrative for discussion.
MRL LOQ	Method Reporting Limit. Also known as: Limit of Quantitation (LOQ) The lowest concentration at which the method analyte may be reliably quantified under the method conditions.
MDL	Method Detection Limit. A statistical value derived from a study designed to provide the lowest concentration that will be detected 99% of the time. Values between the MDL and MRL are estimated (see J qualifier).
LOD	Limit of Detection. A value at or above the MDL which has been verified to be detectable.
ND	Non-Detect. Analyte was not detected at the concentration listed. Same as U qualifier.

Rochester Lab ID # for State Certifications[1]

Connecticut ID # PH0556	Maine ID #NY0032	Pennsylvania ID# 68-786
Delaware Approved	New Hampshire ID # 2941	Rhode Island ID # 158
DoD ELAP #65817	New York ID # 10145	Virginia #460167
Florida ID # E87674	North Carolina #676	

[1] Analyses were performed according to our laboratoryĝs NELAP-approved quality assurance program and any applicable state or agency requirements. The test results meet requirements of the current NELAP/TNI standards or state or agency requirements, where applicable, except as noted in the case narrative. Since not all analyte/method/matrix combinations are offered for state/NELAC accreditation, this report may contain results which are not accredited. For a specific list of accredited analytes, contact the laboratory or go to https://www.alsglobal.com/locations/americas/north-america/usa/new-york/rochester-environmental

Client:	ALS Environmental
Project:	R2005252
WorkOrder:	**20061898**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
**	Estimated Value
a	Analyte is non-accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
Hr	BOD/CBOD - Sample was reset outside Hold Time, value should be considered estimated.
J	Analyte is present at an estimated concentration between the MDL and Report Limit
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL
X	Analyte was detected in the Method Blank between the MDL and Reporting Limit, sample results may exhibit background or reagent contamination at the observed level.

Acronym	Description
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
LOD	Limit of Detection (see MDL)
LOQ	Limit of Quantitation (see PQL)
MBLK	Method Blank
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
TDL	Target Detection Limit
TNTC	Too Numerous To Count
A	APHA Standard Methods
D	ASTM
E	EPA
SW	SW-846 Update III

Units Reported	Description
ng/L	Nanograms per Liter

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ARCADIS U.S., Inc. (formerly ARCADIS of New York)	**Service Request:**	R2005252
Project:	Crosman - East Bloomfield/30005202	**Date Collected:**	06/18/20 10:45
Sample Matrix:	Water	**Date Received:**	06/18/20 16:45
Sample Name:	MW-1A	**Units:**	ug/L
Lab Code:	R2005252-001	**Basis:**	NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.040	0.027	1	06/23/20 17:05	6/22/20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	86	64 - 124	06/23/20 17:05	

Analytical Report

Client:	ARCADIS U.S., Inc. (formerly ARCADIS of New York)	**Service Request:**	R2005252
Project:	Crosman - East Bloomfield/30005202	**Date Collected:**	06/18/20 15:15
Sample Matrix:	Water	**Date Received:**	06/18/20 16:45
Sample Name:	MW-4	**Units:**	ug/L
Lab Code:	R2005252-002	**Basis:**	NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.040	0.027	1	06/23/20 19:07	6/23/20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	81	64 - 124	06/23/20 19:07	

Analytical Report

Client:	ARCADIS U.S., Inc. (formerly ARCADIS of New York)	**Service Request:**	R2005252
Project:	Crosman - East Bloomfield/30005202	**Date Collected:**	06/18/20 13:20
Sample Matrix:	Water	**Date Received:**	06/18/20 16:45
Sample Name:	MW-13	**Units:**	ug/L
Lab Code:	R2005252-003	**Basis:**	NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.040	0.027	1	06/23/20 19:25	6/23/20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	81	64 - 124	06/23/20 19:25	

Analytical Report

Client:	ARCADIS U.S., Inc. (formerly ARCADIS of New York)	**Service Request:**	R2005252
Project:	Crosman - East Bloomfield/30005202	**Date Collected:**	06/18/20
Sample Matrix:	Water	**Date Received:**	06/18/20 16:45
Sample Name:	FD-061820	**Units:**	ug/L
Lab Code:	R2005252-004	**Basis:**	NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.040	0.027	1	06/23/20 20:18	6/23/20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	94	64 - 124	06/23/20 20:18	

Analytical Report

Client:	ARCADIS U.S., Inc. (formerly ARCADIS of New York)	**Service Request:**	R2005252
Project:	Crosman - East Bloomfield/30005202	**Date Collected:**	06/18/20 08:30
Sample Matrix:	Water	**Date Received:**	06/18/20 16:45
Sample Name:	EB-061820	**Units:**	ug/L
Lab Code:	R2005252-005	**Basis:**	NA

1,4-Dioxane by GC/MS

Analysis Method: 8270D SIM
Prep Method: EPA 3535A

Analyte Name	Result	MRL	MDL	Dil.	Date Analyzed	Date Extracted	Q
1,4-Dioxane	ND U	0.040	0.027	1	06/23/20 20:35	6/23/20	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
1,4-Dioxane-d8	91	64 - 124	06/23/20 20:35	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 10:45
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	MW-1A	**Units:**	ng/L
Lab Code:	20061898-01	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorobutanesulfonic Acid (PFBS)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorobutanoic Acid (PFBA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorodecanesulfonic Acid (PFDS)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorodecanoic Acid (PFDA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorododecanoic Acid (PFDoA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluoroheptanesulfonic Acid (PFHpS)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluoroheptanoic Acid (PFHpA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorohexanesulfonic Acid (PFHxS)	4.1 ~~**0.40 J**~~ UB	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorohexanoic Acid (PFHxA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorononanoic Acid (PFNA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorooctanesulfonamide (PFOSA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorooctanesulfonic Acid (PFOS)	**1.5 J**	1.7	1	06/30/20 19:04	06/29/20 19:30	
Perfluorooctanoic Acid (PFOA)	1.7 U	1.7	1	06/30/20 19:04	06/29/20 19:30	
Perfluoropentanoic Acid (PFPeA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorotetradecanoic Acid (PFTeA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluorotridecanoic Acid (PFTriA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
Perfluoroundecanoic Acid (PFUnA)	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	
N-Ethylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 10:45
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	MW-1A	**Units:**	ng/L
Lab Code:	20061898-01	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
N-Methylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	06/30/20 19:04	06/29/20 19:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C2-FtS 6:2	78.6	50 - 150	06/30/20 19:04	
13C2-FtS 8:2	76.8	50 - 150	06/30/20 19:04	
13C2-PFDA	60.5	50 - 150	06/30/20 19:04	
13C2-PFDoA	56.6	50 - 150	06/30/20 19:04	
13C2-PFHxA	65.0	50 - 150	06/30/20 19:04	
13C2-PFHxDA	72.0	50 - 150	06/30/20 19:04	
13C2-PFTeA	64.6	50 - 150	06/30/20 19:04	
13C2-PFUnA	65.3	50 - 150	06/30/20 19:04	
13C3-HFPO-DA	68.2	50 - 150	06/30/20 19:04	
13C3-PFBS	87.2	50 - 150	06/30/20 19:04	
13C4-PFBA	61.3	50 - 150	06/30/20 19:04	
13C4-PFHpA	83.0	50 - 150	06/30/20 19:04	
13C4-PFOA	67.8	50 - 150	06/30/20 19:04	
13C4-PFOS	57.4	50 - 150	06/30/20 19:04	
13C5-PFNA	63.4	50 - 150	06/30/20 19:04	
13C5-PFPeA	74.6	50 - 150	06/30/20 19:04	
13C8-FOSA	56.2	50 - 150	06/30/20 19:04	
18O2-PFHxS	61.8	50 - 150	06/30/20 19:04	
d5-N-EtFOSAA	63.6	50 - 150	06/30/20 19:04	
d3-N-MeFOSAA	66.3	50 - 150	06/30/20 19:04	

ALS Group USA, Corp.
dba ALS Environmental

Analytical Report

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 15:15
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	MW-4	**Units:**	ng/L
Lab Code:	20061898-02	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorobutanesulfonic Acid (PFBS)	**0.39 J**	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorobutanoic Acid (PFBA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorodecanesulfonic Acid (PFDS)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorodecanoic Acid (PFDA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorododecanoic Acid (PFDoA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluoroheptanesulfonic Acid (PFHpS)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluoroheptanoic Acid (PFHpA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorohexanesulfonic Acid (PFHxS)	4.1 ~~**0.66 J**~~ UB	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorohexanoic Acid (PFHxA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorononanoic Acid (PFNA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorooctanesulfonamide (PFOSA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorooctanesulfonic Acid (PFOS)	1.6 U	1.6	1	07/06/20 15:11	06/29/20 19:30	
Perfluorooctanoic Acid (PFOA)	1.6 U	1.6	1	07/06/20 15:11	06/29/20 19:30	
Perfluoropentanoic Acid (PFPeA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorotetradecanoic Acid (PFTeA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluorotridecanoic Acid (PFTriA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
Perfluoroundecanoic Acid (PFUnA)	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	
N-Ethylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 15:15
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	MW-4	**Units:**	ng/L
Lab Code:	20061898-02	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
N-Methylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	07/06/20 15:11	06/29/20 19:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C2-FtS 6:2	80.0	50 - 150	07/06/20 15:11	
13C2-FtS 8:2	76.4	50 - 150	07/06/20 15:11	
13C2-PFDA	58.8	50 - 150	07/06/20 15:11	
13C2-PFDoA	54.5	50 - 150	07/06/20 15:11	
13C2-PFHxA	65.6	50 - 150	07/06/20 15:11	
13C2-PFHxDA	62.8	50 - 150	07/06/20 15:11	
13C2-PFTeA	61.9	50 - 150	07/06/20 15:11	
13C2-PFUnA	66.7	50 - 150	07/06/20 15:11	
13C3-HFPO-DA	70.4	50 - 150	07/06/20 15:11	
13C3-PFBS	86.6	50 - 150	07/06/20 15:11	
13C4-PFBA	60.7	50 - 150	07/06/20 15:11	
13C4-PFHpA	82.9	50 - 150	07/06/20 15:11	
13C4-PFOA	65.5	50 - 150	07/06/20 15:11	
13C4-PFOS	56.0	50 - 150	07/06/20 15:11	
13C5-PFNA	63.3	50 - 150	07/06/20 15:11	
13C5-PFPeA	74.7	50 - 150	07/06/20 15:11	
13C8-FOSA	62.9	50 - 150	07/06/20 15:11	
18O2-PFHxS	59.6	50 - 150	07/06/20 15:11	
d5-N-EtFOSAA	72.3	50 - 150	07/06/20 15:11	
d3-N-MeFOSAA	74.0	50 - 150	07/06/20 15:11	

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Analytical Report

Client: ALS - ROCHESTER
Project: R2005252
Sample Matrix: Water

Service Request: 20061898
Date Collected: 06/18/20 13:20
Date Received: 06/23/20 10:00

Sample Name: MW-13
Lab Code: 20061898-03

Units: ng/L
Basis: Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorobutanesulfonic Acid (PFBS)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorobutanoic Acid (PFBA)	**16** J	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorodecanesulfonic Acid (PFDS)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorodecanoic Acid (PFDA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorododecanoic Acid (PFDoA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluoroheptanesulfonic Acid (PFHpS)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluoroheptanoic Acid (PFHpA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorohexanesulfonic Acid (PFHxS)	4.1 ~~0.52 J~~ UB	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorohexanoic Acid (PFHxA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorononanoic Acid (PFNA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorooctanesulfonamide (PFOSA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorooctanesulfonic Acid (PFOS)	1.6 U	1.6	1	06/30/20 18:01	06/29/20 19:30	
Perfluorooctanoic Acid (PFOA)	1.6 U	1.6	1	06/30/20 18:01	06/29/20 19:30	
Perfluoropentanoic Acid (PFPeA)	**13**	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorotetradecanoic Acid (PFTeA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluorotridecanoic Acid (PFTriA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
Perfluoroundecanoic Acid (PFUnA)	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	
N-Ethylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	

Analytical Report

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 13:20
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	MW-13	**Units:**	ng/L
Lab Code:	20061898-03	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
N-Methylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	06/30/20 18:01	06/29/20 19:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C2-FtS 6:2	80.9	50 - 150	06/30/20 18:01	
13C2-FtS 8:2	71.9	50 - 150	06/30/20 18:01	
13C2-PFDA	59.0	50 - 150	06/30/20 18:01	
13C2-PFDoA	57.7	50 - 150	06/30/20 18:01	
13C2-PFHxA	70.1	50 - 150	06/30/20 18:01	
13C2-PFHxDA	59.7	50 - 150	06/30/20 18:01	
13C2-PFTeA	62.6	50 - 150	06/30/20 18:01	
13C2-PFUnA	61.5	50 - 150	06/30/20 18:01	
13C3-HFPO-DA	69.1	50 - 150	06/30/20 18:01	
13C3-PFBS	88.9	50 - 150	06/30/20 18:01	
13C4-PFBA	64.9	50 - 150	06/30/20 18:01	
13C4-PFHpA	80.8	50 - 150	06/30/20 18:01	
13C4-PFOA	73.0	50 - 150	06/30/20 18:01	
13C4-PFOS	59.2	50 - 150	06/30/20 18:01	
13C5-PFNA	66.2	50 - 150	06/30/20 18:01	
13C5-PFPeA	75.4	50 - 150	06/30/20 18:01	
13C8-FOSA	56.8	50 - 150	06/30/20 18:01	
18O2-PFHxS	62.6	50 - 150	06/30/20 18:01	
d5-N-EtFOSAA	61.0	50 - 150	06/30/20 18:01	
d3-N-MeFOSAA	64.8	50 - 150	06/30/20 18:01	

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Analytical Report

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 00:00
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	FD-061820	**Units:**	ng/L
Lab Code:	20061898-04	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorobutanesulfonic Acid (PFBS)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorobutanoic Acid (PFBA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorodecanesulfonic Acid (PFDS)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorodecanoic Acid (PFDA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorododecanoic Acid (PFDoA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluoroheptanesulfonic Acid (PFHpS)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluoroheptanoic Acid (PFHpA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorohexanesulfonic Acid (PFHxS)	4.2 ~~0.48 J~~ UB	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorohexanoic Acid (PFHxA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorononanoic Acid (PFNA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorooctanesulfonamide (PFOSA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorooctanesulfonic Acid (PFOS)	1.7 U	1.7	1	07/06/20 15:21	06/29/20 19:30	
Perfluorooctanoic Acid (PFOA)	1.7 U	1.7	1	07/06/20 15:21	06/29/20 19:30	
Perfluoropentanoic Acid (PFPeA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorotetradecanoic Acid (PFTeA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluorotridecanoic Acid (PFTriA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
Perfluoroundecanoic Acid (PFUnA)	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	
N-Ethylperfluorooctanesulfonamidoacetic Acid	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 00:00
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	FD-061820	**Units:**	ng/L
Lab Code:	20061898-04	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
N-Methylperfluorooctanesulfonamidoacetic Acid	4.2 U	4.2	1	07/06/20 15:21	06/29/20 19:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C2-FtS 6:2	78.4	50 - 150	07/06/20 15:21	
13C2-FtS 8:2	80.6	50 - 150	07/06/20 15:21	
13C2-PFDA	66.5	50 - 150	07/06/20 15:21	
13C2-PFDoA	64.2	50 - 150	07/06/20 15:21	
13C2-PFHxA	71.7	50 - 150	07/06/20 15:21	
13C2-PFHxDA	62.3	50 - 150	07/06/20 15:21	
13C2-PFTeA	50.4	50 - 150	07/06/20 15:21	
13C2-PFUnA	69.9	50 - 150	07/06/20 15:21	
13C3-HFPO-DA	69.3	50 - 150	07/06/20 15:21	
13C3-PFBS	83.4	50 - 150	07/06/20 15:21	
13C4-PFBA	65.3	50 - 150	07/06/20 15:21	
13C4-PFHpA	77.8	50 - 150	07/06/20 15:21	
13C4-PFOA	70.7	50 - 150	07/06/20 15:21	
13C4-PFOS	62.5	50 - 150	07/06/20 15:21	
13C5-PFNA	69.3	50 - 150	07/06/20 15:21	
13C5-PFPeA	72.3	50 - 150	07/06/20 15:21	
13C8-FOSA	63.7	50 - 150	07/06/20 15:21	
18O2-PFHxS	64.5	50 - 150	07/06/20 15:21	
d5-N-EtFOSAA	73.1	50 - 150	07/06/20 15:21	
d3-N-MeFOSAA	75.3	50 - 150	07/06/20 15:21	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 08:30
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	EB-061820	**Units:**	ng/L
Lab Code:	20061898-05	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result		MRL	Dil.	Date Analyzed	Date Extracted	Q
Fluorotelomer Sulphonic Acid 6:2 (FtS 6:2)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Fluorotelomer Sulphonic Acid 8:2 (FtS 8:2)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorobutanesulfonic Acid (PFBS)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorobutanoic Acid (PFBA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorodecanesulfonic Acid (PFDS)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorodecanoic Acid (PFDA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorododecanoic Acid (PFDoA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluoroheptanesulfonic Acid (PFHpS)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluoroheptanoic Acid (PFHpA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorohexanesulfonic Acid (PFHxS)	**0.34**	**J**	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorohexanoic Acid (PFHxA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorononanoic Acid (PFNA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorooctanesulfonamide (PFOSA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorooctanesulfonic Acid (PFOS)	1.6	U	1.6	1	07/06/20 15:32	06/29/20 19:30	
Perfluorooctanoic Acid (PFOA)	1.6	U	1.6	1	07/06/20 15:32	06/29/20 19:30	
Perfluoropentanoic Acid (PFPeA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorotetradecanoic Acid (PFTeA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluorotridecanoic Acid (PFTriA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
Perfluoroundecanoic Acid (PFUnA)	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	
N-Ethylperfluorooctanesulfonamidoacetic Acid	4.1	U	4.1	1	07/06/20 15:32	06/29/20 19:30	

Client:	ALS - ROCHESTER	**Service Request:**	20061898
Project:	R2005252	**Date Collected:**	06/18/20 08:30
Sample Matrix:	Water	**Date Received:**	06/23/20 10:00
Sample Name:	EB-061820	**Units:**	ng/L
Lab Code:	20061898-05	**Basis:**	Wet

Organic LC

Analysis Method: E537 Mod
Prep Method: E537 Mod

Analyte Name	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
N-Methylperfluorooctanesulfonamidoacetic Acid	4.1 U	4.1	1	07/06/20 15:32	06/29/20 19:30	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
13C2-FtS 6:2	72.8	50 - 150	07/06/20 15:32	
13C2-FtS 8:2	84.6	50 - 150	07/06/20 15:32	
13C2-PFDA	66.5	50 - 150	07/06/20 15:32	
13C2-PFDoA	62.8	50 - 150	07/06/20 15:32	
13C2-PFHxA	67.8	50 - 150	07/06/20 15:32	
13C2-PFHxDA	68.3	50 - 150	07/06/20 15:32	
13C2-PFTeA	59.3	50 - 150	07/06/20 15:32	
13C2-PFUnA	78.0	50 - 150	07/06/20 15:32	
13C3-HFPO-DA	72.0	50 - 150	07/06/20 15:32	
13C3-PFBS	86.1	50 - 150	07/06/20 15:32	
13C4-PFBA	62.4	50 - 150	07/06/20 15:32	
13C4-PFHpA	80.0	50 - 150	07/06/20 15:32	
13C4-PFOA	69.4	50 - 150	07/06/20 15:32	
13C4-PFOS	62.3	50 - 150	07/06/20 15:32	
13C5-PFNA	68.0	50 - 150	07/06/20 15:32	
13C5-PFPeA	72.7	50 - 150	07/06/20 15:32	
13C8-FOSA	59.1	50 - 150	07/06/20 15:32	
18O2-PFHxS	62.4	50 - 150	07/06/20 15:32	
d5-N-EtFOSAA	75.0	50 - 150	07/06/20 15:32	
d3-N-MeFOSAA	73.3	50 - 150	07/06/20 15:32	